Relays, Contactors, Timers, Transformers and Circuit Breakers for General Purpose Industrial & Commercial Applications

This technical databook includes specification information for a broad selection of components. Electromechanical relays, contactors, timers, solid state relays, input/output modules, sensors, protective relays, magnetic circuit breakers, thermal circuit breakers and transformers are all described in the databook.

Locating a product in this databook
Immediately following this introductory page is an alphanumeric index of the product series in this databook. This is helpful if you already know the series designator of the product for which you are seeking specifications. The index is followed by a selector guide that provides a brief overview of the various series in our extensive product line. This is intended to help you quickly determine which product series may be best suited for a given application. The selector guide also lists the page number in the databook where much more detailed specifications for each series may be found.

Need more help selecting a product series?
The body of this databook is divided into 14 major product categories. Each section begins with an alphanumeric index of the product series contained therein. Additionally, a "question tree" is included on the first or second page of several sections to help in narrowing your search to product series that may be appropropriate for a given application. While by no means definitive, these tools can prove to be an effective starting point.

Finding out more details
If you need additional specification information , please contact Tyco Electronics Technical Support (see inside back cover for Technical Support contact information.) Information about our products also can be found on our website at **http://relays.tycoelectronics.com**. Our website is updated more frequently than the printed technical databook, so you may find information there which is more current than our databook.

Note regarding product availability
This databook lists a broad range of products which are available with varying leadtimes. Some are normally maintained in stock for immediate delivery. Many other products are available within what would be considered “normal” leadtimes for our industry. However, there may be extended leadtimes for some non-stock items. Additionally, there are minimum quantity requirements. You should consult with your Tyco Electronics authorized distributor or sales engineer regarding availability and minimum order requirements before specifying a particular non-stock model.

Changes in specifications/availability
We constantly endeavor to enhance the quality of our products and update our product offering; therefore, specifications and product availability are subject to change without notice.

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The dimensions in this databook are for reference purposes only and are subject to change without notice. Dimensions are in inches over (millimeters), unless otherwise specified. Specifications are subject to change without notice. Consult Tyco Electronics at 1-800-522-6752 for latest dimensions and design specifications, or use the global contact list shown on inside back cover.

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Some product series are not described in the databook, as they may not represent the most effective solution for many new design requirements. However, many of the non-cataloged products are still available for sale. Contact a Tyco Electronics Technical Specialist (see inside back cover) for more details about AGASTAT, AXICOM, CII, HARTMAN, KILOVAC, OEG, P&B, PRODUCTS UNLIMITED, SCHRACK or TYCO relay or circuit breaker products that you cannot find in this databook.

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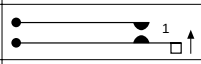
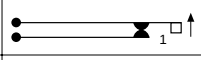
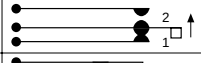
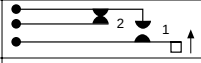
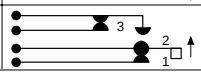
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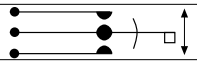
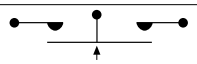
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Contact Designators and Materials / Agency Approvals

Contact Forms

Design	Sequence	Symbol	Form
SPST-NO	Make (1)		**A**
SPST-NC	Break (1)		**B**
SPDT	Break(1) - Make (2)		**C**
SPDT	Make (1) before Break (2)		**D**
SPDT (B-M-B)	Break (1) - Make (2) before Break (3)		**E**

Design	Sequence	Symbol	Form
SPDT-NO	Center OFF		**K**
SPST-NO (DM)	Double Make (1)		**X**
SPST (DB)	Double Break (1)		**Y**
SPDT-NC-NO (DB-DM)	Double Break (1) Double Make (2)		**Z**
SPST-NO (DM)	Double Make		**U**

P&B Numbers for Contact Arrangements

To simplify the listing of contact arrangements, P&B *standard* relays carry code numbers to designate the various contact forms listed in the following table. These numerals are used as abbreviations of the switching arrangements; for *example:* a PM17 relay has a 4PDT (four-pole-double-throw) contact arrangement.

Contact Code and NARM Designator

1—1A SPST-NO
2—1B SPST-NC
3—1X SPST-NO-DM
4—1Y SPST-NC-DB
5—1C SPDT
6—1Z SPDT-NC-NO (DM-DB)
7—2A DPST-NO
8—2B DPST-NC
9—2X DPST-NO-DM
10—2Y DPST-NC-DB
11—2C DPDT
12—3A 3PST-NO
13—3B 3PST-NC
14—3C 3PDT
15—4A 4PST-NO
16—4B 4PST-NC
17—4C 4PDT
18—5A 5PST-NO
19—5B 5PST-NC
20—5C 5PDT
21—6A 6PST-NO
22—6B 6PST-NC
23—6C 6PDT
24—7A 7PST-NO
25—7B 7PST-NC
26—7C 7PDT
27—8A 8PST-NO
28—8B 8PST-NC
29—8C 8PDT
30—9A 9PST-NO
31—9B 9PST-NC
32—9C 9PDT
33—10A 10PST-NO
34—10B 10PST-NC
35—10C 10PDT
36—11A 11PST-NO
37—11B 11PST-NC
38—11C 11PDT
39—12A 12PST-NO
40—12B 12PST-NC
41—12C 12PDT
42—3X 3PST-NO-DM
43—2X + 1Y DPST-NO-DM + SPST-NC-DB
44—2X DPST-NO-DM
45—1X + 2Y SPST-NO-DM + DPST-NC-DB
46—3Y 3PST-NC-DB
47—4X 4PST-NO-DM
48—2X + 2Y 2PST-NO-DM + 2PST-NC-DB
49—4Y 4PST-NC-DB
50—1A + 1B SPST-NO + SPST-NC
51—1A + 1C SPST-NO + SPDT
52—1B + 1C SPST-NC + SPDT
58—1A + 2B SPST-NO + DPST-NC
59—2A + 1B DPST-NO + SPST-NC
60—2A + 2B DPST-NO + DPST-NC
61—2A + 1C DPST-NO + SPDT
62—1A + 2C SPST-NO + DPDT
63—1B + 2C SPST-NC + DPDT
64—2B + 1C DPST-NC + SPDT
65—1A + 1B + 1C SPST-NO + SPST-NC + SPDT
67—3A + 1B 3PST-NO + SPST-NC
68—3A + 1C 3PST-NO + SPDT
69—3B + 1C 3PST-NC + SPDT
70—3A + 3B 3PST-NO + 3PST-NC
71—2A + 2C DPST-NO + DPDT
72—2B + 2C DPST-NC + DPDT
73—1A + 3C SPST-NO + 3PDT
74—3A + 2C 3PST-NO + DPDT
75—1B + 3C SPST-NC + 3PDT
76—1A + 3B SPST-NO + 3PST-NC
77—1A + 1B + 2C SPST-NO + SPST-NC + DPDT
78—1A + 2B + 1C SPST-NO + DPST-NC + SPDT
79—2A + 1B + 1C DPST-NO + SPST-NC + SPDT
80—2A + 6B DPST-NO + 6PST-NC
81—4A + 4B 4PST-NO + 4PST-NC
82—2A + 4C DPST-NO + 4PDT
83—4A + 1B 4PST-NO + SPST-NC
84—4A + 2B 4PST-NO-DPST-NC
85—3A + 2B 3PST-NO-DPST-NC

SP—Single Pole **3P—Three Pole** **SB—Single Break** **ST—Single Throw** **DM—Double Make** **NC—Normally Closed**
DP—Double Pole **4P—Four Pole** **DB—Double Break** **DT—Double Throw** **NO—Normally Open**

CO stands for changeover, a term sometimes used for a double throw configuration.

Common Contact Material Abbreviations Used in this Databook

Ag is silver.
AgCdO is silver-cadmium oxide.
AgNi 0.15 is fine grain silver.
AgNi or AgNi 20 is silver-nickel alloy.
AgPd is silver-palladium alloy.
AgSn is silver-tin alloy.
AgSnO is silver-tin oxide.
Au is gold.
AuAgNi is gold-silver-nickel alloy.
AuPtAg is gold-platinum-silver alloy.
AuRh is gold-rhodium alloy.
Hg is mercury.
PdCu is palladium-copper alloy.
PdNi is palladium-nickel alloy.
Rh is rhodium.
Ru is ruthenium.
W is tungsten.

Logos of Various Approval Agencies/Laboratories Used in this Databook

- UL Recognized for USA.
- UL Recognized for Canada.
- UL Recognized for USA & Canada.
- UL Listed.
- CSA Certification.
- CSA Component Acceptance.
- VDE Approved
- VDE Component Mark
- TUV Approved.
- Demko Approved.
- CECC Approved.
- SEV Approved.
- Factory Mutual Approved.
- Kema-Keur Certification.

Circuit Breakers

	 P&B	 P&B	 P&B	 P&B	 P&B
Series	**W57**	**W54**	**W58**	**W28**	**W51**
Type	Thermal	Thermal	Thermal	Thermal	Thermal
Features	• Compact design • Quick connect terminals • Button extends for visible trip indication • Push-to-reset operation • Optional protective boot	• Quick connect or screw terminals • Button extends for visible trip indication • Push-to-reset operation • Optional protective boot	• Quick connect or screw terminals • Button extends for visible trip indication • Push-to-reset operation	• Replaces slow blow glass cartridge fuse and holder • Snap-in mounting • Button provides visible trip indication • Push-to-reset or switchable version	• Rocker actuated breaker/ switch • Convenient, snap-in mounting • Optional indicator light • Quick connect terminals • Push-to-reset operation
Approximate Size and Weight (per pole)	.575" x 1.15" x .889"d (14.6 x 29.2 x 22.6d) .5 oz. (14.3g)	.575" x 1.378" x 1.22"d (14.6 x 35.0 x 31.0d) .9 oz. (25g)	.66" x 1.38" x 1.38"d (16.8 x 34.9 x 34.9d) 1.5 oz. (43g)	.54" x .63" x 1.54"d (13.7 x 15.9 x 39.0d) .35 oz. (10g)	.598" x 1.311" x 1.232"d (15.2 x 33.3 x 31.3d) .37 oz. (10.5g)
No. of Poles	1	1	1	1	1
Circuit Function	Series Trip	Series Trip	Series Trip	Series Trip	Series Trip
Current Rating	4-20 Amps	5-40 Amps	1-30 Amps	0.5-20 Amps	5-20 Amps
Max. Operating Voltage	50VDC 250VAC	50VDC 250VAC	50VDC 250VAC	32VDC 250VAC	50VDC 125 or 250VAC (model dependent)
Trip Time at 200% of Rating	4 to 40 Sec.	5 to 30 Sec.	1-4A Models – 10 to 45 Sec. 5-30A Models – 6 to 30 Sec.	0.5-2A Models – 4.5 to 28 Sec. 3-15A Models – 2.2 to 15 Sec.	4 to 40 Sec.
Interrupt Capacity	1,000A	1,000A	2,000A @ 50VDC 1,000A @ 250VAC	1,000A @ 32VDC or 250VAC	1,000A
Terminal Options	.250" (6.35) Quick Connect	.250" (6.35) Quick Connect, #8-32 Screw	.250" (6.35) Quick Connect, #6-32 Screw	.250" (6.35) Quick Connect (Do not solder)	.250" (6.35) Quick Connect or PC terminals
Mounting Options	3/8"–24 Threaded Bushing, M11–1.0 Threaded Bushing or M12–1.0 Threaded Bushing	3/8"–24 Threaded Bushing, M11–1.0 Threaded Bushing or M12–1.0 Threaded Bushing	7/16"–28 Threaded Bushing, 15/32"–32 Threaded Bushing	Snaps into 5/8" (15.9) panel cutout from the front	Snaps into .531 x 1.122" (13.5 x 28.5) panel cutout from the front
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Specifications and/or agency recognitions do not necessarily apply to all models within a particular series. When multiple ratings are listed, no individual rating may be exceeded by the combination of others.

Circuit Breakers

	 P&B	 P&B	 P&B	 P&B	 P&B
Series	**W33**	**W23**	**W31**	**W6**	**W9**
Type	Thermal	Thermal	Thermal	Magnetic	Magnetic
Features	• Rocker actuator in various colors • Convenient, snap-in mounting • Optional lighted rockers • Models with aux. switch available • Designed to meet IEC and VDE requirements	• Push/pull actuation for manual on/off and reset	• Toggle actuation for manual on/off and reset	• Compact design • Variety of time delay options • Toggle actuation for manual on/off and reset • Optional aux. switch	• Variety of time delay options • Toggle actuation for manual on/off and reset • Optional aux. switch
Approximate Size and Weight (per pole)	.98" x 1.89" x 1.72"d (24.9 x 48.0 x 43.8d) 1.2 oz. (35g)	.69" x 1.38" x 1.6"d (17.5 x 34.9 x 40.6d) 2 oz. (57g)	.69" x 1.38" x 1.6"d (17.5 x 34.9 x 40.6d) 2 oz. (57g)	.75" x 2.0" x 1.64"d (19.1 x 50.8 x 42.1d) 2.5 oz. (71g)	.75" x 2.5" x 2.1"d (19.1 x 63.5 x 53.0d) 2.5 oz. (71g)
No. of Poles	1 or 2	1	1	1 through 4	1 through 4
Circuit Function	Series Trip, both poles or Series Trip, one pole; Switch only, one pole	Series Trip	Series Trip	Series Trip w/ or w/o Aux. Switch	Series Trip w/ or w/o Aux. Switch
Current Rating	5-20 Amps	1-50 Amps	1-50 Amps	.25-50 Amps	.25-50 Amps
Max. Operating Voltage	50VDC 250VAC	50VDC 250VAC	50VDC 250VAC	65VDC 277VAC 480VAC 3Ø-Wye	65VDC 277VAC 480VAC 3Ø-Wye
Trip Time at 200% of Rating	10 to 45 Sec.	1-3A Models – 11 to 30 Sec. 5-50A Models – 6 to 22 Sec.	1-3A Models – 11 to 30 Sec. 5-50A Models – 6 to 22 Sec.	30ms to 150 Sec. depending upon trip curve specified.	30ms to 150 Sec. depending upon trip curve specified.
Interrupt Capacity	1,000A @ 50VDC 2,000A @ 250VAC	1-25A Models – 2,000A @ 50VDC 1,000A @ 250VAC 30-50A Models – 1,000A @ 50VDC or 250VAC	1-25A Models – 2,000A @ 50VDC 1,000A @ 250VAC 30-50A Models – 1,000A @ 50VDC or 250VAC	0.25-20A Models – 2,000A @ 65VDC 5,000A @ 277VAC or 480VAC, 3Ø-Wye 21-50A Models – 2,000A @ 65VDC 2,500A @ 277VAC	2,000A @ 65VDC 5,000A @ 277VAC or 480VAC, 3Ø-Wye
Terminal Options	.250" (6.35) Quick Connect, Solder	#8-32 Screw	#8-32 Screw	.250" (6.35) Quick Connect, #10-32 Screw	#10-32 Stud
Mounting Options	Snaps into .875 x 1.75" (22.2 x 44.5) panel cutout from the front	3/8"–24 Threaded Bushing	15/32"–32 Threaded Bushing	#6-32 Tapped Holes, M3 Tapped Holes	#6-32 Tapped Holes, M3 Tapped Holes
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Specifications and availability subject to change.

Transformers

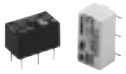
	 PRODUCTS UNLIMITED	 PRODUCTS UNLIMITED	 PRODUCTS UNLIMITED	 PRODUCTS UNLIMITED	 PRODUCTS UNLIMITED
Series	**4000**	**4000**	**4000**	**4000**	**4000**
Type	Class II UL1585 Transformer Inherently Energy Limited	Class II UL1585 Transformer Inherently Energy Limited	Class II UL1585 Transformer Inherently Energy Limited	Class II UL1585 Transformer Inherently Energy Limited	Class II UL1585 Transformer Inherently Energy Limited
VA Rating	5, 10, 20 & 30VA	10, 20 & 30VA	20 & 40VA	40 & 50VA	40 & 50VA
Terminal Options	Wire Leads	Quick Connect	Wire Leads & Screws	WIre Leads	Quick Connect
Mounting Options	Foot or Panel	Foot or Panel	Plate	Foot or Panel	Foot or Panel
Agency Approval	c UL us	c UL us	c UL us	c UL us	c UL us
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Transformers

	 PRODUCTS UNLIMITED	 PRODUCTS UNLIMITED	 PRODUCTS UNLIMITED	 PRODUCTS UNLIMITED	 PRODUCTS UNLIMITED
Series	**4000**	**4000**	**4700**	**4700**	**57**
Type	Class II UL1585 Transformer Non-Inherently Energy Limited Secondary Fusing Required (Opt. integral fuse or breaker)	Class II UL1585 Transformer Non-Inherently Energy Limited Secondary Fusing Required (Opt. integral fuse or breaker)	UL506 Transformer Non-Fused	UL506 Transformer Non-Fused	Transformer Relay Inherently Energy Limited 9100 or 9400 Series Relay
VA Rating	60 & 75VA	60 & 75VA	60, 100 & 150VA	60, 100 & 150VA	40VA
Terminal Options	Wire Leads	Quick Connect	Wire Leads	Quick Connect	Wire Leads and Screws (optional Quick Connects)
Mounting Options	Foot or Panel	Foot or Panel	Foot	Foot	Plate
Agency Approval	c UL us	c UL us	c UL us	c UL us	c UL us
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Specifications and/or agency recognitions do not necessarily apply to all models within a particular series. When multiple ratings are listed, no individual rating may be exceeded by the combination of others.

Low-Signal Printed Circuit Board Relays

							
	P&B	**P&B**	**OEG**	**OEG**	**P&B**	**AXICOM**	**OEG**
Series	**JWS**	**JWD**	**OL**	**OMR**	**159/160**	**V23026**	**TSC**
Features	• **10W rating** • Dry reed relay • SIP configuration • Molded package • Wave solderable and immersion cleanable	• **10W rating** • Dry reed relay • DIP configuration • Molded package • Wave solderable and immersion cleanable	• **10W rating** • Dry reed relay • Plastic dust cover • Consult factory for wave solderable and immersion cleanable model	• **10W rating** • Dry reed relay • Open or with plastic dust cover	• **10W rating** • Hg wetted reed relay • Fast operating speed • No contact bounce • Single, dual and bifilar coils • Single-side stable or bistable contacts	• **1A rating** • Miniature relay • Sealed case • Through-hole or surface mount • Low coil power requirement • Latching or non-latching	• **1A rating** • Miniature relay • Meets FCC Part 68 isolation • Sealed, immerssion cleanable case • Sensitive coil
Approximate Dimensions	.80" x .26" x .31"h (20.3 x 6.6 x 7.8h) 0.08 oz. (2g)	.77" x .30" x .32"h (19.6 x 7.62 x 8.0h) 0.08 oz. (2g)	.795" x .31" x .26"h (20.2 x 7.9 x 6.6h) 0.07 oz. (2g)	.8" x .32" x .35"h (20.3 x 8.0 x 9.0h) 0.16 oz. (4.5g)	.4" x .535" x 1.56"h (10.2 x 13.6 x 39.6h) 1 oz. (28g)	.51" x .31" x .27"h (13 x 7.9 x 6.9h) 0.06 oz. (1.7g)	.49" x .29" x .39"h (12.5 x 7.5 x 10.0h) 0.1 oz. (3g)
Contact Arrangements	1 Form A	1 Form A, 1 Form B 1 Form C, 2 Form A	1 Form A, 2 Form A	1 Form A, 2 Form A	1 Form C, 1 Form D	1 Form C	1 Form C
Contact Material	Ru	Ru	Rh & Ru	Rh & Ru	Hg	RhAu overlay PdNi	Au overlay AgNi
Maximum Contact Rating	10W	10W Form A & B 3W Form C	10W	10W	2A	1A, AC or DC 125VAC, 150VDC 60VA, 30W resistive	1A, AC or DC 30VDC, 120VAC 24W or 120VA resistive
Expected Mechanical Life	1 x 10^8 Ops.	1 x 10^8 Ops.	1 x 10^8 Ops.	1 x 10^8 Ops.	1 x 10^9 Ops.	1 x 10^8 Ops.	5 x 10^7 Ops.
Expected Electrical Life at Rated Load	1 x 10^6 Ops.	1 x 10^6 Ops.	1 x 10^6 Ops.	1 x 10^6 Ops.	1 x 10^9 Ops.	2.5 x 10^5 @ 0.4A, 125VAC 3 x 10^6 @ 1A, 24VDC	1 x 10^5
Nominal Coil Voltage	5-24VDC	5-24VDC	6-24VDC	5-24VDC	2.2-9,000 ohms	5-24VDC	5-24VDC
Nominal Coil Power	50-272mW	50-288mW	100-270mW	100-280mW	20-115mW	67-128mW	150mW
Mounting Options	PC board	PC board	PC board	PC board	PC board	PC board (THT and SMT)	PC board
Sockets / Connectors	—	Fits 14-pin IC socket	—	—	—	—	—
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Specifications and availability subject to change.

Low-Signal Printed Circuit Board Relays

							
	P&B	**OEG**	**AXICOM**	**AXICOM**	**AXICOM**	**AXICOM**	**AXICOM**
Series	**T81**	**OUAZ**	**IM**	**FP2**	**V23079**	**FT2/FU2**	**FX2**
Features	• **0.5 - 1A rating** • Miniature, high density package • Tape sealed, immersion cleanable case • Sensitive coil option • Meets FCC Part 68 isolation	• **0.5 - 1A rating** • Miniature, high density package • Tape sealed, immersion cleanable case • Sensitive coil option • Meets FCC Part 68 isolation	• **2A rating** • Ultraminiature relay • High sensitivity coil • High mechanical shock resistance • Low coil power requirement	• **2A rating** • Low profile relay • High sensitivity coil • High mechanical shock resistance • Latching and non-latching versions • Sealed immersion cleanable case	• **2A rating** • Vertical mount • High dielectric • Latching and non-latching versions • Meets FCC Part 68 insulation • Sealed immersion cleanable case	• **2A rating** • Vertical mount • High dielectric version • Meets FCC Part 68 insulation • Sealed immersion cleanable case	• **2A rating** • Vertical mount • Latching and non-latching versions • Meets FCC Part 68 insulation • Sealed immersion cleanable case
Approximate Dimensions	.61" x .45" x .43"h (15.4 x 11.4 x 11.0h) 0.14 oz. (4g)	.61" x .45" x .43"h (15.4 x 11.4 x 11.0h) 0.14 oz. (4g)	.393" x .236" x .222"h (10 x 6 x 5.65h) 0.03 oz. (.75g)	.574" x .35" x .196"h (14.02 x 9.02 x 5.0h) 0.08 oz. (2g)	.574" x .283" x .389"h (14.6 x 7.2 x 9.9h) 0.084 oz. (2.5g)	.590" x .295" x .377"h (15.0 x 7.5 x 9.6h) 0.12 oz. (3g)	.587" x .283" x .421"h (14.9 x 7.3 x 10.7h) 0.1 oz. (2.5g)
Contact Arrangements	1 Form C	1 Form C	2 Form C	2 Form C	2 Form C	2 Form C	2 Form C
Contact Material	Au overlay AgPd	Au overlay AgPd	Au overlay PdRu	Au overlay AgNi	Au overlay AgNi	Au overlay AgNi	PdRu
Maximum Contact Rating	1A @ 24VDC or 0.5A @ 120VAC, resistive	1A @ 24VDC or 120VAC, resistive	2A, AC or DC 250VAC, 220VDC 60W or 62.5VA, resistive	2A, AC or DC 125VDC, 250VAC 30W or 62.5VA, resistive	2A, AC or DC 220VDC, 250VAC 60W or 60VA, resistive	2A, AC or DC 125VDC, 250VAC 30W or 62.5VA, resistive	2A, AC or DC 220VDC, 250VAC 60W or 62.5VA, resistive
Expected Mechanical Life	5 x 10^6 Ops.	5 x 10^6 Ops.	1 x 10^8 Ops.	1 x 10^8 Ops.	1 x 10^8 Ops.	1 x 10^8 Ops.	1 x 10^8 Ops.
Expected Electrical Life at Rated Load	1.5 x 10^5 @ 1A, 24VDC 1 x 10^5 @ 0.5A, 120VAC	1 x 10^5 @ 1A	5 x 10^5 @ 1A, 30VDC 1 x 10^5 @ 2A, 30VDC	3 x 10^5 @ 1.25A, 24VDC	2 x 10^5 @ 2A, 30VDC	1 x 10^5 @ 1.25A, 24VDC	5 x 10^5 @ 2A, 30VDC
Nominal Coil Voltage	3-24VDC	5-24VDC	1.5-24VDC	3-48VDC	3-48VDC	3-48VDC	3-48VDC
Nominal Coil Power	(standard) 450mW (sensitive) 200mW	(standard) 450mW (sensitive) 200mW	100-200mW	80-200mW	70-140mW	200-300mW	80-300mW
Mounting Options	PC board, Socket	PC board, Socket	PC board (THT and SMT)	PC board (THT)	PC board (THT and SMT)	PC board (THT and SMT)	PC board (THT)
Sockets / Connectors	Fits 12-pin IC socket	Fits 12-pin IC socket	—	—	—	—	—
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Low-Signal PC Board Relays					Mid-Range PC Board Relays		
							
	P&B	**AXICOM**	**AXICOM**	**AXICOM**	**SCHRACK**	**SCHRACK**	**OEG**
Series	**190**	**V23105**	**MT2**	**MT4**	**PE**	**RE**	**PCN**
Features	• **2A rating** • Mini DIP relay • Various coil sensitivity options • Sealed immersion cleanable case • Meets FCC Part 68 insulation	• **3A rating** • Mini DIP relay • High sensitivity coil • Sealed immersion cleanable case • Meets FCC Part 68 insulation	• **1.25A rating** • Miniature, telecom relay • Meets FCC Part 68 isolation • Sealed, immersion cleanable case	• **1.25A rating** • Miniature, telecom relay • Meets FCC Part 68 isolation • Sealed, immersion cleanable case	• **5A rating** • Sensitive coil • Flux-tight case for wave soldering • Class F coil	• **6A rating** • Sensitive coil • DIP cofiguration • 4kV coil-to-contact isolation • Immersion cleanable case with knock-off nib • VDE 0110	• **3A rating** • Ultra slim .197" (5mm) package • Sensitive coil • 3kV coil-to-contact isolation • Immersion cleanable case
Approximate Dimensions	.807" x .398" x .453"h (20.5 x 10.1 x 11.5h) 0.21 oz. (6g)	.795" x .394" x .45"h (20.2 x 10.0 x 11.43h) 0.2 oz. (6g)	.795" x .393" x .433"h (20.2 x 10.0 x 11.0h) 0.18 oz. (5g)	.795" x .582" x .433"h (20.2 x 14.8 x 11.0h) 0.25 oz. (7g)	.79" x .39" x .39"h (20 x 10 x 10h) 0.18 oz. (5g)	.79" x .39" x .42"h (20 x 10 x 10.6h) 0.18 oz. (5g)	.79" x .197" x .492"h (20 x 5 x 12.5h) 0.1 oz. (3g)
Contact Arrangements	2 Form C	2 Form C	2 Form C	4 Form C	1 Form C	1 Form A	1 Form A
Contact Material	Au overlay Ag	Au overlay AgNi	Au overlay AgNi	Au overlay AgNi	AgNi 90/10	AgCdO or Au overlay AgNi	AgNi
Maximum Contact Rating	2A, AC or DC 125VDC, 125VAC 60W or 62.5VA, resistive	3A, AC or DC 250VDC, 230VAC 60W or 120VA, resistive	1.25A, AC or DC 150VAC or VDC 30W or 62.5VA, resistive	1.25A, AC or DC 150VAC or VDC 30W or 62.5VA, resistive	5A @ 250VAC	6A @ 250VAC	3A @ 250VAC
Expected Mechanical Life	15 x 10^6 Ops.	15 x 10^6 Ops.	1 x 10^8 Ops.	1 x 10^8 Ops.	15 x 10^6 Ops.	3 x 10^7 Ops.	2 x 10^7 Ops.
Expected Electrical Life at Rated Load	1 x 10^5 @ 1.8A, 30VDC	1 x 10^5 @ 2A, 30VDC	2 x 10^5 @ 1.25A, 24VDC	2 x 10^5 @ 1.25A, 24VDC	1 x 10^5	5 x 10^5	1 x 10^5
Nominal Coil Voltage	3-48VDC	3-48VDC	4.5-48VDC	4.5-48VDC	5-48VDC	5-48VDC	5-24VDC
Nominal Coil Power	150-500mW	150-500mW	150-550mW	300mW	200mW	200mW	120mW
Mounting Options	PC board	PC board	PC board	PC board	PC board	PC board	PC board
Sockets / Connectors	Fits 16-pin IC Socket	Fits 16-pin IC Socket	Fits 16-pin IC Socket	—	—	—	—
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Specifications and/or agency recognitions do not necessarily apply to all models within a particular series. When multiple ratings are listed, no individual rating may be exceeded by the combination of others.

Mid-Range Printed Circuit Board Relays

							
	SCHRACK	**SCHRACK**	**P&B**	**OEG**	**OEG**	**P&B**	**OEG**
Series	**V23092** (SNR)	**RY II**	**T75**	**PCJ**	**PCH**	**T77**	**OJ/OJE**
Features	• **6A rating** • Ultra slim .197" (5mm) package • Low coil power requirement • Immersion cleanable case • DIN mount module available	• **8A rating** • Meets international specifications • Sensitive coil • Low profile design • Flux-tight or washable case	• **8 - 14A rating** • Meets international specifications • Sensitive coil • Low profile design • Immersion cleanable case	• **5A rating** • Slim profile for high density mount • 200mW coil • 4,000Vrms coil-to-contact breakdown • UL508	• **5-10A rating** • Small size relay • 1 Form C contact arrangement • 4,000 Vrms coil-to-contact breakdown • UL873 • UL Class F coil available	• **3 - 10A rating** • Small size • 4,000 Vrms coil-to-contact breakdown • Sealed or flux tight case • Class F coil insulation	• **3 - 10A rating** • Small size • 4,000 Vrms coil-to-contact breakdown • Sealed or flux tight case • Sensitive models available
Approximate Dimensions	.20" x 1.1" x .59"h (5 x 28 x 15h) 0.21 oz. (6g)	1.12" x .40" x .48"h (28.5 x 10.1 x 12.3h) 0.28 oz. (8g)	1.12" x .39" x .59"h (28.5 x 10 x 15h) 0.65 oz. (18.5g)	.80 x .28 x .59h (20.4 x 7 x 15h) .14 oz (4g)	.78 x .39 x.60 (19.8 x 9.9 x 15.2h) .25 oz (7g)	.72" x .39" x .57"h (18.2 x 10.0 x 14.7h) 0.36 oz. (9g)	.72" x .39" x .57"h (18.2 x 10.0 x 14.7h) 0.36 oz. (9g)
Contact Arrangements	1 Form A, 1 Form C	1 Form A, 1 Form C	1 Form A, 1 Form C	1 Form A	1 Form C	1 Form A	1 Form A
Contact Material	AgSnO, Au plated AgSnO, AgNi 90/10	AgCdO, AgNi 0.15, au plated AgNi0.15, AgSnO	AgCdO	AgNi	AgSnO	Ag Ag Alloy	Ag Ag Alloy
Maximum Contact Rating	6A, 25VAC	8A @ 250VAC	14A @ 120VAC, resistive 10A @ 240 VAC 8A @ 24VDC	5A @ 250VAC or 28VDC resistive	10A @ 125VAC (NO) 5A @ 277VAC or 30VDC (NO) 3A @ 277VAC or 30VDC (NC) resistive	3A @ 28VDC or 250VAC 10A @ 28VDC or 120VAC	3A @ 28VDC or 250VAC 5A @ 28VDC or 250VAC 10A @ 28VDC or 120VAC
Expected Mechanical Life	2 x 10^7 Ops.	3 x 10^7 Ops.	2 x 10^7 Ops.	5 x 10^6 Ops.	5 x 10^6 Ops.	1 x 10^7 Ops.	1 x 10^7 Ops.
Expected Electrical Life at Rated Load	5 x 10^4	1 x 10^5	5 x 10^4	1 x 10^5	1 x 10^5	1 x 10^5	1 x 10^5
Nominal Coil Voltage	12-24VDC	5-48VDC	3-60VDC	5-24VDC	5-48VDC	3-24VDC	5-48VDC
Nominal Coil Power	210mW	220mW	230mW	200mW	200-400mW	200-450mW	200-450mW
Mounting Options	PC board	PC board	PC board	PC board	PC board	PC board	PC board
Sockets / Connectors	—	—	—	—	—	—	—
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Mid-Range Printed Circuit Board Relays

	 OEG	 SCHRACK	 SCHRACK	 P&B	 OEG	 P&B	 OEG
Series	**PCD/PCDF**	**PB**	**V23148** (U/UB)	**T73**	**OUDH**	**T7N**	**PCE**
Features	• **10-15A rating** • Low-profile relay • Sensitive coil • Sealed or flux tight case • Available with quick connect terminals for load	• **10A rating** • Miniature relay • Low complexity design • Flux tight case • Available Class F coil insulation	• **7A rating** • Standard or latching type • Sensitive version available • 2kV or 4kV dieleectric options • Sealed case	• **10A rating** • Low-profile relay • Sealed case • UL508 • Class F coil insulation standard	• **10A rating** • Low-profile relay • Flux tight or sealed case • Class A coil insulation standard	• **10A rating** • Low-profile relay • UL Class F coil standard • Immersion cleanable sealed case	• **10A rating** • Low-profile relay • UL Class F coil standard • Immersion cleanable sealed case
Approximate Dimensions	.90" x .63" x .40"h (23.0 x 16.1 x 10.2h) 0.35 oz. (10g)	.59" x .59" x .79"h (15.0 x 15.0 x 20.0h) 0.2 oz. (5.4g)	.64" x .84" x .59"h (16.2 x 21.2 x 14.9h) 0.34 oz. (9.5g)	.88" x .69" x .61"h (22.3 x 17.6 x 15.5h) 0.42 oz. (12g)	.88" x .69" x .61"h (22.3 x 17.6 x 15.5h) 0.42 oz. (12g)	.87" x .63" x .65"h (22.0 x 16.0 x 16.4h) 0.38 oz. (11g)	.87" x .63" x .65"h (22.0 x 16.0 x 16.4h) 0.38 oz. (11g)
Contact Arrangements	1 Form A	1 Form A	1 Form A, 1 Form B, 1 Form C	1 Form A, 1 Form C	1 Form A, 1 Form C	1 Form A, 1 Form C	1 Form A, 1 Form C
Contact Material	AgSnO	AgNi 90/10	AgNi 0.15	AgCdO	Ag Alloy	AgCdO	AgCdO, AgSnO
Maximum Contact Rating	15A @ 125VAC (QC version only) 10A @ 28VDC or 250VAC resistive	10A @ 240VAC (NO) 3A @ 240VAC (NC)	7A @ 250VAC or 24VDC resistive	10A @ 120VAC 6A @ 24VDC	10A @ 120VAC 6A @ 24VDC	10A @ 240VAC or 28VDC	10A @ 250VAC or 28VDC
Expected Mechanical Life	1 x 10^7 Ops.	5 x 10^6 Ops.	2 x 10^7 Ops.	1 x 10^7 Ops.	1 x 10^7 Ops.	1 x 10^7 Ops.	1 x 10^7 Ops.
Expected Electrical Life at Rated Load	1 x 10^5	1 x 10^5 at 6A, 240VAC (NO) 2.5 x 10^4 at 10A, 240VAC (NO)	5 x 10^4 at 7A (NO)	1 x 10^5	1 x 10^5	1 x 10^5 Ops.	1 x 10^5 Ops.
Nominal Coil Voltage	5-48VDC	6-24VDC	6-48VDC	3-48VDC	5-48VDC	3-48VDC	6-48VDC
Nominal Coil Power	200-250mW	360mW	330-800mW	450-660mW	450-660mW	360mW	360mW
Mounting Options	PC board	PC board	PC board	PC board	PC board	PC board, Socket	PC board, Socket
Sockets / Connectors	—	—	—	—	—	PC terminals (10A rated)	PC terminals (10A rated)
Page Number	424	426	428	430	432	434	436

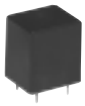
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Specifications and availability subject to change.

Mid-Range Printed Circuit Board Relays

	 OEG	 P&B	 OEG	 OEG	 P&B/SCHRACK	 SCHRACK	 SCHRACK
Series	**ORWH**	**T7C**	**SRUDH**	**SRUUH**	**RT** (DC)	**RT** (AC)	**RT** (Sens.)
Features	• **10A rating** • Low-profile relay • Flux-tight or sealed case	• **5-12A rating** • Compact design • 1,500 Vrms coil-to-contact breakdown • Immersion cleanable or flux-tight case • UL Class F coil standard	• **12A rating** • Compact design • 1,500 Vrms coil-to-contact breakdown • Immersion cleanable or flux-tight case	• **15A rating** • Compact design • 1,500 Vrms coil-to-contact breakdown • Immersion cleanable or flux-tight case	• **8-16A rating** • Immersion cleanable or flux-tight case • Low profile case • 10mm coil-to-contact spacing for 5kV isolation	• **8-16A rating** • Immersion cleanable or flux-tight case • Low profile case • 10mm coil-to-contact spacing for 5kV isolation	• **10A rating** • Sensitive coil • Immersion cleanable or flux-tight case • Low profile case • 10mm coil-to-contact spacing for 5kV isolation
Approximate Dimensions	.75" x .61" x .6"h (20.3 x 16.5 x 20.6h) 0.33 oz. (9.5g)	.80" x .65" x .81"h (20.3 x 16.5 x 20.6h) 0.42 oz. (12g)	.80" x .65" x .81"h (20.3 x 16.5 x 20.6h) 0.42 oz. (12g)	.80" x .65" x .81"h (20.3 x 16.5 x 20.6h) 0.42 oz. (12g)	1.14" x .50" x .62"h (29 x 12.7 x 15.7h) 0.42 oz. (12g)	1.14" x .50" x .62"h (29 x 12.7 x 15.7h) 0.42 oz. (12g)	1.14" x .50" x .62"h (29 x 12.7 x 15.7h) 0.42 oz. (12g)
Contact Arrangements	1 Form A, 1 Form C	1 Form A, 1 Form C	1 Form A, 1 Form C	1 Form A, 1 Form C	1 Form A, 2 Form A, 1 Form C, 2 Form C	1 Form A, 2 Form A, 1 Form C, 2 Form C	1 Form A, 1 Form C
Contact Material	AgCdO	AgCdO, Ag	AgCdO	AgCdO	AgNi 90/10	AgNi 90/10	AgNi 90/10
Maximum Contact Rating	10A @ 277VAC or 28VDC (NO) 15A @ 120VAC (NO) 10A/6A @ 250VAC or 28VDC (NO/NC)	10A @ 240VAC or 28VDC 12A @ 120VAC	10A @ 240VAC or 28VDC 12A @ 120VAC	10A @ 240VAC or 28VDC 15A @ 120VAC	16A, AC or DC 250VAC, 30VDC (16A version)	16A, AC or DC 250VAC, 30VDC (16A version)	10A, AC 250VAC
Expected Mechanical Life	1 x 10^7 Ops.	1 x 10^7 Ops.	1 x 10^7 Ops.	1 x 10^7 Ops.	1 x 10^7 Ops.	1 x 10^7 Ops.	1 x 10^7 Ops.
Expected Electrical Life at Rated Load	1 x 10^5 Ops. at 10A @ 250VAC (NO)	1 x 10^5 Ops.	1 x 10^5 Ops.	1 x 10^5 Ops.	5 x 10^4 (16A version)	5 x 10^4 (16A version)	1.5 x 10^5
Nominal Coil Voltage	3-48VDC	3-48VDC	6-48VDC	3-48VDC	5-110VDC	24-230VAC	5-60VDC
Nominal Coil Power	360mW	360mW	360mW	360-510mW	400mW	.75VA	250mW
Mounting Options	PC board, Socket	PC board, Socket	PC board, Socket	PC board, Socket	PC board, Socket	PC board, Socket	PC board, Socket
Sockets / Connectors	PC terminals (10A rated)	PC terminals (10A rated)	PC terminals (10A rated)	PC terminals (10A rated)	Screw terminals, PC terminals	Screw terminals, PC terminals	Screw terminals, PC terminals
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Mid-Range Printed Circuit Board Relays

							
	SCHRACK	**SCHRACK**	**SCHRACK**	**OEG**	**OEG**	**OEG**	**OEG**
	RTH (Hi-temp)	**RT** (Hi-inrush)	**0429**	**OMI/OMIH**	**OMI 2 pole**	**OZ/OZF**	**OMIT**
Features	• **10-16A rating** • High-temp version for up to 105°C • Immersion cleanable or flux-tight case • Low profile case • 10mm coil-to-contact spacing for 5kV isolation	• **16A rating** • Handles inrush currents to 80A • Immersion cleanable or flux-tight case • Low profile case • 10mm coil-to-contact spacing for 5kV isolation	• **16A rating** • Handles inrush currents to 80A • Flux-tight case • Low profile case • 8mm coil-to-contact spacing for 4kV isolation	• **10-16A rating** • 5,000 Vrms coil-to-contact breakdown • Sealed or flux-tight case • 16A type available (OMIH)	• **5A rating** • 5,000 Vrms coil-to-contact breakdown • Sealed or flux-tight case	• **20A rating** • 5,000 Vrms coil-to-contact breakdown • Flux-tight or sealed case • TV-8 rating available (OZT) • Quick connect terminal available for load (OZF)	• **10A rating** • 5,000 Vrms coil-to-contact breakdown • Flux-tight or sealed case • TV-5 rating
Approximate Dimensions	1.14" x .50" x .62"h (29 x 12.7 x 15.7h) 0.42 oz. (12g)	1.14" x .50" x .62"h (29 x 12.7 x 15.7h) 0.42 oz. (12g)	1.12" x .49" x .59"h (28.5 x 12.5 x 15.0h) 0.35 oz. (10g)	1.15 x .50 x .81h (29.2 x 12.8 x 20.6h) .46 oz (13g)	1.15 x .50 x .81h (29.2 x 12.8 x 20.6h) .46 oz (13g)	1.15 x .50 x .81h (29.2 x 12.8 x 20.6h) .46 oz (13g)	1.15 x .50 x .81h (29.2 x 12.8 x 20.6h) .46 oz (13g)
Contact Arrangements	1 Form A, 1 Form C,	1 Form A	1 Form A	1 Form A, 1 Form C	2 Form A, 2 Form C	1 Form A, 1 Form C	1 Form A, 1 Form C
Contact Material	AgNi 90/10	AgNi 90/10, AgSnO	AgSnO with W prerun	Ag Alloy (OMI) AgSnO (OMIH)	Ag Alloy	Ag Alloy AgSnO	AgSnO
Maximum Contact Rating	16A, AC 250VAC (standard coil version) 10A, AC 250VAC (sensitive coil version)	16A, AC 250VAC 80A for 20ms	10A, AC 250VAC 80A for 20ms	10A @ 240VAC or 24VDC (OMI) 16A @ 240VAC or 24VDC (OMIH)	5A @ 240VAC or 24VDC	20A @ 120VAC, 16A @ 240VAC, TV-8 @ 120VAC	10A @ 240VAC, TV-5 @ 120VAC, 10A @ 30VDC
Expected Mechanical Life	1 x 10^7 Ops.	3 x 10^7 Ops.	5 x 10^6 Ops.	1 x 10^7	1 x 10^7	1 x 10^7	1 x 10^7
Expected Electrical Life at Rated Load	2.5 x 10^5 (Hi-performance contact)	1 x 10^5	5 x 10^4	1 x 10^5	1 x 10^5	1 x 10^5	1 x 10^5
Nominal Coil Voltage	9-24VDC	12-60VDC	6-60VDC	5-48VDC	3-48VDC	5-48VDC	5-48VDC
Nominal Coil Power	400mW (standard) 250mW (sensitive)	400mW	480mW	540mW (Sensitive) 720mW (Standard)	540mW (Sensitive) 720mW (Standard)	540mW (Sensitive) 720mW (Standard)	540mW (Sensitive) 720mW (Standard)
Mounting Options	PC board, Socket	PC board, Socket	PC board, Socket	PC board, Socket	PC board, Socket	PC board, Quick connect (for load), Socket	PC board, Socket
Sockets / Connectors	Screw terminals, PC terminals	Screw terminals, PC terminals	Screw terminals, PC terminals	Screw terminals, PC terminals	Screw terminals, PC terminals	Screw terminals, PC terminals	Screw terminals, PC terminals
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Technical support:
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Mid-Range Printed Circuit Board Relays

	 OEG	 OEG	 OEG	 OEG	 OEG	 OEG	 OEG
	OMIF	**PCI**	**OSA**	**OSZ**	**SDT**	**SDT–R**	**PCK**
Features	• **20A rating** • Flux-tight case • 5,000 Vrms coil-to-contact breakdown • Quick connect terminals for load	• **3A rating** • Slim design • Sealed or flux-tight case • Magnetic blowout option for DC loads • Handles audio speaker loads	• **TV-3/4 rating** • Flux-tight case • Low profile case • 3,000 Vrms coil-to-contact breakdown	• **TV-8 rating** • 4,000 Vrms coil-to-contact breakdown • Sealed or flux-tight case	• **10A/TV-5 rating** • 4,000 Vrms coil-to-contact breakdown • Sealed or flux-tight case	• **TV-8/TV-5 rating** • Standard or sensitive coil • 4,000 Vrms coil-to-contact breakdown • Flux-tight case	• **16A rating** • 5,000 Vrms coil-to-contact breakdown • Quick connect terminals for load • Flux-tight case
Approximate Dimensions	1.14" x .50" x .96"h (29.2 x 12.8 x 24.5h) 0.53 oz. (15g)	.945" x .394" x .984"h (24 x 10 x 25h) 0.41 oz. (10.5g)	.96" x .508" x .976"h (24.4 x 12.9 x 24.8h) 0.46 oz. (13g)	.96" x .508" x .976"h (24.4 x 12.9 x 24.8h) 0.46 oz. (13g)	.96" x .409" x .984"h (24.4 x 10.4 x 25h) 0.39 oz. (11g)	.945" x .394" x .984"h (24 x 10.4 x 25h) 0.39 oz. (11g)	.866 x .417 x 1.05h (22 x 10.6 x 26.7h) .46 oz (13g)
Contact Arrangements	1 Form A	2 Form A	2 Form A	1 Form A	1 Form A	1 Form A	1 Form A
Contact Material	AgSnO	Ag Alloy	AgSnO (DM5 type) AG-GS Alloy (DM3)	AgSnO	AgSnO	AgSnO	AgSnO
Maximum Contact Rating	20A @ 125VAC, 16A @ 240VAC, 16A @ 24VDC	3A @ 120VAC or 24VDC	TV-3 @ 120VAC (UL) TV-4 @ 120VAC (CSA) 5A @ 120VAC or 30VDC (DM5) 3A @ 120VAC or 24VDC (DM3)	TV-8 @ 120VAC (UL) 16A @ 120VAC or 24VDC	TV-5 @ 120VAC (UL) 10A @ 250VAC or 30VDC	TV-8 @ 120VAC (UL) 10A @ 250VAC or 30VDC (Std. Coil) TV-5 @ 120VAC (UL) 5A @ 250VAC or 30VDC (Sens. Coil)	16A @ 250VAC or 24VDC
Expected Mechanical Life	1 x 10^7 Ops.	1 x 10^7 Ops.	1 x 10^7 Ops.	1 x 10^7	1 x 10^7	1 x 10^7	2 x 10^6
Expected Electrical Life at Rated Load	1 x 10^5	1 x 10^5	1 x 10^5	1 x 10^5 2.5 x 10^4 at TV-8	1 x 10^5 2.5 x 10^4 at TV-5	1 x 10^5 2.5 x 10^4 at TV-5 or TV-8	1 x 10^5
Nominal Coil Voltage	12-24VDC	5-24VDC	5-48VDC	5-48VDC	5-48VDC	5-48VDC	5-24VDC
Nominal Coil Power	540mW	350mW	540mW	540mW	540mW	250mW (Sensitive) 540mW (Standard)	500mW
Mounting Options	PC board, Socket	PC board	PC board	PC board	PC board	PC board	PC board
Sockets / Connectors	Screw terminals, PC terminals	—	—	—	—	—	—
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Mid-Range Printed Circuit Board Relays

							
	SCHRACK	**SCHRACK**	**SCHRACK**	**SCHRACK**	**SCHRACK**	**SCHRACK**	**SCHRACK**
	V23057 (Card E)	**RP II/2**	**RP II/1**	**RP 3 SL**	**0409**	**V23077** (IF)	**0410**
Features	• **8A rating** • Horizontal or vertical version • Single or bifurcated contacts • 4,000 Vrms coil-to-contact breakdown • Washable case	• **8A rating** • Slim design • Sealed or flux-tight case • 4,000 Vrms coil-to-contact breakdown	• **8-16A rating** • Slim design • Sealed or flux-tight case • 4,000 Vrms coil-to-contact breakdown	• **120A inrush rating** • **16A rating** • Standard and latching types • Sealed or flux-tight case • 4,000 Vrms coil-to-contact breakdown	• **500A inrush rating** • **10A rating** • Flux-tight case • 4,000 Vrms coil-to-contact breakdown	• **16 rating** • Quick connect terminals for load • 4,000 Vrms coil-to-contact breakdown • Flux-tight case	• **16A rating** • Quick connect terminals for load • 4,000 Vrms coil-to-contact breakdown • Form X model provides 3mm contact gap • Flux-tight case
Approximate Dimensions	1.10" x .984" x .425"h (28.0 x 25.0 x 10.8h) 0.28 oz. (8g)	1.14" x .496" x 1.0"h (29.0 x 12.6 x 25.5h) 0.63 oz. (18g)	1.14" x .496" x 1.0"h (29.0 x 12.6 x 25.5h) 0.63 oz. (18g)	1.12" x .48" x .996"h (28.5 x 12.2 x 25.3h) 0.63 oz. (18g)	.96" x .409" x .984"h (24.4 x 10.4 x 25h) 0.35 oz. (10g)	1.594" x .52" x 1.14"h (40.5 x 13.2 x 29h) 0.92 oz. (26g)	1.594" x .492" x 1.12"h (40.5 x 12.5 x 28.5h) 0.85 oz. (24g)
Contact Arrangements	1 Form A. 1 Form C	2 Form A, 2 Form C	1 Form A, 1 Form C	1 Form A	1 Form A	1 Form A, 1 Form B,	1 Form A, 1 Form B, 1 Form X (only VDE)
Contact Material	AgNi 0.15, AgNi 20, AgCdO	AgCdO, AgNi 0.15	AgCdO, AgNi 0.15	AgSnO	AgCdO with W prerun	AgCdO	AgSnO, AgNi (1 Form X only)
Maximum Contact Rating	8A @ 250VAC 5A @ 250VAC with AgNi 0.15	8A @ 250VAC	16A @ 250VAC 12A @ 250VAC 8A @ 250VAC	120A peak inrush 16A @ 250VAC TV-8 @ 120VAC	500A peak inrush 10A @ 250VAC	16A @ 250VAC	16A @ 250VAC
Expected Mechanical Life	2 x 10^7 Ops.	2 x 10^7 Ops.	3 x 10^7 Ops.	3 x 10^7	3 x 10^7	3 x 10^7	1 x 10^7
Expected Electrical Life at Rated Load	2.5 x 10^5	1 x 10^5 (AgCdO)	1.5 x 10^5 (AgCdO)	2 x 10^5 2.5 x 10^4 at TV-8	2.5 x 10^5	1 x 10^5 (Form A) 5 x 10^4 (Form B)	1 x 10^5 (Form A) 1.5 x 10^5 (Form B) 3 x 10^4 (Form X)
Nominal Coil Voltage	6-60VDC	5-110VDC	5-110VDC	5-60VDC	6-60VDC	6-48VDC	6-60VDC
Nominal Coil Power	450-500mW	500mW	500mW	500mW - 1.5W	820mW	360mW	360mW
Mounting Options	PC board	PC board, Socket	PC board, Socket	PC board	PC board	PC board	PC board
Sockets / Connectors	—	Screw terminals, PC terminals	Screw terminals, PC terminals	—	—	—	—
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	Mid-Range P. C. Board Relays			Power Printed Circuit Board Relays				
								
	OEG	**SCHRACK**	**P&B**	**OEG**	**P&B**	**P&B**	**P&B**	**P&B**
	PCG	**0430**	**600**	**PCF**	**T90**	**T9A**	**491**	**T92**
Features	• **TV-5 rating** • 4,000 Vrms coil-to-contact breakdown • Flux-tight case	• **10-16A rating** • 4,000 Vrms coil-to-contact breakdown • Plastic dust cover • PC board, bracket or panel mount • 3mm contact gap version w/ or w/o magnetic blowout	• **15A rating** • Sensitive coil • Unsealed dust cover or sealed case • Range of contact materials, ratings	• **25A rating** • 5,000Vrms coil-to-contact breakdown • Flux-tight case • Quick connect terminals for load	• **30A rating** • Less than 1W coil power requirement • Class F insulation • Open, dust cover or immersion cleanable case	• **30A rating** • QC and PC terms. • Meets UL 873 / UL 508 spacings • Optional flanged case for panel mounting	• **20A rating** • QC and PC terms. • Meets UL 873 / UL 508 spacings • Optional flanged case for panel mounting	• **30A rating** • Two pole unit can break both sides of the AC line • PC board or panel mount • Ideal for HVAC / appliance apps. • 8mm spacing
Approximate Dimensions	1.11" x .56" x .98"h (28.2 x 14.2 x 24.9h) 0.63 oz. (18g)	1.15 x .51 x .81h (29.2 x 12.9 x 20.6h) .46 oz (13g)	1.25" x .775" x 1.2"h (31.8 x 19.7 x 30.5h) 1.6 oz. (45g)	1.2" x .63" x 1.04"h (30.4 x 16.0 x 26.5h) .99 oz. (28g)	1.20" x .95" x .67"h (30.5 x 24.1 x 16.9h) 0.9 oz. (26g)	1.27" x 1.08" x 1.10"h (32.3 x 27.4 x 27.9h) .9 oz. (26g)	1.26" x 1.08" x 1.10"h (32.5 x 27.4 x 27.9h) 1.2 oz. (33g)	2.06" x 1.36" x 1.21"h (52.3 x 34.5 x 30.7h) 3 oz. (86g)
Contact Arrangements	2 Form A	1 Form A through 2 Form C	1 Form A, 1 Form B, 1 Form C	1 Form A	1 Form A, 1 Form C	1 Form A, 1 Form C	1 Form A, 1 Form B 1 Form C	2 Form A, 2 Form C
Contact Material	AgSnO	AgCdO or AgCu 3	Au flashed AgCd, AuAg, AgCdO, Au flashed Coin Ag, Fine Ag, AgCd, Pd	AgSnO	AgCdO	AgCdO	AgCdO	AgCdO
Maximum Contact Rating	TV-5 @ 120VAC 8A @ 250VAC 5A @ 250VAC	16A @ 250VAC (1 pole types) 10A @ 250 VAC (2 pole types)	From 15A @ 150VAC for AgCdO to 2A @ 28VDC for Pd	25A @ 250VAC 23A @ 277VAC	30A @ 240VAC 20A @ 28VDC 6A @ 277VAC 2 HP @ 240VAC (Form A)	30A @ 240VAC 20A @ 28VDC 10A @ 277VAC 98LRA/22FLA @ 120VAC 2 HP @ 240VAC (Form A)	20A @ 240VAC 20A @ 28VDC 10A @ 277VAC 98LRA/22FLA @ 120VAC 2 HP @ 240VAC (Form A)	30A @ 277VAC 20A @ 28VDC 10A @ 600VAC TV10A @ 120VAC 2.5 HP @ 240VAC 1 HP @ 120VAC
Expected Mechanical Life	1 x 10^7 Ops.	2.5 x 10^5	1 x 10^7 Ops.	1 x 10^7 Ops.	1 x 10^7 Ops.	1 x 10^7 Ops.	1 x 10^7 Ops.	5 x 10^6 Ops.
Expected Electrical Life at Rated Load	1 x 10^5 at 5A 5 x 10^4 at 8A 2.5 x 10^4 at TV-5	2.5 x 10^5 except 1.5 x 10^5 for 3mm gap type	1 x 10^5	1 x 10^5	1 x 10^5	1 x 10^5	1 x 10^5	1 x 10^5 Ops.
Nominal Coil Voltage	5-48VDC	12-110VDC 24-230VAC	3-48VDC	6-48VDC	5-110VDC	5-110VDC	12-220VAC	12-110VDC 24-240VAC
Nominal Coil Power	540mW	1.0W (DC) 1.8VA (AC)	110mW (3-5A types) 240mW (15A types)	900mW	850-930mW	900mW, 1.0W	2.0VA	1.7W (DC) 4.0VA (AC)
Mounting Options	PC board	PC board, Bracket, Panel	PC board	PC board	PC board	PC board, Panel mount	PC board, Panel mount	PC board Panel mount
Sockets / Connectors	—	—	—	—	—	—	—	—
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Specifications and/or agency recognitions do not necessarily apply to all models within a particular series. When multiple ratings are listed, no individual rating may be exceeded by the combination of others.

Relays with Forcibly Guided Contacts

	 SCHRACK	 SCHRACK	 SCHRACK	 SCHRACK	 SCHRACK	 SCHRACK
	V23047 (SR2M)	**SR4**	**SR6D/M**	**V23050** (SR6)	**SR6**-Sensitive	**SR6Z**
Features	• **6A rating** • Forcibly guided contacts • Two poles • Use for emergency shutoff; machine, elevator,escalator, light barrier control	• **8A rating** • Forcibly guided contacts • Four poles • Compact size • Use for emergency shutoff; machine, elevator,escalator, light barrier control	• **8A rating** • Forcibly guided contacts • Four poles • Larger spacings for increased isolation • Use for emergency shutoff; machine, elevator,escalator, light barrier control	• **8A rating** • Forcibly guided contacts • Six poles • Use for emergency shutoff; machine, elevator,escalator, light barrier control	• **8A rating** • Forcibly guided contacts • Six poles • Sensitive, polarized coil • Use for emergency shutoff; machine, elevator,escalator, light barrier control	• **8A rating** • Forcibly guided contacts • Six poles • DIN mount module • Use for emergency shutoff; machine, elevator,escalator, light barrier control
Approximate Dimensions	1.14" x .50" x 1.0"h (29 x 12.7 x 25.4h) 0.6 oz. (18g)	1.57" x .51" x .63"h (40 x 13 x 16h) 0.56 oz. (16g)	2.165" x .65" x .63"h (55 x 16.5 x 16h) 1.06 oz. (30g)	2.17" x .65" x .63"h (55.0 x 16.5 x 16.0h) 1.01 oz. (30g)	2.17" x .65" x .63"h (55.0 x 16.5 x 16.0h) 1.01 oz. (30g)	1.81" x 3.42" x .2.12"h (46 x 87 x 54h) 3.17 oz. (90g)
Contact Arrangements	1 Form A + 1 Form B, 2 Form C	2 Form A + 2 Form B, 3 Form A + 1 Form B	2 Form A + 2 Form B, 3 Form A + 1 Form B	4 Form A + 2 Form B, 3 Form A + 3 Form B, 5 Form A + 1 Form B	4 Form A + 2 Form B, 3 Form A + 3 Form B, 5 Form A + 1 Form B	4 Form A + 2 Form B, 3 Form A + 3 Form B, 5 Form A + 1 Form B
Contact Material	AgNi	AgNi	AgNi	AgNi	AgNi	AgNi
Maximum Contact Rating	6A @ 250VAC	8A @ 250VAC	8A @ 250VAC	8A @ 250VAC	8A @ 250VAC	8A @ 250VAC
Expected Mechanical Life	1 x 10^7 Ops.	1 x 10^7 Ops.	1 x 10^7 Ops.	1 x 10^7 Ops.	1 x 10^7 Ops.	1 x 10^7 Ops.
Expected Electrical Life at Rated Load	—	—	—	—	—	—
Nominal Coil Voltage	5-110VDC	5-110VDC	5-110VDC	5-110VDC	5-48VDC	24VDC, 24VAC/VDC, 115VAC/VDC, 230VAC
Nominal Coil Power	700mW	800mW	1.2W	1.2W	800mW	—
Mounting Options	PC board, Socket	PC board	PC board	PC board	PC board	PC board
Sockets / Connectors	Screw terminals, PC terminals	—	—	—	—	—
Page Number	603	606	607	609	611	613

Specifications and/or agency recognitions do not necessarily apply to all models within a particular series. When multiple ratings are listed, no individual rating may be exceeded by the combination of others.

Dimensions are shown for reference purposes only.

Dimensions are in inches over (millimeters) unless otherwise specified.

Specifications and availability subject to change.

Plug-in / Panel Mount Relays

							
	P&B	**P&B**	**OEG**	**SCHRACK**	**P&B**	**P&B**	**SCHRACK**
Series	**R10**	**KHA/KHS**	**PCL(H)**	**PT**	**K10**	**KUP**	**RM2/3/7**
Features	• **0 - 7.5A rating** • Up to 8 poles • Highly sensitive coils available • Many contact options • Various case, terminal and mounting styles	• **0 - 5A rating** • Compact package • 2PDT & 4PDT • Smoked dust cover • Various mounting configurations • Indicator lamp available • Hermetically sealed case option	• **3-15A rating** • Compact package • One through four poles • Smoked dust cover • AC and DC coils	• **6 - 12A rating** • Low profile • DPDT, 3PDT & 4PDT • Mechanical indicator • Manual test with locking tab option • AC and DC coils	• **15A rating** • Compact package • DPDT • Smoked dust cover • Various mounting configurations • AC and DC coils	• **10A rating** • Open or enclosed • Plain or bracket mount dust covers • Optional indicator lamp and push-to-test button • Several socket styles	• **10-16A rating** • Mechanical indicator standard • Plain or bracket mount dust covers • Several socket styles
Approximate Dimensions	1.17" x .74" x 1.18"h (29.6 x 18.7 x 30.2h) 1.0 oz. (28g)	1.11" x .86" x 1.28"h (28.2 x 21.8 x 34.9h) 1.6 oz. (45g)	1.08 x .83 x 1.32h (27.5 x 21.2 x 33.6h) 1.13 oz (32g)	.886" x 1.1" x 1.14"h (22.5 x 28 x 29h) 1.06 oz. (30g)	1.11" x .86" x 1.28"h (28.2 x 21.8 x 34.9h) 1.8 oz. (51g)	1.53" x 1.41" x 1.91"h (38.9 x 35.7 x 48.4h) 3 oz. (85g)	1.52" x 1.40" x 1.91"h (38.5 x 35.5 x 48.4h) 3.2 oz. (92g)
Contact Arrangements	1 Form C to 8 Form C	2 Form C, 4 Form C	1 Form A through 4 Form C	2 Form C, 3 Form C 4 Form C	2 Form C	1 Form A to 4 Form C	2 Form C, 3 Form C
Contact Material	AgCdO, Ag, Au overlay Ag	Ag, AgCdO, AuAgNi, Au overlay Ag, Au diffused Ag	Ag (4 pole only), Ag Alloy	AgNi 90/10, Au plated AgNi 90/10	AgCdO	Ag AgCdO	AgCdO
Maximum Contact Rating	Dry circuit to 7.5A @ 28VDC or 115VAC 1/8HP @ 110-120VAC 1/6HP @ 220-240VAC	Dry circuit to 5A @ 28VDC or 240VAC 1/10HP @ 120-240VAC	3A to 15A @ 250VAC or 24VDC resistive	12A@240VAC (DPDT) 8A@240VAC (3PDT) 6A@240VAC (4PDT)	15A @ 30VDC or 120VAC 10A @ 277VAC 1/3HP @ 120VAC 1/2HP @ 240VAC	5A @ 28VDC or 240VAC 10A @ 28VDC or 240VAC 1/3HP @ 120VAC 1/2HP @ 250-600VAC	16A @ 400VAC (RM2/7) 10A @ 400VAC (RM3)
Expected Mechanical Life	1 x 10^8 Ops.	1 x 10^7 Ops.	1 x 10^8 Ops.	3 x 10^7 Ops. (DC coil) 2 x 10^7 Ops. (AC coil)	1 x 10^7 Ops.	1 x 10^7 Ops.	2 x 10^7 Ops.
Expected Electrical Life at Rated Load	2 x 10^4 to 6 x 10^5	1 x 10^5	1 x 10^5	1 x 10^5	1 x 10^5	1 x 10^5	1 x 10^5
Nominal Coil Voltage	3-115VDC 6-115VAC	6-110VDC 6-240VAC	6-110VDC 6-240VAC	6-220VDC 6-230VAC	6-110VDC 6-240VAC	6-110VDC 6-240VAC	6-220VDC 6-400VAC
Nominal Coil Power	36mW to 1.6W (DC) 1.5VA (AC)	0.9W (DC) 1.2VA (AC)	0.9 - 1W (DC) 1.4VA (AC)	0.75W (DC) 1VA (AC)	0.9W (DC) 1.2VA (AC)	1.2-1.8W (DC) 2.0-2.75VA (AC)	1.2-1.6W (DC) 2.3-2.8VA (AC)
Mounting Options	Socket, Panel mount, PC board	Socket, Panel mount, PC board	Socket, Panel mount, PC board	Socket, PC board	Socket, Panel mount, PC board	Socket, Panel mount, PC board	Socket, Panel mount
Sockets / Connectors	Screw terminal, Solder terminal, PC terminal	Screw terminal, Solder terminal, PC terminal	Screw terminal, Solder terminal, PC terminal	Screw terminal, Solder terminal, PC terminal	Screw terminal, Solder terminal, PC terminal	Screw terminal, Solder terminal, PC terminal, Quick connect terminal	Screw terminal, Solder terminal, PC terminal, Quick connect terminal
Page Number	703	709	713	717	720	723	733

Specifications and/or agency recognitions do not necessarily apply to all models within a particular series. When multiple ratings are listed, no individual rating may be exceeded by the combination of others.

Plug-in / Panel Mount Relays

							
	P&B	**P&B**	**P&B**	**SCHRACK**	**P&B**	**P&B**	**P&B**
Series	**KUEP**	**KUIP**	**KUGP**	**RM5/6**	**KUMP**	**KUP93**	**KRPA/KRP**
Features	• **10A rating** • Switches DC currents. • Magnetic blowout • Plain or bracket mount dust covers • Optional indicator lamp	• **10A rating** • 8mm coil-to-contact spacing • Plain or bracket mount dust covers • Several socket styles	• **10A rating** • 3mm contact gap • 8mm coil-to- contact spacing • Plain or bracket mount dust cover • Several socket styles	• **10-16A rating** • Mechanical indicator standard • Optional push-to-test button • 3mm contact gap • Plain or bracket mount dust cover • Several socket styles	• **15A rating** • Open or enclosed • Plain or bracket mount dust covers • Optional indicator lamp and push-to-test button • Several socket styles	• **3-10A rating** • Designed primarily for HVAC industry • Accepted pin pattern for HVAC • Plain dust cover	• **10A rating** • Octal-type plug • Dust cover • Optional indicator lamp
Approximate Dimensions	1.53" x 1.41" x 1.91"h (38.9 x 35.7 x 48.4h) 3 oz. (85g)	1.53" x 1.41" x 1.91"h (38.9 x 35.7 x 48.4h) 3 oz. (85g)	1.53" x 1.41" x 1.91"h (38.9 x 35.7 x 48.4h) 3 oz. (85g)	1.52" x 1.40" x 1.91"h (38.5 x 35.5 x 48.4h) 3.2 oz. (92g)	1.53" x 1.41" x 1.91"h (38.9 x 35.7 x 48.4h) 3 oz. (85g)	1.53" x 1.41" x 1.91"h (38.9 x 35.7 x 48.4h) 3 oz. (85g)	1.41" x 1.41" x 2.00"h (35.7 x 35.7 x 50.8h) 3 oz. (85g)
Contact Arrangements	1 Form X, 2 Form A, 2 Form C	1 Form A to 3 Form C	1 Form A, 2 Form A, 3 Form A, 1 Form X	2 Form A 3 Form A	1 Form A to 3 Form C	3 Form C	1 Form C to 3 Form C
Contact Material	AgCdO	Ag, AgCdO	AgCdO	AgCdO	AgCdO	Ag AgCdO	Ag AgCdO
Maximum Contact Rating	10A @ 150VDC (1X) 5A @ 150VDC (2A) 3A @ 150VDC (2C)	5A @ 28VDC or 240VAC 10A @ 28VDC or 240VAC 1/3HP @ 120VAC 1/2HP @ 250-600VAC	5A @ 28VDC or 240VAC 10A @ 28VDC or 240VAC 1/3HP @ 120VAC 1/2HP @ 250-600VAC	16A @ 400VAC (RM5) 10A @ 400VAC (RM6)	15A @ 277VAC 10A @ 28VDC or 240VAC 1/3HP @ 120VAC 1/2HP @ 250-600VAC	3A @ 32VDC or 250VAC 5A @ 28VDC or 240VAC 10A @ 28VDC or 240VAC	5A @ 28VDC or 120VAC 10A @ 28VDC or 240VAC 1/3HP @ 120VAC 1/2HP @ 240VAC
Expected Mechanical Life	1 x 10^7 Ops.	1 x 10^7 Ops.	1 x 10^7 Ops.	2 x 10^7 Ops.	1 x 10^7 Ops.	1 x 10^7 Ops.	1 x 10^7 Ops.
Expected Electrical Life at Rated Load	1 x 10^5	1 x 10^5	1 x 10^5	1 x 10^5	1 x 10^5	1 x 10^5	1 x 10^5
Nominal Coil Voltage	6-110VDC 6-240VAC	6-110VDC 6-240VAC	6-110VDC 6-240VAC	6-220VDC 6-400VAC	6-110VDC 6-240VAC	6-110VDC 6-240VAC	6-110VDC 6-240VAC
Nominal Coil Power	1.2-1.8W (DC) 2.0-2.7VA (AC)	1.2W (DC) 2.0-2.7VA (AC)	1.8W (DC) 2.7VA (AC)	1.6W (DC) 2.8VA (AC)	1.2W (DC) 2.7VA (AC)	1.2W (DC) 2.0-2.7VA (AC)	1.2W (DC) 2.0VA (AC)
Mounting Options	Socket, Panel mount, PC board	Socket, Panel mount, PC board	Socket, Panel mount, PC board	Socket, Panel mount	Socket, Panel mount, PC board	Socket	Socket
Sockets / Connectors	Screw terminal, Solder terminal, PC terminal, Quick connect terminal	Screw terminal, Solder terminal, PC terminal, Quick connect terminal	Screw terminal, Solder terminal, PC terminal, Quick connect terminal	Screw terminal, Solder terminal, PC terminal	Screw terminal, Solder terminal, PC terminal, Quick connect terminal	PC terminal	Screw terminal
Page Number	723	723	723	733	723	731	737

Specifications and/or agency recognitions do not necessarily apply to all models within a particular series. When multiple ratings are listed, no individual rating may be exceeded by the combination of others.

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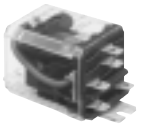
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Specifications and availability subject to change.

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Technical support:
Refer to inside back cover.

Plug-in / Panel Mount Relays

Power Relay

							
	SCHRACK	**P&B**	**P&B**	**P&B**	**SCHRACK**	**SCHRACK**	**P&B**
Series	**MT**	**KR–E**	**KA**	**KRP–3H**	**RM8**	**0419**	**KUHP**
Features	• **10A rating** • Lockable push-to-test button • Octal-type plug • Optional LED, protection and timing modules • Mechanical indicator	• **10A rating** • Hermetically sealed steel case for use in hazardous locations • Octal-type plug	• **10A rating** • Compact, open-style relay • Ruggedly constructed • Cost effective • Highly efficient for switching light power loads	• **20A rating** • Available as open relay or with dust cover and octal-type plug	• **25A rating** • Enclosed • Integral mechanical indicator standard • Bracket mount case • 2,500Vrms coil-to-contact breakdown	• **16A rating** • Compatible with RAST 5 connector • 3mm contact gap • 4,000Vrms coil-to-contact breakdown • Designed for European domestic appliances	• **20 - 30A rating** • Various mounting options • 3,750Vrms coil-to-contact breakdown
Approximate Dimensions	1.40" x 1.40" x 2.24"h (35.5 x 35.5 x 57h) 2.82 oz. (80g)	1.44" x 1.66" x 2.12"h (36.6 x 42.2 x 53.8h) 4.8 oz. (136g)	1.92" x 1.47" x 1.38"h (48.8 x 37.3 x 34.9h) 1.7 oz. (48g) - KA	1.53" x 1.41" x 2.28"h (38.9 x 35.7 x 57.9h) 2 oz. (57g)	1.52" x 1.40" x 1.91"h (38.5 x 35.5 x 48.4h) 3.2 oz. (92g)	1.85" x .98" x 1.85"h (47 x 24 x 47h) 3.2 oz. (92g)	1.53" x 1.41" x 1.91"h (38.9 x 35.7 x 48.4h) 3.2 oz. (92g)
Contact Arrangements	2 Form C, 3 Form C	1 Form A to 3 Form C	1 Form A to 3 Form C	1 Form X	2 Form C	2 Form A	1 Form C to 2 Form C
Contact Material	AgNi 90/10 Au overlay AgNi 90/10	Ag AgCdO	Ag AgCdO	AgCdO	AgCdO	AgCdO, AgNi	AgCdO
Maximum Contact Rating	10A @ 250VAC (4A @ 250VAC for bifurcated contacts) 1/2HP @ 240VAC 1/4HP @ 120VAC	5A @ 28VDC or 120VAC 10A @ 28VDC or 240VAC 1/6HP @ 120VAC	5A @ 120VAC 10A @ 120VAC 6A @ 240VAC 1/6HP @ 120VAC 1/3HP @ 240VAC	20A @ 120VAC 1HP @ 120/240VAC	25A @ 250VAC 2HP @ 240VAC 1.5HP @ 120VAC	16A @ 250VAC	(1C) 30A @ 240VAC 25A @ 28VDC 1HP @ 120VAC (2C) 20A @ 240VAC or 28VDC 3/4HP @ 120VAC
Expected Mechanical Life	2 x 10^7 Ops.	1 x 10^7 Ops.	1 x 10^7 Ops.	2.5 x 10^6 Ops.	2 x 10^7 Ops.	2 x 10^6 Ops.	1 x 10^7 Ops.
Expected Electrical Life at Rated Load	3 x 10^5	1 x 10^5	1 x 10^5	1 x 10^5	3 x 10^4	1 x 10^5 (AC coil) 2.5 x 10^5 (DC coil)	1 x 10^5
Nominal Coil Voltage	6-220VDC 6-230VAC	6-110VDC 6-240VAC	6-110VDC 6-240VAC	6-110VDC 6-240VAC	12-24VDC 24-115VAC	12-24VDC 110-400VAC, 50 Hz.	12-24VDC 24-120VAC
Nominal Coil Power	1.2W (DC) 2.3VA (AC)	1.2W (DC) 2.0VA (AC)	1.2W (DC) 2.0VA (AC)	1.2W (DC) 2.0VA (AC)	1.2W (DC) 2.8VA (AC)	1.3W (DC) 2.0-2.5VA (AC)	1.2W (DC) 2.7VA (AC)
Mounting Options	Socket	Socket	Panel mount	Socket, Panel mount	Panel mount	Panel mount	Panel mount
Sockets / Connectors	Screw terminal	Screw terminal	—	Screw terminal	Screw terminal, Solder terminal, PC terminal, Quick connect terminal	—	—
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Specifications and/or agency recognitions do not necessarily apply to all models within a particular series. When multiple ratings are listed, no individual rating may be exceeded by the combination of others.

Power Relays & Definite Purpose Contactors

	 SCHRACK	 P&B	 P&B	 P&B	 PRODUCTS UNLIMITED	 PRODUCTS UNLIMITED	 PRODUCTS UNLIMITED
Series	**RM C/D**	**S86/S87**	**PM**	**PRD**	**9400**	**9100**	**38**
Features	• **30A rating** • Enclosed • Optional push-to-test button, LED indicator and protection diode • Bracket mount case • 2,500Vrms coil-to-contact breakdown	• **20A rating** • Economical switching in a compact package • Choice of two mounting brackets	• **25A rating** • 4PDT • High dielectric strength • Screw or quick connect terminals • Dust cover available	• **10-50A rating** • High inrush capacity • Available with magnetic blowouts • Optional auxiliary switch	• **8-12FLA rating** • Used extensively in HVAC applications • Double make and double break contacts • Various mounting bracket options	• **3-12FLA rating** • Used extensively in HVAC applications • Single and double pole models • Multi-positional mounting	• **35A rating** • Used extensively in HVAC applications • Potential motor starting relay • Various mounting postions and brackets • Custom-built to customer specs
Approximate Dimensions	1.52" x 1.40" x 1.91"h (38.5 x 35.5 x 48.4h) 3.2 oz. (92g)	1.31" x 2.07" x 2.42"h (33.3 x 52.6 x 61.5h) 2.9 oz. (82g)	3.39" x 2.66" x 2.72"h (86.2 x 67.5 x 69.1h) 14 oz. (397g)	3.38" x 2.51" x 2.50"h (85.7 x 63.8 x 63.5h) 10 oz. (284g)	1.84" x 1.26" x 1.5"h (46.8 x 32.1 x 38.1h) 2.9 oz. (82g)	2.11" x 1.83" x 2.36"h (53.6 x 46.5 x 60.1h) 6.1 oz. (173g)	2.03" x 1.82" x 1.82"h (51.6 x 46.2 x 46.2h) 5.8 oz. (164g)
Contact Arrangements	1 Form X, ! Form Z	1 Form C, 2 Form C	4 Form C	1 Form A to 2 Form C	1 Form X, 1 Form Y, 1 Form Z, 1 Form C (jumpered 1 Form X)	1 Form A through 2 Form C, including mixed forms	1 Form B
Contact Material	AgCdO	Ag, AgCdO	AgCdO	Ag, AgCdO	Fine Ag (pilot), AgAlloy	Ag, Fine Ag, AuAlloy (pilot)	AgCdO
Maximum Contact Rating	30A @ 250VAC	20A @ 277VAC 1HP @ 125VAC 2HP @ 250VAC	25A @ 277VAC 10A @ 28VDC 1HP @ 240VAC	50A @ 277VAC 30A @ 277VAC 20A @ 125VDC 1.5HP @ 120VAC 2HP @ 250VAC	12FLA/60LRA @ 125VAC 8FLA/48LRA @ 240/277VAC 25A @ 240/277VAC, resistive (Form X)	12FLA/60LRA @ 125VAC 6FLA/35LRA @ 250/277VAC 25A @ 240/277VAC, resistive (Form A)	35A @ 277VAC, inductive
Expected Mechanical Life	1 x 10^7 Ops.	1 x 10^6 Ops.	1 x 10^7 Ops.	2 x 10^6 Ops.	1 x 10^6 Ops.	1 x 10^6 Ops.	7.5 x 10^5 Ops.
Expected Electrical Life at Rated Load	4.5 x 10^4	5 x 10^4	1 x 10^5	1 x 10^5	1 x 10^5 (inductive load) 2.5 x 10^5 (resistive load)	1 x 10^5 (inductive load) 2.5 x 10^5 (resistive load)	2.5 x 10^5
Nominal Coil Voltage	6-220VDC 24-400VAC	6-125VDC 12-240VAC	6-125VDC 12-20VAC	6-110VDC 6-480VAC	12-24VDC 6-277VAC	12-24VDC 24-277VAC	130-495VAC
Nominal Coil Power	1.2W (DC) 2.8VA (AC)	1.13-4.5W (DC) 4.0VA (AC)	4.4W (DC) 14VA (AC)	2.0W (DC) 9.8VA (AC)	3.0W (DC) 4.0VA (AC)	5.75W (DC) 9.5VA (AC)	5VA
Mounting Options	Panel mount	Panel mount	Panel mount	Panel mount	Panel mount	Panel mount	Panel mount
Sockets / Connectors	—	—	—	—	—	—	—
Page Number	805	807	809	811	814	816	818

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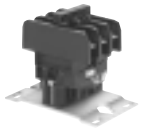
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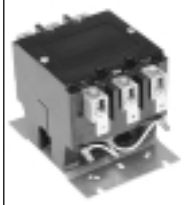
Specifications and availability subject to change.

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Power Relays & Definite Purpose Contactors

							
	P&B	**P&B**	**P&B**	**PRODUCTS UNLIMITED**	**PRODUCTS UNLIMITED**	**PRODUCTS UNLIMITED**	**PRODUCTS UNLIMITED**
Series	**P25**	**P30/P40**	**P31/P41**	**Mod. 2000**	**96-3100**	**98-3100**	**93-3100**
Features	• **25FLA rating** • Control 3Ø loads • Field replaceable contacts • Optional auxiliary switch • Universal mounting plate	• **30 - 40FLA rating** • P30 switches 30A • P40 switches 40A • Field replaceable contacts • Optional auxiliary switch • Universal mounting plate	• **16 - 40FLA rating** • P31 is 3 pole • P41 is 4 pole • Universal mounting plate • Various terminal options	• **25-30FLA rating** • 1 or 2 pole • New design is small, lightweight • Enclosed case and plastic base for quiet operation • Design permits direct access to mounting holes	• **20-40FLA rating** • 1 or 2 pole • Robust design • Arc cover standard on 40FLA types, optional on others • Convenient mounting plate	• **20-40FLA rating** • 3 pole • Arc cover standard on 40FLA types, optional on others • Convenient mounting plate • Optional auxiliary switches • Manual test button	• **50-60FLA rating** • 3 pole • Arc cover standard • Convenient mounting plate • Optional auxiliary switches
Approximate Dimensions	2.50" x 3.80" x 3.33"h (64.8 x 96.5 x 63.5h) 14 oz. (397g)	2.55" x 3.80" x 3.98"h (67.3 x 96.5 x 101.1h) 28oz. (794g)	2.63" x 3.80" x 2.87"h (64.8 x 96.5 x 72.9h) 18oz. (510g)	2.125" x 3" x 2.125"h (54.0 x 76.2 x 54.0h) 4.9 oz. (140g)	2.1" x 3.3" x 2.541"h (53.3 x 83.8 x 64.5h) 8 oz. (227g)	2.375" x 3.75" x 3"h (60.3 x 95.2 x 76.2h) 16 oz. (455g)	2.75" x 3.75" x 3.56"h (69.9 x 95.2 x 90.5h) 32 oz. (910g)
Contact Arrangements	3 Form X and 2 Form X + 1 Form Y	3 Form X to 4 Form Y	3 Form X to 4 Form X	1 Form X w/ or w/o shunt, 2 Form X	1 Form X w/ or w/o shunt, 2 Form X	3 Form X	3 Form X
Contact Material	AgCdO	AgCdO	AgCdO	AgCdO	AgCdO	AgCdO	AgCdO
Maximum Contact Rating	25FLA/100LRA @ 600VAC 30A res. @ 600VAC	(P30) 30FLA/120LRA @ 600VAC 40A res. @ 600VAC (P40) 40FLA/160LRA @ 600VAC 50A res. @ 600VAC	40FLA/160LRA @ 600VAC 50A res. @ 600VAC	30FLA/150LRA @ 277VAC 40A res. @ 277VAC	40FLA/240LRA @ 240/277VAC 40FLA/200LRA @ 480VAC 40FLA/160LRA @ 600VAC 50A res. @ 600VAC	40FLA/240LRA @ 240/277VAC 40FLA/200LRA @ 480VAC 40FLA/160LRA @ 600VAC 50A res. @ 600VAC	60FLA/360LRA @ 240VAC 60FLA/300LRA @ 480VAC 60FLA/240LRA @ 600VAC 75A res. @ 600VAC
Expected Mechanical Life	2 x 10^6 Ops. (DC coil) 5 x 10^6 Ops. (AC coil)	2 x 10^6 Ops. (DC coil) 1 x 10^7 Ops. (AC coil)	5 x 10^5 Ops	5 x 10^5 Ops.	—	—	—
Expected Electrical Life at Rated Load	5 x 10^5	2 x 10^5	2 x 10^5	2 x 10^5	—	—	—
Nominal Coil Voltage	12-24VDC 120-240VAC	21-120VDC 24-277VAC	12 & 24VDC	24-277VAC	24-277VAC	24-480VAC	24-480VAC
Nominal Coil Power	4.8W (DC) 10VA (AC)	7.5W (DC) 12VA (AC)	8W	6VA	5.25-7.0VA	5.0VA	14.0VA
Mounting Options	Panel mount	Panel mount	Panel mount	Panel mount	Panel mount	Panel mount	Panel mount
Sockets / Connectors	—	—	—	—	—	—	—
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Specifications and/or agency recognitions do not necessarily apply to all models within a particular series. When multiple ratings are listed, no individual rating may be exceeded by the combination of others.

Power Relays & Definite Purpose Contactors				Latching, Impulse, Rotary & Special Application Relays			
							
	PRODUCTS UNLIMITED	**PRODUCTS UNLIMITED**	**PRODUCTS UNLIMITED**	**SCHRACK**	**OEG**	**SCHRACK**	**P&B**
Series	**93-3100**	**96-3186**	**A-3100**	**PE** (latching)	**PCKWK**	**RT** (latching)	**KUL**
Features	• **25-40FLA rating** • 4 pole • Arc cover standard on 40FLA types, optional on others • Convenient mounting plate • Optional auxiliary switches	• **75-90FLA rating** • 3 pole • Arc cover standard • Convenient mounting plate • Optional auxiliary switches	• **120FLA rating** • 3 pole • Arc cover standard • Convenient mounting plate • Optional auxiliary switches	• **5A rating** • Magentic latching relay • Single coil	• **16A rating** • Magentic latching relay • Dual coil	• **16A rating** • Magentic latching relay • Single or dual coil	• **10A rating** • Magentic latching relay • Single or dual coil • Sockets available
Approximate Dimensions	3.05" x 3.75" x 2.63"h (77.6 x 95.2 x 66.9h) 24 oz. (683g)	3.75" x 5.0" x 4.06"h (95.2 x 127 x 103h) 64 oz. (1,820g)	4.625" x 6.375" x 5.0"h (117.5 x 161.9 x 127h) 128 oz. (3,640g)	.787" x .394" x .394"h (20 x 20 x 10h) .18 oz. (5g)	.957" x .457" x 1.05"h (24.3 x 11.6 x 26.7h) .49 oz. (14g)	1.14" x .50" x .62"h (29 x 12.7 x 15.7h) .46 oz. (13g)	1.53" x 1.41" x 2.16"h (38.9 x 35.7 x 54.8h) 3.4 oz. (96g)
Contact Arrangements	4 Form X	3 Form X	3 Form X	1 Form C	1 Form A	1 Form C, 2 Form C	1 Form C, 2 Form C, 3 Form C
Contact Material	AgCdO	AgCdO	AgCdO	AgNi 90/10	AgSnO	AgNi 90/10	Ag AgCdO
Maximum Contact Rating	40FLA/240LRA @ 240/277VAC 40FLA/200LRA @ 480VAC 40FLA/160LRA @ 600VAC 50A res. @ 600VAC	90FLA/540LRA @ 240VAC 90FLA/450LRA @ 480VAC 90FLA/360LRA @ 600VAC 120A res. @ 600VAC	120FLA/720LRA @ 240VAC 120FLA/600LRA @ 480VAC 120FLA/480LRA @ 600VAC 150A res. @ 600VAC	5A @ 250VAC	16A @ 277VAC	16A @ 240VAC (1 pole) 8A @ 240VAC (2 pole)	5A @ 28VDC or 240VAC 10A @ 28VDC or 240VAC 1/4HP @ 120VAC 1/3HP @ 250-600VAC
Expected Mechanical Life	—	—	—	5×10^6 Ops.	5×10^6 Ops.	5×10^6 Ops. (1 pole) 2×10^6 Ops. (2 pole)	1×10^7 Ops.
Expected Electrical Life at Rated Load	—	—	—	1×10^5	1×10^5	1×10^4 (1 pole) 3×10^4 (2 pole)	1×10^5
Nominal Coil Voltage	24-480VAC	24-480VAC	24-480VAC	32-24VDC	312VDC	5-24VDC	12-48VDC 24-240VAC
Nominal Coil Power	9.0-9.5VA	27.0VA	40.0-48.0VA	360mW	1,800mW (set) 800mW (reset)	400mW (1 coil) 600mW (2 coil)	1.6W (DC dual coil) 1.2W (DC single coil)
Mounting Options	Panel mount	Panel mount	Panel mount	PC board	PC board	PC board	Socket
Sockets / Connectors	—	—	—	—	—	—	Screw terminal, Solder terminal, PC terminal, Quick connect terminal
Page Number	836	838	840	902	904	906	908

Specifications and/or agency recognitions do not necessarily apply to all models within a particular series. When multiple ratings are listed, no individual rating may be exceeded by the combination of others.

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Specifications and availability subject to change.

Latching, Impulse, Rotary & Special Application Relays

	 P&B	 P&B	 P&B	 P&B	 AGASTAT	 AGASTAT	 AGASTAT
Series	**KB-KBP**	**S89/S90**	**MDR**	**136**	**GP**	**ML**	**TR**
Features	• **10A rating** • Dual coil, mechanical latching relay • Available as an open relay or in a clear dust cover with plug-in base • Up to 5 poles • Sockets available	• **10 - 20A rating** • Low cost, bistable, impulse relay • Optional dust cover with plug-in base • Up to 4 poles	• **10A rating** • Rotary relay • Withstands high-impact shock blows with no contact chatter • Latching & non-latching types • Up to 24 poles	• **20A rating** • Traffic control (flash transfer) relay • Clear plastic dust cover with 8-position Jones plug • CALTRANS and NEMA approved	• **10A rating** • Control relay • Articulated design produces wide contact gap • Plastic dust cover • Optional mag. blow-out • Sockets available	• **10A rating** • Magnetic latching control relay • Articulated design produces wide contact gap • Plastic dust cover • Optional mag. blow-out • Sockets available	• **10A rating** • On- delay timing control relay • Articulated design produces wide contact gap • Plastic dust cover • Optional mag. blow-out • Sockets available
Approximate Dimensions	1.78" x 2.41" x 3.56"h (45.2 x 61.1 x 90.4h) 10.8 oz. (306g)	2.70" x 2.00" x 2.42"h (68.6 x 50.8 x 61.5h) 7.8 oz. (241g)	2.63" x 2.63" x 3.13"h (66.7 x 66.7 x 79.5h) 32 oz. (900g)	2.375" x 1.75" x 2.8"h (60.3 x 44.4 x 71.1h) 11 oz. (312g)	1.77" x 1.77" x 4.3"h (45.0 x 45.0 x 109.0h) 10.3 oz. (288g)	1.77" x 1.77" x 4.3"h (45.0 x 45.0 x 109.0h) 10.3 oz. (288g)	1.77" x 1.77" x 4.3"h (45.0 x 45.0 x 109.0h) 10.3 oz. (288g)
Contact Arrangements	2 Form C to 5 Form C	1 Form A to 4 Form C	4 Form C to 24 Form C	2 Form C	4 Form C	4 Form C	4 Form C
Contact Material	AgCdO	Ag AgCdO	Ag AgCdO	AgPd	Ag Plated	Ag Plated	Ag Plated
Maximum Contact Rating	10A @ 120VAC	(S89) 15A @ 250VAC 1/2 HP @ 125VAC (S90) 20A @ 277VAC 2 HP @ 250VAC	10A @ 115VAC 3A @ 28VDC 800mA @ 125VDC	20A Tungsten @ 120VAC	10A @ 120VAC	10A @ 120VAC	10A @ 120VAC
Expected Mechanical Life	5 x 10^5 Ops.	1 x 10^5 Ops.	—	5 x 10^6 Ops.	1 x 10^8 Ops.	1 x 10^8 Ops.	1 x 10^8 Ops.
Expected Electrical Life at Rated Load	5 x 10^4	5 x 10^4	—	2.5 x 10^5	1 x 10^6	1 x 10^6	1 x 10^6
Nominal Coil Voltage	12-110VDC 24-240VAC	6-24VDC 24-240VAC	28-125VDC 115-440VAC	120VAC	12-250VDC 24-220VAC	12-250VDC 24-220VAC	24-215VDC 120VAC
Nominal Coil Power	2.7W (DC) 5.3-7.8VA (AC)	6.33W (DC) 9VA (AC)	5.1-21.8W	10VA	6W 6VA	6W 6VA	6W 6VA
Mounting Options	Socket	Panel mount, Socket	Panel mount	Socket	Socket	Socket	Socket
Sockets / Connectors	Screw terminal, Solder terminal	Screw terminal	—	8-position Jones plug	Screw terminal	Screw terminal	Screw terminal
Page Number	910	912	914	916	917	917	917

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Automotive Relays

	 TYCO ELECTRONICS	 TYCO ELECTRONICS	 TYCO ELECTRONICS	 TYCO ELECTRONICS	 TYCO ELECTRONICS	 TYCO ELECTRONICS	 TYCO ELECTRONICS	 TYCO ELECTRONICS
Series	**V23086**	**T72M**	**VKP**	**V2R**	**VFM**	**VF4**	**VF7**	**VTF**
Features	• **20A rating** • Micro-miniature PC board relay • 60% less volume than comparable relays • Sealed case	• **20A rating** • Miniature PC board relay • Sealed case • 105°C Ambient	• **40A rating** • PC board relay • Available open or with sealed case • Various contact arrangements • Minimum PCB real estate	• **20A rating** • Motor reversing contact arragement • Sealed case • Miniature PC board relay • 105°C ambient	• **20A rating** • Miniature relay for plug-in or PC board mounting • Plastic enclosure • Various contact arrangements	• **40A rating** • Plug-in or PC board mountable relay • Various enclosure options • Various contact arrangements • Optional mounting bracket	• **70A rating** • Plug-in or PC board mountable relay • 1 Form A contact arrangement • Optional mounting bracket	• **279W rating** • Turn signal, hazard, or combination versions • Flash rate not sensitive to load current • Electronic timing with relay output • Meets applicable U.S. standards
Approximate Dimensions	.472" x .508" x .39"h (12.0 x 12.9 x 9.9h) 0.14 oz. (4g)	.89" x .65" x .67"h (22.5 x 16.5 x 17h) 0.4 oz. (12g)	.911"x.748"x.715"h (23.1x19.0x18.2h) 0.7 oz. (20g)	1.46" x .65" x .67"h (37.1 x 16.5 x 17h) 0.9 oz. (25g)	.610"x.906"x1.02"h (15.5 x 23 x 26h) 0.7 oz. (19.8g)	1.12" x 1.12" x .987"h (28.5 x 28.5 x 25.1h) 1.1 oz. (31g)	1.04"x1.04"x.992"h (26.5x26.5x25.2h) 1.1 oz. (31g)	1.12" x 1.12" x 1.6"h (28.5 x 28.5 x 40.5h) 1.3 oz. (37g)
Contact Arrangements	1 Form C	1 Form C	1 Form A, 1 Form C	2 x 1 Form C (H-Bridge)	1 Form A, 1 Form C	1 Form A, 1 Form C	1 Form A	1 Form A
Contact Material	AgNi 0.15 AgSnO	AgNi 0.15 AgSnO	AgNi 0.15 PdCu, AgSnO AgSnO	AgNi 0.15	AgSnO AgNi 0.15	AgSnO AgNi 0.15	AgNi 0.15	PdCu AgCu
Contact Rating @ 85°C (Form A only, nominal coil voltage)	20A @ 14VDC	20A @ 14VDC	40A @ 14VDC	20A @ 14VDC	20A @ 14VDC	40A @ 14VDC	70A @ 14VDC	55W to 275W (Lamp)
Expected Mech. Life	1 x 10^7 Ops.	1 x 10^7 Ops.	1 x 10^7 Ops.	1 x 10^7 Ops.	1 x 10^7 Ops.	1 x 10^7 Ops.	1 x 10^7 Ops.	1 x 10^7 Ops.
Expected Electrical Life at Rated Load	1 x 10^5	1 x 10^5	1 x 10^5	1 x 10^5	1 x 10^5	1 x 10^5	1 x 10^5	1 x 10^6 - 3 x 10^6 (Load dependent)
Nominal Coil Voltage	12VDC	12 & 24VDC	12 & 24VDC	12VDC	12VDC	12 & 24VDC	12VDC	12VDC
Nominal Coil Power	.55W	.8W	1.6W	.64W .91W	1.6W	1.6W-1.81W	2.0W	1.6W
Mounting Options	PC board	PC board	PC board	PC board	Plug-in	PC board, Plug-in, Bracket	Plug-in, Bracket	Plug-in
Sockets / Connectors	–	—	—	—	PC terminal socket, wiring harness style connector	PC terminal socket, wiring harness style connector with or without bracket	Wiring harness style connector	PC terminal socket, wiring harness style connector with or without bracket
Page Number	1002	1005	1007	1012	1014	1017	1021	1024

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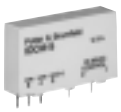
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Solid State Relays & Input/Output Modules

	 P&B	 P&B	 P&B	 P&B	 P&B	 P&B	 P&B	 P&B
Series	**SSRT**	**SSR**	**SSRD**	**SSRQ**	**IAC**	**OAC**	**IDC**	**ODC**
Features	• **10 - 25A rating** • "Hockey Puck" package • LED indicator • Triac output • AC & DC input	• **25 - 125A rating** • "Hockey Puck" package • LED indicator • Inverse parallel SCR output • AC & DC input	• **25-40A rating per output** • Two independent solid state relays in one "Hockey Puck" package • Inverse parallel SCR output	• **20A rating per output** • Four independent solid state relays in one "Hockey Puck" package • Triac output	• **0.05A output rating** • AC input module • Industry standard 0.6" (15.2mm) wide package • Series operation compatible	• **5A output rating** • AC output module • Industry standard 0.6" (15.2mm) wide package • Series operation compatible	• **0.05A output rating** • DC input module • Industry standard 0.6" (15.2mm) wide package • Series operation compatible	• **3A output rating** • DC output module • Industry standard 0.6" (15.2mm) wide package • Series operation compatible
Approximate Dimensions	1.75" x 2.25" x .87"h (44.4 x 57.2 x 22h) 3.5 oz. (98g)	1.75" x 2.25" x .87"h (44.4 x 57.2 x 22h) 3.5 oz. (98g)	1.75" x 2.25" x .89"h (44.4 x 57.2 x 22.6h) 3.5 oz. (98g)	1.75" x 2.3" x .85"h (44.4 x 58.4 x 21.6h) 3.5 oz. (98g)	1.7" x .60" x 1.25"h (43.2 x 15.2 x 31.8h) 1.48 oz. (42g)	1.7" x .60" x 1.25"h (43.2 x 15.2 x 31.8h) 1.48 oz. (42g)	1.7" x .60" x 1.25"h (43.2 x 15.2 x 31.8h) 1.48 oz. (42g)	1.7" x .60" x 1.25"h (43.2 x 15.2 x 31.8h) 1.48 oz. (42g)
Switch Arrangement	1 Form A	1 Form A	(2) x 1 Form A	(4) x 1 Form A	1 Form A (sinking)	1 Form A	1 Form A (sinking)	1 Form A
Coupling	Optical	Optical	Optical	Optical	Optical	Optical	Optical	Optical
Input	3-32VDC 90-280VAC	3-32VDC 90-280VAC	4-15VDC	4-15VDC	18-36VAC/VDC 90-140VAC/VDC 180-280VAC/VDC	5VDC 15VDC 24VDC	3.3-32VDC 4-32VDC 10-60VDC	5VDC 15VDC 24VDC
Output Switching	Zero	Zero, Random	Zero, Random	Zero, Random	Random	Zero	Random	Random
Min. Output Current	.1A	.05 or .1A (model dependent)	.1A	.15A	>0	.05A	>0	.01A
Max. Output Current	25A	125A	40A	20A	0.05A	3A to 5A	0.05A	1A @ 250V 3A @ 60V
Min. Output Voltage	24V	24 or 48V (model dependent)	24V	24V	>0	24V	>0	3V
Max. Output Voltage	280V	280 or 660V (model dependent)	280V	280V	30V	280V	30V	60V, 250V
Output Type	AC	AC	AC	AC	DC	AC	DC	DC
Terminals	Screw	Screw	Quick connect	Quick connect	Printed circuit	Printed circuit	Printed circuit	Printed circuit
Mounting	Chassis mount	Chassis mount	Chassis mount	Chassis mount	Mounting board	Mounting board	Mounting board	Mounting board
Page Number	1102	1104	1106	1108	1110	1110	1110	1110

Specifications and/or agency recognitions do not necessarily apply to all models within a particular series. When multiple ratings are listed, no individual rating may be exceeded by the combination of others.

Solid State Input/Output Modules

				
	P&B	**P&B**	**P&B**	**P&B**
Series	**IACM**	**OACM**	**IDCM**	**ODCM**
Features	• **0.05A output rating** • Slim line AC input module • Only 0.4" (10.2mm) wide package • Series operation compatible	• **5A output rating** • Slim line AC output module • Only 0.4" (10.2mm) wide package • Series operation compatible	• **0.05A output rating** • Slim line DC input module • Only 0.4" (10.2mm) wide package • Series operation compatible	• **3A output rating** • Slim line DC output module • Only 0.4" (10.2mm) wide package • Series operation compatible
Approximate Dimensions	1.7" x .4" x 1.0"h (43.2 x 10.2 x 25.4h) 0.9 oz. (25.5g)	1.7" x .4" x 1.0"h (43.2 x 10.2 x 25.4h) 0.9 oz. (25.5g)	1.7" x .4" x 1.0"h (43.2 x 10.2 x 25.4h) 0.9 oz. (25.5g)	1.7" x .4" x 1.0"h (43.2 x 10.2 x 25.4h) 0.9 oz. (25.5g)
Switch Arrangement	1 Form A (sinking)	1 Form A	1 Form A (sinking)	1 Form A
Coupling	Optical	Optical	Optical	Optical
Input	18-36VAC/VDC 90-140VAC/VDC 180-280VAC/VDC	5VDC 15VDC 24VDC 3-15VDC	3.3-32VDC 4-32VDC 10-60VDC	5VDC 15VDC 24VDC 3-15VDC
Output Switching	Random	Zero, Random	Random	Random
Minimum Output Current	>0	.05A	>0	.01A
Maximum Output Current	0.05A	3A to 5A	0.05A	3A
Minimum Output Voltage	>0	24V	>0	3V
Maximum Output Voltage	30V	280V	30V	60V
Output Type	DC	AC	DC	DC
Terminals	Printed circuit	Printed circuit	Printed circuit	Printed circuit
Mounting	Mounting board	Mounting board	Mounting board	Mounting board
Page Number	1118	1118	1118	1118

Time Delay Relays

		
	P&B	**AGASTAT**
Series	**3RP1**	**48K**
Features	• **3A rating** • Programmable time delay relay • Universal or fixed input voltage • Fits 35 mm DIN track • Consult factory for VDE file	• **10A rating** • Programmable time delay relay • Universal input voltage • LED status indicators • 1/16 DIN style enclosure
Approximate Dimensions	4.02" x .886" x 3.39"h (102 x 22.5 x 86h) 5.3 oz. (150g)	1.89" x 1.89" x 2.73"h (48.0 x 48.0 x 69.3h) 5.0 oz. (142g)
Contact Arrang.	1 Form C, 2 Form C	2 Form C
Contact Rating	3A @ 250VAC	10A @ 30VDC or 120/240VAC
Mode of Operation	Programmable: 8 -16 timing functions or Delay On	Programmable 8 functions (11-pin) 4 functions (8-pin) or Delay On
Delay Time	0.05 sec. to 100 hr.	0.1 sec. to 10 hr.
Type of Control	Rotary switches & Potentiometer Adj.	Knob & Rotary switches
Maximum Repeatability	±1%	±0.5% ± 0.02 sec.
Precision	Tolerance ±5%	Overall Accuracy ±1.0% ± 0.02 sec.
Temp. Range	-25°C to +60°C	-25°C to +60°C
Input Voltage	24-240VAC/VDC; 24VAC/VDC. 110VAC; 24VAC/VDC. 220VAC	24-240VAC; 24-125VDC; 120VAC
Mounting	DIN Mount	Plug-in
Page Number	1207	1210

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Specifications and availability subject to change.

Time Delay Relays & Modules

							
	P&B	**P&B**	**P&B**	**AGASTAT**	**AGASTAT**	**P&B**	**P&B**
Series	**CNT**	**CNS**	**CNM5**	**SSF**	**SCF**	**CN1**	**CG**
Features	• **10A rating** • Programmable timer/counter • Digital display • Universal input voltage • 1/16 DIN style enclosure	• **10A rating** • Programmable time delay relay • Universal input voltage • 1/16 DIN style enclosure	• **10A rating** • Economical, programmable time delay relay • Digital accuracy • LED shows status • 1/16 DIN style enclosure	• **10A rating** • Programmable time delay module with replaceable relay • Universal input voltage	• **10A rating** • Programmable time delay relay • Slim plug-in package with mating socket	• **10A rating** • Economical single function (on delay) time delay relay • Digital accuracy • LED shows status • 1/16 DIN style enclosure	• **10A rating** • Top of the line P&B non-programmable time delay relays • Extended timing ranges
Approximate Dimensions	1.88" x 1.88" x 2.83"h (47.8 x 47.8 x 71.9h) 4.3 oz. (122g)	1.88" x 1.88" x 2.83"h (47.8 x 47.8 x 71.9h) 4.3 oz. (122g)	1.88" x 1.88" x 2.83"h (47.8 x 47.8 x 71.9h) 4.3 oz. (122g)	3.81" x 2.19" x 2.67"h (97 x 56 x 68h) 5.5 oz. (156g)	2.84" x 1.42" x 3.53"h (72 x 36 x 90h) 3.5 oz. (99g)	1.88" x 1.88" x 2.83"h (47.8 x 47.8 x 71.9h) 4.3 oz. (122g)	2.41" x 1.78" x 2.94"h (61.1 x 45.2 x 74.6h) 8 oz. (227g)
Contact Arrang.	2 Form C	2 Form C	2 Form C	2 Form C	2 Form C	2 Form C	2 Form C
Contact Rating	10A @ 30VDC or 277VAC	10A @ 30VDC or 277VAC	10A @ 30VDC or 277VAC	10A @ 28VDC or 120VAC	5 or 10A @ 28VDC or 120VAC	10A @ 30VDC or 277VAC	10A @ 240VAC
Mode of Operation	Programmable: 10 timing functions 2 counting functions	Programmable: 8 functions (11-pin) 4 functions (8-pin)	Programmable: 5 timing functions	Programmable 4 functions	Programmable 4 functions	On Delay	Delay on Operate Delay on Release Interval On
Delay Time	0.1 sec. to 9,990 hr.	0.1 sec. to 100 min.	0.1 sec. to 9,990 hr.	0.1 sec. to 10 hr.	0.1 sec. to 10 hr.	0.1 sec. to 9,990 hr.	1 min. to 50 min.
Type of Control	Thumbwheel switches	DIP switches & Potentiometer Adj.	Thumbwheel switches & Rotary switch	Recessed Potentiometer Adj.	Recessed dials and Potentiometer Adj.	Thumbwheel switches	Potentiometer Adj.
Maximum Repeatability	±0.1% ± 0.05 sec.	±0.2%	±0.05% ± 0.04 sec.	±1% ± 0.01 sec.	±1% ± 0.01 sec.	±0.05% ± 0.04 sec.	±0.5% (AC) ±0.1% (DC)
Precision	Tolerance ±0.1% ± 0.05 sec.	Tolerance Min. spec. at min.; +20%, -0 at max.	Tolerance ±0.05% ± 0.04 sec.	Overall Accuracy ±3% ± 0.01 sec.	Overall Accuracy ±3% ± 0.01 sec.	Tolerance ±0.05% ± 0.04 sec.	Tolerance +0, -10% at min. +10%, -0 at max.
Temp. Range	-10°C to +55°C	-10°C to +55°C	-10°C to +55°C	-30°C to +65°C	-30°C to +65°C	-10°C to +55°C	-10°C to +55°C
Input Voltage	12VDC 24-240VAC/VDC	24-240VAC/VDC	120VAC	24-125VDC 24-240VAC or User-selectable	12-125VDC 24-240VAC	120VAC	12-24VDC 120-240VAC
Mounting	Plug-in	Plug-in	Plug-in	DIN-mount or panel mount	Plug-in	Plug-in	Plug-in
Page Number	1211	1213	1215	1217	1218	1219	1220

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Specifications and availability subject to change.

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Technical support:
Refer to inside back cover.

Time Delay Relays & Modules

	 P&B	 P&B	 P&B	 P&B	 P&B	 P&B	 AGASTAT
Series	**CD**	**CK**	**CH**	**CB**	**CR**	**CL/CU**	**MD0**
Features	• **10A rating** • Ideal for many demanding applications • Broad temperature range	• **10A rating** • Broad line • Wide choice of functions • Extremely versatile	• **10A rating** • Wide range of industrial applications • Dependable timing cycles	• **10A rating** • Economical for volume applications • Various timing ranges	• **10A rating** • Recycle timer allows independent control of ON and OFF delays • Time as low as 0.1 sec.	• **10A rating** • Compact package is well-suited for many OEM applications • Various mounting options	• **5A rating** • Specification grade • Subminiature package • On-delay timer • Universal input voltage
Approximate Dimensions	2.41" x 1.78" x 2.94"h (61.1 x 45.2 x 74.6h) 8 oz. (227g)	2.41" x 1.78" x 2.94"h (61.1 x 45.2 x 74.6h) 6 oz. (170g)	2.41" x 1.78" x 2.94"h (61.1 x 45.2 x 74.6h) 6 oz. (170g)	2.41" x 1.78" x 2.94"h (61.1 x 45.2 x 74.6h) 6 oz. (170g)	2.41" x 1.78" x 3.56"h (61.1 x 45.2 x 90.4h) 6 oz. (170g)	1.53" x 1.41" x 1.91"h (38.9 x 35.7 x 48.4h) 3.5 oz. (99g)	1.05" x .85" x 2.75"h (26.7 x 21.6 x 69.8h) 4 oz. (96g)
Contact Arrang.	2 Form C	2 Form C	2 Form C	2 Form C	2 Form C	2 Form C	2 Form C, 4 Form C
Contact Rating	10A @ 240VAC	10A @ 240VAC	10A @ 240VAC	10A @ 240VAC	10A @ 240VAC	10A @ 28VDC or 240VAC	5A @ 30VDC or 240VAC
Mode of Operation	Delay on Operate Delay on Release	Delay on Operate Delay on Release Interval On Delay on Dropout	Delay on Operate Delay on Release Interval On	Delay on Operate Delay on Release Interval On	Recycle Timer	Delay on Operate	On Delay
Delay Time	0.1 sec. to 180 sec.	0.1 sec. to 180 sec.	1 sec. to 180 sec.	0.1 sec. to 100 min.	0.1 sec. to 180 sec.	0.1 sec. to 120 sec.	0.1 sec. to 10 hr.
Type of Control	Fixed, Potentiometer Adj., Ext. Res. Adj.	Fixed, Potentiometer Adj., Ext. Res. Adj.	Fixed, Potentiometer Adj.	Potentiometer Adj.	Potentiometer Adj.	Fixed, Potentiometer Adj., Ext. Res. Adj.	Potentiometer Adj.
Maximum Repeatability	±1%	±2%	±2%	±2%	±2%	±3%	±0.5%
Precision	Tolerance ±5% (fixed only)	Tolerance Min. specified delay time or less at min,; -0, +20% at max. (knob) ±5% (fixed)	Tolerance ±5% (fixed only)	Tolerance Min. specified delay time or less at min,; -0, +30% at max.	Tolerance Min. specified delay time or less at min,; -0, +20% at max.	Tolerance ±5%(fixed only)	Overall Accuracy ±1% ± 0.02 sec.
Temp. Range	-40°C to +55°C	-10°C to +55°C	-10°C to +55°C	-10°C to +55°C	-10°C to +55°C	-10°C to +40°C	-25°C to +60°C
Input Voltage	12-110VDC 24-120VAC	12-24VDC 24-120VAC	24VDC 24-240VAC	12-24VDC 24-120VAC	24VDC 120VAC	12-24VDC 24-120VAC	12-125VDC 24-240VAC
Mounting	Plug-in	Plug-in	Plug-in	Plug-in	Plug-in	Plug-in	Plug-in
Page Number	1222	1224	1226	1228	1230	1231	1233

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Dimensions are shown for reference purposes only.

Dimensions are in inches over (millimeters) unless otherwise specified.

Specifications and availability subject to change.

Time Delay Relays & Modules

	 AGASTAT	 AGASTAT	 AGASTAT	 AGASTAT	 AGASTAT	 AGASTAT	 AGASTAT	 AGASTAT
Series	**SSC**	**SCB/SCC**	**STA**	**SRC**	**SST**	**SCE**	**VTM-1**	**VTM1**
Features	• **10A rating** • Specification grade • Choose from 13 different timing ranges	• **10A rating** • Specification grade • Choose from 13 different timing ranges • Premium components	• **10A rating** • Specification grade • Choose from 13 different timing ranges • LED indicators • Space-saving quick connect plug-in terminals	• **10A rating** • Specification grade • Repeat cycle timer • Choose from 13 different timing ranges • Premium components	• **10A rating** • Industrial grade • Wide choice of functions • 9 different timing ranges	• **10A rating** • Specification grade • True Off Delay • 6 different timing ranges	• **1A rating** • Specification grade • In-line timing module • Solid state output switch • Universal input voltage	• **1A rating** • On Delay timing module • Solid state output switch • External Res. adjustable
Approximate Dimensions	1.97" x 1.97" x 3.25"h (50 x 50 x 83h) 4 oz. (112g)	1.97" x 1.97" x 3.25"h (50 x 50 x 83h) 4 oz. (112g)	1.5" x 1.39" x 3.045"h (38 x 35 x 77h) 4.2 oz. (119g)	1.97" x 1.97" x 3.25"h (50 x 50 x 83h) 5.3 oz. (149g)	2.0" x 2.0" x 3.2"h (50.8 x 50.8 x 81.3h) 4 oz. (112g)	1.97" x 1.97" x 3.25"h (50 x 50 x 83h) 4 oz. (112g)	2.13" x 2.65" x 0.76"h (54 x 67 x 19h) 3 oz. (84g)	2.0" x 2.0" x 1.25"h (50.8 x 50.8 x 31.8h) 4 oz. (112g)
Contact. Arrang.	2 Form C	2 Form C	2 Form C	2 Form C	2 Form C	1 Form C, 2 Form C	1 Form A	1 Form A
Contact Rating	10A @ 28VDC or 120VAC	10A @ 28VDC or 120VAC	10A @ 28VDC or 120VAC	10A @ 28VDC or 120VAC	10A @ 120/240VAC	10A @ 120/240VAC (1 pole) or 5A @ 120/240VAC	1A @ 240VAC/VDC	1A @ 240VAC/VDC
Mode of Operation	On Delay Off Delay Interval	On Delay Off Delay Interval	On Delay Off Delay Interval Accum. On Delay	Repeat Cycle	On Delay, Off Delay, Interval, One Shot, Repeat Cycle	True Off Delay	On Delay	On Delay
Delay Time	0.1 sec. to 10 hr.	0.1 sec. to 10 hr.	0.1 sec. to 10 hr.	0.1 sec. to 60 min.	0.1 sec. to 120 min.	0.1 sec. to 10 min.	1 sec. to 1,000 sec.	0.5 sec. to 60 min.
Type of Control	Fixed, Potentiometer Adj., Ext. Res. Adj.	Fixed, Potentiometer Adj., Ext. Res. Adj.	Fixed, Potentiometer Adj., Ext. Res. Adj.	Potentiometer Adj.	Potentiometer Adj.	Fixed, Potentiometer Adj.,	Ext. Res. Adj.	Ext. Res. Adj.
Maximum Repeatability	±1% ±0.004 sec.	±0.5% ±0.004 sec.	±0.5% ±0.004 sec.	±1% ±0.004 sec.	±1%	±1%	±2%	±1%
Precision	Overall Accuracy ±5.25%	Overall Accuracy ±2%	Overall Accuracy ±2%	Overall Accuracy ±2.25%	Overall Accuracy ±5%	Overall Accuracy ±5%	Overall Accuracy ±2%	Overall Accuracy ±2% at R = 1 megohm
Temp. Range	-30°C to +65°C	-30°C to +65°C (SCB)	-30°C to +65°C	-30°C to +65°C	-23°C to +54°C	-30°C to +65°C	-30°C to +65°C	-40°C to +65°C
Input Voltage	12-120VDC 24-240VAC	12-120VDC 24-240VAC	12-120VDC 24-240VAC	12-120VDC 24-240VAC	12-120VDC 24-120VAC	24-125VDC 24-120VAC	24-240 VAC/VDC or 12VDC	12-120VAC/VDC
Mounting	Plug-in	Plug-in	Plug-in	Plug-in	Plug-in	Plug-in	Panel mount	Panel Mount
Page Number	1234	1235	1236	1237	1238	1239	1240	1241

Specifications and/or agency recognitions do not necessarily apply to all models within a particular series. When multiple ratings are listed, no individual rating may be exceeded by the combination of others.

Time Delay Relays & Modules

	 AGASTAT	 AGASTAT	 AGASTAT	 AGASTAT	 AGASTAT	 AGASTAT	 AGASTAT	 AGASTAT
Series	**VTMA1**	**VTMR1**	**VTM2**	**VTM3**	**VTM4**	**VTM7**	**7000**	**2100**
Features	• **1A rating** • On Delay timing module • Solid state output switch • Internal potentiometer	• **8A rating** • On Delay timing module • Electromechanical relay output • Internal potentiometer	• **1A rating** • Off Delay timing module • Solid state output switch • External Res. adjustable	• **1A rating** • Interval timing module • Solid state output switch • External Res. adjustable	• **1A rating** • One Shot timing module • Solid state output switch • External Res. adjustable	• **1A rating** • Repeat cycle timing module • Independently adjustable on and off times • Solid state output switch • External Res. adjustable	• **20A rating** • Electropneumatic time delay relay • Calibrated timing head • Front terminals • Optional auxiliary switches • Many options	• **10A rating** • Miniature electropneumatic time delay relay • Knob or key adj. • Hermetically sealed, high shock and vibration option
Approximate Dimensions	2.0" x 2.0" x 1.25"h (50.8 x 50.8 x 31.8h) 4 oz. (112g)	2.0" x 2.0" x 1.25"h (50.8 x 50.8 x 31.8h) 4 oz. (112g)	2.0" x 2.0" x 1.25"h (50.8 x 50.8 x 31.8h) 4 oz. (112g)	2.0" x 2.0" x 1.25"h (50.8 x 50.8 x 31.8h) 4 oz. (112g)	2.0" x 2.0" x 1.25"h (50.8 x 50.8 x 31.8h) 4 oz. (112g)	2.0" x 2.0" x 1.25"h (50.8 x 50.8 x 31.8h) 4 oz. (112g)	4.52" x 2.57" x 2.83"h (114.8 x 65.3 x 71.9h) 36 oz. (1.02kg)	1.52" x 1.52" x 4.26"h (38.6 x 38.6 x 108.2h) 17 oz. (482g)
Contact. Arrang.	1 Form A	1 Form C	1 Form A	1 Form A	1 Form A	1 Form A	2 Form C, 4 Form C	2 Form C
Contact Rating	1A @ 240VAC/VDC	8A @ 120VAC	1A @ 240VAC/VDC	1A @ 240VAC/VDC	1A @ 240VAC/VDC	1A @ 240VAC/VDC	20A @ 120/240VAC 15A @ 30VDC	10A @ 120VAC or 30VDC
Mode of Operation	On Delay	On Delay	Off Delay	Interval	One Shot (Latching Interval)	Repeat Cycle	On Delay, Off Delay, On Delay-Off Delay	On Delay, Off Delay
Delay Time	0.5 sec. to 60 min.	15 to 300 sec.	0.5 sec. to 60 min.	0.5 sec. to 60 min.	0.5 sec. to 60 min.	0.5 sec. to 60 min.	0.1 sec. to 60 min.	0.03 to 180 sec.
Type of Control	Potentiometer Adj.	Potentiometer Adj.	Ext. Res. Adj.	Ext. Res. Adj.	Ext. Res. Adj.	Ext. Res. Adj.	Knob	Knob
Maximum Repeatability	±5%	±5%	±1%	±1%	±1%	±1%	±5-15% (model & delay dependent)	±5-8% (temp. dependent)
Precision	Overall Accuracy -0%,+10% at Max. -30%,+10% at Min.	Overall Accuracy -0%,+10% at Max. -30%,+10% at Min.	Overall Accuracy ±2% at R = 1 megohm	Overall Accuracy ±2% at R = 1 megohm	Overall Accuracy ±2% at R = 1 megohm	Overall Accuracy ±2% at R = 1 megohm	—	—
Temp. Range	-40°C to +65°C	-40°C to +65°C	-40°C to +65°C	-40°C to +65°C	-40°C to +65°C	-40°C to +65°C	-29°C to +74°C	-55°C to +85°C
Input Voltage	24-240VAC/VDC	120VAC	12-120VAC/VDC	12-120VAC/VDC	12-120VAC/VDC	12-120VAC/VDC	12-550VAC 28-550VDC	120-240VAC 12-125VDC
Mounting	Panel Mount	Panel Mount	Panel Mount	Panel Mount	Panel Mount	Panel Mount	Panel Mount	Panel Mount
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Specifications and/or agency recognitions do not necessarily apply to all models within a particular series. When multiple ratings are listed, no individual rating may be exceeded by the combination of others.

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Specifications and availability subject to change.

www.tycoelectronics.com
Technical support:
Refer to inside back cover.

Sensors, Monitors & Protective Relays

	 P&B	 AGASTAT	 AGASTAT	 AGASTAT	 P&B	 KILOVAC	 KILOVAC
Series	**CS**	**VCA**	**VMA**	**PMA/PMB**	**SDAS-01**	**WD25**	**WD2759**
Features	• **Single phase voltage sensor** • Functions as either an overvoltage or an undervoltage sensor • Choice of fixed pick-up and knob adjustable drop-out or knob adjustable pick-up and drop-out	• **Single phase undervoltage relay** • Fixed pick-up and internal potentiometer adjustable drop-out • Compact design	• **Single phase undervoltage relay** • Fixed pick-up and internal potentiometer adjustable drop-out • Locking potentiometer	• **Three phase power quality monitor** • Monitors voltage, phase imbalance, phase sequence, phase loss. • Start-up delay and locking potentiometer options.	• **Single phase current sensor** • AC current sensor is offered in both overcurrent and undercurrent types • Inductive coupling to power line • Potentiometer adjustable	• **Paralleling (snych check) relay** • Checks synchronization of two circuits for voltage, phase relationship and frequency • Adjustable setpoints • Single dead bus, double dead bus and generator to generator types	• **Overvoltage/ undervoltage relay** • User adjustable sensing voltages, number of phases, over and under-voltage setpoints, and time delays.
Approximate Dimensions	2.41" x 1.78" x 2.94"h (61.1 x 42.2 x 76.6h) 8 oz. (227g)	2.0" x 2.0" x 1.25"h (50.8 x 50.8 x 31.8h) 3.2 oz. (90.7g)	1.94" x 1.94" x 3.25"h (49 x 49 x 83h) 6 oz. (168g)	3.85" x 2.18" x 5.31"h (98 x 55 x 135h) 24 oz. (625g)	1.53" x 1.41" x 2.72"h (38.9 x 35.7 x 70.6h) 3.2 oz. (90g)	2.95" x 2.87" x 4.41"h (75 x 73 x 112h) 14.4 oz. (400g)	2.95" x 2.87" x 4.41"h (75 x 73 x 112h) 14.4 oz. (400g)
Contact / Switch Arrangement	2 Form C	1 Form C	2 Form C	1 Form A + 1 Form C	2 Form C	2 Form C	1 Form C for undervoltage and 1 Form C for overvoltage
Contact / Switch Rating	10A @ 28VDC or 120VAC	7A @ 250VAC 3A @ 30VDC	7A @ 250VAC 3A @ 30VDC	8A @ 250VAC 3A @ 30VDC	2A @ 28VDC or 1A @ 120VAC	5A @ 120VAC or 30VDC	5A @ 120VAC or 30VDC
Monitor / Sense Range or Threshold	16 to 140VAC or VDC in various ranges	120VAC or 240VAC, nominal	15 to 240VAC or VDC in various ranges	110 to 600VAC in various ranges	1.5 to 15A AC	120 to 480VAC, nominal 575VAC, Max. 40-400 Hz.	120 to 480VAC, nominal 700VAC, Max. 50-400 Hz.
Temperature Range	-10°C to +55°C	-23°C to +55°C	-10°C to +55°C	-10°C to +60°C	-25°C to +70°C	-40°C to +60°C	-40°C to +60°C
Terminals	Octal plug	Quick Connect	Octal plug	Screws	Quick connect	Screws	Screws
Mounting Options	Socket	Panel	Socket	DIN-rail, Panel or Machine Tool Rail (with optional adapter plate)	Socket	DIN-rail or Panel	DIN-rail or Panel
Sockets	Screw terminal	—	Screw terminal	—	Screw terminal, Solder terminal, PC terminal, Quick connect terminal	—	—
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Sensors, Monitors & Protective Relays

				
	KILOVAC	**KILOVAC**	**KILOVAC**	**KILOVAC**
Series	**WD32**	**WD47**	**WD5051**	**WD81OU**
Features	• **Reverse power relay** • Monitors the direction of power from AC generators • Adjustable trip set and time delay	• **Phase sequence relay** • Monitors the correct phase rotation and loss of phase. • No adjustments or calibration necessary.	• **One and three phase overcurrent relay** • Nominal sensing current, instantaneous over current (IOC) setpoint, time over current (TOC) setpoint and time overcurrent time delay are user configured.	• **Over/ underfrequency relay** • User selectable nominal frequency, underfrequency (UF) trip set, overfrequency (OF) trip set, UF time delay and OF time delay.
Approximate Dimensions	2.95" x 2.87" x 4.41"h (75 x 73 x 112h) 14.4 oz. (400g)	2.95" x 2.87" x 4.41"h (75 x 73 x 112h) 14.4 oz. (400g)	2.95" x 2.87" x 4.41"h (75 x 73 x 112h) 14.4 oz. (400g)	2.95" x 2.87" x 4.41"h (75 x 73 x 112h) 14.4 oz. (400g)
Contact / Switch Arrangement	2 Form C	2 Form C	1 Form C for IOC and 1 Form C for TOC	1 Form C for UF and 1 Form C for OF
Contact / Switch Rating	5A @ 120VAC or 30VDC	5A @ 120VAC or 30VDC	5A @ 120VAC or 30VDC	5A @ 120VAC or 30VDC
Monitor / Sense Range or Threshold	120 to 480VAC, nominal 575VAC, Max. 40-400 Hz. 5A, nominal	120 to 480VAC, nominal 575VAC, Max. 50-400 Hz.	1, 3, 6 or 8A 40-400 Hz.	50, 60 or 400 Hz., nominal 1000 Hz.,Max. 20 to 480VAC, 575VAC, Max.
Temperature Range	-40°C to +60°C	-40°C to +60°C	-40°C to +60°C	-40°C to +60°C
Terminals	Screws	Screws	Screws	Screws
Mounting Options	DIN-rail or Panel	DIN-rail or Panel	DIN-rail or Panel	DIN-rail or Panel
Sockets	—	—	—	—
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Need Protective Relays in Steel Cases?

Our steel-cased protective relays are not desribed in this technical databook as they do not represent the most cost-effective solution for many design requirements. While the plastic-cased WD... series products are more appropriate for many new industrial applications, we still offer our steel-cased protective relays. For details on KILOVAC steel-cased protective relays, consult technical support (see inside back cover) or visit our website at www.tycoelectronics.com.

Looking for high performance relay products?

Our KILOVAC high voltage relays; HARTMAN and KILOVAC high performance power relays, sensors and contactors; and CII high performance signal level relays, timers, sensors and solenoids are not described in detail in this technical databook. We have included an overview of those product lines in section 14 beginning on page 1401. For detailed information on our broad high performance relay product line, consult technical support (see inside back cover) or visit our website at www.tycoelectronics.com.

Specifications and/or agency recognitions do not necessarily apply to all models within a particular series. When multiple ratings are listed, no individual rating may be exceeded by the combination of others.

Alphanumeric Index

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Circuit Breakers 101-124 **1**

NOTE: A question tree that may help you in selecting an appropriate circuit breaker for your application can be found on the next page.

P&B Circuit Breaker Question Tree

This guide helps the user select one or more circuit breaker series which may be appropriate for a given application. The user should then refer to detailed specifications elsewhere in this catalog to determine the actual part number to be specified. Of course, the user must assume ultimate responsibility for determining the suitability of a breaker for a particular application.

What general type of breaker do you need?

Thermal Circuit Breaker

- Typically less expensive
- Trip point varies with ambient temperature
- One-pole and two-pole models are offered.

Pushbutton Actuator

W23 Series
Push-pull actuation for manual on/off and reset.
One pole. Screw terminals.

W28 Series (-X version)
Push-to-reset actuation.
Compact unit can replace slow-blow glass cartridge fuse and holder.
One pole. Quick connect terminals.

W54 Series
Push-to-reset actuation.
One pole. Quick connect, PC board or screw terminals.

W57 Series
Push-to-reset actuation.
Compact size.
One pole. Quick connect or PC board terminals.

W58 Series
Push-to-reset actuation.
One pole. Quick connect or screw terminals.

Toggle Actuator

W31 Series
Toggle actuation for manual on/off and reset.
One pole. Screw terminals.

Rocker Actuator

W28 Series (-S version)
Rocker actuation for manual on/off and reset.
Compact unit can replace slow-blow glass cartridge fuse and holder.
One pole. Quick connect terminals.

W33 Series
Rocker actuation for manual on/off and reset.
One or two pole. Optional indicator lamp.
Quick connect terminals.

W51 Series
Rocker actuation for manual on/off and reset.
One pole. Optional indicator lamp.
Quick connect or PC board terminals.

Magnetic Circuit Breaker

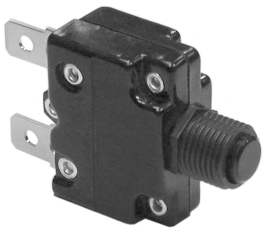
- Typically more expensive
- Temperature stable over a wide range
- Available with different time delays before tripping
- One through four poles.

Compact size

W6 Series
Toggle actuator standard, rocker optional.
Quick connect or screw terminals.

Standard size

W9 Series
Toggle actuation.
Stud terminals.



W57 series

Compact, Push To Reset Only Thermal Circuit Breaker

Features
- New, compact, design.
- 4 to 20 amp ratings.
- Cannot be manually tripped.
- Button extends for visual trip indication.
- Push button to reset breaker.
- Numerous mounting and termination options.

Agency Approvals
W57 series is UL 1077 Recognized as Supplementary Protectors, File E69543, for Canada and the United States.

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also sek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Electrical Data @ 25°C
Calibration: Will continuously carry 100% of rating.
May trip between 101% and 134%, but must trip at 135% of rating within one hour at +25°C.
Dielectric Strength: 1,500VAC (60 seconds).
Insulation Resistance: 100 megohms.
Maximum Operating Voltages: 50VDC; 250VAC, 50/60 Hz.

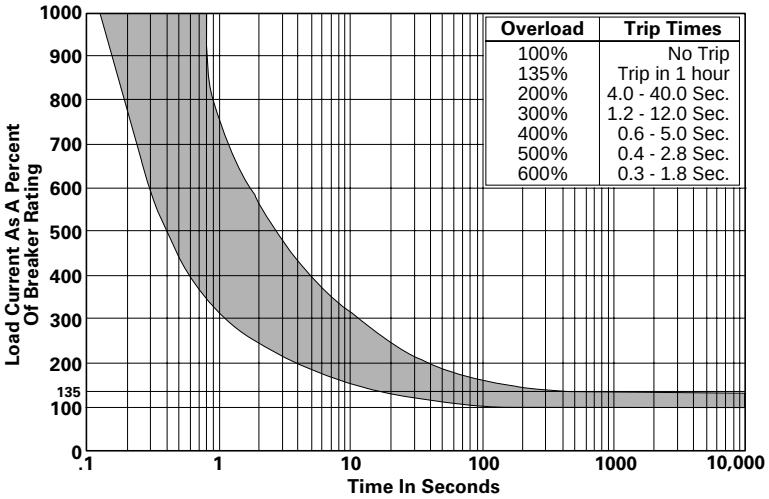
Interrupt Capacity: 1,000 amps in accordance with UL standard 1077.
Resettable Overload Capacity: Ten times rated current.
Reset Time: 60 seconds.

Typical Resistance vs. Current Rating @ +25°C

Current Rating in Amps	Typical Resistance in Ohms	Current Rating in Amps	Typical Resistance in Ohms
4.0	0.062	10.0	0.025
5.0	0.050	12.0	0.021
6.0	0.042	15.0	0.017
7.0	0.036	20.0	0.012
8.0	0.031		

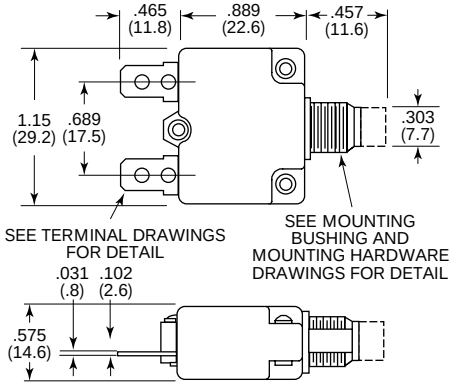
Mechanical/Environmental Data
Operating Temperature Range: 0°C to +60°C.
Termination: .250" (6.35mm) quick connects.
Mounting: Various options. See Ordering Information and drawings.
Approximate Weight: 0.5 oz. (14.3g).

Time vs. Current Trip Curve @ +25°C

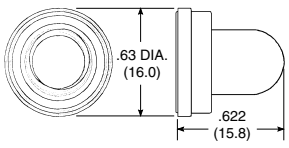


Overload	Trip Times
100%	No Trip
135%	Trip in 1 hour
200%	4.0 - 40.0 Sec.
300%	1.2 - 12.0 Sec.
400%	0.6 - 5.0 Sec.
500%	0.4 - 2.8 Sec.
600%	0.3 - 1.8 Sec.

Outline Dimensions

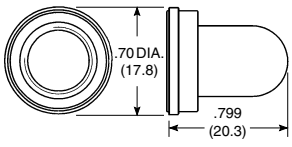


Optional Protective Boot
Silicone rubber boot is bonded to integral alumimum nut.



1-1423696-5
Black boot for W57 with 3/8"-24 bushing.

1-1423696-7
Clear boot for W57 with 3/8"-24 bushing.



1-1423696-4
Black boot for W57 with M11 X 1.0 bushing.

1-1423696-6
Clear boot for W57 with M11 X 1.0 bushing.

Ambient Compensation Table

Ambient Temperature in °C	Rating Correction Factor	
	3-6A Models	7-20A Models
10	.80	.80
20	.90	.90
25	1.00	1.00
30	1.10	1.05
40	1.25	1.15
50	1.61	1.25
60	2.15	1.40

To use this chart: Divide the breaker rating by the correction factor to determine the compensated rating. Calculate the overloads in terms of the compensated rating to use the published trip curve.
Do not use these devices outside their specified operating temperature ranges.

Ordering Information

Typical Part No. ▶	W	57	-X	B	1	A	4	A	1	0	-4

1. Designator:
W = Circuit breaker

2. Series Number:
57 = Compact, Single Pole, Push-to-Reset, Thermal Model

3. Circuit Function:
X = Series Trip

4. Button:
A = White, plain, no rate marking
B = White with red rate marking (vertical)
C = White with black rate marking (vertical)

5. Mounting Bushing:
1 = 9.8mm x 9.6mm long, plastic
2 = 3/8" (one side flat) x 10.5mm) long, plastic
6 = 3/8" (one side flat) x 10.5mm) long, metal
7 = 10.8mm x 12.6mm long, metal

6. Terminals:
A = Quick connect .250" (6.35mm) straight

7. Mounting Hardware:
4 = Metal knurled nut/hex nut
5 = Plastic knurled nut
12 = Metal knurled nut
99 = None

8. Mounting Hardware Packaging:
A = Assembled to bushing
B = Bulk unassembled
C = No mounting hardware.

9. Maximum Operating Voltage (AC):
1 = 250VAC

10. Nameplate:
0 = None

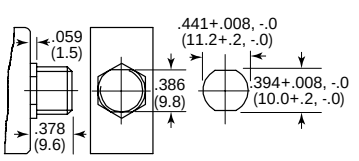
11. Specify Amp Rating:
4 5 6 7 8 10 12 15 20

Our authorized distributors are more likely to stock the following items for immediate delivery.

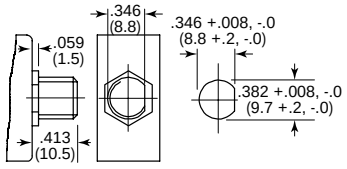
W57-XB1A4A10-5 W57-XB1A4A10-15 W57-XB1A7A10-5 W57-XB1A7A10-15
W57-XB1A4A10-10 W57-XB1A4A10-20 W57-XB1A7A10-10 W57-XB1A7A10-20

ORDERING NOTE: Many options illustrated below are not listed in the "Ordering Information" chart above. Options denoted by "Special" or "Special Order" in their descriptions are only offered on a special order basis. Additionally, mounting hardware can be ordered separately. These options are subject to extended leadtimes and significant minimum order quantities. Your Tyco Electronics sales engineer must consult with the factory before providing price and availability information regarding these options.

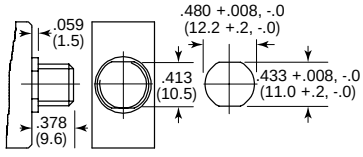
Mounting Bushings and Recommended Panel Cutouts



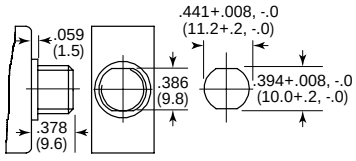
Standard Option 1 – M11 X 1.0 Thread



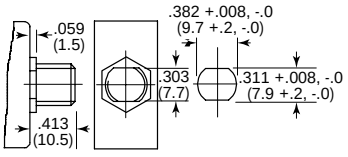
Standard Option 2 & 6 – 3/8" - 24UNF Thread



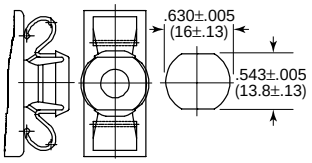
Standard Option 7 – M12 X 1.0 Thread



Special Order – M11 X 1.0 Thread

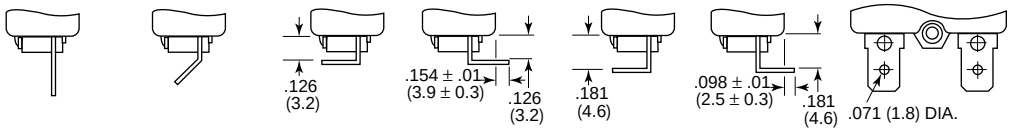


Special Order – 3/8" - 24UNF Thread



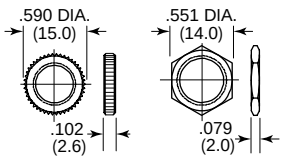
Special Order – Snap In Option

Termination Options



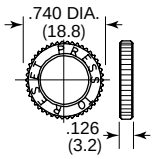
Standard .250 QC Straight
Special .250 QC 45°
Special .250 QC 90°
Special .250 QC/PCB 270°
Special .250 QC 90 °
Special .250 QC/PCB 270 °
Special .250 QC Straight (small hole)

Mounting Hardware Options

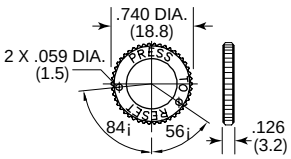


Standard Knurled Nut

Standard Hex Nut

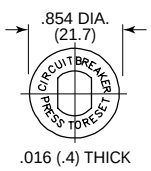


Special Integrated Knurled Nut



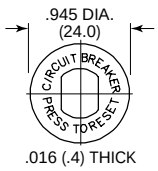
Special Integrated Knurled Nut with Small Holes

Optional Nameplates



.016 (.4) THICK

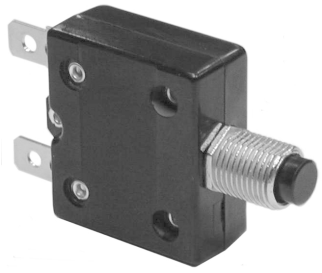
Special Embossed Aluminum



.016 (.4) THICK

Special Silver Printing On Black

Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.
www.tycoelectronics.com
Technical support:
Refer to inside back cover.



W54 series

Push To Reset Only Thermal Circuit Breaker

Features

- New design.
- 5 to 40 amp ratings. (35A and 40A models will not be submitted for UL).
- Cannot be manually tripped.
- Button extends for visual trip indication.
- Push button to reset breaker.
- Numerous mounting and termination options.

Agency Approvals

W54 series (except 35A and 40A models) is UL 1077 Recognized as Supplementary Protectors, File E69543, for Canada and the United States.

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Electrical Data @ 25°C

Calibration: Will continuously carry 100% of rating.
May trip between 101% and 134%, but must trip at 135% of rating within one hour at +25°C.
Dielectric Strength: 1,500VAC (60 seconds).
Insulation Resistance: 100 megohms.
Maximum Operating Voltages: 50VDC; 250VAC .

Interrupt Capacity: 1,000 amps in accordance with UL standard 1077.
Resettable Overload Capacity: Ten times rated current.
Reset Time: 60 seconds.

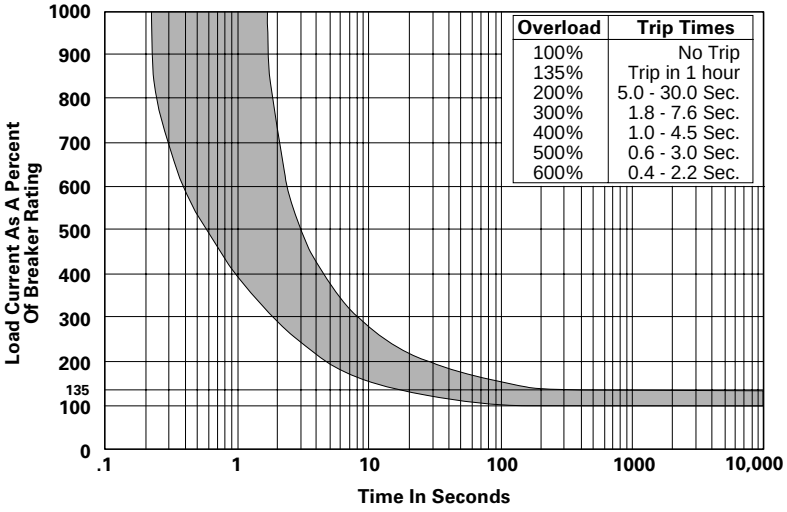
Typical Resistance vs. Current Rating @25°C

Current Rating in Amps	Typical Resistance in Ohms	Current Rating in Amps	Typical Resistance in Ohms
5.0	0.050	15.0	0.017
6.0	0.042	20.0	0.012
7.0	0.036	25.0	0.010
8.0	0.031	30.0	0.008
10.0	0.025	35.0	0.007
12.0	0.021	40.0	0.006

Mechanical/Environmental Data

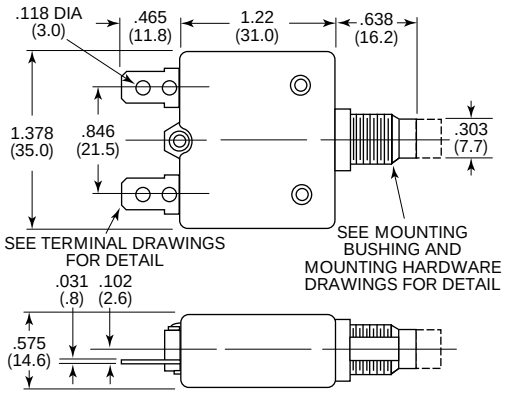
Operating Temperature Range: 0°C to +60°C.
Termination: .250" (6.35mm) quick connects or #8-32 screws.
Mounting: Various options. See Ordering Information and drawings.
Approximate Weight: 0.9 oz. (25.0g).

Time vs. Current Trip Curve @ +25°C



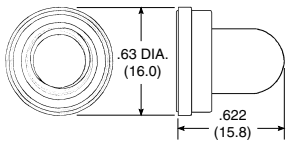
Overload	Trip Times
100%	No Trip
135%	Trip in 1 hour
200%	5.0 - 30.0 Sec.
300%	1.8 - 7.6 Sec.
400%	1.0 - 4.5 Sec.
500%	0.6 - 3.0 Sec.
600%	0.4 - 2.2 Sec.

Outline Dimensions



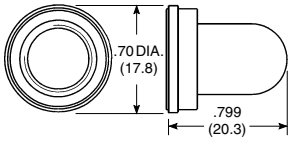
Optional Protective Boot

Silicone rubber boot is bonded to integral alumimum nut.



1-1423696-5
Black boot for W54 with 3/8"-24 bushing.

1-1423696-7
Clear boot for W54 with 3/8"-24 bushing.



1-1423696-4
Black boot for W54 with M11 X 1.0 bushing.

1-1423696-6
Clear boot for W54 with M11 X 1.0 bushing.

Ambient Compensation Table

Ambient Temperature in °C	Rating Correction Factor	
	4-8A Models	9-30A Models
10	.90	.80
20	.98	.90
25	1.00	1.00
30	1.10	1.05
40	1.25	1.15
50	1.61	1.31
60	2.00	1.55

To use this chart: Divide the breaker rating by the correction factor to determine the compensated rating. Calculate the overloads in terms of the compensated rating to use the published trip curve.
Do not use these devices outside their specified operating temperature ranges.

Ordering Information

Typical Part No. ▶	W	54	-X	B	1	A	4	A	1	0	-5

1. Designator:
W = Circuit breaker

2. Series Number:
54 = Single Pole, Push-to-Reset, Thermal Model

3. Circuit Function:
X = Series Trip

4. Button:
A = White, plain, no rate marking
B = White with red rate marking (vertical)
C = White with black rate marking (vertical)

5. Mounting Bushing:
1 = 9.8mm x 12.6mm long, metal
2 = 3/8" (one side flat) x 10mm) long, metal
4 = 10.8mm x 12.6mm long, metal
7 = 3/8" (one side flat) x 10mm) long, plastic

6. Terminals:
A = Quick connect .250" (6.35mm) straight
C = #8-32 screw 90° (screws installed)

7. Mounting Hardware:
4 = Metal knurled nut/hex nut
5 = Plastic knurled nut
12 = Metal knurled nut
99 = None

8. Mounting Hardware Packaging:
A = Assembled to bushing
B = Bulk unassembled
C = No mounting hardware

9. Maximum AC Operating Voltage:
1 = 250VAC

10. Nameplate:
0 = None

11. Specify Amp Rating:

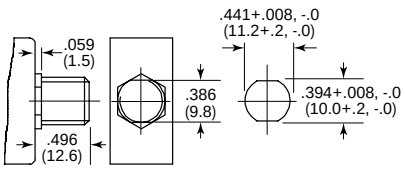
5	7	10	15	25	35*
6	8	12	20	30	40*

*Not UL

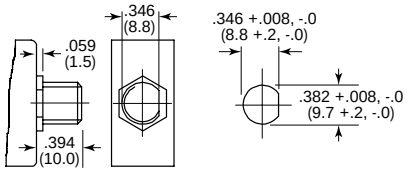
Our authorized distributors are more likely to stock the following items for immediate delivery.

W54-XB1A4A10-5
W54-XB1A4A10-10
W54-XB1A4A10-15
W54-XB1A4A10-20
W54-XB1A4A10-25
W54-XB1A4A10-30

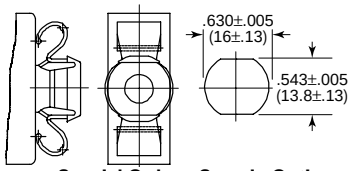
Mounting Bushings and Recommended Panel Cutouts



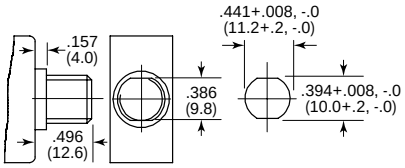
Standard Option 1 – M11 X 1.0 Thread



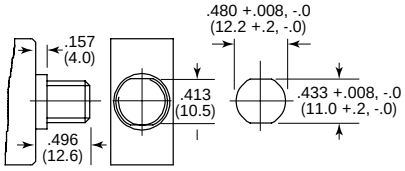
Standard Option 2 & 7 – 3/8" - 24UNF Thread



Special Order – Snap In Option

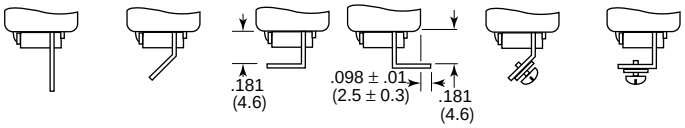


Special Order – M11 X 1.0 Thread



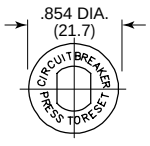
Standard Option 4 – M12 X 1.0 Thread

Termination Options



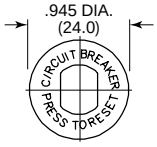
Standard .250 QC Straight	Special .250 QC 45°	Special .250 QC 90°	Special .250 QC/PCB 270°	Special #8-32 Screw 45°	Standard #8-32 Screw 90°

Optional Nameplates



.016 (.4) THICK

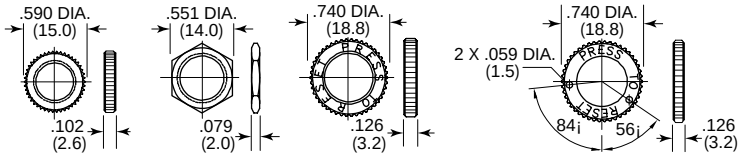
Special Embossed Aluminum



.016 (.4) THICK

Special Silver Printing On Black

Mounting Hardware Options



Standard Knurled Nut	Standard Hex Nut	Special Integrated Knurled Nut	Special Integrated Knurled Nut with Small Holes

ORDERING NOTE:
Many options illustrated here are not listed in the "Ordering Information" chart above. Options denoted by "Special" or "Special Order" in their descriptions are only offered on a special order basis. Additionally, mounting hardware can be ordered separately. These options are subject to extended leadtimes and significant minimum order quantities. Your Tyco Electronics sales engineer must consult with the factory before providing price and availability information regarding these options.

Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.



W58 series

Push To Reset Only Thermal Circuit Breaker

Features

- 0.5 amp to 30 amp ratings.
- Cannot be manually tripped.
- Button extends for visual trip indication.
- Push button to reset breaker.
- Termination is screw or .250" QC.

Agency Approvals

W58 Series is UL 1077 Recognized as Supplementary Protectors, File E69543, and CSA Certified as Appliance Component Protectors, File LR15734.

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Maximum Resistance vs. Current Rating @ +25°C

Current Rating in Amps	Maximum Resistance in Ohms	Current Rating in Amps	Maximum Resistance in Ohms
0.5	5.0	8	0.020
1	1.35	9	0.020
2	0.32	10	0.014
3	0.18	12	0.010
4	0.10	15	0.010
5	0.026	20	0.005
6	0.026	25	0.006
7	0.020	30*	0.004

*No UL/CSA

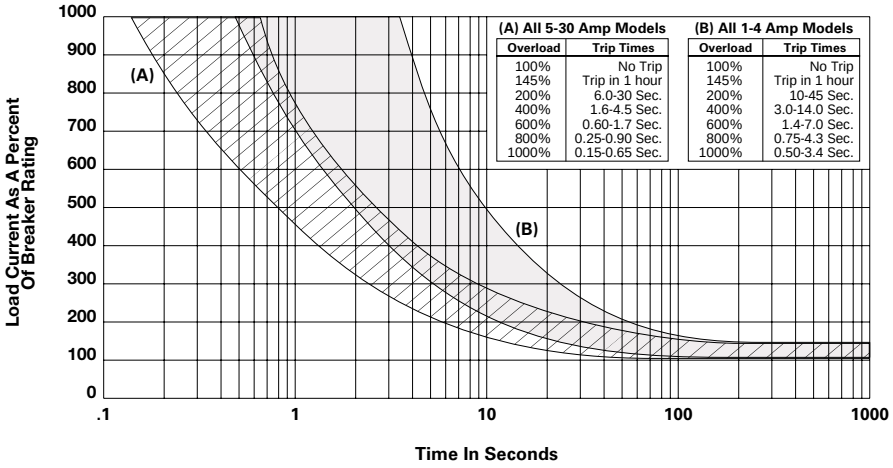
Electrical Data @ +25°C

Calibration: Breaker will continuously carry 100% of rated load. It may trip between 101% and 145% of rated load, but must trip at 145% at 25°C.
Dielectric Strength: Over 1,500 volts RMS.
Maximum Operating Voltages: 50VDC; 250VAC.
Interrupt Capacity: 2,000 amps at 50VDC (0.5 - 30 amp models).
1,000 amps at 250VAC (0.5 - 30 amp models).
Note: 30 0amp model not UL or CSA.
Resettable Overload Capacity: Ten times rated current.

Mechanical/Environmental Data

Shock: Withstands to 10g.
Endurance Cycling: Over 1,000 cycles at 200% of rated load.
Vibration: Withstands to 10g at 10-55 Hz.
Weight: Less than 1 1/2 oz. (42.5g).

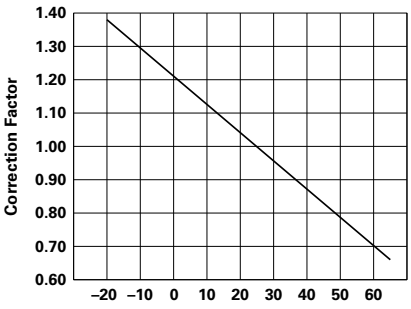
Time vs. Current Trip Curve @ +25°C



(A) All 5-30 Amp Models	
Overload	Trip Times
100%	No Trip
145%	Trip in 1 hour
200%	6.0-30 Sec.
400%	1.6-4.5 Sec.
600%	0.60-1.7 Sec.
800%	0.25-0.90 Sec.
1000%	0.15-0.65 Sec.

(B) All 1-4 Amp Models	
Overload	Trip Times
100%	No Trip
145%	Trip in 1 hour
200%	10-45 Sec.
400%	3.0-14.0 Sec.
600%	1.4-7.0 Sec.
800%	0.75-4.3 Sec.
1000%	0.50-3.4 Sec.

Ambient Compensation Chart



To use this chart: Read up from the ambient temperature to the curve, and across to find a correction factor. Multiply the breaker rating by the correction factor to determine the compensated rating. Calculate the overloads in terms of the compensated rating to use the published trip curve.

Ordering Information

Typical Part No. ▶	W	58	-X	B	1	A	4	A	-5

1. Designator:
W = Circuit breaker

2. Series Number:
58 = Single Pole, Push-to-Reset

3. Circuit Function:
X = Series Trip

4. Button:
A = White, plain, no rate marking, no trip band
B = White with red rate marking, red trip band
C = White with black rate marking, red trip band
E = White with red rate marking no trip band
F = White with black rate marking, no trip band

5. Mounting Bushing:
1 = 7/16" x .500" (12.70mm) long
4 = 15/32" x .300" (7.62mm) long, black
6 = 3/8" x .465" (11.81mm) long, round

6. Terminals:
A = Quick connect .250" (6.35mm) straight
C = 6/32 screw 90° (screws installed)
D = 6/32 screw 90° (screws bulk packed)

7. Mounting Hardware:
4 = Knurled nut/hex nut
6 = Knurled nut/hex nut/lock washer
12 = Knurled nut/lock washer
15 = Two hex nuts/lock washer
99 = No mtg. hardware supplied (Use C, Step #8)

Note: For other hardware combinations, order separately. See mounting hardware Ordering Information table.

8. Mounting Hardware Packaging:
A = Assembled to bushing
B = Bulk unassembled
C = No mounting hardware

9. Specify Amp Rating:

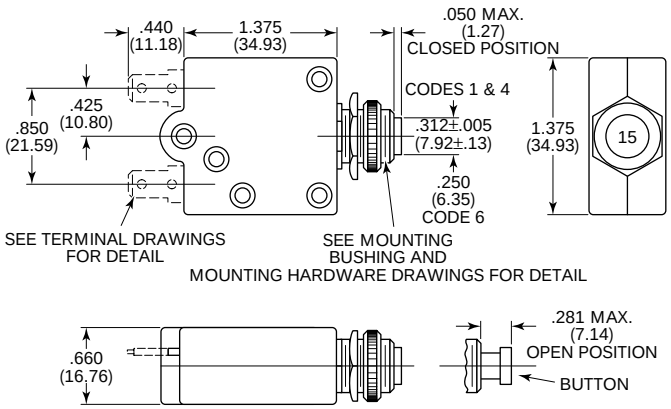
0.5	3	6	9	15	30*
1	4	7	10	20	
2	5	8	12	25	

*Not UL or CSA

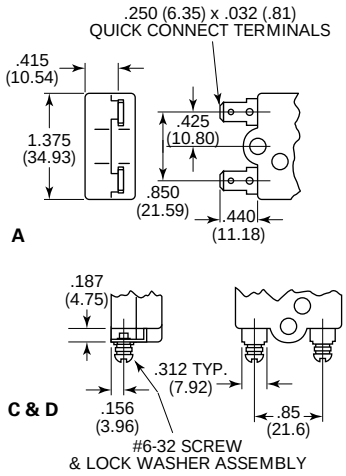
Stock Items – Authorized distributors are more likely to stock the following items.

W58-XB1A4A-1	W58-XB1A4A-6	W58-XB1A4A-15	W58-XC4C12A-2	W58-XC4C12A-15
W58-XB1A4A-2	W58-XB1A4A-7	W58-XB1A4A-20	W58-XC4C12A-3	W58-XC4C12A-20
W58-XB1A4A-3	W58-XB1A4A-8	W58-XB1A4A-25	W58-XC4C12A-5	W58-XC4C12A-25
W58-XB1A4A-4	W58-XB1A4A-10	W58-XB1A4A-30	W58-XC4C12A-7	W58-XC4C12A-30
W58-XB1A4A-5	W58-XB1A4A-12	W58-XC4C12A-1	W58-XC4C12A-10	

Outline Dimensions



Terminal Options



Dimensions are shown for reference purposes only.

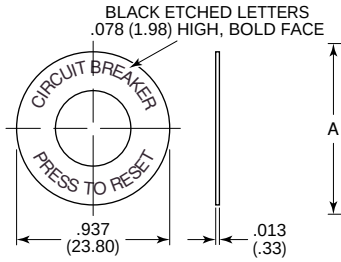
Dimensions are in inches over (millimeters) unless otherwise specified.

Specifications and availability subject to change.

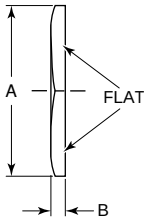
www.tycoelectronics.com
Technical support:
Refer to inside back cover.

Mounting Hardware

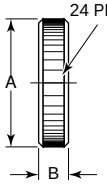
Disc



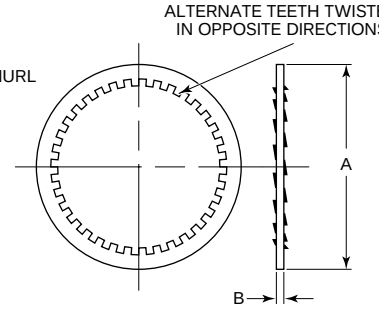
Hex Nut



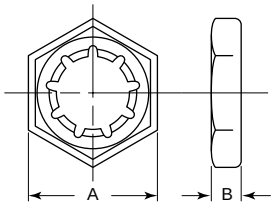
Knurled Nut



Lockwasher

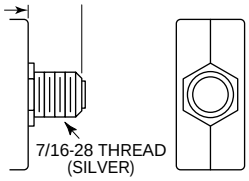


Pal Nut

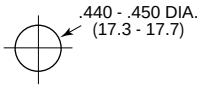


Mounting Bushing

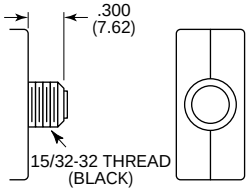
Type 1

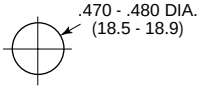


Recommended Cutout

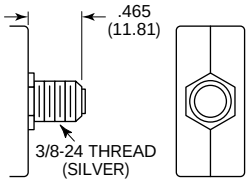


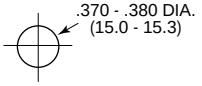
Type 4





Type 6





Mounting Hardware Dimensions

	Dim.	Hex.	Knurled	L/W	Pal
A.	3/8″	.556	.562	.562	.562
	7/16″	.625	.625	.540	.625
	15/32″	.556	.625	.600	.625
B.	3/8″	.085	.078	.018	.140
	7/16″	.078	.125	.022	.111
	15/32″	.078	.125	.018	.090

Mounting Hardware Ordering Information

Mounting Bushing Code	Knurl Nut	Hex Nut	Pal Nut	Washer	Push to Reset Disc
1	55-010A	55-011A	16S086B	88-021B	33-012A
4	•	55-001B	16S086C	88-002A	33-012C
6	55-008A	55-001D	16S086A	88-006K	33-012B

• 55-010B (silver) 55-010E (black)

W28 series

Switchable or Push to Reset Fuseholder-Type Thermal Circuit Breaker



Switch/Breaker

Push-to-Reset Breaker

Note: VDE, Demko, Semko not available on 16A and 20A W28 only.

Features

- Switchable version combines on-off switch and circuit protection in a single unit.
- Approved to many international standards (push to reset type).
- Replaces slow blow glass cartridge fuse.
- Labor-saving snap-in mounting.
- Button extends for visual trip indication on push to reset model.
- Rocker on switchable model moves to "overload" position upon trip.

Resettable Overload Capacity: Six times rated current for 0.25 through 2 amp models. Ten times rated current for 3 through 20 amp models.

Reset Time: 180 seconds max. for 0.25 through 2 amp models. 10 to 60 seconds for 3 through 20 amp models.

Agency Approvals

W28 series is UL 1077 Recognized as Supplementary Protectors, File E69543, and CSA Certified as Appliance Component Protectors, File LR15734. W28 breakers have been issued Certificate of Suitability CS2190N as supplementary Equipment Protectors by the Energy Authority of New South Wales, Australia. W28 breakers are also DEMKO (Denmark) and SEV (Switzerland) approved. VDE approved for use in office equipment and provides 8mm isolation. 16 amp and 20 amp models do not have VDE, DEMKO and SEV approvals at present. W28-S is UL 1077 Recognized, and CSA Certified for models up to and including 15 amps.

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Typical Resistance vs. Current Rating @ +25°C

Current Rating in Amps	Typical Resistance in Ohms	Current Rating in Amps	Typical Resistance in Ohms
0.25	14.0	8.0	0.016
0.50	3.55	9.0	0.014
0.75	2.0	10.0	0.011
1.0	0.89	11.0	0.01
2.0	0.17	12.0	0.009
3.0	0.069	13.0	0.009
4.0	0.043	14.0	0.007
5.0	0.030	15.0	0.007
6.0	0.026	16.0	0.007
7.0	0.017	20.0	0.006

Electrical Data @ 25°C

Calibration: Will continuously carry 100% of rating.
3-20 amp models – may trip between 101% and 134%, but must trip at 135% of rating within one hour at +25°C.
0.25-2 amp models – may trip between 101% and 174%, but must trip at 175% of rating within one hour at +25°C.

Dielectric Strength: Over 1,500 volts RMS.

Maximum Operating Voltages: 32VDC; 250VAC, 50/60 Hz.

Interrupt Capacity: 1,000 amps at 250VAC, 50/60 Hz. and 32VDC in accordance with UL standard 1077.

Mechanical/Environmental Data

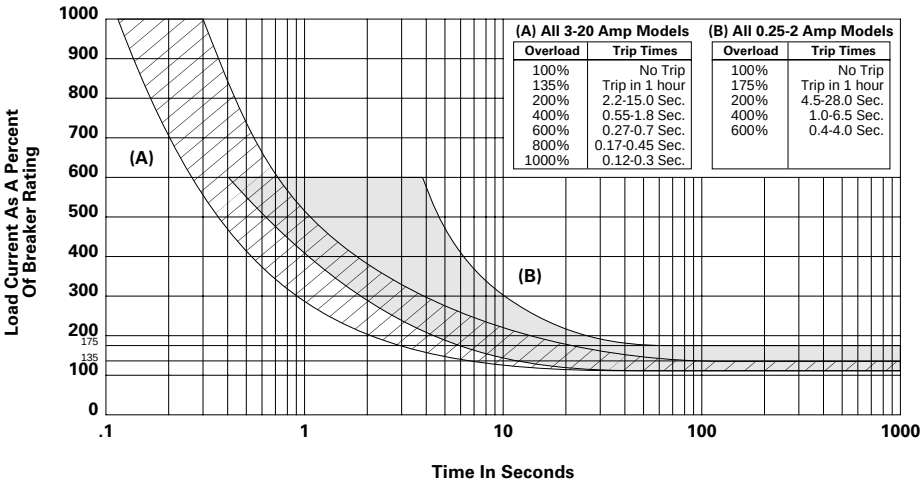
Endurance Cycling(switchable type): Typically 30,000 operations at 100% of rating.

Termination: .250" (6.35mm) quick connects. Soldering to terminals is not recommended.

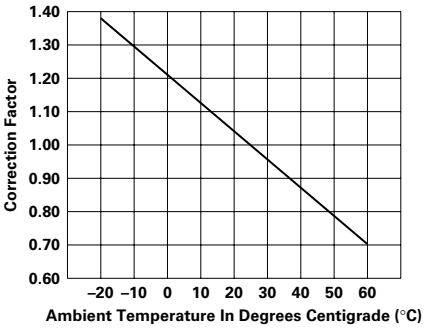
Mounting: Snaps into panel from front. See Recommended Panel Cutouts.

Approximate Weight: 0.35 oz. (10g).

Time vs. Current Trip Curve @ +25°C



Ambient Compensation Chart



To use this chart: Read up from the ambient temperature to the curve, and across to find a correction factor. Multiply the breaker rating by the correction factor to determine the compensated rating. Calculate the overloads in terms of the compensated rating to use the published trip curve. Do not use these devices outside their specified operating temperature ranges.

Dimensions are shown for reference purposes only.

Dimensions are in inches over (millimeters) unless otherwise specified.

Specifications and availability subject to change.

Ordering Information

Typical Part Number ▶	W	28	-X	Q	1	A	-5

1. Designator:
W = Circuit breaker

2. Series Number:
28 = Single Pole Fuseholder Type

3. Circuit Function:
X = Series Trip, Push-to-Reset Button S = Series Trip, Switchable Rocker

4. Terminal Type and Mounting:
Q = .250" (6.35mm) Quick Connect will mount in .032"-.062" (.813mm – 1.574mm) thick panel.
T = .250" (6.35mm) Quick Connect will mount in .075"-.105" (1.905mm – 2.667mm) thick panel.
For panel thicknesses other than above, order "Q" type and 55-025B Internal Tooth Push-On Lockwasher.

5. Bezel Color:
1 = Black with White Rate Marking † 11 = Black with No Rate Marking
2 = Red with Black Rate Marking † 21 = Red with No Rate Marking
B = Black with White "Reset" Marked On Bezel (No Rate Marking) †
† Not available with Circuit Function "S."
Consult factory for other bezel colors.

6. Button Color:
A = Black
B = Red
Consult factory for other button colors.

7. Amp Rating:

0.25†	1†	4	7	10	13	16
0.50†	2†	5	8	11	14	20*
0.75†	3	6	9	12	15	

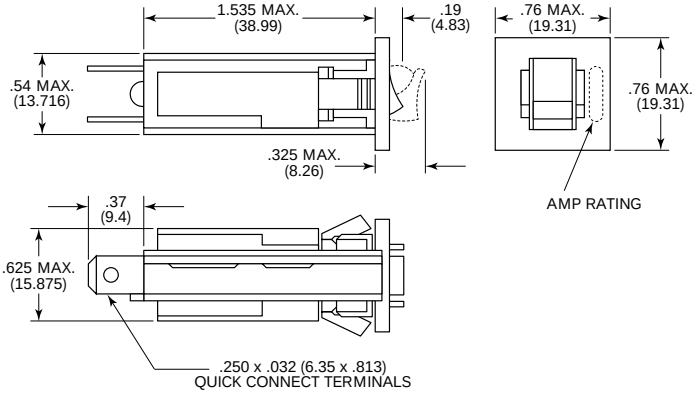
† Not available with Circuit Function "S."
* Contact factory for availability.

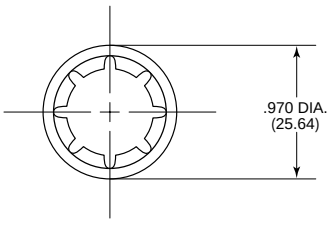
Stock Items – Authorized distributors are more likely to stock the following items.

W28-XQ1A-0.25	W28-XQ1A-2	W28-XQ1A-6	W28-XQ1A-12	W28-XT1A-12
W28-XQ1A-0.50	W28-XQ1A-3	W28-XQ1A-7	W28-XQ1A-15	
W28-XQ1A-0.75	W28-XQ1A-4	W28-XQ1A-8	W28-XQ1A-20	
W28-XQ1A-1	W28-XQ1A-5	W28-XQ1A-10	W28-XT1A-10	

Outline Dimensions

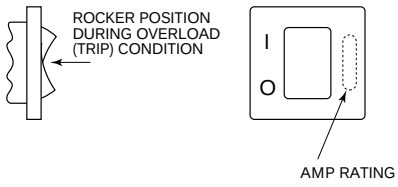
Push-to-Reset Type



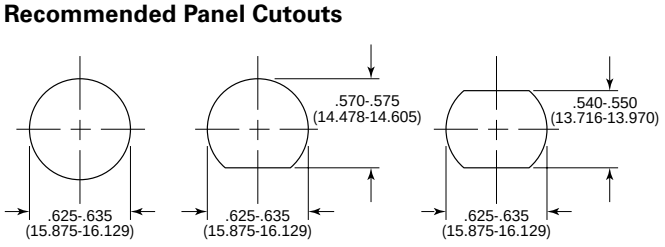


55-025B
INTERNAL TOOTH
PUSH-ON LOCKWASHER
For panels greater than .105" (2.67) thickness

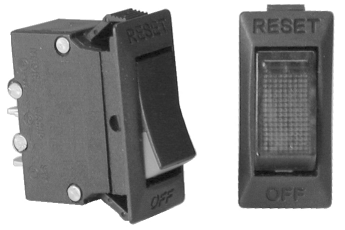
Switchable Type



Recommended Panel Cutouts



Note: 1. Soldering to terminals is not recommended.
2. Recommended Panel Thickness: Style Q: .032" - .062" (.813 mm - 1.574 mm)
Style T: .075" - .105" (1.905 mm - 2.667 mm)
3. Internal tooth push-on washer available for panel thickness not covered above. Part No. 55-025B.



W51 series

Rocker-Actuated Thermal Circuit Breaker/Power Switch With Optional Indicator Lamp

Features

- Compact, trip-free, rocker-actuated design.
- 5 to 20 amp ratings.
- Provides circuit protection and power switching in a single unit.
- Available with optional indicator lamp.
- Snaps into the same cutout as many common power switches.
- Various color, marking and termination options.

Agency Approvals

W51 series is UL 1077 Recognized as Supplementary Protectors, File E69543, for Canada and the United States.

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Electrical Data @ 25°C

Calibration: Will continuously carry 100% of rating. May trip between 101% and 134%, but must trip at 135% of rating within one hour at +25°C.
Dielectric Strength: 1,500VAC (60 seconds).
Insulation Resistance: 100 megohms.
Maximum Operating Voltages: 50VDC; 125 or 250VAC, 50/60 Hz. (model dependent).

Interrupt Capacity: 1,000 amps in accordance with UL standard 1077.
Resettable Overload Capacity: Ten times rated current.
Switch Endurance Cycling: Typically 6,000 operations at 100% of rating.
Reset Time: 60 seconds.

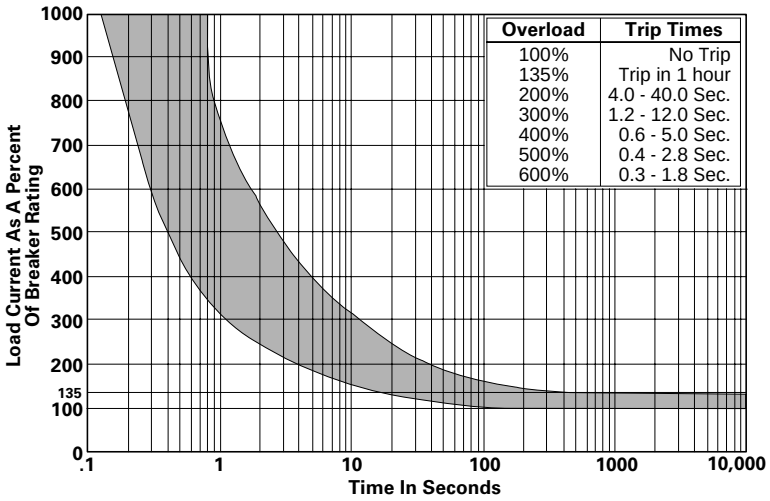
Typical Resistance vs. Current Rating @ +25°C

Current Rating in Amps	Typical Resistance in Ohms	Current Rating in Amps	Typical Resistance in Ohms
5.0	0.050	10.0	0.025
6.0	0.042	15.0	0.017
7.0	0.036	20.0	0.0125
8.0	0.031		

Mechanical/Environmental Data

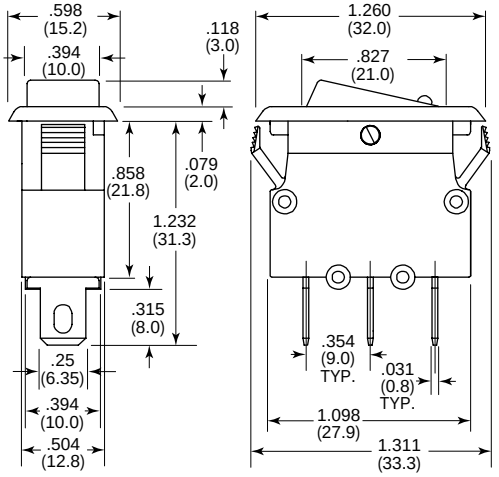
Operating Temperature Range: 0°C to +60°C.
Termination: .250" (6.35mm) quick connects, solder terminals or right angle PC terminals.
Mounting: Snaps into 1.122 x .531 (28.5 x 13.5) panel cutout.
Approximate Weight: 0.37 oz. (10.5g).

Time vs. Current Trip Curve @ +25°C



Overload	Trip Times
100%	No Trip
135%	Trip in 1 hour
200%	4.0 - 40.0 Sec.
300%	1.2 - 12.0 Sec.
400%	0.6 - 5.0 Sec.
500%	0.4 - 2.8 Sec.
600%	0.3 - 1.8 Sec.

Outline Dimensions

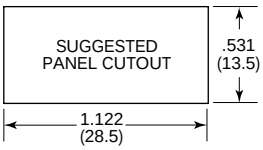


Ambient Compensation Table

Ambient Temperature in °C	Rating Correction Factor	
	5-6A Models	7-20A Models
10	.80	.80
20	.90	.90
25	1.00	1.00
30	1.10	1.05
40	1.25	1.15
50	1.61	1.25
60	2.15	1.40

To use this chart: Divide the breaker rating by the correction factor to determine the compensated rating. Calculate the overloads in terms of the compensated rating to use the published trip curve.
Do not use these devices outside their specified operating temperature ranges.

Recommended Panel Cutout



Panel Thickness
W51 series circuit breakers accommodate panel thicknesses from 0.030 in. to 0.118 in. (0.75 mm - 3.0 mm).

Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.
www.tycoelectronics.com
Technical support:
Refer to inside back cover.

Ordering Information

Typical Part No. ▶	W	51	-A	1	2	1	B	1	-5

1. Designator:
W = Circuit breaker

2. Series Number:
51 = Switchable, Single Pole, Rocker-Actuated Thermal Model

3. Terminals:
A = Quick connect .250" (6.35mm) straight
C = Printed Circuit - right angle

4. Breaker Style & Base Color:
1 = Angular button design (see drawing below), black base color
B = Countoured button design (see drawing below), black base color

5. Rocker Color:
1 = Amber (translucent)
2 = Red (translucent)
3 = Green (translucent)
4 = White (opaque - for use on non-illuminated models)
5 = Black (opaque - for use on non-illuminated models)
6 = Red (opaque - for use on non-illuminated models)
7 = Gray (opaque - for use on non-illuminated models)
8 = Black (opaque) with red (translucent) indicator (only available on model with contoured button)
9 = Black (opaque) with green (translucent) indicator (only available on model with contoured button)

6. Maximum Operating Voltage (AC):
1 = 125VAC
2 = 250VAC

7. Light:
A = Non-illuminated
B = Illuminated

8. Marking option:
0 = No marking
1 = RESET/OFF printed
2 = RESET/OFF molded (only available on model with contoured button)

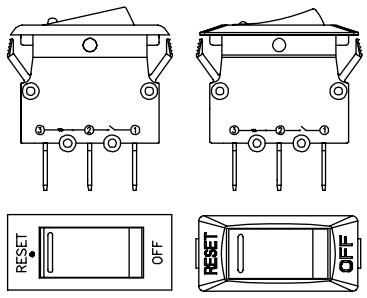
9. Specify Amp Rating:
5 6 7 8 10 15 20

Our authorized distributors are more likely to stock the following items for immediate delivery.

W51-A121B1-5	W51-A121B1-15	W51-A122B1-5	W51-A122B1-15	W51-A152A1-5	W51-A152A1-15
W51-A121B1-10	W51-A121B1-20	W51-A122B1-10	W51-A122B1-20	W51-A152A1-10	W51-A152A1-20

ORDERING NOTE: Some options illustrated below are not listed in the "Ordering Information" chart above. Options denoted by "Special" or "Special Order" in their descriptions are only offered on a special order basis. Other base and button colors and intermediate amp ratings are also available on a special order basis. All special order items are subject to extended leadtimes and significant minimum order quantities. Your Tyco Electronics sales engineer must consult with the factory before providing price and availability information regarding items with these options.

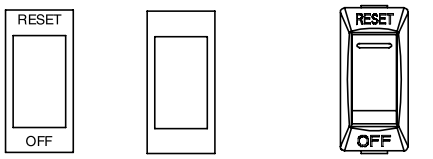
Case Styles



Angular Button Design

Contoured Button Design

Marking Options

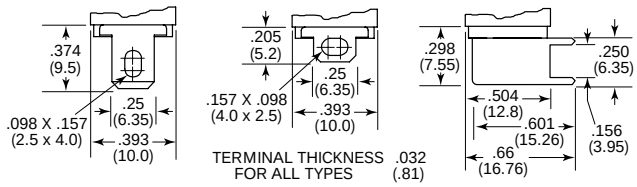


Standard - RESET/OFF Printed on Bezel

Standard - No Marking

Standard - RESET/OFF Molded into bezel

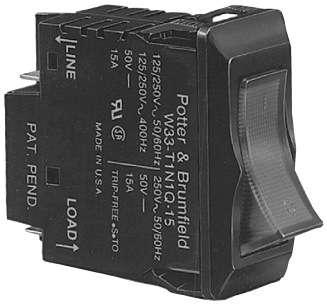
Terminal Types



Standard – .250 Quick Connect Terminal

Special Order - Solder Terminal

Standard – Right Angle PC Terminal



W33 series

One- and Two-Pole, Switchable Thermal Circuit Breaker / Power Switch With Optional Indicator Lamp

Features

- Combines on/off switch and circuit protection in a single unit.
- 2 to 20 amp ratings (<2A types available as special order).
- One or two pole sensing.
- Lighted or non-lighted rocker actuator in various colors.
- Convenient, snap-in mounting.
- Optional auxiliary switch available.
- Trip-free operation.

Electrical Data @ 25°C

Calibration: Breaker will continuously carry 100% of rated load. It may trip between 101% and 135%, but must trip at 135% within one hour at +25°C.
Dielectric Strength: Over 2,000 volts RMS.
Maximum Operating Voltages: 50VDC; 250VAC to 400 Hz.
Interrupt Capacity: 1,000 amps at 50VDC; 250VAC, 60 Hz. and 125/250VAC, 400 Hz.
1,500 amps at 125/250VAC, 60 Hz.
Resettable Overload Capacity: Ten times rated current.

Agency Approvals

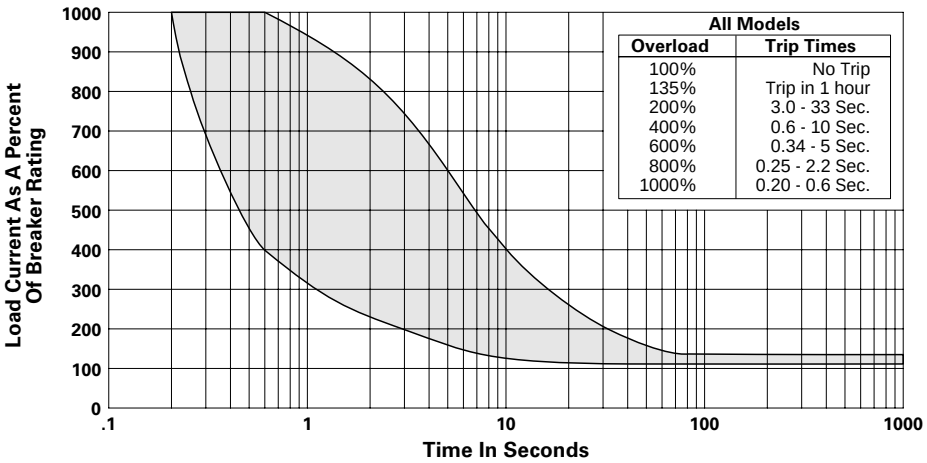
W33 series is UL 1077 Recognized as Supplementary Protectors, File E69543, and CSA Certified as Appliance Component Protectors, File LR15734.

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

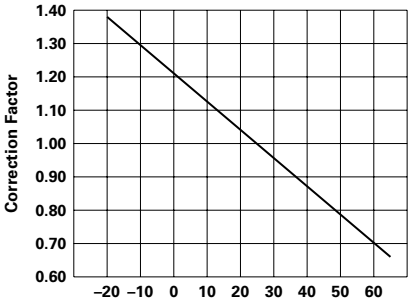
Mechanical/Environmental Data

Termination: Poles 1&2: .250" (6.35mm) quick connect/solder terminals.
Opt. Aux. Sw.: .110"(2.79mm) quick connect terminals.
Mounting: Snaps into panel from front.
Actuator: Rocker or lighted rocker.
Shock: 30g tested to IEC 68-2-27, test Ea.
Vibration: 8g tested to IEC 68-2-6, test Fc.
Switch Endurance Cycling: 50,000 operations at rated load.
1,000 operations at 200% rated load.

Time vs. Current Trip Curve @ +25°C



Ambient Compensation Chart



To use this chart: Read up from the ambient temperature to the curve, and across to find a correction factor. Multiply the breaker rating by the correction factor to determine the compensated rating. Calculate the overloads in terms of the compensated rating to use the published trip curve.

Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.
www.tycoelectronics.com
Technical support:
Refer to inside back cover.

Ordering Information

Typical Part No. ▶	W	33	-S	1	N	1	Q	-20

1. Designator:
W = Circuit breaker

2. Series Number:
33 = Two pole, rocker actuated

3. Circuit Function:
S = Pole 1 – Switch only; Pole 2 – Series trip overload sensing.
T = Poles 1 & 2 – Series trip overload sensing.
SS = Same as S with auxiliary switch on pole 1.
TS = Same as T with auxiliary switch on pole 1.
D = 2 Pole switching.

4. Rocker Color:
1 = Black. 2 = White. 3 = Red. 4 = Amber. 5 = Smoke.

5. Light (available only with White, Red, Amber and Smoke rocker colors):
A = 24VDC (Incandescent). B = 120VAC (Neon with resistor). C = 240VAC (Neon with resistor). N = No light.

6. Marking:
1 = International I/O. 2 = Contrasting I/O stamp (white toggle with black stamp).

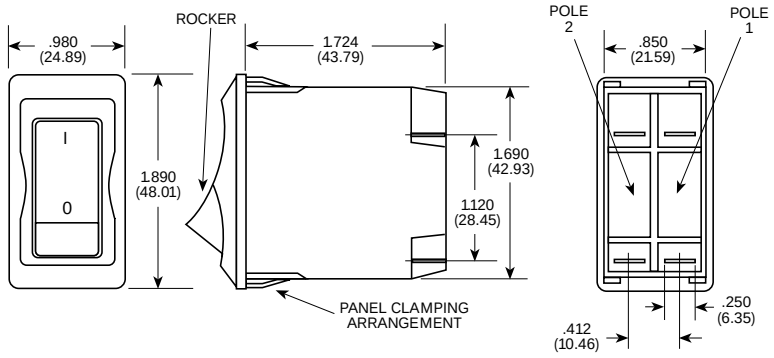
7. Termination:
Q = .250" x .032" (6.35 x .813mm) quick connect / solder terminals.

8. Amp Rating:
2 5 7 10 12 15 16 20 Consult factory for availability of ratings <2A

Stock Items – Authorized distributors are more likely to stock the following items.

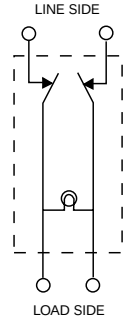
W33-S1N1Q-5	W33-S4B1Q-10	W33-T4B1Q-5
W33-S1N1Q-15	W33-S4B1Q-15	W33-T4B1Q-10
W33-S1N1Q-20	W33-T2N1Q-20	W33-T4B1Q-15

Outline Dimensions

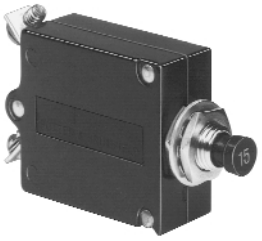


FITS .875 x 1.750 (22.22 x 44.45) PANEL OPENING
FROM .032" - .250"(.813mm - 6.35mm) THICK

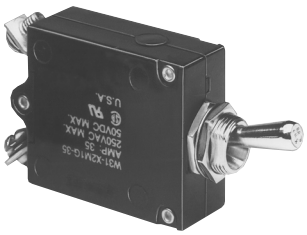
Schematic



NEON - AC
INCANDESCENT - DC



W23



W31

W23/W31 series

Toggle or Push/Pull Actuator Thermal Circuit Breaker

Features

- 0.5 amp to 50 amp ratings may be used as on/off switch.
- Cannot be reset against overload.
- W23 has visible trip indicator.
- Screw termination.
- Trip-free operation.

Agency Approvals

W23 and W31 are UL 1077 Recognized as Supplementary Protectors. File E69543, and CSA Certified as Appliance Component Protectors, File LR15734.

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Maximum Resistance vs. Current Rating @ +25°C

Current Rating in Amps	Maximum Resistance in Ohms ± 30%
1	.61
5	.03
10	.01
15	.006
20	.004
30	.003
40	.002
50	.002

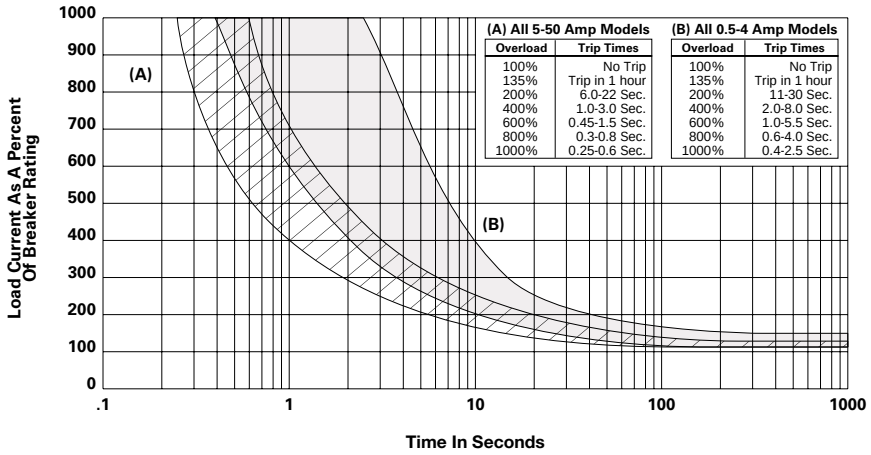
Electrical Data @ +25°C

Calibration: Will continuously carry 100% of rating, may trip between 101% and 134% of rating at 25°C. Must trip at 135% in one hour.
Maximum Operating Voltages: 50VDC or 250VAC (to 400 Hz).
Interrupting Capacity:
With 4X Max. Series Fuse Protection
0.5-50 amp models — 1000 amps at 240VAC.
30-50 amp models — 1000 amps at 50VDC.
Without 4X Max. Series Fuse Protection
0.5-25 amp models — 2000 amps at 50VDC.
10-20 amp models — 2000 amps at 120VAC.
Resettable Overload Capacity: Ten times rated current.
Dielectric Strength: Over 1,500 volts RMS.

Mechanical/Environmental Data

Endurance Cycling: More than 6,000 cycles at 100% of rating, or 10,000 mechanical cycles.
Humidity: Will meet requirements of MIL-STD-202, Method 106.
Salt Spray: Will meet requirements of MIL-STD-202, Method 101, Test Condition B.
Termination: Two #8-32 screw terminals.
Mounting: W23 — Threaded bushing, 3/8" (9.53mm) diameter.
W31 — Threaded bushing, 15/32" (11.91mm) diameter, with or without anti-rotation flats.
Weight: Less than 2 oz. (57g).

Time Vs. Current Trip Curve @ +25°C



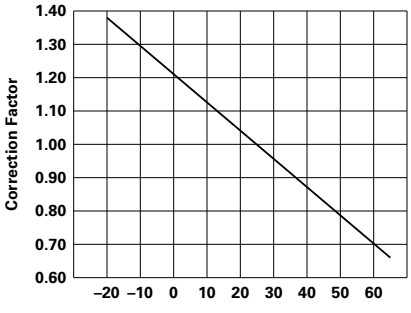
(A) All 5-50 Amp Models

Overload	Trip Times
100%	No Trip
135%	Trip in 1 hour
200%	6.0-22 Sec.
400%	1.0-3.0 Sec.
600%	0.45-1.5 Sec.
800%	0.3-0.8 Sec.
1000%	0.25-0.6 Sec.

(B) All 0.5-4 Amp Models

Overload	Trip Times
100%	No Trip
135%	Trip in 1 hour
200%	11-30 Sec.
400%	2.0-8.0 Sec.
600%	1.0-5.5 Sec.
800%	0.6-4.0 Sec.
1000%	0.4-2.5 Sec.

Ambient Compensation Chart



To use this chart: Read up from the ambient temperature to the curve, and across to find a correction factor. Multiply the breaker rating by the correction factor to determine the compensated rating. Calculate the overloads in terms of the compensated rating to use the published trip curve.

Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.
www.tycoelectronics.com
Technical support:
Refer to inside back cover.

Ordering Information

Typical Part No. ▶	W	23	-X	1	A	1	G	-5

1. Designator:
W = Circuit breaker

2. Series Number:
23 = Single pole, push/pull

3. Circuit Function:
X = Series trip

4. Button:
1 = Black with white amp rate marking and white trip band.

5. Mounting Bushing:
A = 3/8”-24 threaded bushing .375” (9.53mm) long, silver color

6. Terminals (See drawings for relative terminal positions):
1 = Screw terminals situated 90° to each other with #8-32 screws and washers installed.
3 = Screw terminals situtated parallel to each other pointing upward with #8-32 screws and washers installed.

7. Mounting Hardware:
A = Knurled nut/hex nut installed
G = Two hex nuts/lockwasher installed
Z = No mounting hardware supplied

8. Amp Rating:

0.5	3	7.5	20	35
1	4	10	25	40
2	5	15	30	50

Stock Items – Authorized distributors are more likely to stock the following items.

W23-X1A1G-1	W23-X1A1G-7.50	W23-X1A1G-25	W23-X1A1G-50
W23-X1A1G-2	W23-X1A1G-10	W23-X1A1G-30	
W23-X1A1G-3	W23-X1A1G-15	W23-X1A1G-35	
W23-X1A1G-5	W23-X1A1G-20	W23-X1A1G-40	

Ordering Information

Typical Part No. ▶	W	31	-X	2	M	1	G	-5

1. Designator:
W = Circuit breaker

2. Series Number:
31 = Single pole, toggle actuator

3. Circuit Function:
X = Series trip

4. Mounting Bushing:
1 = 15/32”-32 threaded bushing .320” (8.13mm) long, round, silver color
2 = 15/32”-32 threaded bushing .320” (8.13mm) long, double “D,” silver color

5. Toggle:
M = Silver color metal toggle, round, with amp rate marking on end

6. Terminals (See drawing for relative terminal positions):
1 = Screw terminals situated 90° to each other with #8-32 screws and washers installed.
5 = Screw terminals situated parallel to each other pointing downward with #8-32 screws and washers installed.

7. Mounting Hardware:
A = Knurled nut/hex nut intalled
G = Two hex nuts/lockwasher installed
Z = No mounting hardware supplied

8. Amp Rating:

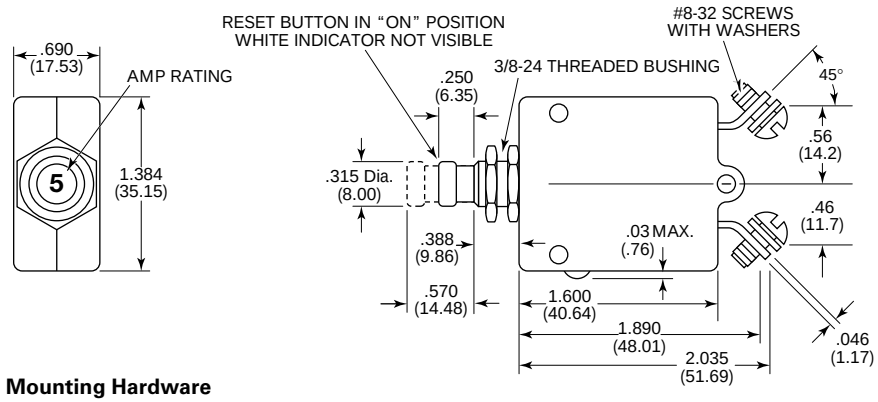
0.5	3	7.5	20	35
1	4	10	25	40
2	5	15	30	50

Stock Items – Authorized distributors are more likely to stock the following items.

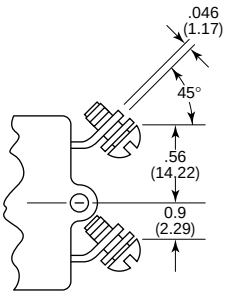
W31-X2M1G-1	W31-X2M1G-10	W31-X2M1G-35
W31-X2M1G-2	W31-X2M1G-15	W31-X2M1G-40
W31-X2M1G-3	W31-X2M1G-20	W31-X2M1G-50
W31-X2M1G-5	W31-X2M1G-25	
W31-X2M1G-7.50	W31-X2M1G-30	

W23 Outline Dimensions

Terminal Style 1



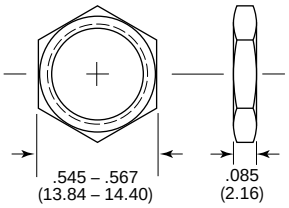
Terminal Style 3



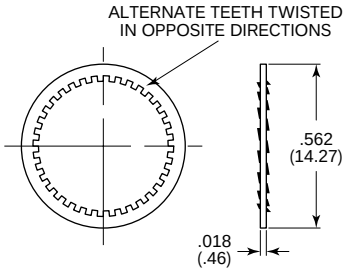
All dimensions are given as inches (mm)

Mounting Hardware

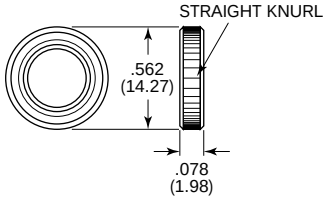
Hex Nut
(55-001D - Silver Color)



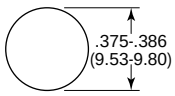
Lockwasher
(88-006B - Silver Color)



Knurled Nut
(55-008A - Silver Color)

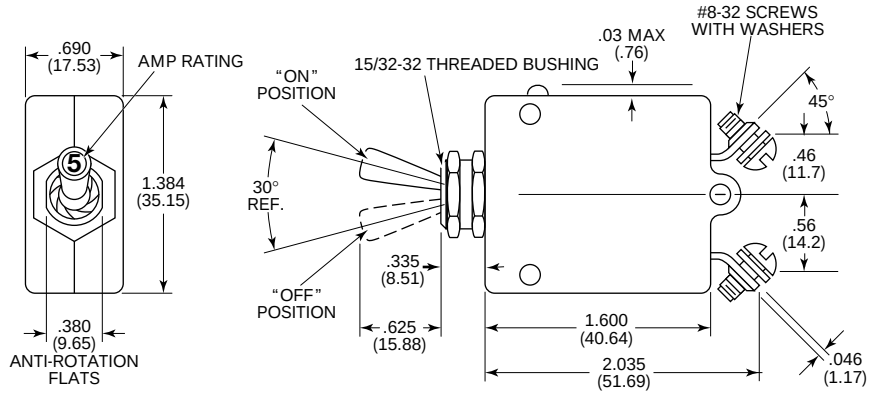


Suggested Mounting Holes

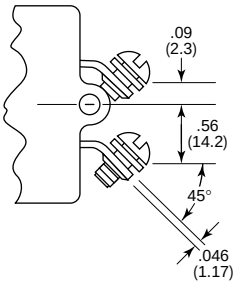


W31 Outline Dimensions

Terminal Style 1

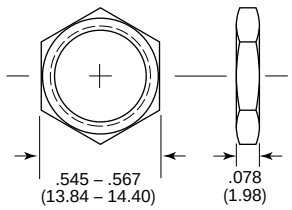


Terminal Style 5

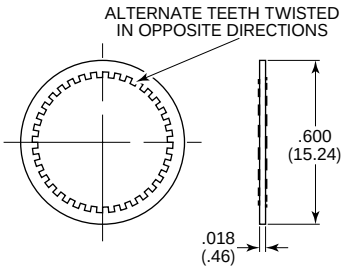


Mounting Hardware

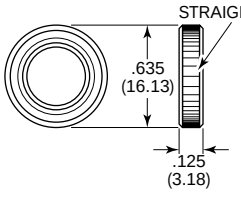
Hex Nut
(55-001B - Silver Color)



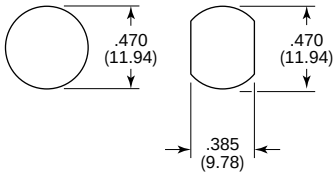
Lockwasher
(88-002B - Silver Color)

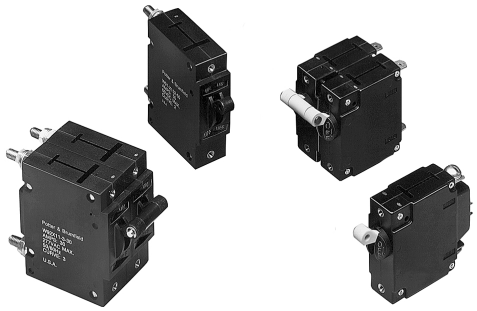


Knurled Nut
(55-010B - Silver Color)



Suggested Mounting Holes





W6/W9 series

Magnetic Hydraulic Circuit Breakers

Features

- Designed for the international market. UL Recognized, CSA Certified, and VDE approved.
- Ratings to 50 amps.
- Heavy duty #10-32 stud connections. (W9)
- Quick-connect or screw terminals. (W6)
- Optional 10 amp auxiliary switch.
- Several delay curve options.
- Trip-free operation.

Agency Approvals

UL: Recognized as Supplementary Protector under UL 1077. File E69543.
CSA: Certified as a Supplementary Protector. File LR15734.
VDE: Approved to VDE 0642/EN 60 934 (Circuit Breakers for Equipment) License No. 73782.

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Electrical Data

Auxiliary Switch: See Auxiliary Switch Ratings Table 2 for details.
Calibration: Breakers will hold 100% of rated current. Breakers may trip between 101% and 124% of rated load (149% for 400 Hz. units and 134% for AC/DC units). Breakers must trip at 125% of rated load and above (150% for 400 Hz. units and 135% for AC/DC units).
Dielectric Strength: 50/60 or 400 Hz., 1500V: DC, 1100V.
Insulation Resistance: 100 Megohms at 500VDC.
Endurance: 10,000 on/off cycles - 6000 at rated load, 4000 at no load. Units tested at six cycles per minute, 1 second on and 9 seconds off at 25°C ambient.

Typical Resistance and Impedance

Current (Amps)	DC Resistance (Ohms)	50/60 Hz. Impedance (Ohms)	400 Hz. Impedance (Ohms)
0.2	90	90	180
1.0	1.2	1.2	2.0
2.0	0.28	0.28	0.50
5.0	0.04	0.04	0.05
10.0	0.013	0.013	0.025
20.0	0.004	0.005	0.0065
30.0	0.0027	0.004	0.004
40.0	0.002	0.002	0.003
50.0	0.0015	0.0015	0.0025

Tolerance: 0.1 - 4.99 ± 15%; 5 - 9.99 ± 20%; 10 - 15 ± 25%; 16 - 30 ± 50%.

Mechanical/Environmental Data

Operating Temperature: -40°C to +85°C.
Humidity: Meets requirements of Mil-STD-202 method 103.
Shock: Tested per Mil-STD-202, method 213, test condition C (100g @ 6 ms).
Vibration: Tested per Mil-STD-202, method 201, 10-55 Hz., 0.06" (1.52mm) total excursion in 2 planes.
Fungus And Moisture Resistance: Special moisture resistant finish applied to all ferrous parts. Plastic parts are made of inherently fungus resistant material.
Marking: W6 units have ON and OFF molded on the rocker of rocker actuated units (rocker actuated VDE units have international "1" and "0"). W9 units have ON and OFF molded into the area at the base of the toggle. International "1" and "0" symbols are marked on the toggle for both W6 and W9.
Mounting: Units are mounted with two #6-32 screws from the front of the panel. Metric models for use with M3 x 0.5 screws are available. To maintain published performance specifications, units should not be mounted more than 90° from their normal upright position.
Weight: Approximately 2.5 ounces per pole.

Approvals and Ratings Table 1

W6 Series UL/CSA (All Circuit Functions)

Maximum Voltage	Frequency (Hz)	Phase	Current Rating (Amps)	Interrupting Capacity (Amps)
65	DC	-	0.2 - 50	2,000
277	50/60	1	0.2 - 20	5,000
277	50/60	1	21 - 50	2,500
277/480	50/60	3Ø-Wye	0.2 - 20	5,000
250	400	1	0.2 - 20	2,500
250	400	1	21 - 50	1,250
250	400	3Ø-Wye	0.2 - 20	2,500

W6 Series VDE (Circuit Function X)

Maximum Voltage	Frequency (Hz)	Phase	Current Rating (Amps)	Interrupting Capacity (Amps)
65	DC	-	0.2-50	2,000
250	50/60	1	0.2-30	5,000
250	50/60	1	31-50	2,000
415/240	50/60	3Ø	0.2-30	5,000

W9 Series UL/CSA (All Circuit Functions)

Maximum Voltage	Frequency (Hz)	Phase	Current Rating (Amps)	Interrupting Capacity (Amps)
65	DC	-	0.2 - 50	2,000
277	50/60	1	0.2 - 50	5,000
277/480	50/60	3Ø-Wye	0.2 - 20	5,000
250	400	1	0.2 - 50	2,500
250	400	3Ø-Wye	0.2 - 50	2,500

W9 Series VDE (Circuit Function X)

Maximum Voltage	Frequency (Hz)	Phase	Current Rating (Amps)	Interrupting Capacity (Amps)
65	DC	-	0.2-50	2,000
250	50/60	1	0.2-30	5,000
250	50/60	1	31-50	2,000
415/240	50/60	3Ø	0.2-30	5,000

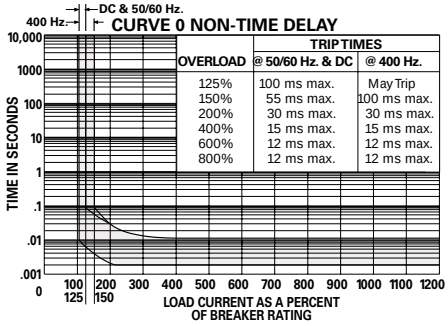
Approvals and Ratings Table 2

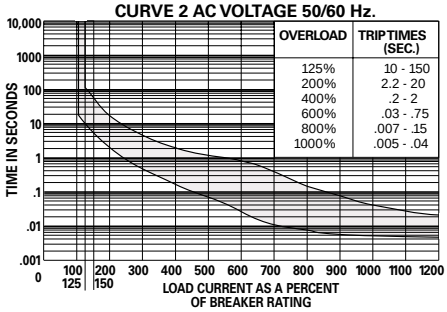
UL/CSA

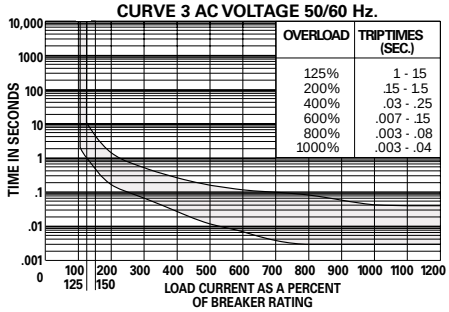
Switch Number	Voltage 50/60 Hz.	Current (Amps)	Terminals WxTxL
A	125	10	.093 x .020 x .250 (2.36 x .51 x 6.40)

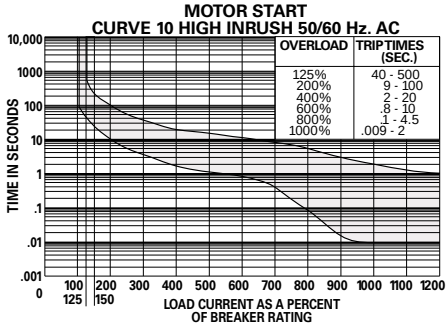
Time vs. Current Trip Curves For W6 Series and W9 Series

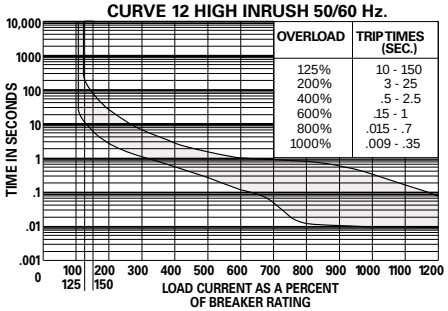
AC 50/60 Hz.

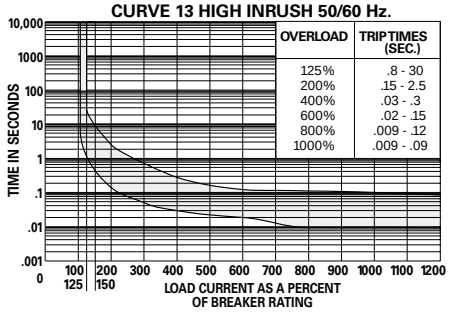




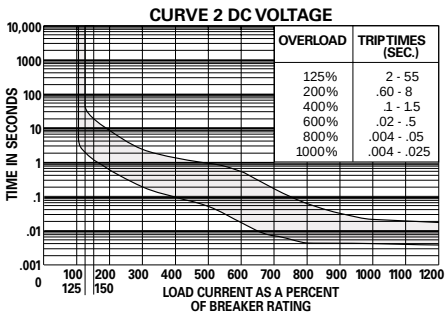


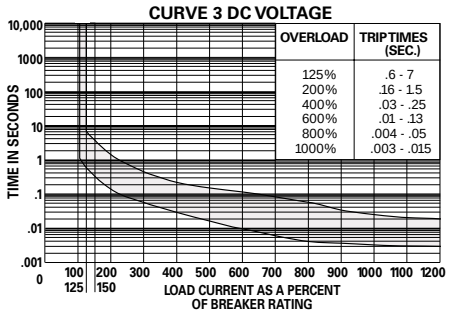


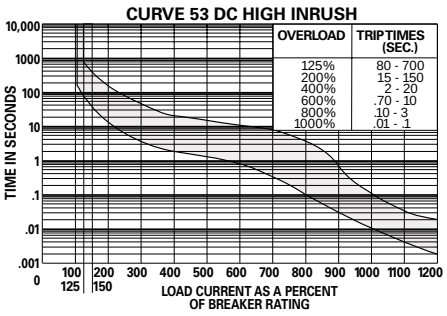




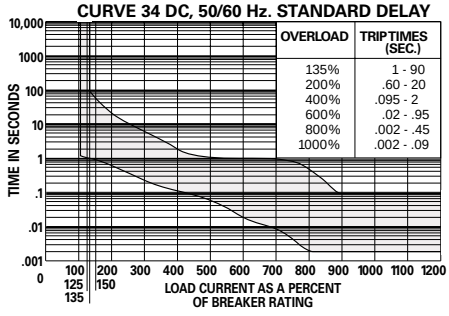
DC



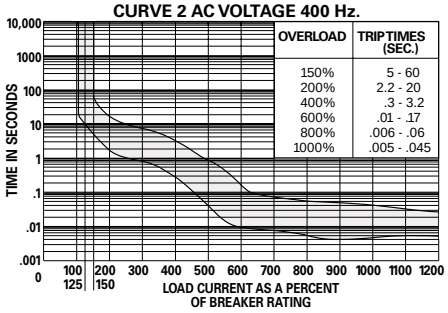


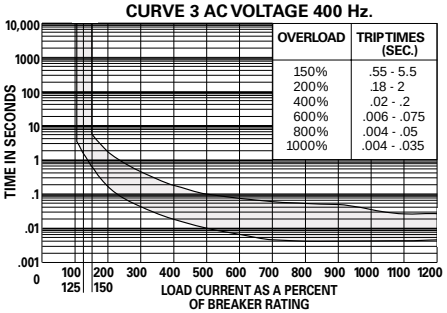


AC/DC



AC 400 Hz.





Note:
For instantaneous curves for all voltages refer to Curve 0 Non-Time Delay under the AC 50/60 Hz. heading.

Pulse Tolerance Specifications

Pulse tolerance is defined as a single pulse of a half sine wave (1/2 cycle or 8 milliseconds) that will not trip the breaker. An inertia wheel for increased pulse tolerance is available by specifying "P" after the time delay curve number in the ordering information. The table at right lists pulse tolerance values of standard and inertia delay models.

Voltage	Time Delay Curve	Pulse Tolerance Value	
		Standard	Inertia Delay
AC 50/60 Hz.	2	7.5	18
	3	6	18
	10	18	30
	12	18	30
	13	18	30
AC 400 Hz.	2	6.5	18
	3	5.5	18

To determine pulse tolerance multiply breaker rating by value in table. For example, a 2A breaker with time delay curve 3 has a standard pulse tolerance of 12A (2A x 6). The same breaker with an inertia delay has a pulse tolerance of 36A (2A x 18).

Ordering Information

W6 Series

Typical Part No. ►	W	67-	X	2	Q	1	2-	20

1. Circuit Breaker Mounting:
W = #6-32 mounting threads.
M = M3.0 x 0.5 mounting threads.

2. Number of Poles:
67 = Single pole 68 = Two pole 69 = Three pole 70 = Four pole

3. Circuit Function: (Only X is VDE approved)
A = Series trip with auxiliary switch (.093" QC) X = Series trip

4. Actuator: (One actuator per pole)
1 = Black toggle 3 = Black rocker 5 = Red rocker 9 = Red toggle
2 = White toggle 4 = White rocker 6 = Grey rocker

5. Termination:
Q = .250" QC (DIN 46 244) [25A Max. VDE] S = #8-32 screw [30A Max. VDE] T = #10-32 screw [50A Max. VDE]
Note: "T" termination must be used for **all** ratings of 31 amps or above.

6. Maximum Line Voltage: (See Table 1 for current ranges)
UL/CSA TYPES 1 = 277VAC, 50/60 Hz.
2 = 277/480
3 = 250VAC, 400 Hz.
5 = 65VDC
7 = AC/DC 277VAC or 65VDC
(Delay curve 34 must be specified.)
VDE TYPES 1 = 250VAC, 415/240VAC
5 = 65VDC
7 = AC/DC 250VAC, 415/240VAC, 65VDC
(Delay curve 34 must be specified.)

7. Time Delay Curve:
0 = Instantaneous
2 = Standard delay
3 = Short delay
53 = DC high inrush
10 = AC high inrush (Motor start)
12 = AC high inrush version of #2
13 = AC high inrush version of #3
34 = Combination AC/DC standard delay
Notes: Curves may be specified with increased pulse tolerance for 1/2 cycle by adding "P" after curve, See delay curve section for availability and details.

8. Amp Rating:

0.20	0.50	1.0	2.0	3.0	4.0	6.0	7.5	9.0	11.0	15.0	25.0	35.0	45.0	Consult factory for
0.25	0.75	1.5	2.5	3.5	5.0	7.0	8.0	10.0	12.0	20.0	30.0	40.0	50.0	other values.

9. VDE Approval:
Blank = UL/CSA approved breaker
V = VDE approved breaker without auxiliary switch

Authorized distributors are more likely to stock the following items.

W67-A2Q12-5	W67-X2Q12-5	W67-X2Q13-1	W67-X2Q13-25	W67-X2Q52-15	W68-X2Q12-5	W68-X2Q12-30	W69-X2Q12-15
W67-A2Q12-10	W67-X2Q12-7	W67-X2Q13-2	W67-X2Q13-30	W67-X2Q52-20	W68-X2Q12-7	W68-X2Q13-15	W69-X2Q12-20
W67-X2Q10-3	W67-X2Q12-10	W67-X2Q13-3	W67-X2Q50-5	W67-X2Q52-30	W68-X2Q12-10	W68-X2Q110-10	W69-X2Q12-25
W67-X2Q10-5	W67-X2Q12-15	W67-X2Q13-10	W67-X2Q50-10	W67-X2Q110-15	W68-X2Q12-15	W68-X2Q110-20	W69-X2Q12-30
W67-X2Q12-2	W67-X2Q12-20	W67-X2Q13-15	W67-X2Q52-5	W67-X2Q110-20	W68-X2Q12-20	W69-X2Q12-5	W69-X2Q110-20
W67-X2Q12-3	W67-X2Q12-30	W67-X2Q13-20	W67-X2Q52-10	W68-X2Q12-3	W68-X2Q12-25	W69-X2Q12-10	W69-X2Q110-30

Ordering Information

W9 Series

Typical Part No. ►	W	91-	X	1	1	2-	20

1. Circuit Breaker Mounting:
W = #6-32 mounting threads. M = M3.0 x 0.5 mounting threads.

2. Number of Poles:
91 = Single pole 92 = Two pole 93 = Three pole 94 = Four pole

3. Circuit Function: (Only X is VDE approved)
A = Series trip with auxiliary switch (.093" QC) X = Series trip

4. Actuator: (One actuator per pole):
1 = Black toggle 2 = White toggle

5. Maximum Line Voltage: (See Table 1 for current ranges)
UL/CSA TYPES 1 = 277VAC, 50/60 Hz.
2 = 277/480
3 = 250VAC, 400 Hz.
5 = 65VDC
7 = AC/DC 277VAC or 65VDC
(Delay curve 34 must be specified.)
VDE TYPES 1 = 250VAC, 415/240VAC
5 = 65VDC
7 = AC/DC 250VAC, 415/240VAC, 65VDC
(Delay curve 34 must be specified.)

6. Time Delay Curve:
0 = Instantaneous
2 = Standard delay
3 = Short delay
53 = DC high inrush
10 = AC high inrush (Motor start)
12 = AC high inrush version of #2
13 = AC high inrush version of #3
34 = Combination AC/DC standard delay
Notes: Curves may be specified with increased pulse tolerance for 1/2 cycle by adding "P" after curve. See delay curve section for availability and details.

7. Amp Rating:

0.20	0.75	2.0	3.5	6.0	8.0	11.0	20.0	35.0	50.0
0.25	1.0	2.5	4.0	7.0	9.0	12.0	25.0	40.0	Consult factory for other values
0.50	1.5	3.0	5.0	7.5	10.0	15.0	30.0	45.0	

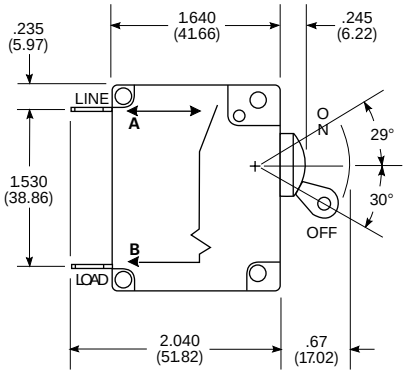
8. VDE Approval:
Blank = UL/CSA approved breaker
V = VDE approved breaker without auxiliary switch

Authorized distributors are more likely to stock the following items.

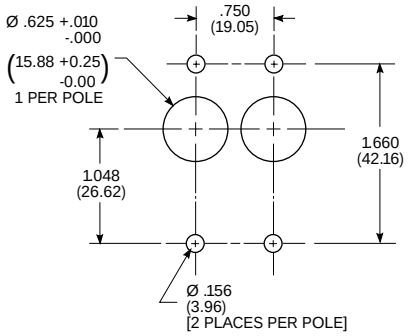
W91-X112-1	W91-X112-15	W91-X113-15	W91-X152-40	W92-X112-5	W92-X112-30	W92-X1110-30	W93-X112-30
W91-X112-2	W91-X112-20	W91-X150-5	W91-X152-50	W92-X112-7	W92-X112-40	W93-X112-5	W93-X112-40
W91-X112-3	W91-X112-40	W91-X152-10	W91-X1110-20	W92-X112-10	W92-X112-50	W93-X112-10	W93-X112-50
W91-X112-5	W91-X112-50	W91-X152-15	W92-X112-1	W92-X112-15	W92-X113-15	W93-X112-15	W93-X1110-20
W91-X112-7	W91-X113-5	W91-X152-20	W92-X112-2	W92-X112-20	W92-X113-20	W93-X112-20	W93-X1110-30
W91-X112-10	W91-X113-10	W91-X152-30	W92-X112-3	W92-X112-25	W92-X1110-20	W93-X112-25	

Outline Dimensions - Toggle Actuator Models

W6 Series

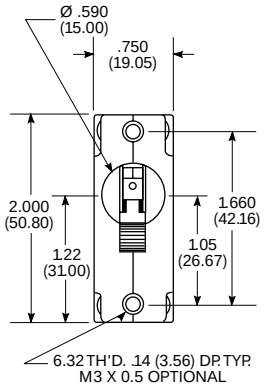


Panel Mounting Cutout

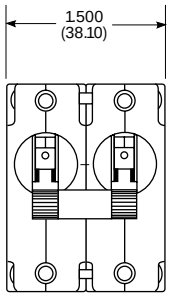


W6 Series

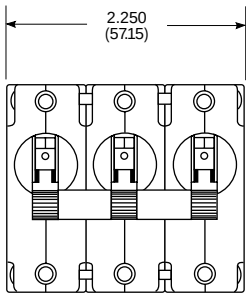
1 Pole



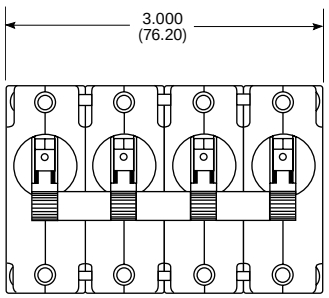
2 Pole



3 Pole



4 Pole

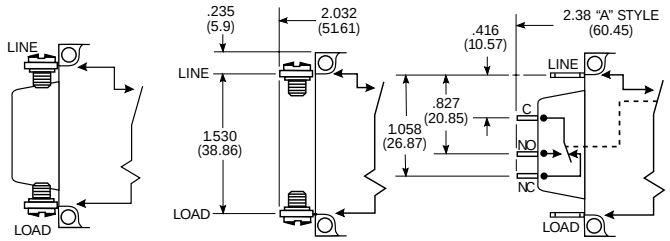


Note:
Multi-pole models furnished with separate handle tie hardware.

VDE Models W/Screw Terminals

UL/CSA Models W/Screw Terminals

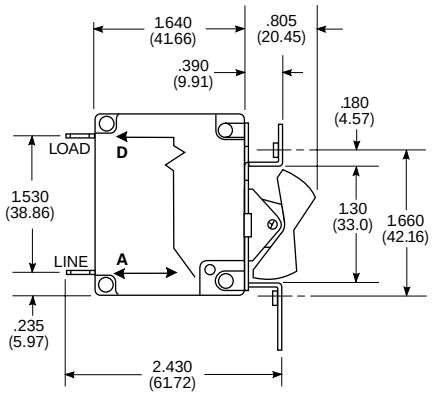
UL/CSA/VDE Models W/Aux. Switch



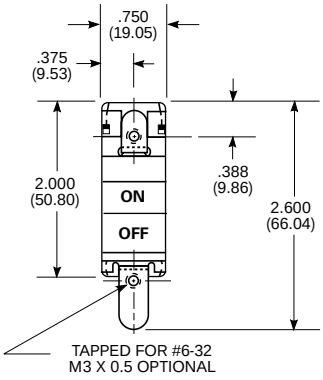
Notes:
1. Terminal protrusion dimensions are referenced from back of mounting panel.
2. Main terminals are male quick connect type .250 (6.35) wide x .031 (.79) thick x .377 (9.58) long. Optional 8-32 x .250 (6.35) or 10-32 x .250 (6.35) screw type.
3. Panel mounting cutout detail mtg. detail tol.: ± .005 (.13) unless noted. Add additional cutouts to correspond to number of poles. Outline drawing tolerance ± .015 (.38) unless noted. Dimensions in brackets ( ) are in millimeters.

Outline Dimensions - Rocker Actuator Models

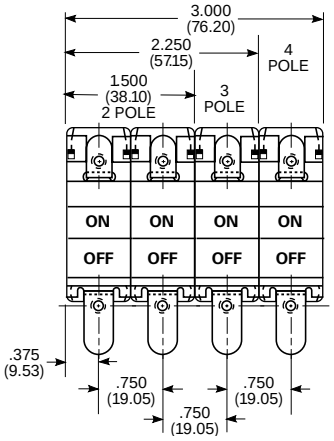
W6 Series



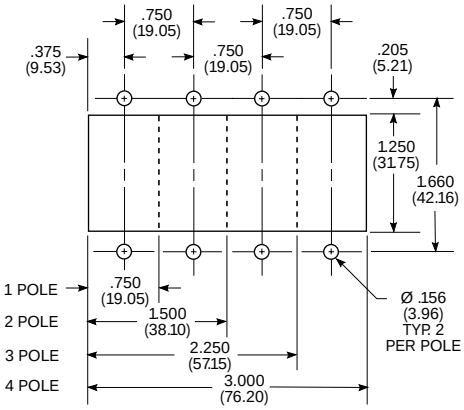
1 Pole



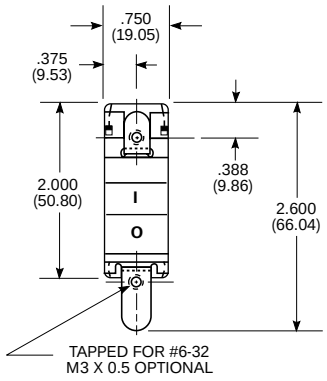
2, 3 & 4 Pole



Panel Mounting Cutout



VDE Rocker Marking

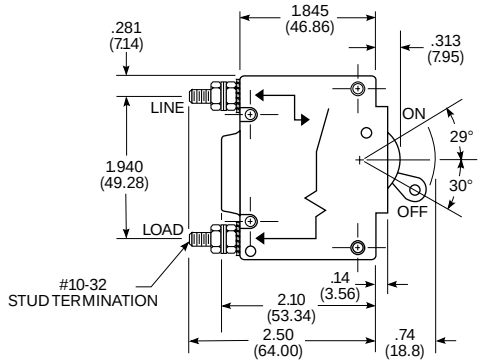


Notes:
1. Outline drawing tolerance ± .015 (.38) unless noted. Dimensions in brackets ( ) are in millimeters.
2. Mounting Detail Tol.: ± .005 (.13) unless noted

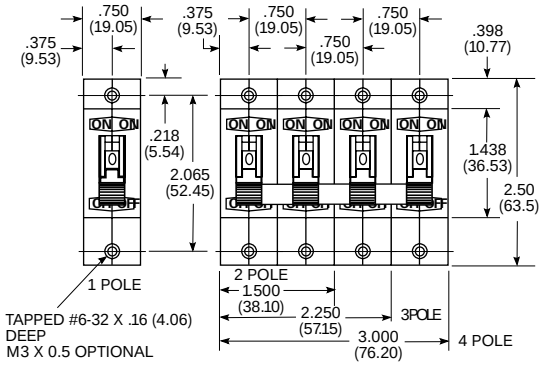
Outline Dimensions

W9 Series

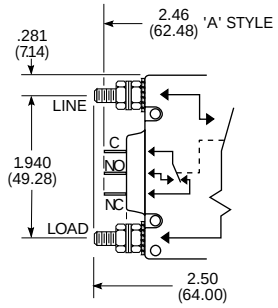
Series Trip Model



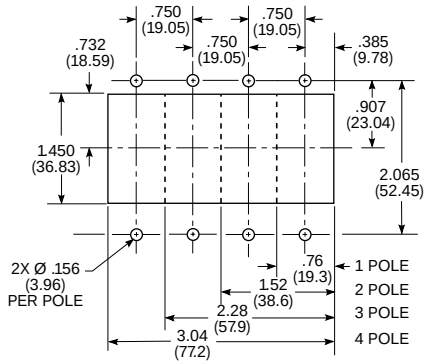
Series Trip Model



Series Trip Model
With Common Enclosed Auxiliary Switch



Panel Mounting Cutout Detail



Notes:
1. Terminal protrusion dimensions are referenced from the back of the mounting panel.
2. Mounting detail tolerance ±.005 (13) unless noted.
3. Outline drawing tolerance ± .015 (.38) unless noted. Dimensions in brackets ( ) are in millimeters.

Engineering Notes

Dimensions are shown for reference purposes only.

Dimensions are in inches over (millimeters) unless otherwise specified.

Specifications and availability subject to change.

www.tycoelectronics.com
Technical support:
Refer to inside back cover.

Alphanumeric Index

Series	Type	Page
4000	5-30VA, Wire Leads, Class II	204
4000	10-30VA, QC Terminals, Class II	205
4000	20-40VA, Plate Mount, Class II	206
4000	40-50VA, Wire Leads, Class II	207
4000	40-50VA, QC Terminals, Class II	208
4000	60-75VA, Wire Leads, Class II	209
4000	60-75VA, QC Terminals, Class II	210
4700	60-150VA, Wire Leads or QC, UL 508	211
57	Transformer Relay for HVAC	212

Transformers 201-212 **2**

Transformers...Questions and Answers

What is a Transformer?
A transformer is a passive electrical device which is designed to change one AC voltage to another by magnetic induction. It "steps-up" or "steps-down" voltage in order to match incoming supply voltage from the utility to the voltage required by the user's end product. Typical USA supply voltages are 120, 208, 240, 277, 480 (and 575 in Canada). Common International voltages include 110, 220, 380, and 415.

What is an Isolation Transformer?
An isolation transformer is a transformer whose primary and secondary windings are separate for the purpose of isolating the circuit from the supply source.

What is an Autotransformer?
An autotransformer has only one winding, which is shared by the primary and secondary circuits. Autotransformers do not provide isolation but offer a substantial savings when used to obtain small increments of voltage above or below the input voltage.

What is a Class II Transformer?
A Class II transformer is used to supply Class II circuits. Class II transformers have a maximum VA (Volt-Ampere) rating of less than 100 and a maximum secondary output of 30 VAC. The maximum VA generally offered is 75 and the most common secondary voltage is 24 VAC. All Class II transformers are either inherently or non-inherently limited. This means that the maximum output current of the transformer is limited, either by the intrinsic coil impedance or by a fuse or circuit breaker. These transformers are designed to meet the requirements of U.L. 1585.

Inherently Energy Limited Transformers - Class II transformers up to 50 VA are "Inherently Limited" which means that the transformer, if overloaded, will short itself out and fail safely, *not requiring a fuse*.

Non-Inherently Energy Limited Transformers - 60 thru 75 VA Class II transformers are generally *protected by a resettable circuit breaker or a fuse* within the transformer secondary. Without this overload protection, the transformer would not satisfy the safety requirements for a Class II circuit.

What is a General Purpose Transformer?
General purpose transformers include any VA rating along with primary and secondary voltage ratings up to 600 VAC. *Although internal fusing is an option, no fusing is required.* However, applicable U.L. specifications may require fusing in the end product. These transformers are designed to meet the requirements of U.L. 506.

What is Voltage Regulation?
Voltage regulation is the percent of change in the output voltage when the load is reduced from full load to no load while the input voltage remains constant.

What is the effect of a load on a control transformer?
A control transformer is designed to provide rated output voltage at full VA. As the load decreases, the output voltage will go up. Conversely, increases in load will result in lower output voltages. Typically, the smaller the VA size of the unit, the greater difference there is between no-load and full-load voltage.

Part Numbering System

This chart illustrates a breakdown of our part numbering system on a few of our most popular models. Consult factory for your specific requirements.

Typical Part No. ▶	4000	–	01	E	07	BB	999

1. Series:

4000 = Class II (UL 1585) inherently protected or internally fused.	4500 = Autotransformer.
4001 = Class II (UL 1585) externally fused.	4600 = 60 Hz. only
4100 = No UL or CSA approval.	4700 = General Purpose (UL 506).

2. Packaging:
– = Bulk Pack Y = Individual Box

3. Primary and Secondary Voltages:

	Primary V	Secondary V		Primary V	Secondary V
01 =	120	24	09 =	208/240	24
02 =	240	24	13 =	208/240/480	24
03 =	277	24	20 =	120	12
04 =	480	24	51 =	380/415	24
05 =	120/208/240	24	78 =	575	24

4. VA and Series Dimension:

	VA Rating	Series Size		VA Rating	Series Size
A =	10	3/4" (19.05mm)	AW =	50	7/8" (22.22 mm)
C =	20	3/4" (19.05mm)	L =	60	15/16" (23.81mm)
M =	30	3/4" (19.05mm)	J =	75	15/16" (23.81mm)
E =	40	7/8" (22.22 mm)	K =	100	1 1/4" (31.75mm)
V =	40	3/4" (19.05mm)	Z =	150	1 1/4" (31.75mm)

5. Stack Thickness and Fusing (Generally determined at factory):

19 = 0.5" (12.7mm) thick.	07 = 0.875" (22.225mm) thick.	15 = 1.00" (25.4mm) thick.
02 = 0.625" (15.875mm) thick.	04 = 1.00" (25.4mm) thick.	18 = 1.25" (31.75mm) thick.

6. Mounting and Termination:

	Mounting	Termination		Mounting	Termination
K =	Foot Mount	Leads	AE =	Foot Mount	QCs on Top
BC =	4" (101.6mm)foot	Screw / Leads	BB =	Foot Mount	QCs on One Side
G =	Panel Mount	Leads	AB =	Foot Mount	QCs on Other Side

7. Customer ID Suffix:
000-999 = Factory assigned customer ID

Example: 4000-01E07BB999 This part number is a Class II transformer with a 120V primary and 24V secondary. It is 40VA and inherently energy limited. This is a foot mount transformer with quick connect terminals (line & load) exiting out of the same side of the transformer cover.

Note: This is a partial listing only. Consult factory for your specific requirements. All combinations of voltage and VA may not be available.

Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.

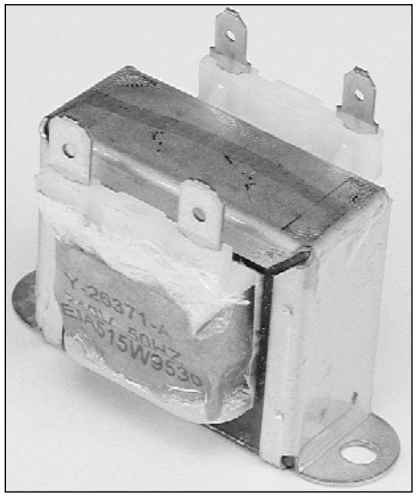
Custom Transformer Capabilities

In addition to our industry leading standard transformer series (see the following pages), We have a proven track record of being an innovative leader in custom transformer designs. We specialize in working with our customers in the initial stages of their design process, offering ideas and suggestions which lead to a transformer product that can be manufactured with the lowest *Defective Parts Per Million (DPPM)* levels and at the highest value to the customer. The following is a list of guidelines for transformer products which compliment our Demand Flow Manufacturing system.

Leaded Transformers - Quick Connect Transformers - PC Mount Transformers - Inductors

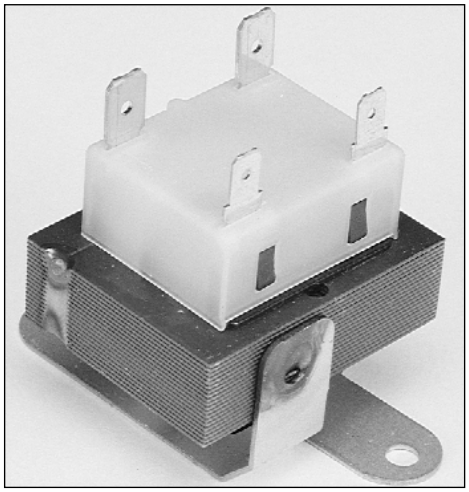
- 5 VA through 400 VA
- Spray on rust preventative
- Butt stack and weld lamination construction
- Molded bobbin construction
- Numerous welded bracket options
- Molded cover with integral strain relief for lead or quick connect terminal

When a transformer fits the above criteria and the customer is willing to share in the design process with us, we can both benefit from *Design For Manufacturing (DFM)*, as demonstrated in the following example:



Traditional Method

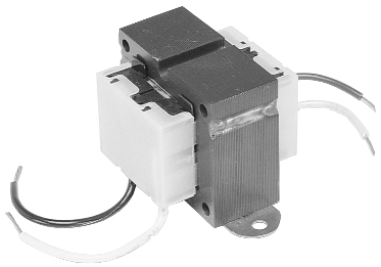
- DPPM level >2000
- 10 Week lead time
- 3 Part numbers
- 12 Inventory turns
- Costly
- Fragile design



DFM Method

- DPPM level <100
- 1 Week lead time
- 1 Universal part number
- 50 Inventory turns
- 20% Cost improvement
- Robust design

Our electrical and mechanical design groups are ready to work with you on your specific product needs.



4000 series

Class II UL 1585 Transformer
5 VA - 30VA Inherently Energy Limited
No Secondary Fusing Required
Wire Leads

c UL us File E87824

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- Type K Foot Mount - features a steel bracket welded to the bottom of the laminations for easy mounting.
- Type G Panel Mount - features .179" (4.55 mm) diameter holes in each corner to allow direct mounting to a panel.
- Multiple voltage combinations are available. Consult factory for availability.

Specifications

Wire Size: All leads are 18 AWG stranded 2/64" (.794 mm) insulation thickness. Standard parts have 12" (305 mm) total length with 1/2" (12.7 mm) strip.
Frequency: 50/60 Hz.
Insulation Class: UL Class B (130°C).
Weight: 5VA – 10.56 oz. (300 g); 10VA – 10.88 oz. (308 g); 20VA – 14.24 oz. (404 g); 30VA – 19.2 oz. (544 g).

Standard "999" Models Available

Primary V	Secondary V	20VA
120	24	4000-01C02K999
120	24	4000-01C02K999

For more details about standard models see Part Numbering System table at beginning of transformer section in this catalog .

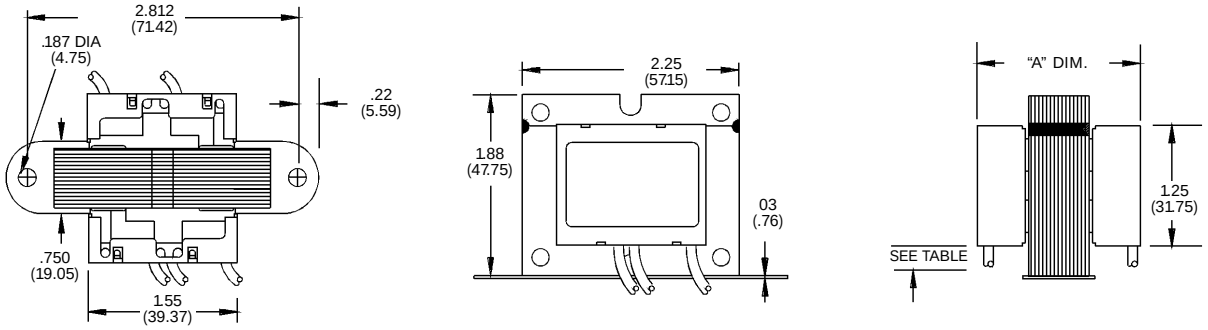
Partial Listing of Custom Models

Primary V	Secondary V	5VA	10VA	20VA	30VA
120	24	4000-01X19K*	4000-01A19K*	4000-01C02K*	4000-01M04K*
240	24	4000-02X19K*	4000-02A19K*	4000-02C02K*	4000-02M04K*
277	24	4000-03X19K*	4000-03A19K*	4000-03C02K*	4000-03M04K*
480	24	4000-04X19K*	4000-04A19K*	4000-04C02K*	4000-04M04K*
208/240	24	–	–	4000-09C02K*	4000-09M04K*
120	12	–	–	4000-20C02K*	–

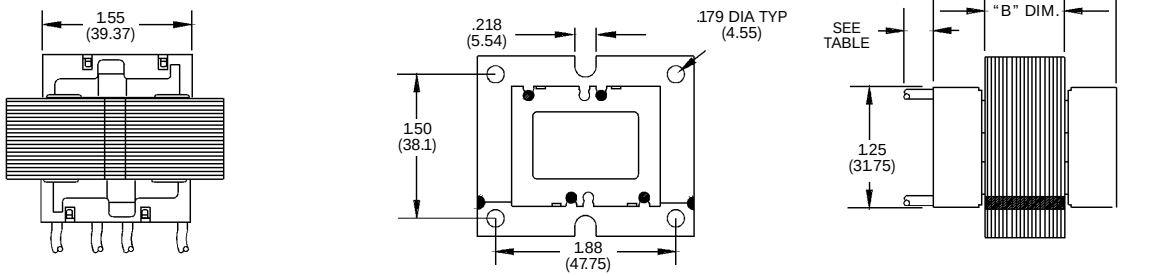
* A three digit customer ID suffix will be assigned by the factory.
All custom model part numbers are listed as Type K Foot Mount. To specify Type G Panel Mount, replace K in above part numbers with G.

Outline Dimensions

Type K Foot Mount



Type G Panel Mount



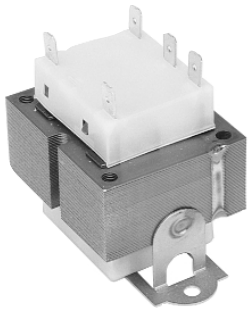
"A" and "B" Dimensions

	5 VA	10 VA	20 VA	30 VA
"A" Dimension [inches (mm)]	1.5 (38.1)	1.5 (38.1)	1.625 (41.28)	2.00 (50.8)
"B" Dimension [inches (mm)]	0.5 (12.7)	0.5 (12.7)	0.625 (15.9)	1.00 (25.4)

Details regarding leads on standard models

	Primary Leads							Secondary Leads	
Voltage	COM	120	208	240	277	480	575	24	VAC
Color	Black	White	Red	Orange	Brown	Black/Red	Gray	Blue	Yellow
Length [inches (mm)]	12 (305)	12 (305)	12 (305)	12 (305)	12 (305)	12 (305)	12 (305)	12 (305)	12 (305)
Strip Length [inches (mm)]	0.5 (12.7)	0.5 (12.7)	0.5 (12.7)	0.5 (12.7)	0.5 (12.7)	0.5 (12.7)	0.5 (12.7)	0.5 (12.7)	0.5 (12.7)

Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.
www.tycoelectronics.com
Technical support:
Refer to inside back cover.



4000 series

Class II UL 1585 Transformer
10VA - 30VA Inherently Energy Limited
No Secondary Fusing Required
Quick Connect Terminals

c UL us File E87824

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- Type BB Same Side Termination - features quick connect terminals with line and load terminations on the same side of transformer.
- Type AE Laydown Termination - features quick connect terminals with line and load terminations on the top of transformer.
- Type AB Opposite Side Termination - features quick connect terminals with line and load terminations on opposite sides of transformer.
- Multiple voltage combinations are available. Consult factory for availability.

Specifications

Terminals: Standard male quick connects are .250" x .032" (6.35 x .81 mm). Other available quick connects include .187" x .032" (4.75 x .81 mm) and .187" x .020" (4.75 x .51 mm).
Frequency: 50/60 Hz.
Insulation Class: UL Class B (130°C).
Weight: 10VA – 10.9 oz. (308 g); 20VA – 14.1 oz. (399 g); 30VA – 18.6 oz. (525 g).

Standard "999" Models Available

No standard models are offered.

For more details about standard models see Part Numbering System table at beginning of transformer section in this catalog .

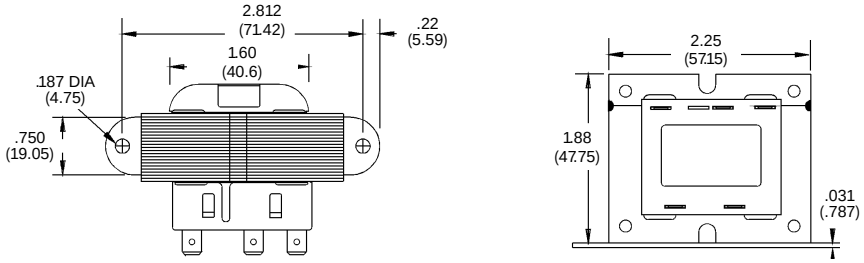
Partial Listing of Custom Models

Primary V	Secondary V	10VA	20VA	30VA	30VA
120	24	4000-01A19BB*	4000-01C02BB*	4000-01M04BB*	4000-01M04BB*
240	24	4000-02A19BB*	4000-02C02BB*	4000-02M04BB*	4000-02M04BB*
277	24	–	–	4000-03M04BB*	4000-03M04BB*
480	24	–	–	4000-04M04BB*	4000-04M04BB*
208/240	24	–	–	4000-09M04BB*	4000-09M04BB*
120	12	–	4000-20C02BB*	–	–

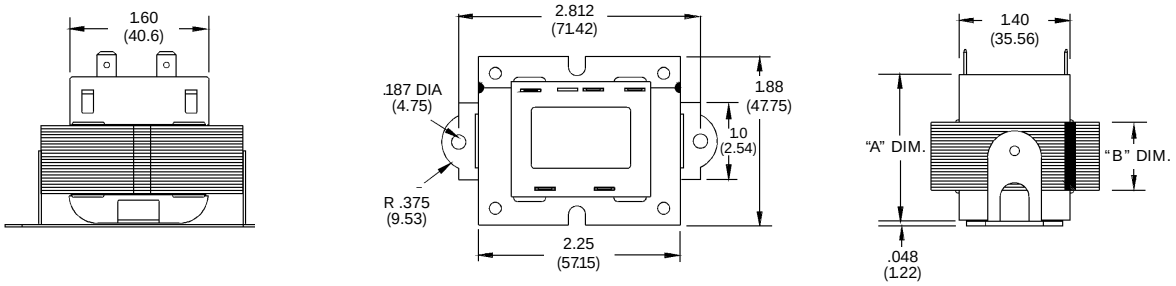
* A three digit customer ID suffix will be assigned by the factory.
To specify Type AE Laydown Termination, replace BB in above part numbers with AE.

Outline Dimensions

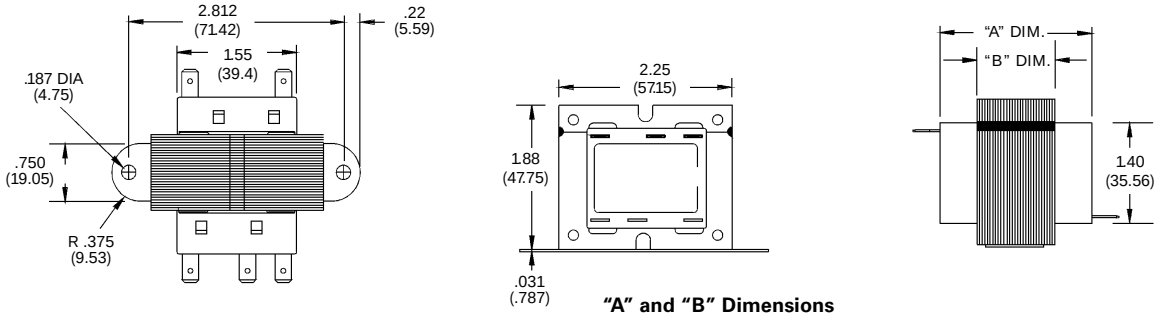
Type BB Same Side Termination



Type AE Laydown Termination



Type AB Opposite Side Termination



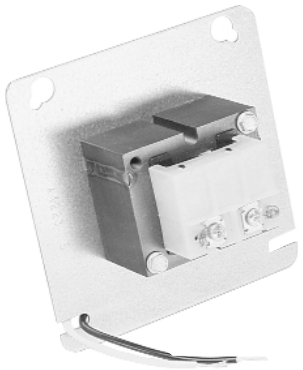
"A" and "B" Dimensions

	10VA	20VA	30VA
"A" Dimension [inches (mm)]	1.50 (38.1)	1.625 (41.28)	2.00 (50.8)
"B" Dimension [inches (mm)]	.50 (12.7)	0.625 (15.88)	1.00 (25.4)

Dimensions are shown for reference purposes only.

Dimensions are in inches over (millimeters) unless otherwise specified.

Specifications and availability subject to change.



4000 series

Class II UL 1585 Transformer
20VA - 40VA Inherently Energy Limited
No Secondary Fusing Required
Plate for Electrical Box Mounting

File E87824

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- Type BC Plate Mount - mounted on a 4" (101.6mm) square plate designed to fit a standard 4" (101.6mm) square electrical box.
- The line voltage is connected inside the electrical boxto the color-coded leads on the transformer. The low voltage is terminated to either 1/4" (4.75 mm) quick connects and/or #6-32 screw furnished on the secondary side.
- Multiple voltage combinations are available. Consult factory for availability.

Specifications

Wire Size: All leads are 18 AWG stranded 2/64" (.794 mm) insulation thickness. Standard parts have 12" (305 mm) total length with 1/2" (12.7 mm) strip.
Frequency: 50/60 Hz.
Insulation Class: UL Class B (130°C).
Weight: 20VA – 19.2 oz. (544 g); 40VA – 32 oz. (906 g).

Standard "999" Models Available

Primary V	Secondary V	20VA	40VA
120	24	4000-01C02BC999	4000-01V18BC999

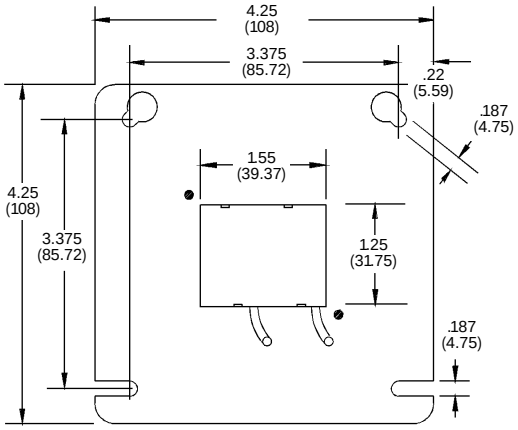
For more details about standard models see Part Numbering System table at beginning of transformer section in this catalog .

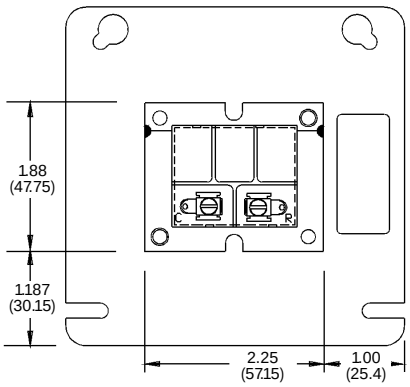
Partial Listing of Custom Models

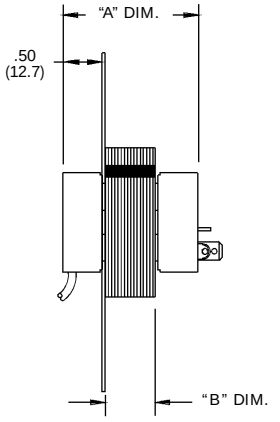
Primary V	Secondary V	20VA	40VA
120	24	4000-01C02BC*	4000-01V18BC*
208/240	24	4000-09C02BC*	4000-09V18BC*

* A three digit customer ID suffix will be assigned by the factory.
All custom model part numbers are listed as Type K Foot Mount. To specify Type G Panel Mount, replace K in above part numbers with G.

Outline Dimensions





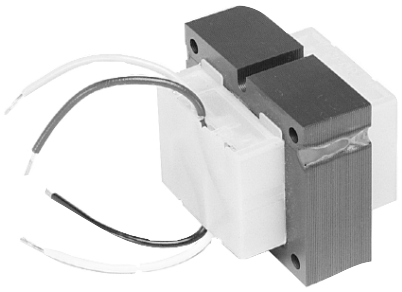


"A" and "B" Dimensions

	20 VA	40 VA
"A" Dimension [inches (mm)]	1.625 (41.28)	2.56 (65.02)
"B" Dimension [inches (mm)]	.625 (15.88)	1.25 (31.75)

Details regarding leads on standard models

	Primary Leads							Secondary Leads	
Voltage	COM	120	208	240	277	480	575	24	VAC
Color	Black	White	Red	Orange	Brown	Black/Red	Gray	Blue	Yellow
Length [inches (mm)]	12 (305)	12 (305)	12 (305)	12 (305)	12 (305)	12 (305)	12 (305)	12 (305)	12 (305)
Strip Length [inches (mm)]	0.5 (12.7)	0.5 (12.7)	0.5 (12.7)	0.5 (12.7)	0.5 (12.7)	0.5 (12.7)	0.5 (12.7)	0.5 (12.7)	0.5 (12.7)



4000 series

Class II UL 1585 Transformer
40 VA - 50VA Inherently Energy Limited
No Secondary Fusing Required
Wire Leads

c UL us File E87824

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- Type K Foot Mount - features a steel bracket welded to the bottom of the laminations for easy mounting.
- Type G Panel Mount - features .156" (3.96 mm) diameter holes in each corner to allow direct mounting to a panel.
- Multiple voltage combinations are available. Consult factory for availability.

Specifications

Wire Size: All leads are 18 AWG stranded 2/64" (.794 mm) insulation thickness. Standard parts have 12" (305 mm) total length with 1/2" (12.7 mm) strip.
Frequency: 50/60 Hz.
Insulation Class: UL Class B (130°C).
Weight: 40VA – 24.3 oz. (600 g); 50VA – 33.6 oz. (953 g).

Standard "999" Models Available

Primary V	Secondary V	40VA	50VA
120	24	4000-01E07K999	4000-01AW18K999
277	24	4000-03E07K999	4000-03AW18K999
480	24	4000-04E07K999	4000-04AW18K999
120/208/240	24	4000-05E07K999	–
208/240	24	4000-09E07K999	4000-09AW18K999

For more details about standard models see Part Numbering System table at beginning of transformer section in this catalog .

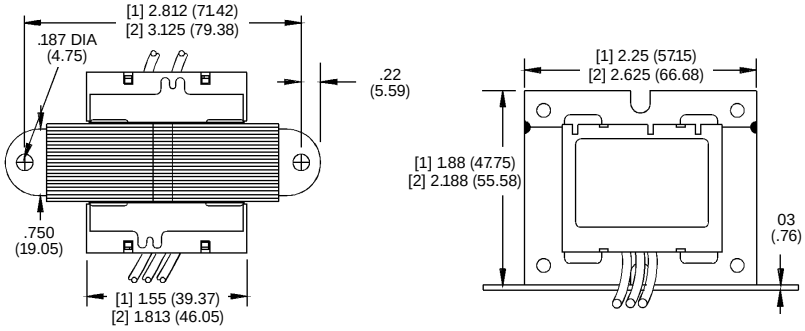
Partial Listing of Custom Models

Primary V	Secondary V	40VA	40VA	50VA
120	24	4000-01V18K*	4000-01E07K*	4000-01AW18K*
240	24	4000-02V18K*	4000-02E07K*	4000-02AW18K*
277	24	4000-03V18K*	4000-03E07K*	4000-03AW18K*
480	24	4000-04V18K*	4000-04E07K*	4000-04AW18K*
120/208/240	24	–	4000-05E07K*	–
208/240	24	4000-09V18K*	4000-09E07K*	4000-09AW18K*
208/240/480	24	–	4000-13E07K*	–
380/415	24	4000-51V18K*	4000-51E07K*	4000-51AW18K*
575	24	4000-78V18K*	4000-78E07K*	4000-78AW18K*

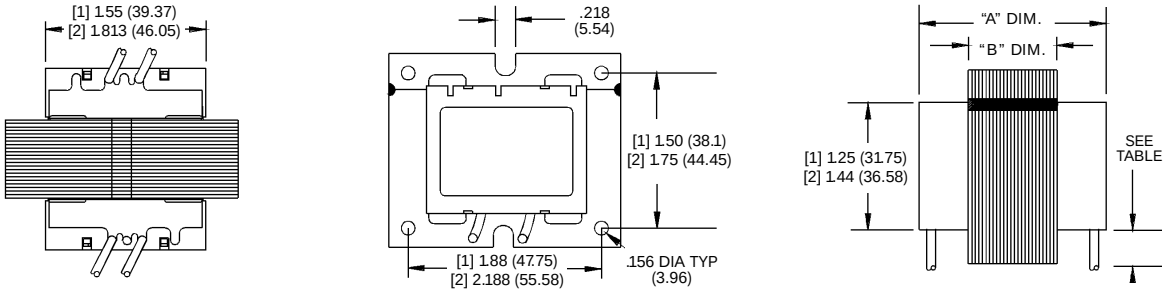
* A three digit customer ID suffix will be assigned by the factory.
All custom model part numbers are listed as Type K Foot Mount. To specify Type G Panel Mount, replace K in above part numbers with G.

Outline Dimensions

Type K Foot Mount



Type G Panel Mount



[1] Applies to V18 models.
[2] Applies to E07 & AW18 models.

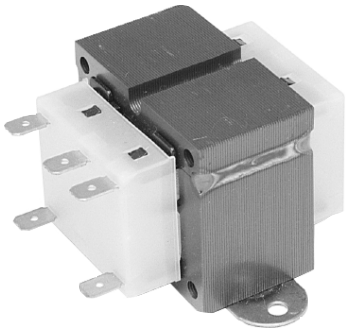
"A" and "B" Dimensions

	40 VA / V18	40 VA / E07	50 VA / AW18
"A" Dimension [inches (mm)]	2.25 (57.15)	2.125 (53.98)	2.56 (65.02)
"B" Dimension [inches (mm)]	1.25 (31.75)	0.875 (22.22)	1.25 (31.75)

Details regarding leads on standard models

	Primary Leads							Secondary Leads	
Voltage	COM	120	208	240	277	480	575	24	VAC
Color	Black	White	Red	Orange	Brown	Black/Red	Gray	Blue	Yellow
Length [inches (mm)]	12 (305)	12 (305)	12 (305)	12 (305)	12 (305)	12 (305)	12 (305)	12 (305)	12 (305)
Strip Length [inches (mm)]	0.5 (12.7)	0.5 (12.7)	0.5 (12.7)	0.5 (12.7)	0.5 (12.7)	0.5 (12.7)	0.5 (12.7)	0.5 (12.7)	0.5 (12.7)

Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.
www.tycoelectronics.com
Technical support:
Refer to inside back cover.



4000 series

Class II UL 1585 Transformer
40VA - 50VA Inherently Energy Limited
No Secondary Fusing Required
Quick Connect Terminals

c UL us File E87824

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- Type BB Same Side Termination - features quick connect terminals with line and load terminations on the same side of transformer.
- Type AE Laydown Termination - features quick connect terminals with line and load terminations on the top of transformer.
- Type AB Opposite Side Termination - features quick connect terminals with line and load terminations on opposite sides of transformer.
- Multiple voltage combinations are available. Consult factory for availability.

Specifications

Terminals: Standard male quick connects are .250" x .032" (6.35 x .81 mm). Other available quick connects include .187" x .032" (4.75 x .81 mm) and .187" x .020" (4.75 x .51 mm).
Frequency: 50/60 Hz.
Insulation Class: UL Class B (130°C).
Weight: 40VA – 22.4 oz. (636 g); 50VA – 35.2 oz. (999 g).

Standard "999" Models Available

Primary V	Secondary V	40VA
120	24	4000-01E07AE999
120	24	4000-01E07BB999
208/240	24	4000-09E07AE999

For more details about standard models see Part Numbering System table at beginning of transformer section in this catalog .

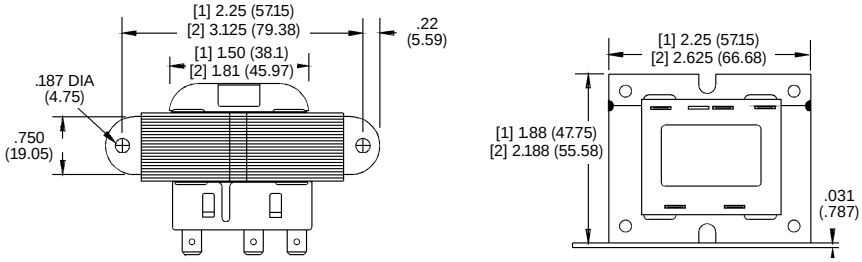
Partial Listing of Custom Models

Primary V	Secondary V	40VA	40VA	40VA	50VA
120	24	4000-01E07BB*	4000-01V18BB*	4000-01V18AB*	4000-01AW18BB*
240	24	4000-02E07BB*	4000-02V18BB*	4000-02V18AB*	4000-02AW18BB*
277	24	4000-03E07BB*	4000-03V18BB*	4000-03V18AB*	4000-03AW18BB*
480	24	4000-04E07BB*	4000-04V18BB*	4000-04V18AB*	4000-04AW18BB*
208/240	24	4000-09E07BB*	4000-09V18BB*	4000-09V18AB*	4000-09AW18BB*
380/415	24	4000-51E07BB*	4000-51V18BB*	4000-51V18AB*	4000-51AW18BB*
575	24	4000-78E07BB*	4000-78V18BB*	–	4000-78AW18BB*

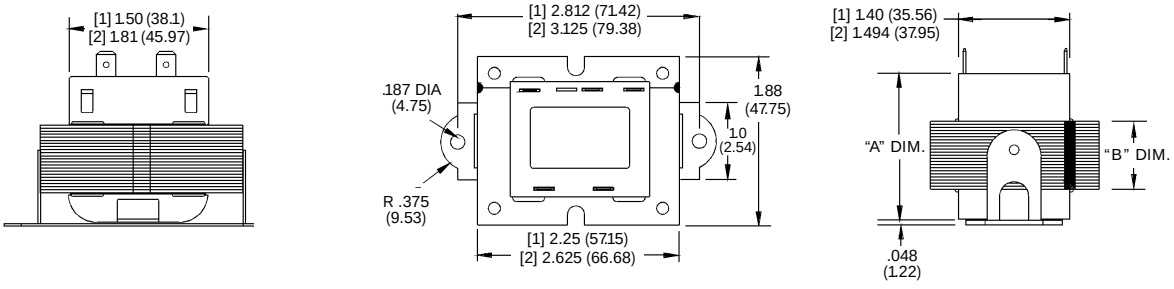
* A three digit customer ID suffix will be assigned by the factory.
To specify Type AE Laydown Termination, replace BB in above part numbers with AE.

Outline Dimensions

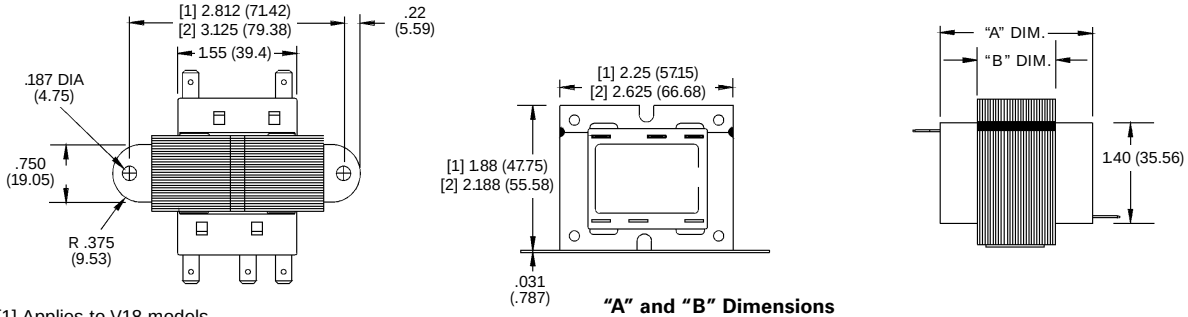
Type BB Same Side Termination



Type AE Laydown Termination



Type AB Opposite Side Termination

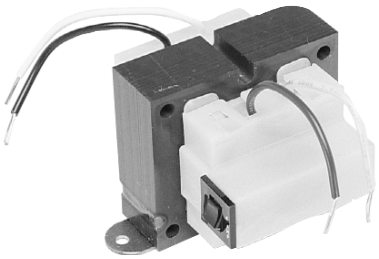


[1] Applies to V18 models.
[2] Applies to E07 & AW18 models.

"A" and "B" Dimensions

	40 VA / V18	40 VA / E07	50 VA / AW18
"A" Dimension [inches (mm)]	2.25 (57.15)	2.125 (53.98)	2.56 (65.02)
"B" Dimension [inches (mm)]	1.25 (31.75)	0.875 (22.22)	1.25 (31.75)

Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.



4000 series

Class II UL 1585 Transformer
60VA -75VA Non-Inherently Energy Limited
Secondary Fusing Required
Wire Leads

c UL us File E87824

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- Type K Foot Mount - features a steel bracket welded to the bottom of the laminations for easy mounting.
- Type G Panel Mount - features .218" (5.54 mm) diameter holes in each corner to allow direct mounting to a panel.
- For agency approval, 60 & 75VA transformers must have one of the following overcurrent protectors in series with the secondary winding: Internal fuse, integral circuit breaker. Any customer-supplied fusing or protection must be approved by the factory.
- Multiple voltage combinations are available. Consult factory for availability.

Standard "999" Models Available

Primary V	Secondary V	75VA
120	24	4000-01J15K999
277	24	4000-03J15K999
208/240	24	4000-09J15K999
575	24	4000-78J15K999
120/208/240/480	24	4000-08J15K999

For more details about standard models see Part Numbering System table at beginning of transformer section in this catalog . All 75VA standard models come with an integral circuit breaker.

Specifications

Wire Size: All leads are 18 AWG stranded 2/64" (.794 mm) insulation thickness. Standard parts have 12" (305 mm) total length with 1/2" (12.7 mm) strip.
Frequency: 50/60 Hz.
Insulation Class: UL Class B (130°C).
Weight: 60VA – 35.2 oz. (997 g); 75VA – 38.4 oz. (1087 g).

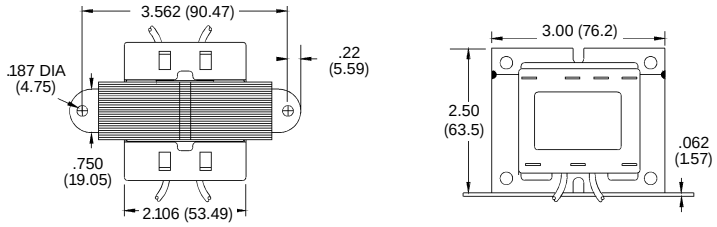
Partial Listing of Custom Models

Primary V	Secondary V	60VA	75VA
120	24	4000-01L15K*	4000-01J15K*
240	24	4000-02L15K*	4000-02J15K*
277	24	4000-03L15K*	4000-03J15K*
480	24	4000-04L15K*	4000-04J15K*
120/208/240	24	4000-05L15K*	4000-05J15K*
208/240	24	4000-09L15K*	4000-09J15K*
208/240/480	24	–	4000-13J15K*
380/415	24	–	4000-51J15K*
575	24	–	4000-78J15K*

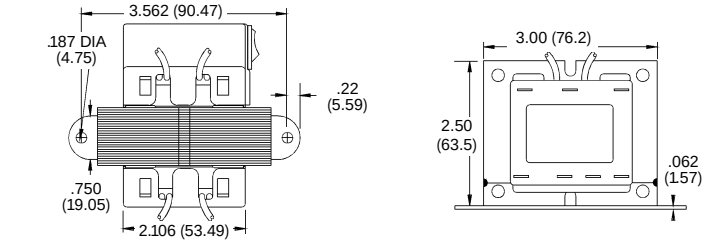
* A three digit customer ID suffix will be assigned by the factory.
For Type G Panel Mount, replace K in above part numbers with G.

Outline Dimensions

Type K Foot Mount - Internally Fused



Type K Foot Mount - Integral Circuit Breaker



Type G Panel Mount



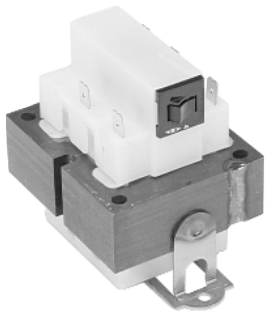
"A" and "B" Dimensions for 60VA & 75VA Models

	L15K & J15K Internally Fused	L15K & J15K w/ Integral Circuit Breaker	J41K Standard Part
"A" Dimension [inches (mm)]	2.475 (62.86)	3.25 (82.55)	3.45 (87.63)
"B" Dimension [inches (mm)]	1.00 (25.4)	1.00 (25.4)	1.125 (28.58)

Details regarding leads on standard models

	Primary Leads							Secondary Leads	
Voltage	COM	120	208	240	277	480	575	24	VAC
Color	Black	White	Red	Orange	Brown	Black/Red	Gray	Blue	Yellow
Length [inches (mm)]	12 (305)	12 (305)	12 (305)	12 (305)	12 (305)	12 (305)	12 (305)	12 (305)	12 (305)
Strip Length [inches (mm)]	0.5 (12.7)	0.5 (12.7)	0.5 (12.7)	0.5 (12.7)	0.5 (12.7)	0.5 (12.7)	0.5 (12.7)	0.5 (12.7)	0.5 (12.7)

Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.
www.tycoelectronics.com
Technical support:
Refer to inside back cover.



4000 series

Class II UL 1585 Transformer
60VA -75VA Non-Inherently Energy Limited
Secondary Fusing Required
Quick Connect Terminals

c UL us File E87824

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- Type BB Same Side Termination - features quick connect terminals with line and load terminations on the same side of transformer.
- Type AE Laydown Termination - features quick connect terminals with line and load terminations on the top of transformer.
- For agency approval, 60 & 75VA transformers must have one of the following overcurrent protectors in series with the secondary winding: Internal fuse, integral circuit breaker. Any customer-supplied fusing or protection must be approved by the factory.
- Multiple voltage combinations are available. Consult factory for availability.

Standard "999" Models Available

Primary V	Secondary V	75VA
120	24	4000-01J15AE999
208/240	24	4000-09J15AE999

For more details about standard models see Part Numbering System table at beginning of transformer section in this catalog. All 75VA standard models come with an integral circuit breaker.

Specifications

Terminals: Standard male quick connects are .250" x .032" (6.35 x .81 mm). Other available quick connects include .187" x .032" (4.75 x .81 mm) and .187" x .020" (4.75 x .51 mm).
Frequency: 50/60 Hz.
Insulation Class: UL Class B (130°C).
Weight: 60VA – 35.2 oz. (997 g); 75VA – 38.4 oz. (1087 g).

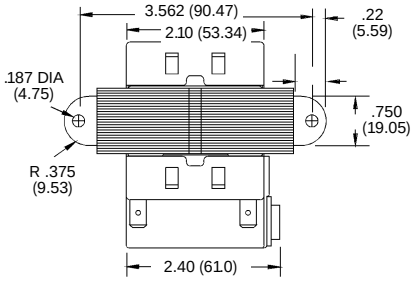
Partial Listing of Custom Models

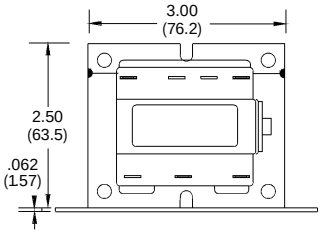
Primary V	Secondary V	60VA	75VA
120	24	4000-01L15BB*	4000-01J15BB*
240	24	4000-02L15BB*	4000-02J15BB*
277	24	4000-03L15BB*	4000-03J15BB*
480	24	4000-04L15BB*	4000-04J15BB*
120/208/240	24	4000-05L15BB*	4000-05J15BB*
208/240	24	4000-09L15BB*	4000-09J15BB*
208/240/480	24	–	4000-13J15BB*
380/415	24	–	4000-51J15BB*
575	24	–	4000-78J15BB*

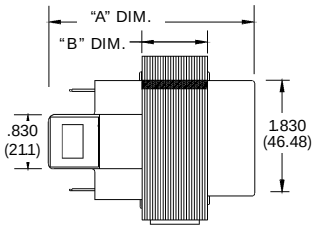
* A three digit customer ID suffix will be assigned by the factory.
For Type AE Laydown Termination, replace BB in above part numbers with AE.

Outline Dimensions

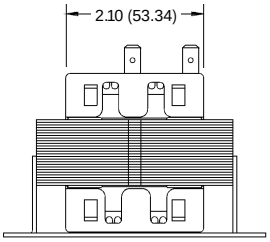
Type BB Same Side Termination

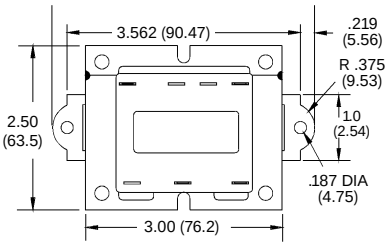


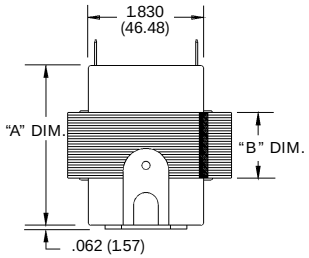




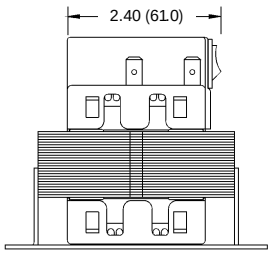
Type AE Laydown Termination - Internally Fused

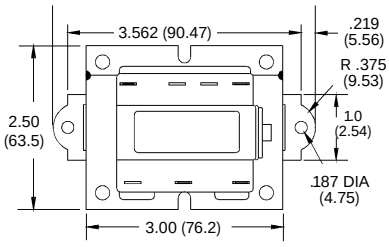


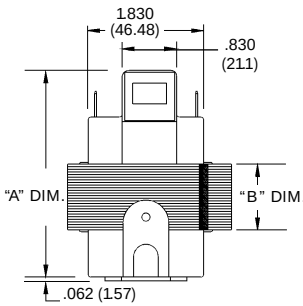




Type AE Laydown Termination - Integral Circuit Breaker



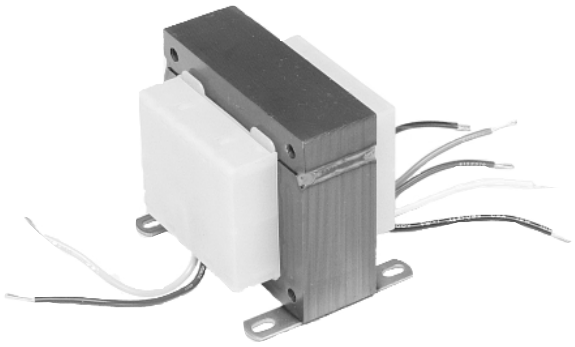




"A" and "B" Dimensions for 60VA & 75VA Models

	Internally Fused	w/ Integral Circuit Breaker
"A" Dimension [inches (mm)]	2.475 (62.86)	3.25 (82.55)
"B" Dimension [inches (mm)]	100 (25.4)	100 (25.4)

Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.
www.tycoelectronics.com
Technical support:
Refer to inside back cover.



4700 series

UL 506 Transformer 60VA - 150VA Non-Fused Wire Leads or Quick Connects

c UL us File E102980

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- Type K Foot Mount - features wire leads and a steel bracket welded to the bottom of the laminations for easy mounting.
- Type BB Same Side Termination - features quick connect terminals with line and load terminations on the same side of transformer.
- Multiple voltage combinations are available. Consult factory for availability.

Specifications

Wire Size: All leads are 18 AWG stranded 2/64" (.794 mm) insulation thickness. Standard parts have 12" (305 mm) total length with 1/2" (12.7 mm) strip.

Terminals: Standard male quick connects are .250" x .032" (6.35 x .81 mm). Other available quick connects include .187" x .032" (4.75 x .81 mm) and .187" x .020" (4.75 x .51 mm).

Frequency: 50/60 Hz.

Insulation Class: UL Class B (130°C).

Weight: 60VA – 36.8 oz. (1042 g); 100VA – 80 oz. (2270 g); 150VA – 83.2 oz. (2356 g).

Standard "999" Models Available

Primary V	Secondary V	60VA	100VA
120	24	4700-81L15K999	–
120/208/240/480	24	–	4700-08K18K999

For more details about standard models see Part Numbering System table at beginning of transformer section in this catalog .

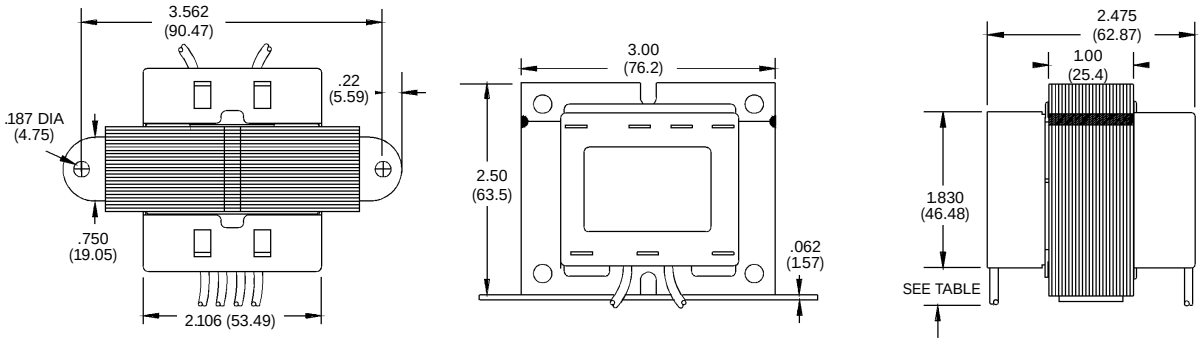
Partial Listing of Custom Models

Primary V	Secondary V	100VA	150VA
120	24	4700-01K18K*	4700-01Z18K*
277	24	4700-03K18K*	4700-03Z18K*
480	24	4700-04K18K*	4700-04Z18K*
120/208/240/480	24	4700-08K18K*	–
208/240	24	4700-09K18K*	4700-09Z18K*
208/230/460	24	4700-12K18K*	–
208/240/480	24	4700-13K18K*	–
400	24	4700-48K18K*	4700-48Z18K*
575	24	4700-78K18K*	4700-78Z18K*
460/575	24	4700-130K18K*	4700-130Z18K*

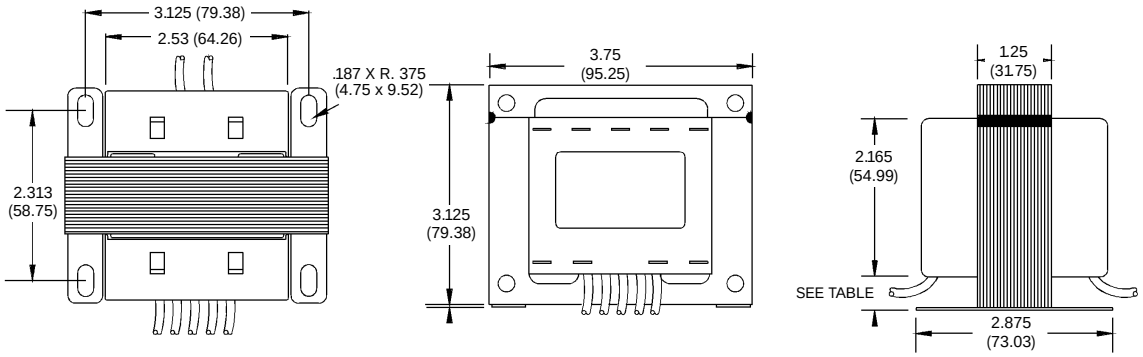
* A three digit customer ID suffix will be assigned by the factory.

Outline Dimensions

Type K Foot Mount 60VA



Type K Foot Mount 100VA

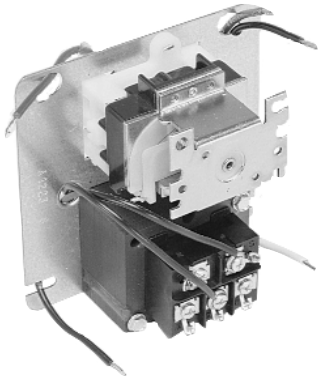


	Primary Leads							Secondary Leads	
Voltage	COM	120	208	240	277	480	575	24	VAC
Color	Black	White	Red	Orange	Brown	Black/Red	Gray	Blue	Yellow
Length [inches (mm)]	12 (305)	12 (305)	12 (305)	12 (305)	12 (305)	12 (305)	12 (305)	12 (305)	12 (305)
Strip Length [inches (mm)]	0.5 (12.7)	0.5 (12.7)	0.5 (12.7)	0.5 (12.7)	0.5 (12.7)	0.5 (12.7)	0.5 (12.7)	0.5 (12.7)	0.5 (12.7)

Dimensions are shown for reference purposes only.

Dimensions are in inches over (millimeters) unless otherwise specified.

Specifications and availability subject to change.



57 series

Transformer Relay for HVAC Applications

c UL us File E113772

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- Cover mounts on conventional 4" square box.
- All leads terminate in the box.
- Leads are 8" (203.2 mm) long with 1/2" (12.7mm) stripped)
- Standard transformer is 40VA Class II Energy Limited. Other transformers are available.
- Five secondary terminations (two are hot) for thermostat connection and #6-32 screw termination is standard. Quick connects are optional.
- Assembled with choice of 9100 or 9400 series relays.
- Custom-built to meet customer requirements.

Relay Data @ 25°C

Arrangements: 1 Form A (SPST-NO) through 2 Form C (DPDT), depending upon relay selected

Rating: 9100 Series Relay: 12 FLA, 60 LRA, 15A resistive @ 125VAC;
6 FLA, 36 LRA, 15A resistive @ 240VAC;
3/4 HP @ 125/250VAC.
9400 Series Relay: 12 FLA, 60 LRA, 18A resistive @ 125VAC;
8 FLA, 48 LRA, 18A resistive @ 240VAC.

Specifications

Insulation Class: UL Class B (130°C).
Duty Cycle: Continuous.
Weight: 32 oz. (909 g) approximately

Ordering Information

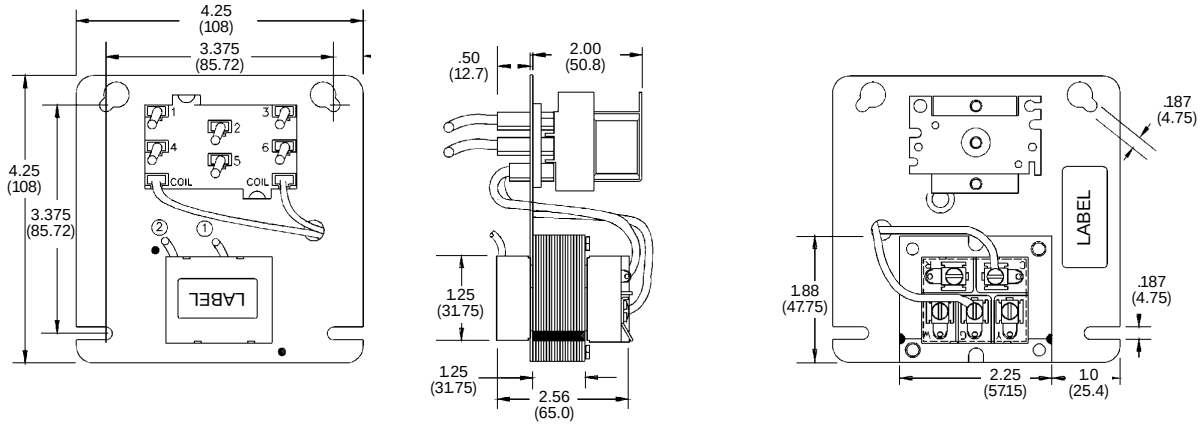
57 series products are custom-built. Your Tyco Electronics sales engineer will need to consult with the factory to develop a model meeting your needs.

Standard part numbers listed below are more likely to be available from stock.

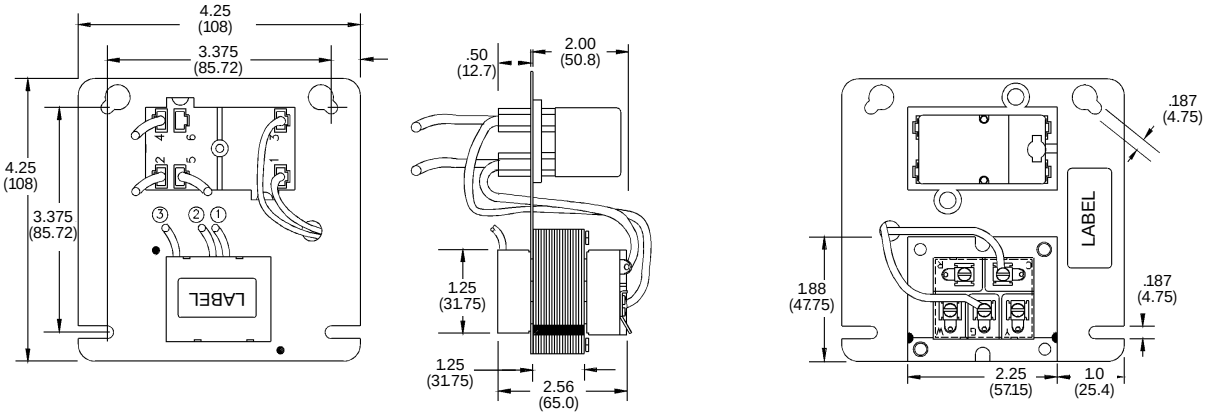
Custom parts only.

Outline Dimensions

Using 9100 Series Relay



Using 9400 Series Relay



Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.
www.tycoelectronics.com
Technical support:
Refer to inside back cover.

Alphanumeric Index

Series	Type	Page
159/160	Mercury-Wetted Reed Relays	308
190	DPDT, THT Relay	331
D2N (V23105)	DPDT, THT Relay	333
FP2	DPDT, THT Relay	323
FT2/FU2	DPDT, SMT or THT Relay	327
FX2	DPDT, THT Relay	329
IM	DPDT, SMT or THT Relay	321
JWD/JWS	SPST-NO – DPDT, Dry Reed Relay	303
MT2	DPDT, THT Relay	335
MT4	4PDT, THT Relay	337
OL	SPST-NO & DPST-NO, Dry Reed Relay	304
OMR	SPST-NO & DPST-NO, Dry Reed Relay	306
OUAZ	SPDT, THT Relay	319
T81	SPDT, THT Relay	318
P1 (V23026)	SPDT, SMT or THT Relay	314
P2 (V23079)	DPDT, SMT or THT Relay	325
TSC	SPDT, THT Relay	316
V23026 (P1)	SPDT, SMT or THT Relay	314
V23079 (P2)	DPDT, SMT or THT Relay	325
V23105 (D2N)	DPDT, THT Relay	333

NOTE: A question tree that may help you in selecting an appropriate low-signal relay for your application can be found on the next page.

Low-signal PC Board Relays 301-338 **3**

High Performance Relays
If you need a low signal relay capable of switching up to 6Ghz or enduring challenging environments such as extreme shock, vibration, or temperature, you should consider our CII high performance relays. There is an overview of our high performance relay product line in section 14 of this databook.

Low Signal (<3A), PC Board Relay Question Tree

This guide helps the user select one or more relay series which may be appropriate for a given application. The user should then refer to detailed specifications elsewhere in this catalog to determine the actual part number to be specified. Of course, the user must assume ultimate responsibility for determining the suitability of a relay for a particular application.

What mounting type do you need?

Through-Hole PC Board Terminals

One Pole

159/160 Series
Bridging or Non-bridging, Hg -wetted Reed Relay.

JWD/JWS Series
Dry Reed Relay.

OL Series
Dry Reed Relay.

OMR Series
Dry Reed Relay.

OUAZ Series
Non-polarized.

T81 Series
Non-polarized.

TSC Series
Non-polarized.

V23026 (P1) Series
Low Profile, Polarized.

Two Pole

190 Series
Non-polarized.

FP2 Series
Low Profile, Polarized.

FT2/FU2 Series
Slim, Polarized.

FX2 Series
Slim, Polarized.

IM Series
Ultraminiature, Slim or Low Profile, Polarized.

JWD Series
Dry Reed Relay.

MT2 Series
Non-polarized.

V23079 (P2) Series
Slim, Polarized.

V23105 (D2N) Series
Non-polarized.

Four Pole

MT4 Series
Non-polarized.

Surface Mount PC Board Terminals

One Pole

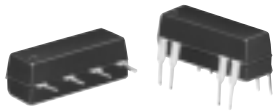
V23026 (P1) Series
Low Profile, Polarized.

Two Pole

IM Series
Ultraminiature, Slim or Low Profile, Polarized.

FT2/FU2 Series
Slim, Polarized.

V23079 (P2) Series
Slim, Polarized.



JWD/JWS series

Dual In-Line Package & Single In-Line Package Dry Reed Relays

File E29244 File LR81479

Features

- JWD has dual in-line package (DIP) configuration. (14-pin DIP)
- JWS has single in-line package (SIP) configuration.
- Low cost, dry reed reliability with various contact arrangements.
- Wave solderable and immersion cleanable.
- Optional coil suppression diode.

Contact Data @ 25°C

Arrangements: 1 Form A (SPST - NO) on JWD & JWS. 1 Form B (SPST - NC), 1 Form C (SPDT) and 2 Form A (DPST-NO) on JWD only.
Material: Ruthenium.
Expected Mechanical Life: 100 million operations.
Expected Electrical Life:

	Resistive Load	End of Life Criteria	No. of Operations
Forms A & B	20VDC, 500mA 20VDC, 250mA Low Level (5VDC, 1mA)	500mV Loss 500mV Loss 50 Ohms	1×10^6 20×10^6 100×10^6
Form C	12VDC, 500mA 10VDC, 10mA Low Level (5VDC, 1mA)	500mV Loss 50 Ohms 50 Ohms	1×10^6 25×10^6 100×10^6

Contact Ratings:
Maximum Switched Voltage: 100VDC for Forms A & B; 28VDC for Form C.
Maximum Switched Current: 500mA for all models.
Maximum Switched Power: 10W for Forms A & B; 3W for Form C.
Initial Contact Resistance: 200 milliohms, max. at 10mA, 6VDC.

Initial Dielectric Strength

Between Open Contacts: 250VDC for Forms A & B; 175VDC for Form C.
Between Contacts and Coil: 500VDC.

Initial Insulation resistance

Between Mutually Insulated Conductors: 10^{10} ohms at 100VDC.

Coil Data @ 25°C

See Ordering Information table.

Operate Data @ 25°C

Operate Time (Including Bounce)†: 1.5 ms, max.
Release Time (Including Bounce)†: 0.5 ms, max., for Forms A & B; 3.0 ms, max., for Form C.

† At or from Nominal Coil Voltage.

Environmental Data

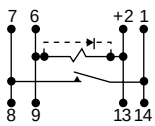
Temperature Range: -35°C to +85°C.
Shock: 100 g, max., in three planes for 8 ms, 1/2 wave pulse.
Vibration: 20 g, max., between 10 and 2,000 Hz.

Mechanical Data

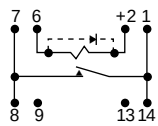
Termination: Printed circuit terminals on 0.100" (2.54mm) grid centers.
Enclosure Type: Black molded epoxy package.
Weight: 0.08 oz. (2.3g) approximately.

Wiring Diagrams (Top Views)

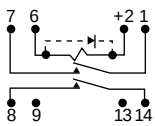
Dia. 1



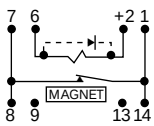
Dia. 2



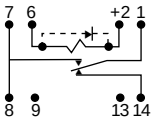
Dia. 3



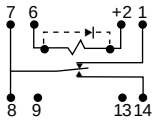
Dia. 4



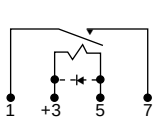
Dia. 5



Dia. 6



Dia. 7



Note: Terminal numbers are for reference only and do not appear on relays.

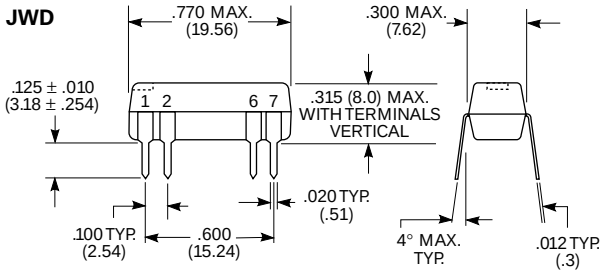
Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Ordering Information – Boldface items are more likely to be stocked.

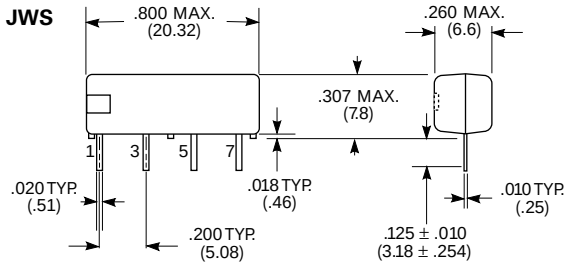
Relay Part No.	Diode	Nom. Voltage (VDC)	Resistance ±10% (Ohms)	Must Operate Voltage (VDC)	Must Release Voltage (VDC)	Max. Voltage (VDC)	Nom. Coil Power (mW)	Wiring Dia. No.
JWD (DIP units) with 1 Form A (SPST-NO) contacts rated 10W max.								
JWD-107-1	No	5/6	500	3.8	0.5	19	50/72	1
JWD-107-5	Yes	5/6	500	3.8	0.5	19	50/72	1
JWD-107-3	No	12	1,200	9.6	1.0	19	120	1
JWD-107-7	Yes	12	1,200	9.6	1.0	19	120	1
JWD-171-5	No	24	2,150	19.2	2.0	40	268	2
JWD-171-10	Yes	24	2,150	19.2	2.0	40	268	2
JWD (DIP units) with 2 Form A (DPST-NO) contacts rated 10W max.								
JWD-171-21	No	5/6	200	3.8	0.5	14	125/180	3
JWD-171-25	Yes	5/6	200	3.8	0.5	14	125/180	3
JWD-171-23	No	12	500	9.6	1.0	19	288	3
JWD-171-27	Yes	12	500	9.6	1.0	19	288	3
JWD-171-24	No	24	2,200	19.2	2.0	40	262	3
JWD-171-28	Yes	24	2,200	19.2	2.0	40	262	3
JWD (DIP units) with 1 Form B (SPST-NC) contacts rated 10W max.								
JWD-171-12	No	5/6	500	3.8	0.5	7	50/72	4
JWD-171-17	Yes	5/6	500	3.8	0.5	7	50/72	4
JWD-171-14	No	12	1,200	9.6	1.0	16	120	4
JWD-171-19	Yes	12	1,200	9.6	1.0	16	120	4
JWD-171-15	No	24	2,200	19.2	2.0	40	262	4
JWD-171-20	Yes	24	2,200	19.2	2.0	40	262	4
JWD (DIP units) with 1 Form C (SPDT) contacts rated 3W max.								
JWD-172-1	No	5/6	200	3.8	0.5	12	125/180	5
JWD-172-5	Yes	5/6	200	3.8	0.5	12	125/180	5
JWD-172-3	No	12	500	9.6	1.0	19	288	5
JWD-172-7	Yes	12	500	9.6	1.0	19	288	5
JWD-172-4	No	24	2,200	19.2	2.0	38	262	5
JWD-172-8	Yes	24	2,200	19.2	2.0	38	262	5
JWD-172-155	No	5/6	200	3.8	0.5	12	125/180	6
JWD-172-159	Yes	5/6	200	3.8	0.5	12	125/180	6
JWD-172-157	No	12	1,000	9.6	1.0	19	144	6
JWD-172-161	Yes	12	1,000	9.6	1.0	19	144	6
JWD-172-158	No	24	2,150	19.2	2.0	38	268	6
JWD-172-162	Yes	24	2,150	19.2	2.0	38	268	6
JWS (SIP units) with 1 Form A (SPST-NO) contacts rated 10W max.								
JWS-117-1	No	5	500	3.8	0.5	16	50	7
JWS-117-6	Yes	5	500	3.8	0.5	16	50	7
JWS-117-3	No	12	530	9.6	1.0	19	272	7
JWS-117-8	Yes	12	530	9.6	1.0	19	272	7
JWS-117-13	No	12	1,850	9.6	1.0	30	78	7
JWS-117-18	Yes	12	1,850	9.6	1.0	30	78	7
JWS-117-5	No	24	2,150	19.2	2.0	36	268	7
JWS-117-10	Yes	24	2,150	19.2	2.0	36	268	7

Outline Dimensions

JWD



JWS



Note: Magnetic shielding may be required between relays when they are placed in very close proximity to one another.



OL series

Dry Reed Relay

Telecommunications, Office Machines.

Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- Low cost, small package dry reed relay.
- 1 Form A and 2 Form A contact arrangements.
- Immersion cleanable, sealed version available. Consult factory.

Contact Data @ 20°C

Arrangements: 1 Form A (SPST-NO), 2 Form A (DPST-NO).
Material: Rh, Ru.
Max. Switching Rate: 300 ops./min. (no load).
30 ops./min. (rated load).
Expected Mechanical Life: 100 million operations (no load).
Expected Electrical Life: 1,000,000 operations (rated load).
Minimum Load: 1mA @ 1VDC.
Initial Contact Resistance: 150 milliohms @ 100mA, 6VDC.

Contact Ratings

Ratings:
100µA @ 5VDC, 100,000,000 operations.
1mA @ 5VDC, 50,000,000 operations.
5mA @ 5VDC, 50,000,000 operations.

5mA @ 12VDC, 50,000,000 operations.
10mA @ 12VDC, 50,000,000 operations.
100mA @ 12VDC, 10,000,000 operations.

100mA @ 24VDC, 7,000,000 operations.
200mA @ 24VDC, 7,000,000 operations.
400mA @ 24VDC, 5,000,000 operations.

Max. Switched Voltage: **AC:** 120V.
DC: 60V.
Max. Switched Current: 0.5A.
Max. Switched Power: 10VA, 10W.

Initial Dielectric Strength

Between Open Contacts: 200VDC. (1 second).
Between Coil and Contacts: 3,000VDC. (1 second).
Surge Voltage Between Coil and Contacts: 3,000V (10 / 160µs).

Initial Insulation Resistance

Between Mutually Insulated Elements: 1,000M ohms min. @ 100VDCM.

Coil Data

Voltage: 6 to 24VDC.
Nominal Power: 100 mW to 270mW.
Coil Temperature Rise: 30°C max., at rated coil voltage.
Max. Coil Power: 150% of nominal.
Duty Cycle: Continuous.

Coil Data @ 20°C

OL				
Rated Coil Voltage (VDC)	**Nominal Current (mA)**	**Coil Resistance (ohms) ± 10%**	**Must Operate Voltage (VDC)**	**Must Release Voltage (VDC)**
6	34.3	175	4.20	0.60
9	22.5	400	6.30	0.90
12	17.1	700	8.40	1.20
24	11.4	2,100	16.80	2.40

Operate Data

Must Operate Voltage: 70% of nominal voltage or less.
Must Release Voltage: 10% of nominal voltage or more.
Operate Time: 1.0 ms max.
Release Time: 0.5 ms max.

Environmental Data

Temperature Range:
Operating: -30°C to +60°C
Vibration, Mechanical: 10 to 55 Hz., 1.5mm double amplitude
Operational: 10 to 55 Hz., 1.5mm double amplitude.
Shock, Mechanical: 1,000m/s² (100G approximately).
Operational: 100m/s² (10G approximately).
Operating Humidity: 20 to 85% RH. (Non-condensing)

Mechanical Data

Termination: Printed circuit terminals.
Enclosure (94V-0 Flammability Ratings): Snap-on dust cover.
Weight: 0.07 oz (2g) approximately.

Ordering Information

Typical Part Number ▶	OL	-C	-1	12	H	,000

1. Basic Series:
OL = Dry Reed Relay.

2. Enclosure:
C = Snap-on dust cover.

3. Termination:
1 = 1 pole
2 = 2 pole

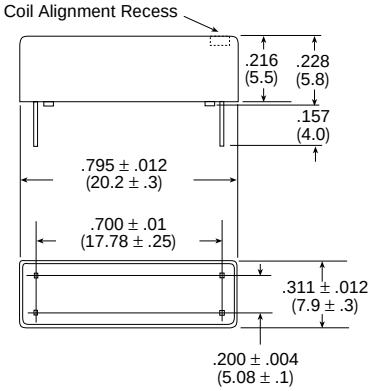
4. Coil Voltage:
06 = 6VDC
09 = 9VDC
12 = 12VDC
24 = 24VDC

5. Contact Rating:
H = 0.1A @ 120VAC

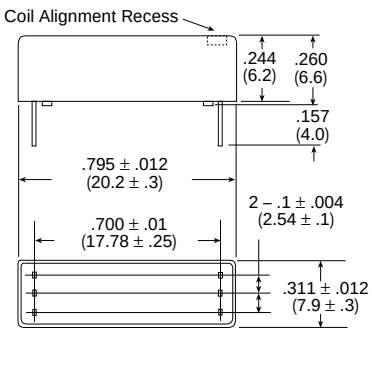
6. Suffix:
,000 = Standard model
Other Suffix = Custom model

Our authorized distributors are more likely to stock the following items for immediate delivery.
None at present.

Outline Dimensions

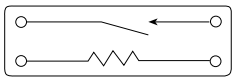


1 Form A

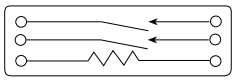


2 Form A

Wiring Diagrams (Bottom View)

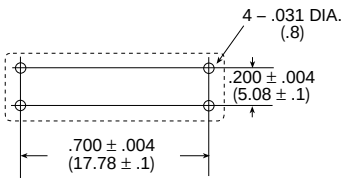


1 Form A

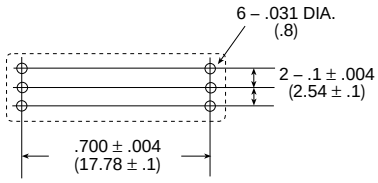


2 Form A

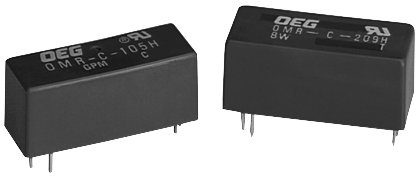
PC Board Layouts (Bottom View)



1 Form A



2 Form A



OMR series

Dry Reed Relay

Telecommunications, Office Machines.

File No. E82292

Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- Low cost, small package dry reed relay.
- 1 Form A contact and 2 Form A arrangements.

Contact Data @ 20°C

Arrangements: 1 Form A (SPST-NO), 2 Form A (DPST-NO).
Material: Rh, Ru.
Max. Switching Rate: 300 ops./min. (no load).
30 ops./min. (rated load).
Expected Mechanical Life: 100 million operations (no load).
Expected Electrical Life: 1,000,000 operations (rated load).
Minimum Load: 1mA @ 1VDC.
Initial Contact Resistance: 150 milliohms @ 100mA, 6VDC.

Contact Ratings

Ratings:
100µA @ 5VDC, 100,000,000 operations.
1mA @ 5VDC, 50,000,000 operations.
5mA @ 5VDC, 50,000,000 operations.

5mA @ 12VDC, 50,000,000 operations.
10mA @ 12VDC, 50,000,000 operations.
100mA @ 12VDC, 10,000,000 operations.

100mA @ 24VDC, 7,000,000 operations.
200mA @ 24VDC, 7,000,000 operations.
400mA @ 24VDC, 5,000,000 operations.

Max. Switched Voltage: **AC:** 120V.
DC: 60V.
Max. Switched Current: 0.5A .
Max. Switched Power: 10VA, 10W.

Initial Dielectric Strength

Between Open Contacts: 200VDC. (1 second).
Between Coil and Contacts: 3,000VDC. (1 second).
Surge Voltage Between Coil and Contacts: 3,000V (10 / 160µs).

Initial Insulation Resistance

Between Mutually Insulated Elements: 1,000M ohms min. @ 100VDCM.

Coil Data

Voltage: 6 to 24VDC.
Nominal Power: 100 mW to 280mW.
Coil Temperature Rise: 30°C max., at rated coil voltage.
Max. Coil Power: 160% of nominal.
Duty Cycle: Continuous.

Coil Data @ 20°C

OMR				
Rated Coil Voltage (VDC)	**Nominal Current (mA)**	**Coil Resistance (ohms) ± 10%**	**Must Operate Voltage (VDC)**	**Must Release Voltage (VDC)**
5/6	24.0	250	3.50	0.50
9	12.9	700	6.30	0.90
12	11.4	1,050	8.40	1.20
24	11.5	2,080	16.80	2.40

Operate Data

Must Operate Voltage: 70% of nominal voltage or less.
Must Release Voltage: 10% of nominal voltage or more.
Operate Time: 1.0 ms max.
Release Time: 0.5 ms max.

Environmental Data

Temperature Range:
Operating: -30°C to +70°C
Vibration, Mechanical: 10 to 55 Hz., 1.5mm double amplitude
Operational: 10 to 55 Hz., 1.5mm double amplitude.
Shock, Mechanical: 1,000m/s² (100G approximately).
Operational: 100m/s² (10G approximately).
Operating Humidity: 20 to 85% RH. (Non-condensing)

Mechanical Data

Termination: Printed circuit terminals.
Enclosure (94V-0 Flammability Ratings):
OMR: Open, no cover.
OMR-C: Snap-on dust cover.
Weight: 0.16 oz (4.5g) approximately.

Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.

Ordering Information

Typical Part Number ▶	OMR	-C	-1	12	H	,000

1. Basic Series:
OMR = Dry Reed Relay.

2. Enclosure:
Blank = Open, no cover.
C = Snap-on dust cover.

3. Termination:
1 = 1 pole 2 = 2 pole

4. Coil Voltage:
06 = 6VDC 12 = 12VDC
09 = 9VDC 24 = 24VDC

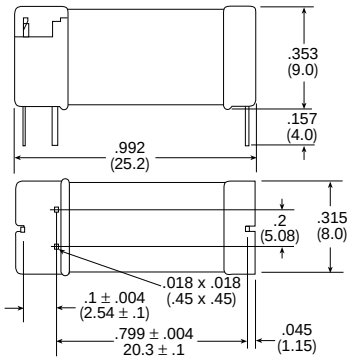
5. Contact Rating:
H = 0.5A @ 120VAC

6. Suffix:
,000 = Standard model Other Suffix = Custom model

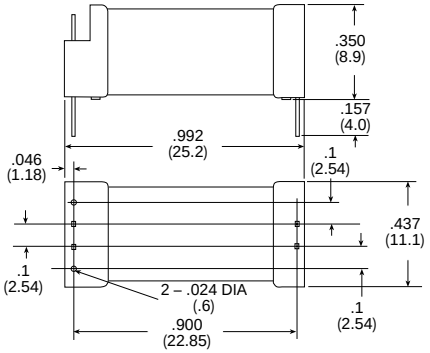
Our authorized distributors are more likely to stock the following items for immediate delivery.
None at present.

Outline Dimensions

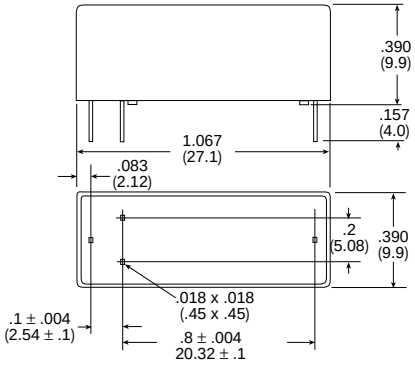
Open Type, 1 Form A



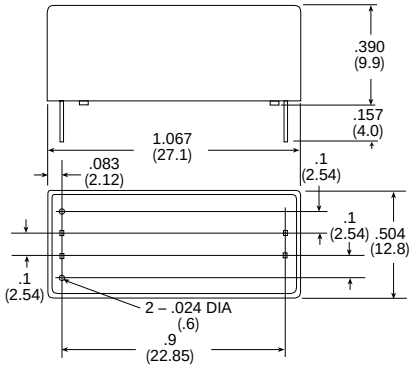
Open Type, 2 Form A



Snap-on Dust Cover Type, 1 Form A

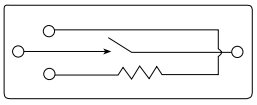


Snap-on Dust Cover type, 2 Form A

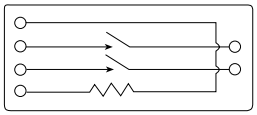


Wiring Diagrams (Bottom View)

1 Form A

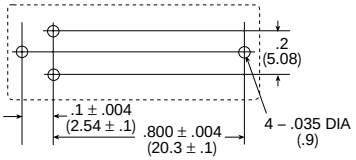


2 Form A

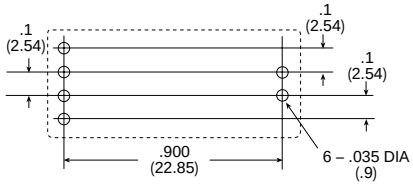


PC Board Layout (Bottom View)

1 Form A



2 Form A

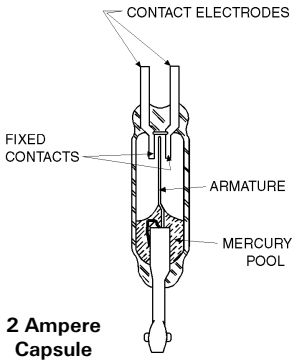




159/160 series

Mercury-Wetted Reed Relays

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.



2 Ampere Capsule

General Information

The mercury-wetted contact relay represents one of the more sophisticated types of relays made today. The early pioneer work in mercury-wetted contact switching dates back to the 1950's, as telephone laboratory scientists sought out the "perfect contact". Mercury-wetted contacts represent the nearest thing to the perfect contact yet developed, being characterized by such parameters as: bounce-free operation; very low and stable contact resistance; hermetic protection; fast operating speeds; Form C or Form D contact, action contact life measured in billions of operations. The only major weakness of a mercury-wetted contact relay is the necessity to mount the relay within 30° of a vertical position, due to its position sensitivity.

While there are several variations of the mercury-wetted contact relay on the market, the basic contact element has essential concepts in common. The mercury-wetted contact element consists of a glass-encapsulated nickel-iron reed with its base immersed in a pool of mercury. The free reed cantilever projects upward between sets of stationary contact electrodes, which have been glass-sealed in proper juxtaposition at the top of the glass chamber. The mercury is induced to flow up the cantilever by capillary action, wetting mercury on both the cantilever contact tip as well as the stationary contacts. Thus a mercury-to-mercury contact is maintained on both the normally-closed and normally-open contacts, and the system is self-replenishing. The 2-ampere mercury-wetted capsule is shown far left.

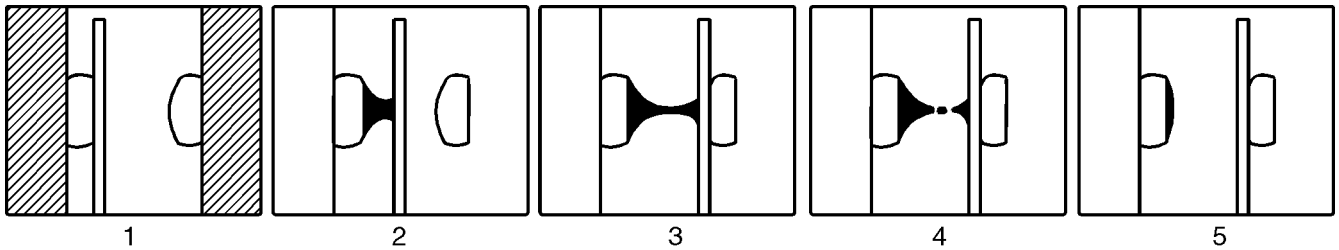
Along with the inherent fast actuation of the capsule and excellent load-handling capacity, the mercury-wetted contacts exhibit extremely long life, as the mercury films re-establish at each closure and contact erosion is eliminated. Contact interface resistance is very low and stable, and as the mercury films are elastic, contact bounce is eliminated. A dynamic sequence of the mercury-wetted contact action is shown below.

While the below sequence portrays a Form D (make-before-break) contact action, a true Form C (break-before-make) contact can be provided by proper control of the mercury film dynamics and the contact electrode spacing.

The mercury-wetted contact capsules generally are mounted within a coil assembly, and with appropriately mounted bias magnets, mounting base and magnetic shielded enclosures. The more popular assemblies contain one or two capsules in a convenient printed circuit mounting module.

Mercury-wetted relays can be adjusted to operate with very low levels of input power, in the order of 10-20 milliwatts. Thus, power gain switching of as great as 10,000 can be realized. For all but very light contact loads, contact protection is required to limit the current or voltage rise time across the contacts.

Form D Mercury-Wetted Contact Action As Seen In High-Speed Sequence



(1) Mercury (shown in black) covers armature and contact points; (2) and (3) as armature moves from open to closed position, mercury filament joins both contacts momentarily; (4) ruptured mercury surfaces accelerate away from each other, providing rapid breaking action; (5) as contact surfaces join, mercury wetting dampens rebound, eliminates electrical chatter, and provides contact reliability.

SPDT (Form C or Form D) Contact Specifications

Material	Rating (Switched Load)	(Carry Load)	Bridging and Transfer Time	Contact Resistance	Life Expectancy
Mercury-wetted platinum contacts hermetically sealed in an inert atmosphere	2 amperes maximum 500 volts maximum 100 VA maximum	5 amperes maximum Not switched	When operated by a single DC pulse, the bridging or transfer time will be greater than 50 microseconds, but less than 500 microseconds.	14 milliohms typical; 20 milliohms maximum Stable within ±2 milliohms throughout life.	1 billion operations minimum at rated load

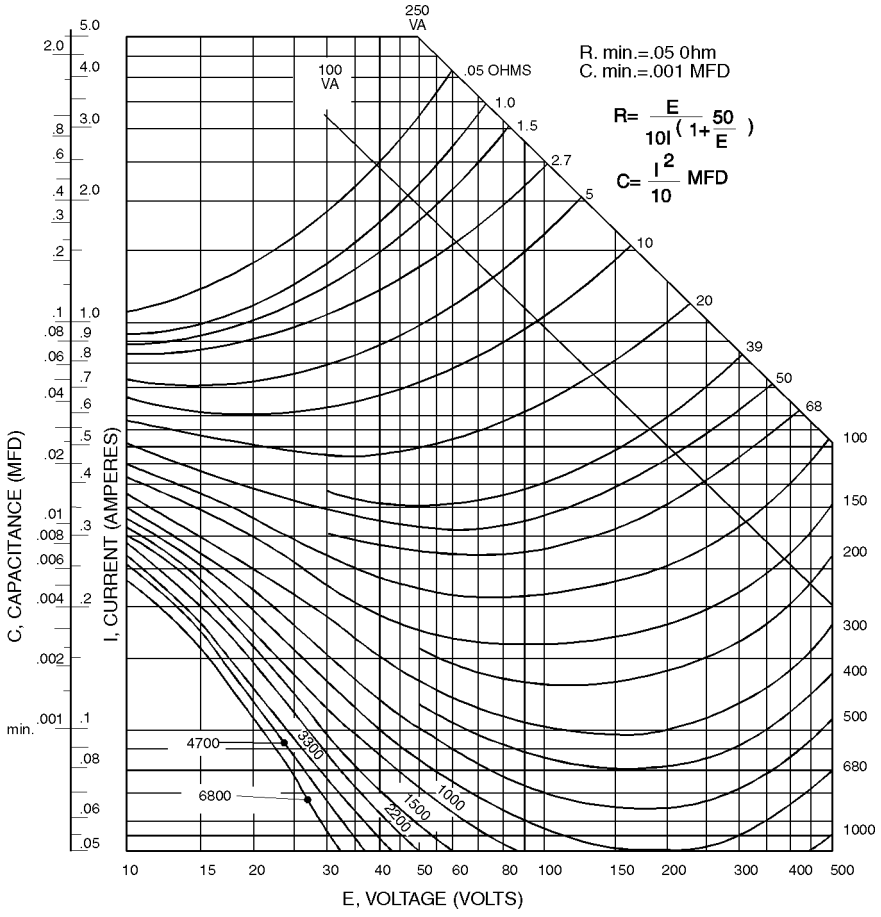
Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.

Mercury-Wetted Relays Contact Protection

The essentially infinite life of mercury-wetted contact relays may only be realized if the requirements for suitable contact protection are observed.

In that the goal is control of the rate of rise of voltage across the contacts when the circuit is opened (rather than peak transient limiting), the only suitable protection recognized is an RC network.

Values of R and C may be calculated using the formula shown, or may be obtained from the direct reading nomograph.



Nomograph Explanation

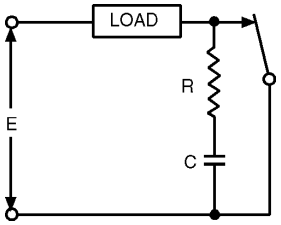
I=Steady state current at time of circuit opening
E=Open circuit voltage
Find I on the ordinate scale. Read C on the scale adjacent to I. R is found at the intersection of I and E.

To reduce voltage transient amplitudes, C may be increased up to 10 times calculated values. (R must be calculated value.)

For I=0.5 amps or less
and
E=50 volts or less
R may be omitted
C must be calculated value

Resistor Tolerances

E	R
Less than 70V	R up to 2R
70V to 100V	±50%
100V to 150V	±10%
Greater than 150V	±5%



Specifications

Parameter		159 Series	160 Series
Coils			
Single Wound–max. ohms		8,600	9,000
Double Wound–max. ohms		4,275	4,500
Rating–Watts Continous		2.0	1.75
Temp. Rise–°C per watt		30°	35°
Dielectric Breakdown–RMS, 60Hz		1,000	1,000
Insulation Resistance–Megohms–500 VDC		1,000	1,000
Capacitance–Armature to Coi pf, Typical		9.0	9.0
Electrostatic Shielding–Optional		yes	yes
Typical Operate Times–mS, 2X Must Operate		1-3	1-3
Typical Release Times–mS, 2X		2.5	2.5
Contact Form Available		Form C, D	Form C, D
Adjustments Available			
Single-side-stable		yes	yes
Bi-stable		yes	yes
Polar 1% Balance		yes	yes
Temperature Range	Operating °C	All types – 38.8°C to + 85°C	
	Storage °C	All types – 65°C to + 100°C	
Weight–ounces		2.0	0.5
Encapsulant		Polyurethane	Polyurethane
Mounting Method		PCB	PCB



159 series

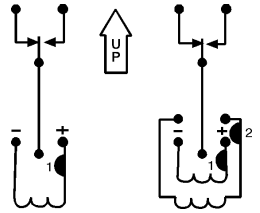
Mercury-Wetted Reed Relays

Features

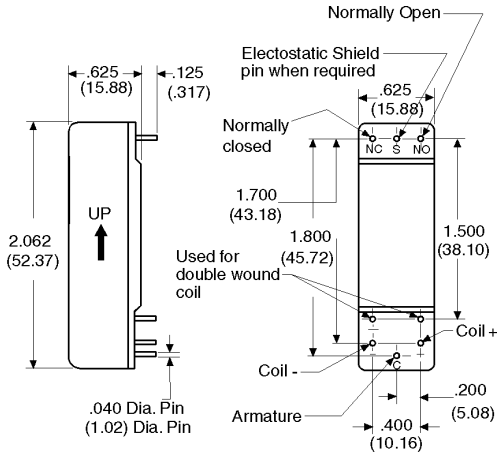
159 series relays are available in a Form C or Form D 2 amp contact arrangement, single or dual coil and printed circuit board terminals.
Weight: 1.0 ounce

Positive potential applied to the start of the winding indicated by the symbol ◠ will close the contacts shown open on the electrical schematics. For reset of bistable relays, reversed polarity must be applied.

Wiring Diagrams



Outline Dimensions



Note: Relay must be mounted within 30° of vertical and suitable contact protection must be used.

Part Numbering System

Relay Series	Enclosure And Terminals	Contacts And Adjustment	Coils	Standard Or Special
160	1–.625 Ht., .125 Lg. 2–.625 Ht., .156 Lg. 3–.625 Ht., .187 Lg. 4–.625 Ht., .250 Lg. 0–Special	1–1D Single-Side-Stable 2–1D Bistable 5–1C Single-Side-Stable 6–1C Bistable 7–1C Dynamic (1%) Balanced Bistable 0–Special	1A-1Z–Single Coil 2K-2V–Double Coil 7A-7T–Single Coil 8A-8Z–Bifilar Coil 9A-9Z–Double Coil (Concentric) 1S and 2S–Special	00–Standard A1-Z9–Special Customer Requirement

Example: 159-151N00 is a 159 series relay, enclosure height of .625 in., pin length of .125 in., Form C contact, single-side-stable adjustment, single coil 1N, of completely standard construction.

Coil Characteristics and Part Numbers

One Winding Single-Side-Stable 40 Milliwatts

Coils	Coil Resistance (Ohms)	Must Operate Current (MA-DC)	Must Operate Voltage (VDC)	Must Release Voltage (VDC)	Maximum Voltage (VDC)	Part Number	
						Form C	Form D
1A	2.2	116	.28	.06	2.1	159-151A00	159-111A00
1B	3.9	86	.37	.07	2.8	159-151B00	159-111B00
1C	6.4	67	.47	.09	3.6	159-151C00	159-111C00
1D	9.0	60	.60	.12	4.3	159-151D00	159-111D00
1E	14	47	.72	.15	5.3	159-151E00	159-111E00
1F	24	35	.93	.19	6.9	159-151F00	159-111F00
1G	34	32	1.2	.24	8.2	159-151G00	159-111G00
1H	56	24	1.5	.30	11	159-151H00	159-111H00
1J	86	20	1.9	.39	13	159-151J00	159-111J00
1K	140	15	2.3	.46	17	159-151K00	159-111K00
1L	225	12	2.9	.59	21	159-151L00	159-111L00
1M	385	9.0	3.8	.73	28	159-151M00	159-111M00
1N	620	7.0	4.8	.95	35	159-151N00	159-111N00
1P	940	5.8	6.0	1.2	43	159-151P00	159-111P00
1Q	1,450	4.8	7.7	1.6	54	159-151Q00	159-111Q00
1R	2,430	3.6	9.7	2.0	70	159-151R00	159-111R00
1T	3,620	2.9	12	2.3	85	159-151T00	159-111T00
1U	5,500	2.5	15	3.0	105	159-151U00	159-111U00
1V	8,600	2.0	19	3.8	130	159-151V00	159-111V00

Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.
www.tycoelectronics.com
Technical support:
Refer to inside back cover.

159 Series (continued) – Coil Characteristics and Part Numbers

Coils	Coil Resistance (Ohms)	Must Operate Current (MA-DC) (Either Winding)	Must Operate Voltage (VDC) (Either Winding)	Must Release Voltage (VDC) (Either Winding)	Maximum Voltage (VDC) (Either Winding)	Dielectric Stand Off Between Coils (VDC)	Part Number	
							Form C	Form D
Two Windings Single-Side-Stable 80 Milliwatts Per Winding								
2K	70/70	30	2.3	.47	12	500	159-152K00	159-112K00
2L	115/115	23	3.0	.60	15	500	159-152L00	159-112L00
2M	190/190	18	3.8	.79	19	400	159-152M00	159-112M00
2N	325/325	14	5.0	1.0	26	400	159-152N00	159-112N00
2P	490/490	12	6.2	1.3	31	400	159-152P00	159-112P00
2Q	730/730	9.6	7.7	1.6	38	400	159-152Q00	159-112Q00
2R	1250/1250	7.2	10	2.0	50	400	159-152R00	159-112R00
2T	1860/1860	5.8	12	2.5	61	200	159-152T00	159-112T00
2U	2760/2760	5.0	15	3.0	74	200	159-152U00	159-112U00
2V	4275/4275	3.9	18	3.8	92	200	159-152V00	159-112V00
Two Windings Single-Side-Stable 40 Milliwatts Per Winding								
2K	70/70	15	.30	1.2	12	500	159-162K00	159-122K00
2L	115/115	12	.37	1.5	15	500	159-162L00	159-122L00
2M	190/190	9.0	.47	1.9	19	400	159-162M00	159-122M00
2N	325/325	7.0	.62	2.5	26	400	159-162N00	159-122N00
2P	490/490	5.8	.77	3.1	31	400	159-162P00	159-122P00
2Q	730/730	4.8	.97	3.9	38	400	159-162Q00	159-122Q00
2R	1250/1250	3.6	1.2	5.0	50	400	159-162R00	159-122R00
2T	1860/1860	3.0	1.5	6.0	61	200	159-162T00	159-122T00
2U	2760/2760	2.5	1.8	7.5	74	200	159-162U00	159-122U00
2V	4275/4275	2.0	2.3	9.2	92	200	159-162V00	159-122V00
Two Windings Bifilar Windings Bistable 40 Milliwatts Per Winding								
8A	135/135	16	.48	2.4	16.4	500	159-168A00	159-128A00
8B	170/170	15.5	.58	2.9	18.5	400	159-168B00	159-128B00
8C	200/200	13.3	.58	2.9	20.0	400	159-168C00	159-128C00
8D	310/310	11.9	.82	4.1	24.9	400	159-168D00	159-128D00
8E	460/460	7.8	.80	4.0	30.3	400	159-168E00	159-128E00
8F	675/675	6.5	.96	4.8	36.7	400	159-168F00	159-128F00
8G	810/810	6.85	1.2	6.1	40.2	400	159-168G00	159-128G00
8H	1000/1000	6.75	1.5	7.4	44.7	400	159-168H00	159-128H00
8J	1240/1240	5.6	1.4	7.0	49.8	400	159-168J00	159-128J00
8K	2300/2300	3.82	1.9	9.7	67.8	200	159-168K00	159-128K00

Note: All values at 25°C. Resistances specified are ±10%. Maximum voltages based on 2 watts continuous dissipation.

Nominal Resistance (Ohms)	Single-Side-Stable						Bistable				
	Must Operate Current (MA-DC)	Must Operate Voltage (VDC)	Must Release Voltage (VDC)	Maximum Voltage (VDC)	Part Number		Must Operate Current (MA-DC)	Must Operate Voltage (VDC)	Must Release Voltage (VDC)	Part Number	
					Form C	Form D				Form C	Form D
One Winding Single-Side-Stable 115 Milliwatts And Bistable 25 Milliwatts											
18	66.6	1.3	.18	6.0	159-157A00	159-117A00	31.2	.12	.62	159-167A00	159-127A00
65	37.4	2.7	.36	11.4	159-157B00	159-117B00	17.8	.26	1.3	159-167B00	159-127B00
85	33.3	3.1	.42	13.0	159-157C00	159-117C00	15.6	.30	1.5	159-167C00	159-127C00
90	37.7	3.8	.51	13.4	159-157D00	159-117D00	17.6	.36	1.8	159-167D00	159-127D00
115	30.0	3.8	.51	15.1	159-157E00	159-117E00	14.0	.36	1.8	159-167E00	159-127E00
275	17.0	5.2	.77	23.4	159-157F00	159-117F00	8.0	.50	2.5	159-167F00	159-127F00
450	12.9	6.4	.85	30.0	159-157G00	159-117G00	6.0	.60	3.0	159-167G00	159-127G00
675	11.6	8.6	1.1	36.7	159-157H00	159-117H00	5.4	.80	4.0	159-167H00	159-127H00
940	10.1	10.5	1.4	43.3	159-157J00	159-117J00	4.7	.98	4.9	159-167J00	159-127J00
950	12.1	12.7	1.7	43.6	159-157K00	159-117K00	5.7	1.2	6.0	159-167K00	159-127K00
1250	9.4	12.9	1.8	50.0	159-157L00	159-117L00	4.4	1.2	6.1	159-167L00	159-127L00
1425	8.3	13	1.8	53.4	159-157M00	159-117M00	3.9	1.2	6.2	159-167M00	159-127M00
1800	9.4	18.6	2.6	60.0	159-157N00	159-117N00	4.4	1.7	8.8	159-167N00	159-127N00
1950	7.5	17.6	2.1	62.4	159-157P00	159-117P00	3.5	1.5	7.5	159-167P00	159-127P00
2400	7.35	20.6	2.6	69.2	159-157Q00	159-117Q00	3.4	1.8	9.0	159-167Q00	159-127Q00
4000	5.55	24.4	3.3	89.5	159-157R00	159-117R00	2.6	2.3		159-167R00	159-127R00
4000		17.6	2.4	89.5	159-157T00	159-117T00	1.9	1.6	8.3	159-167T00	159-127T00



160 series

Mercury-Wetted Reed Relays

Features

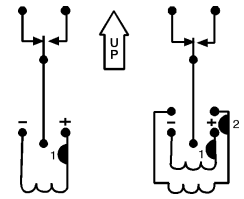
160 series relays are available in a single Form C or Form D two ampere contact arrangement, single or dual coil and printed circuit board terminals.

The part numbers shown on the adjacent page are for relays with 0.093" terminal spacing. The part number designator for the 0.100" grid is a 160-3XXXXX for a pin of 0.09" length, and 160-4XXXXX for a pin of 0.125" length.

Positive potential applied to the start of the winding indicated by the symbol ◠ will close the contacts shown open on the electrical schematics. For reset of bistable relays, reversed polarity must be applied. Weight 0.5 ounces. UL File E55708

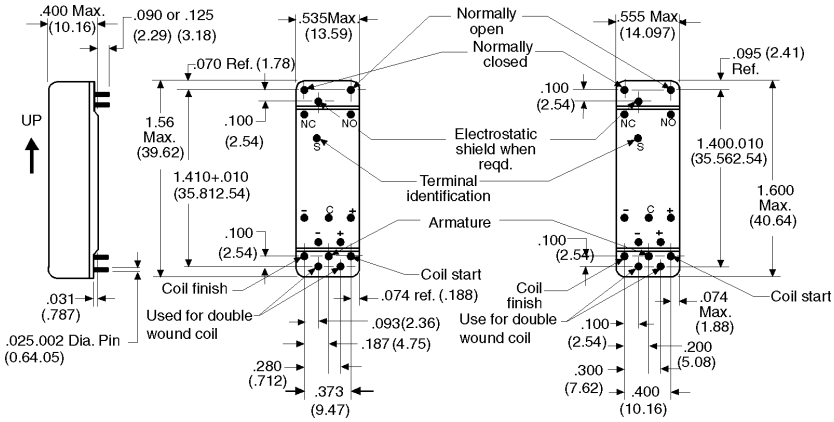
Note: Relay must be mounted within 30° of vertical and suitable contact protection must be used.

Wiring Diagrams



Single Coil Double Coil

Outline Dimensions



Grid 0.093
(160-1)
(160-2)

Grid 0.100
(160-3)
(160-4)

Part Numbering System

Relay Series	Enclosures And Terminals	Contacts and Adjustments	Coil	Standard or Special
160	1–.090 Lg., .093 Grid 2–.125 Lg., .093 Grid 3–.090 Lg., .100 Grid 4–.125 Lg., .100 Grid 0–Special	1–1D Single-Side-Stable 2–1D Bistable 5–1C Single-Side-Stable 6–1C Bistable 7–1C Dynamic (1%) Balanced Bistable 0–Special	1A-1Z–Single Coil 2A-2Z–Double Coil 1S–Special Single Coil 2S–Special Double Coil	00–Standard A1-Z9–Special Customer Requirement

Example: 160-151K00 is a 160 series relay, enclosure height of .400 in., pin length of .090 in., Form C contact, single-side-stable adjustment, single coil 1K, of completely standard construction.

Coil Characteristics and Part Numbers

Two Windings Bistable 20 Milliwatts Per Winding

Coil	Coil Resistance (Ohms)	Must Operate Current (MA-DC) (Either Winding)	Must Not Operate Voltage (VDC) (Either Winding)	Must Operate Voltage (VDC) (Either Winding)	Maximum Voltage (VDC) (One Winding Only)	Dielectric Standoff Between Coils (VDC)	Part Number	
							Form C	Form D
2K	60/60	17	.29	1.1	10	500	160-162K00	160-122K00
2L	90/90	15	.38	1.5	13	400	160-162L00	160-122L00
2M	155/155	11	.49	1.9	16	400	160-162M00	160-122M00
2N	205/205	10	.61	2.3	19	400	160-162N00	160-122N00
2P	340/340	7.5	.73	2.8	24	400	160-162P00	160-122P00
2Q	560/560	6.0	.98	3.6	31	400	160-162Q00	160-122Q00
2R	870/870	4.7	1.2	4.5	39	200	160-162R00	160-122R00
2T	1320/1320	3.8	1.4	5.5	48	200	160-162T00	160-122T00
2U	1980/1980	3.2	1.8	7.0	59	200	160-162U00	160-122U00
2V	3000/3000	2.7	2.3	9.0	73	200	160-162V00	160-122V00
2W	4500/4500	2.1	2.8	11.0	89	200	160-162W00	160-122W00

Note: All values at 25°C. Resistances specified are ±10%. Maximum voltages based on 1.75 watts continuous dissipation.

Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.
www.tycoelectronics.com
Technical support:
Refer to inside back cover.

160 Series (continued) – Coil Characteristics and Part Numbers

One Winding Single-Side-Stable 40 Milliwatts

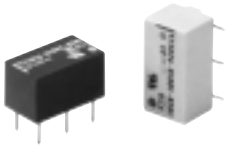
Coil Resistance (Ohms)	Must Operate Current (MA-DC)	Must Operate Voltage (VDC)	Must Release Voltage (VDC)	Maximum Voltage (VDC)	Part Number	
					Form C	Form D
2.2	113	.27	.05	2.0	160-151A00	160-111A00
3.1	103	.35	.07	2.3	160-151B00	160-111B00
4.4	90	.43	.08	2.8	160-151C00	160-111C00
5.9	80	.52	.10	3.2	160-151D00	160-111D00
13.0	49	.71	.14	4.8	160-151E00	160-111E00
18.7	43	.87	.18	5.7	160-151F00	160-111F00
27.7	36	1.1	.22	7.0	160-151G00	160-111G00
50	25	1.4	.28	9.4	160-151H00	160-111H00
70	23	1.8	.35	11	160-151J00	160-111J00
125	16	2.3	.46	15	160-151K00	160-111K00
185	14	2.9	.60	18	160-151L00	160-111L00
325	11	3.8	.77	24	160-151M00	160-111M00
435	10	4.6	.94	28	160-151N00	160-111N00
680	7.5	5.7	1.1	35	160-151P00	160-111P00
1,120	5.9	7.2	1.4	44	160-151Q00	160-111Q00
1,750	4.6	8.8	1.7	55	160-151R00	160-111R00
2,650	3.8	11	2.2	68	160-151T00	160-111T00
3,900	3.2	14	2.7	83	160-151U00	160-111U00
6,100	2.6	17	3.5	103	160-151V00	160-111V00
9,000	2.1	21	4.2	125	160-151W00	160-111W00

Two Windings Single-Side-Stable 80 Milliwatts Per Winding

Coil Resistance (Ohms)	Must Operate Current (MA-DC) (Either Winding)	Must Not Operate Voltage (VDC) (Either Winding)	Must Operate Voltage (VDC) (Either Winding)	Maximum Voltage (VDC) (One Winding Only)	Dielectric Standoff Between Coils (VDC)	Part Number	
						Form C	Form D
60/60	33	2.2	.44	10	500	160-152K00	160-112K00
90/90	29	2.9	.58	13	400	160-152L00	160-112L00
155/155	22	3.7	.74	16	400	160-152M00	160-112M00
205/205	20	4.5	.92	19	400	160-152N00	160-112N00
340/340	15	5.6	1.1	24	400	160-152P00	160-112P00
560/560	10.8	7.9	1.3	31	400	160-152Q00	160-112Q00
870/870	9.3	9.0	1.8	39	200	160-152R00	160-112R00
1,320/1,320	7.5	11.0	2.2	48	200	160-152T00	160-112T00
1,980/1,980	6.4	14.0	2.8	59	200	160-152U00	160-112U00
3,000/3,000	5.3	18.0	3.5	73	200	160-152V00	160-112V00
4,500/4,500	4.2	21.0	4.2	89	200	160-152W00	160-112W00

V23026 (P1) series

Miniature, Sealed PC Board Relay



File E48393
File LR45064-5

Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- Surface and through-hole mounting types.
- 1 Form C contact arrangement.
- Latching or non-latching versions available.
- Switches loads from dry circuit to 1 amp.
- Washable – meets IEC protection class IP67.
- Low coil power requirement for IC compatibility.
- Terminals arranged on 0.1" grid.
- Designed for compact, high density mounting, 106.6mm^2 surface area.
- Ideal for data and communication systems.

Contact Data @ 23°C

Arrangements: 1 Form C (SPDT) bifurcated contacts.
Material & Style: Palladium-Nickel with Gold-Rhodium overlay.
Expected Mechanical Life: 1 billion operations.
Expected Electrical Life: 50 million ops. at 10mA, 12VDC;
10 million ops. at 100mA, 6VDC;
100,000 ops. at 1A, 30VDC.
Contact Ratings:
Maximum Switched Voltage: 125VDC, 150VAC.
Maximum Switched Current: 1A.
Maximum Carrying Current: 1A.
Maximum Switched Power: 30W (DC), 60VA (AC).
Minimum Switched Capability: 100µV.
UL/CSA Contact Ratings: 1A @ 30VDC;
460mA @ 65VDC;
460mA @ 150VAC.
Initial Contact Resistance: 50 milliohms max. @ 10mA, 20mV.

High Frequency Data

Capacitance: **Between Open Contacts:** 5pF, max.
Between Coil and Contacts: 6pF, max.
RF Characteristics: **Isolation at 100 / 900 MHz:** -30.9 db / -18.0 db.
Insertion loss at 100 / 900 MHz: -0.12 db / -1.9 db.
V. S. W. R. at 100 / 900 MHz: 1.06 db / 1.75 db.

Initial Dielectric Strength

Between Open Contacts: 500V rms for 1 minute.
Between Contacts and Coil: 1,500V rms for 1 minute.
Surge Voltage Resistance per Bellcore TR-NWT-001089 (2 / 10 µs):
Between Open Contacts: 2,000V on request.
Between Coil and Contacts: 2,500V.
Surge Voltage Resistance per FCC 68 (10 / 160 µs):
Between Open Contacts: 1,500V on request.
Between Coil and Contacts: 1,500V.

Note: Consult factory regarding availability of models meeting high surge resistance requirements between open contacts.

Initial Insulation Resistance

Between Mutually Insulated Conductors: 10^9 ohms @ 500VDC.

Coil Data @ 23°C

Voltage: 1.5 to 24VDC.
Thermal Resistance at Continuous Thermal Load: 130°K per Watt.
Maximum Coil Temperature: 85°C.
Duty Cycle: Continuous.

Coil Data @ 23°C

Nominal Voltage (VDC)	Maximum Operating Voltage (VDC)	Nominal Power (mW)	Resistance (Ohms) ± 10%	Coil Number Order Designation (Step 4 in Ordering Information chart)
Non-Latching — Through-Hole versions (A1)				
1.5	4.5	63	36	7
3	8.8	66	137	6
5	14.5	67	370	1
9	25.5	69	1,165	5
12	35	64	2,250	2
15	42	72	3,100	3
24	50	128	4,500	4
Non-Latching — Surface-Mount versions (D1)				
1.5	4	80	28	7
3	8	80	113	6
5	13.3	80	313	1
9	24	80	1,013	5
12	32	80	1,800	2
15	40	80	2,813	3
24	50	128	4,500	4
Bistable, Dual Coils — Through-Hole and Surface-Mount versions (B1,E1) (values are the same for each coil)(1)				
1.5	4.25	70	32	7
3	8.55	69	130	6
5	14.75	64	390	1
9	14.75	68	1,200	5
12	29	96	1,500	2
15	29	150	1,500	3
Bistable, Single Coil — Through-Hole and Surface-Mount versions (C1,F1)				
1.5	6	37	61	5
3	13	30	300	6
5	20	34	740	1
9	35	38	2,160	7
12	50	32	4,500	2
15	50	50	4,500	3
24	50	128	4,500	4

(1) The specified voltages apply with only one coil energized.

Operate Data @ 23°C

Must Operate Voltage: 75% of nominal voltage or less.
Must Release Voltage: 10% of nominal voltage or less.
Max. Continuous Thermal Load : 500mW.
Operate Time (Excluding Bounce)†: 1 ms, typ.
Operate Bounce Time†: 1 ms, typ.
Release Time (Excluding Bounce)†: 0.4 ms, typ.
Set Time (Latching)†: 1 ms, typ.
Reset Time (Latching)†: 1 ms, typ.
Maximum Switching Rate: 200 operations/second.
† At or from Nominal Coil Voltage

Environmental Data

Temperature Range: -40°C to +70°C.
Vibration, Operational: 40g, 10-200 Hz; 20g, 200-2000 Hz.
Shock, Operational: 50g at 11 ms 1/2 sinusoidal impulse.
Resistance to Soldering Heat: 260°C for 10s. Internal relay temperature should not exceed 210°C.
Needle Flame Test: Application time 20s, burning time <15s.

Mechanical Data

Termination: Through-hole or surface mount printed circuit terminals.
Enclosure Type: Immersion cleanable, plastic sealed case.
Weight: 0.063 oz. (1.8g) approximately.

Ordering Information

Typical Part Number ▶	V23026	A1	00	2	B201

1. Basic Series:
V23026 = P1 Miniature, printed circuit board relay.

2. Termination:

	Non-Latching	Dual Coil Latching	Single Coil Latching
Through-Hole	**A1**	**B1**	**C1**
Surface Mount	**D1**	**E1**	**F1**

Consult factory regarding availability of models meeting FCC Part 68/1500V surge requirement.

3. Function Type:
00 = Single Coil Non-Latching, Through-Hole terminals
02 = Single Coil Non-Latching, Surface-Mount terminals
05 = Single Coil Latching
10 = Dual Coil Latching

4. Coil Voltage:
7 = 1.5VDC(1) 6 = 3VDC 1 = 5VDC 5 = 9VDC(1) 2 = 12VDC 3 = 15VDC 4 = 24VDC(2)
(1) For single coil latching versions only (C1, F1), 5 =1.5VDC and 7 = 9VDC (2) 24V coil not available on dual coil version

5. Contact Type:
B201 = Bifurcated, 1 Form C (SPDT).

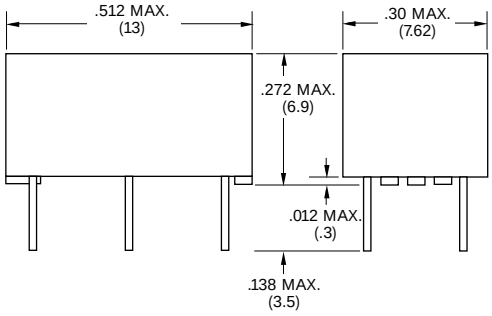
*Consult factory for tape and reel packaging.

Our authorized distributors are more likely to stock the following items for immediate delivery.

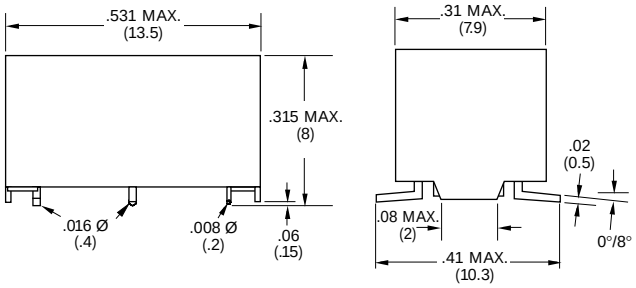
V23026A1001B201 V23026D1021B201
V23026A1002B201 V23026D1022B201
V23026A1004B201 V23026D1024B201

Outline Dimensions

Through-Hole

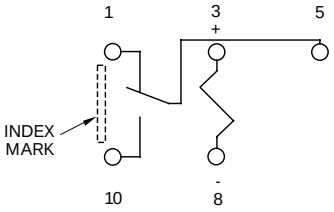


Surface Mount



Wiring Diagrams (Bottom Views)

Single Coil Non-Latching & Single Coil Latching



For non-latching versions, coil polarity must be observed.
For single coil latching versions, polarity shown results in "set" condition.
Reverse polarity results in "reset" condition.
Diagram indicates de-energized position for non-latching and "reset" position for single coil latching.

Dual Coil Latching

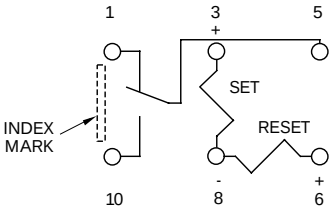
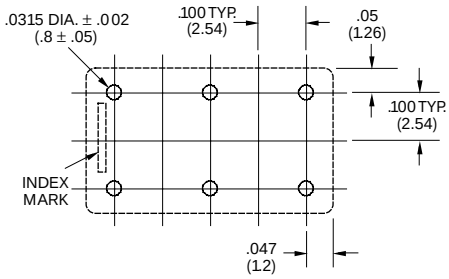


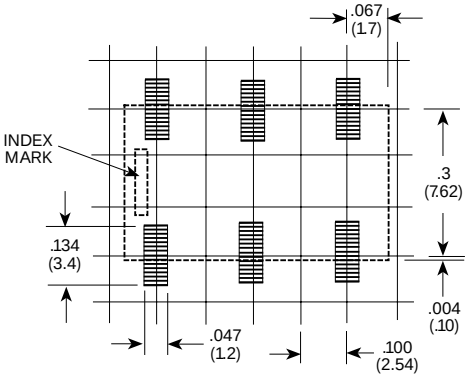
Diagram indicates relay in the "reset" position, with "reset" coil most recently energized as shown. Energizing "set" coil as shown will transfer the contacts.

PC Board Layouts (Bottom Views)

Through-Hole



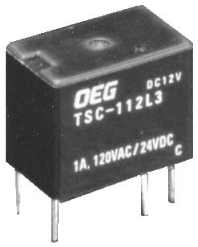
Surface Mount



TSC series

Miniature, Sealed PC Board Relay

Telecommunications, Appliances, Office Machines



UL File No. E82292
CSA File No. LR48471

Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- Designed for thermostat, modem, computer peripherals, video recording and security applications.
- 1 Form C contact arrangement.
- Low coil power requirement for IC compatibility.
- Terminals arrangement on grid pattern.

Contact Data @ 20°C

Arrangements: 1 Form C (SPDT).
Material: Gold overlay Silver Nickel Alloy.
Max. Switching Rate: 300ops./ min. (no load).
30ops./ min. (rated load).
Expected Mechanical Life: 5 million ops (no load).
Expected Electrical Life: 100,000 ops (rated load).
Minimum Load: 1mA @ 1VDC.
Initial Contact Resistance: 50 milliohms @ 100mA, 6VDC.

Contact Ratings

Ratings: 1A @ 24VDC resistive.
1A @ 120VAC resistive.
Max. Switched Voltage: **AC:** 120V.
DC: 30V.
Max. Switched Current: 1A.
Max. Switched Power: 120VA, 24W.

Initial Dielectric Strength

Between Open Contacts: 400VAC, 50/60 Hz. (1 min.).
Between Contacts and Coil: 1,000VAC, 50/60 Hz. (1 min.).
Note: Consult factory for higher dielectric version: 1,500VAC, 50/60 Hz. (1 min.).
Surge Voltage Between Coil and Contacts: 1,500V FCC Part 68 (10/160µs).

Initial Insulation Resistance

Between Mutually Insulated Conductors: 1,000Mohm @ 500VDCM.

Coil Data

Voltage: 5 to 24VDC.
Duty Cycle: Continuous.
Nominal Power: **TSC-L:** 150mW.
TSC-D: 300mW.
Max. Coil Power: **TSC-L:** 140% of nominal at 70°C.
TSC-D: 115% of nominal at 70°C.

Coil Data @ 20°C

TSC-L Sensitive				
Rated Coil Voltage (VDC)	**Nominal Current (mA)**	**Coil Resistance (ohms) ± 10%**	**Must Operate Voltage (VDC)**	**Must Release Voltage (VDC)**
5	30.0	166	3.75	0.25
6	25.0	240	4.50	0.30
9	16.7	540	6.75	0.45
12	12.5	960	9.00	0.60
24	6.3	3,840	18.00	1.20
TSC-D Standard				
Rated Coil Voltage (VDC)	**Nominal Current (mA)**	**Coil Resistance (ohms) ± 10%**	**Must Operate Voltage (VDC)**	**Must Release Voltage (VDC)**
5	60.0	83	3.75	0.25
6	50.0	120	4.50	0.30
9	33.4	270	6.75	0.45
12	25.0	480	9.00	0.60
24	12.5	1,920	18.00	1.20

Operate Data @ 20°C

Must Operate Voltage: 75% of nominal voltage or less.
Must Release Voltage: 5% of nominal voltage or more.
Operate Time: 5ms max.
Release Time: 5ms max.

Environmental Data

Temperature Range:
Operating: -40°C to +80°C.
Vibration, Mechanical: 10 to 55Hz., 1.5mm double amplitude.
Operational: 10 to 55Hz., 1.5mm double amplitude.
Shock, Mechanical: 500m/s² (50G approximately).
Operational: 100m/s² (10G approximately).
Operating Humidity: 45 to 85% RH. (Non-condensing)

Mechanical Data

Termination: Printed circuit terminals.
Enclosure: Plastic sealed case.
Weight: 0.1 oz (3g) approximately.

Ordering Information

Typical Part Number ▶	TSC	-1	05	L	3	H	,000

1. Basic Series:
TSC = Miniature relay

2. Termination:
1 = 1 pole

3. Coil Voltage:
05 = 5VDC 09 = 9VDC 24 = 24VDC
06 = 6VDC 12= 12VDC

4. Coil Input:
L = Sensitive D = Standard

5. Contact Material:
3 = Silver Nickel

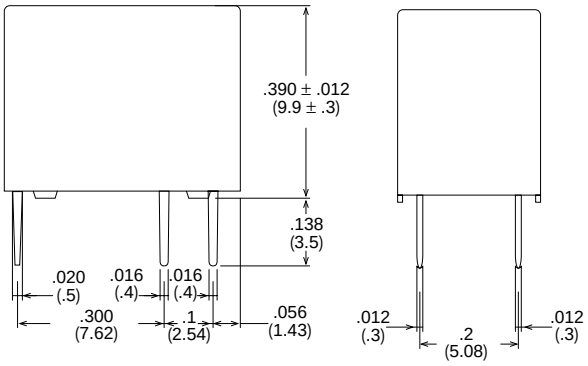
6. Enclosure:
Blank = Vented (Flux-tight) cover H = Sealed plastic case

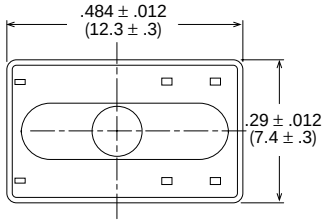
7. Suffix:
,000 = Standard model Other Suffix = Custom model

Our authorized distributors are more likely to stock the following items for immediate delivery.

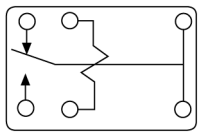
TSC-105L3H,000 TSC-124L3H,000 TSC-112D3H,000
TSC-112L3H,000 TSC-105D3H,000 TSC-124D3H,000

Outline Dimensions

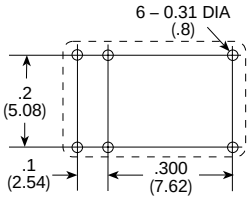




Wiring Diagram (Bottom View)

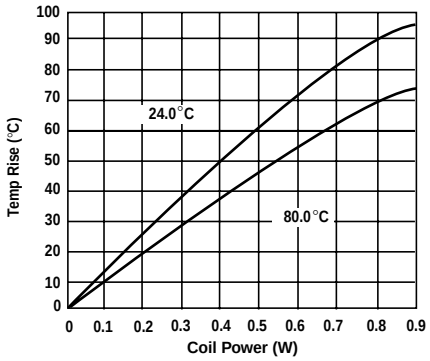


PC Board Layout (Bottom View)

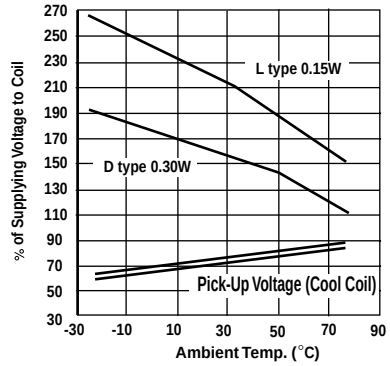


Reference Data

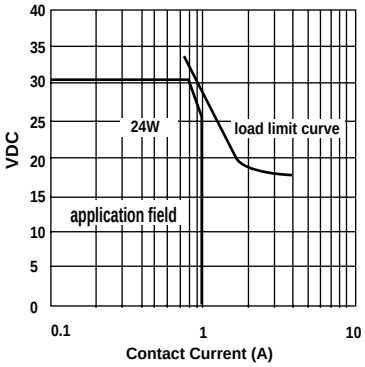
Coil Temperature Rise



Ambient Temp. & Operate Voltage



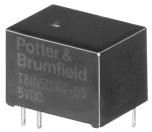
Load Limit Curve



Dimensions are shown for reference purposes only.

Dimensions are in inches over (millimeters) unless otherwise specified.

Specifications and availability subject to change.



T81N/T81H series

Ultraminiature, High Density PC Board Relay

File E29244

File LR48471

Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- Gold clad contacts in a 1 Form C contact arrangement.
- Standard 0.1" x 0.3" grid spacing in a DIP configuration.
- Standard or sensitive DC coils through 24 volts.
- High dielectric strength.
- Well suited for audio communications circuits, logic and process control, vending machines, thermostats and office automation applications.
- Immersion cleanable, plastic sealed case.
- Quiet operation for security applications.

Contact Data @ 20°C

Arrangements: 1 Form C (SPDT).
Material: Gold overlay silver-palladium alloy.
Ratings: 1 amp @ 24VDC, resistive; 0.5 amp @ 120VAC, resistive.
Max. Switching Current: 2A
Max. Switching Power: 60VA/24W.
Max. Switching Voltage: 120VAC/60VDC.
Expected Mechanical Life: 10 million operations.
Expected Electrical Life: 150,000 ops. @ 1A, 24VDC, resistive.
100,000 ops. @ 1A, 120VAC, resistive.
Initial Contact Resistance: 50 milliohms, max., @ 100mA, 6VDC.
Surge Voltage:
Between Coil and Contacts (10 x 160μs): 1,500V: (FCC Part 68).

Initial Dielectric Strength

Between Open Contacts: 500V rms, 50/60 Hz., for 1 minute.
Contact to Coil: 1,000V rms, 50/60 Hz., for 1 minute.

Initial Insulation Resistance

Between Mutually Insulated Conductors: 10^8 ohms @ 500VDC, 20°C and 65% relative humidity.

Coil Data @ 20°C

Voltage: 3 through 24VDC.
Nom. Power (Approx.)**: Std. Coil:** 450 mW; **Sensitive Coil:** 200 mW.
Maximum Power: Std. Coil: 800 mW.;**Sensitive Coil:** 640 mW.
Temperature Rise: Std. Coil: 105°C per watt, typ.
Sensitive Coil: 125°C per watt, typ.
Maximum Coil Temperature: 105°C.
Duty Cycle: Continuous.

Coil Data @ 20°C

Standard Coils		Sensitive Coils	
Nominal Voltage (VDC)	Resistance ±10% (Ohms)	Nominal Voltage (VDC)	Resistance ±10% (Ohms)
3	20	3	45
5	55	5	125
6	80	6	180
9	180	9	400
12	320	12	700
24	1,280	24	2,800

Operate Data @ 20°C

Must Operate Voltage: 70% of nominal voltage or less.
Must Release Voltage: 5% of nominal voltage or more.
Operate Time (Excluding Bounce)†: Standard Coil : 5 ms, approx.
Sensitive Coil : 5 ms, approx.
Release Time (Excluding Bounce)†: All Models: 2 ms, approx.

† At or from Nominal Coil Voltage.

Environmental Data

Temperature Range: Standard Coil: -40°C to +55°C.
Sensitive Coil: -40°C to +75°C.
Vibration: 0.059" (1.5mm) max. excursions for 10-40 Hz.
Shock: Standard Coil: 10g for 11 ms.
Sensitive Coil: 6g for 11 ms.

Mechanical Data

Termination: Printed circuit terminals on 0.1" (2.54mm) centers.
Enclosure: Sealed PBT plastic case.
Weight: 0.14 oz. (4g) approximately.

Ordering Information

Typical Part Number ▶	T81	H	5	D	3	1	2	-12

1. Basic Series:
T81 = Ultraminiature, PC board relay.

2. Coil Sensitivity:
N = Standard coil.
H = Sensitive coil.

3. Contact Arrangement:
5 = 1 Form C (SPDT)

4. Coil Input:
D = DC Voltage.

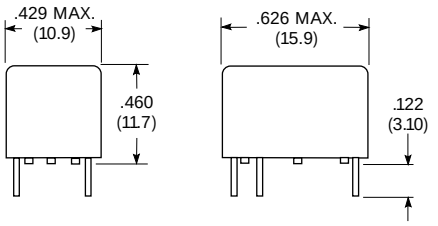
5. Dielectric Strength:
3 = High dielectric strength, UL recognized.

6. Contact Rating:
1 = 1A @ 24VDC; 0.5A @ 120VAC.

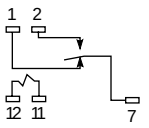
7. Contact Material:
2 = Gold overlay silver-palladium alloy.

8. Coil Voltage:
03 = 3VDC 06 = 6VDC 12 = 12VDC
05 = 5VDC 09 = 9VDC 24 = 24VDC

Outline Dimensions

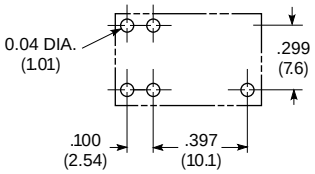


Wiring Diagram (Bottom View)



Terminals - #1 & 2
.023 (0.6) X .018 (0.45)
Terminals - #11 & 12
.023 (0.6) X .016 (0.40)
Terminal - #7
.008 (0.20) X .023 (0.6)

PC Board Layout (Bottom View)



Our authorized distributors are more likely to stock these items.

T81H5D312-05 T81H5D312-12 T81N5D312-05 T81N5D312-24
T81H5D312-06 T81H5D312-24 T81N5D312-12

Dimensions are shown for reference purposes only.

Dimensions are in inches over (millimeters) unless otherwise specified.

Specifications and availability subject to change.

www.tycoelectronics.com
Technical support:
Refer to inside back cover.

OUAZ series

Miniature, Sealed PC Board Relay

Telecommunications, Appliances, Office Machines, Audio Equipment.



UL File No. E82292
CSA File No. LR48471

Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- Gold overlay silver palladium alloy contact suitable for low loads.
- High density available on PC board due to small size.
- 2.54mm terminal pitch same as I.C. socket terminal pitch.
- Sensitive and standard coils available.
- Immersion cleanable, sealed version available.

Contact Data @ 20°C

Arrangements: 1 Form A (SPST-NO) and 1 Form C (SPDT).
Material: Gold overlay silver palladium.
Max. Switching Rate: 300 ops./min. (no load).
30 ops./min. (rated load).
Expected Mechanical Life: 10 million operations (no load).
Expected Electrical Life: 100,000 operations (rated load).
Minimum Load: 1mA @1VDC.
Initial Contact Resistance: 50 milliohms @ 100mA,6VDC.

Contact Ratings

Ratings: 1A @ 24VDC resistive,
1A @ 120VAC resistive.
Max. Switched Voltage: **AC:** 120V.
DC: 60V.
Max. Switched Current: 1A.
Max. Switched Power: 120VA, 30W.

Initial Dielectric Strength

Between Open Contacts: 500VAC 50/60 Hz. (1 minute).
Between Coil and Contacts: 1,000VAC 50/60 Hz. (1 minute).
Surge Voltage Between Coil and Contacts: 1,500V FCC Part 68 (10/160µs).

Initial Insulation Resistance

Between Mutually Insulated Elements: 1,000M ohms min. @ 500VDCM.

Coil Data

Voltage: 5 to 24VDC.
Nominal Power: **OUAZ-D:** 450 mW.
OUAZ-L: 200 mW.
Coil Temperature Rise: **OUAZ-D:** 60°C max., at rated coil voltage.
OUAZ-L: 25°C max., at rated coil voltage.
Max. Coil Power: 130% of nominal.
Duty Cycle: Continuous.

Coil Data @ 20°C

OUAZ-D Standard				
Rated Coil Voltage (VDC)	**Nominal Current (mA)**	**Coil Resistance (ohms) ± 10%**	**Must Operate Voltage (VDC)**	**Must Release Voltage (VDC)**
5	90.9	55	3.50	0.25
6	75.0	80	4.20	0.30
9	50.0	180	6.30	0.45
12	37.5	320	8.40	0.60
24	18.8	1,280	16.80	1.20
OUAZ-L Sensitive				
Rated Coil Voltage (VDC)	**Nominal Current (mA)**	**Coil Resistance (ohms) ± 10%**	**Must Operate Voltage (VDC)**	**Must Release Voltage (VDC)**
5	40.0	125	3.75	0.50
6	33.3	180	4.50	0.60
9	22.5	400	6.75	0.90
12	17.0	700	9.00	1.20
24	8.6	2,800	18.00	2.40

Operate Data

Must Operate Voltage: **OUAZ-D:** 70% of nominal voltage or less.
OUAZ-L: 75% of nominal voltage or less.
Must Release Voltage: **OUAZ-D:** 5% of nominal voltage or more.
OUAZ-L: 10% of nominal voltage or more.
Operate Time: **OUAZ-D:** 5 ms max.
OUAZ-L: 10 ms max.
Release Time: 7 ms max.

Environmental Data

Temperature Range:
Operating: **OUAZ-D:** -30°C to +60°C
OUAZ-L: -30°C to +75°C.
Vibration, Mechanical: 10 to 55 Hz., 1.5mm double amplitude
Operational: 10 to 55 Hz., 1.5mm double amplitude.
Shock, Mechanical: 500m/s² (50G approximately).
Operational: 100m/s² (10G approximately).
Operating Humidity: 20 to 85% RH. (Non-condensing)

Mechanical Data

Termination: Printed circuit terminals.
Enclosure (94V-0 Flammability Ratings):
OUAZ-SS: Vented (Flux-tight), plastic cover.
OUAZ-SH: Sealed, plastic case.
Weight: 0.12 oz. (3.5g) approximately.

Ordering Information

Typical Part Number ▶	OUAZ	-SS	-1	12	L	M	,900

1. Basic Series:
OUAZ = Miniature, sealed PC board relay.

2. Enclosure:
SS = Vented (Flux-tight)*, plastic cover.
SH = Sealed, plastic case.

3. Termination:
1 = 1 pole

4. Coil Voltage:
03 = 3VDC 06 = 6VDC 12 = 12VDC
05 = 5VDC 09 = 9VDC 24 = 24VDC

5. Coil Input:
L = Sensitive D = Standard

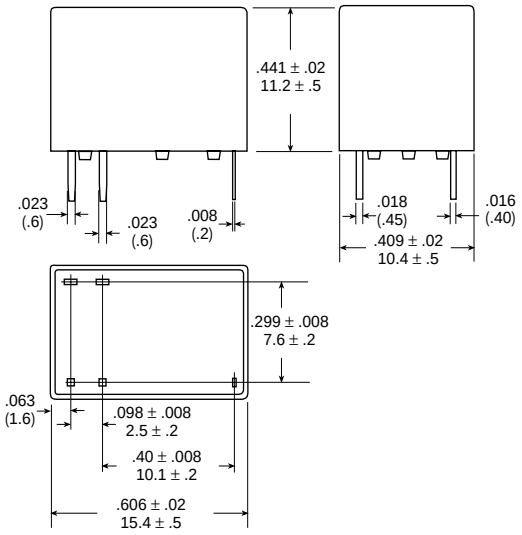
6. Contact Arrangement:
Blank = 1 Form C, SPDT M = 1 Form A, SPST-NO

7. Suffix:
,900 = Standard model Other Suffix = Custom model

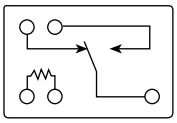
* Not suitable for immersion cleaning processes.

Our authorized distributors are more likely to stock the following items for immediate delivery.
None at present.

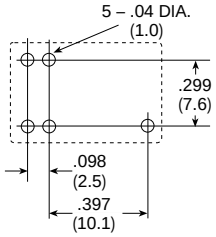
Outline Dimensions



Wiring Diagram (Bottom View)

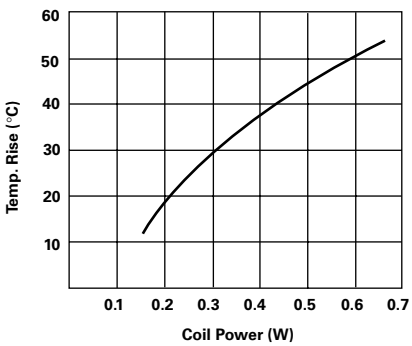


PC Board Layout (Bottom View)

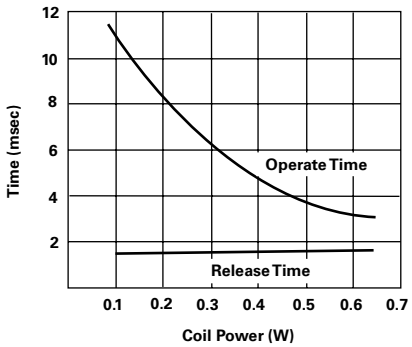


Reference Data

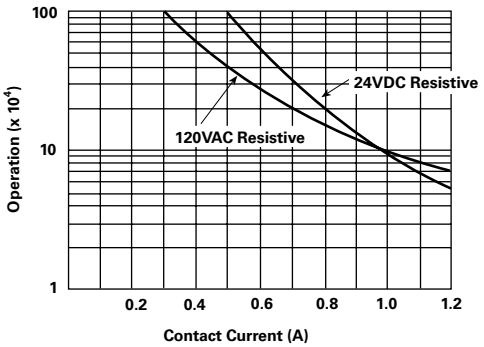
Coil Temperature Rise



Operate Time



Life Expectancy



Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.
www.tycoelectronics.com
Technical support:
Refer to inside back cover.



IM series

DPDT Slimline and Low Profile Telecom/Signal PC Board Relays

File E111441
File 169679-1079886
16501-003

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- Through hole or surface mount terminals.
- Meets Bellcore GR 1089, FCC Part 68 and ITU-T K20.
- For applications in telecommunications, office automation, consumer electronics, medical equipment, measurement and control equipment.
- Immersion cleanable, plastic sealed case.
- 100mW coil for latching models, 140mW coil for non-latching.
- Ultrasonic cleaning not recommended.

Contact Data @ 23°C (except as noted)

Arrangement: 2 Form C (DPDT) bifurcated contacts.
Material: Stationary: Palladium-Ruthenium, gold covered.
Ratings: Max. Switched Current: 2A.
Max. Carry Current: 2A (at max ambient temperature.
Max. Switched Voltage: 220VDC, 250VAC.
Max. Switched Power: 60W DC or 62.5VA AC.
UL/CSA Ratings: 250mA @ 250VAC; 2A @ 30VDC; 500mA @ 120VDC; 270mA @ 220VDC.
Initial Contact Resistance: <70 milliohms @ 10mA / 20mV.
Expected Mechanical Life: 100 million operations.
Expected Electrical Life: 2.5 million operations @ 10mA / 30mVDC.
2 million operations @ cable load open end.
500,000 operations @ 240mA / 125VDC, res.
500,000 operations @ 1A / 30VDC, res.
100,000 operations @ 270mA / 220VDC, res.
100,000 operations @ 2A / 30VDC, res.
100,000 operations @ 250mA / 250VDC, res.
Thermoelectric potential: <10µV.

High Frequency Data

Capacitance: Between Open Contacts: 1pF, max.
Between Coil and Contacts: 2pF, max.
Between Poles: 2pF, max.
RF Characteristics: Isolation at 100 / 900 MHz: -37.0 db / -18.8 db.
Insertion loss at 100 / 900 MHz: -0.03 db / -0.33 db.
V. S. W. R. at 100 / 900 MHz: 1.06 db / 1.49 db.

Initial Dielectric Strength

Between Open Contacts: 1,000Vrms for 1 minute.
Between Coil and Contacts: 1,800Vrms for 1 minute.
Between Poles: 1,000Vrms for 1 minute.
Surge Voltage Resistance per Bellcore 1089 (2 / 10 µs), FCC 68 (10 / 160 µs) and IEC (10 / 700 µs):
Between Open Contacts: 1,500V.
Between Coil and Contacts: 2,500V.
Between Poles: 1,500V.

Initial Insulation Resistance

Between Contact and Coil: 10^9 ohms or more @ 500VDC.

Coil Data @ 23°C

Voltage: 1.5 to 24VDC.
Nominal Power: 100mW for 1.5 - 12VDC latching models;
140mW for 1.5 - 12VDC non-latching models;
200mW for all 24VDC models.
Duty Cycle: Continuous.

Coil Data @ 23°C

Nominal Voltage (VDC)	Operate/Set Range		Minimum Release/Reset Voltage (VDC)	Resistance ±10% (Ohms)	Part Number
	Minimum Voltage (VDC)	Maximum Voltage (VDC)			
Non-latching 1 coil versions					
1.5	1.13	3.4	0.15	16	IM00
3	2.1	6.8	0.3	64	IM01
4.5	3.15	10.3	0.45	145	IM02
5	3.5	11.4	0.5	178	IM03
6	4.2	13.7	0.6	257	IM04
9	6.3	20.4	0.9	574	IM05
12	8.4	27.3	1.2	1,028	IM06
24	16.8	45.6	2.4	2,880	IM07
Latching 1 coil versions					
1.5	1.13	4.1	-1.13	23	IM40
3	2.25	8.1	-2.25	90	IM41
4.5	3.38	12.1	-3.38	203	IM42
5	3.75	13.5	-3.75	250	IM43
6	4.5	16.2	-4.5	360	IM44
9	6.75	24.2	-6.75	810	IM45
12	9.0	32.3	-9.0	1,440	IM46
24	18.0	41.9	-18.0	2,880	IM47

Operate Data @ 23°C

Operate and Release Voltage: See values in chart above.
Operate Time (at nominal voltage): 1 ms, typ.; 3 ms, max.
Reset Time [latching](at nominal voltage): 1 ms, typ.; 3 ms, max.
Release Time [non-latching](without diode in parallel): 1 ms, typ.; 3 ms, max.
Release Time [non-latching](with diode in parallel): 3 ms, typ.; 5 ms, max.
Bounce Time (at contact close): 1 ms, typ.; 5 ms, max.
Maximum Switching Rate (no load): 50 operations/s.

Environmental Data

Temperature Range: -55°C to +85°C.
Maximum Allowable Coil Temperature: 125°C.
Thermal Resistance: < 150K/W.
Shock, half sinus, 11 ms: Functional: 50g.
Shock, half sinus, 0.5 ms: Destructive: 500g.
Vibration, 10-1000 Hz.: Functional: 20g.
Needle Flame Test: Application Time 20s.
Resistance to Soldering: 260°C for 10s.

Mechanical Data

Termination: Through-hole printed circuit terminals or gull-wing or J-leg surface mount printed circuit terminals.
Mounting Position: Any.
Enclosure Type: Immersion cleanable (IP67) plastic case.
Weight: 0.03 oz. (.75g) approximately.

U_I = Minimum voltage at 23° C after pre-energizing with nominal voltage without contact current

U_{II} = Maximum continous voltage at 23°

The operating voltage limits U_I and U_{II} depend on the temperature according to the formula:

$U_{I\,tamb} = K_I \cdot U_{I\,23°C}$

and

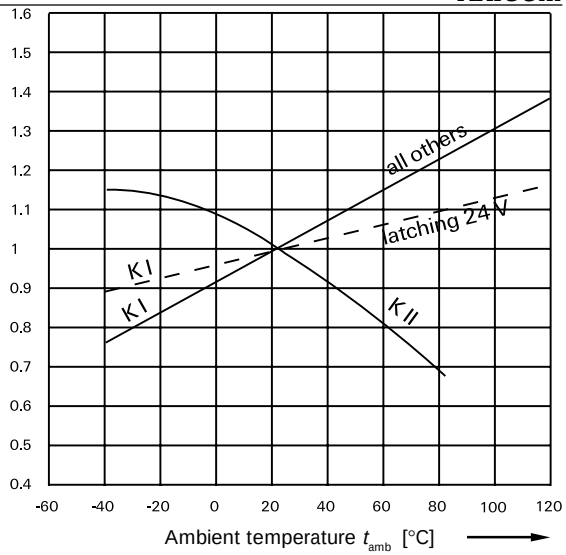
$U_{II\,tamb} = K_{II} \cdot U_{II\,23°C}$

t_{amb} = Ambient temperature

$U_{I\,tamb}$ = Minimum voltage at ambient temperature, t_{amb}

$U_{II\,tamb}$ = Maximum voltage at ambient temperature, t_{amb}

k_I, k_{II} = Factors (dependent on temperature), see diagram



Ordering Information

See "Part Number" column in Coil Data chart on previous page for available base part numbers in the IM series.
For THT versions, add the suffix "TS" to the base part number.
For gull-wing SMT versions, add the suffix "GR" to the base part number.
For J-leg SMT versions, add the suffix "JR" to the base part number.

Packaging Information

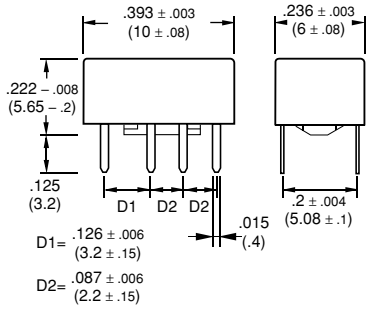
THT IM series relays are shipped in tubes of 50. There are 1,000 relays in a full carton. SMT IM series relays are shipped in reels of 1,000. There are 1,000 or 5,000 relays in a full carton.

Our authorized distributors are more likely to stock the following items for immediate delivery.

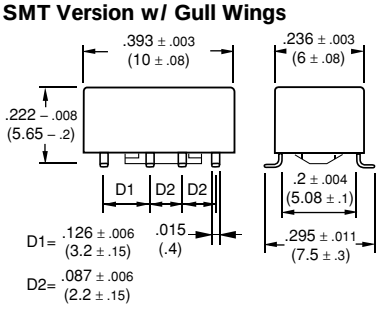
None at present.

Outline Dimensions

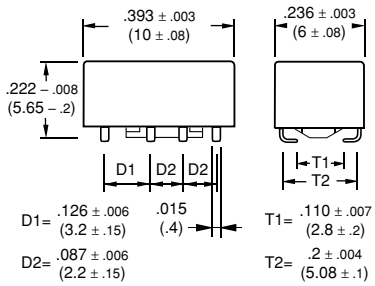
THT Version



SMT Version w/ Gull Wings

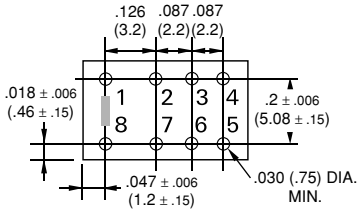


SMT Version w/ J Legs



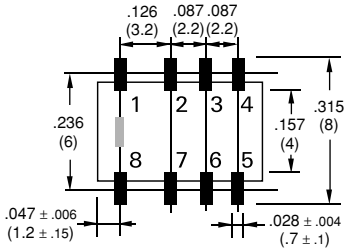
PC Board Layout (Bottom View)

THT Version

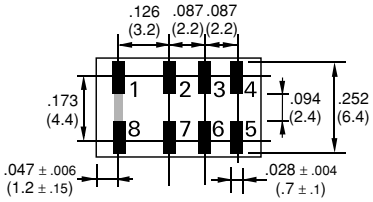


Solder Pad Layout (Bottom Views)

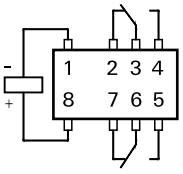
SMT Version w/ Gull Wings



SMT Version w/ J Legs

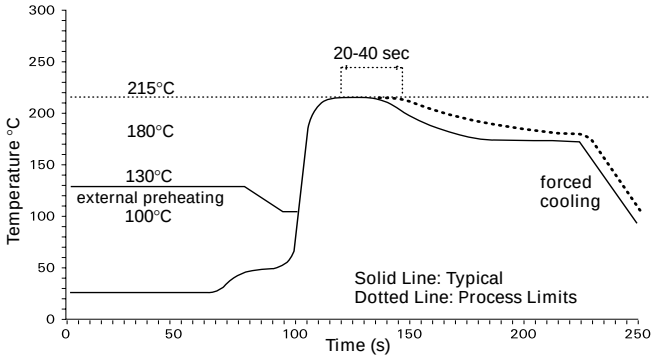


Wiring Diagram (Bottom View)

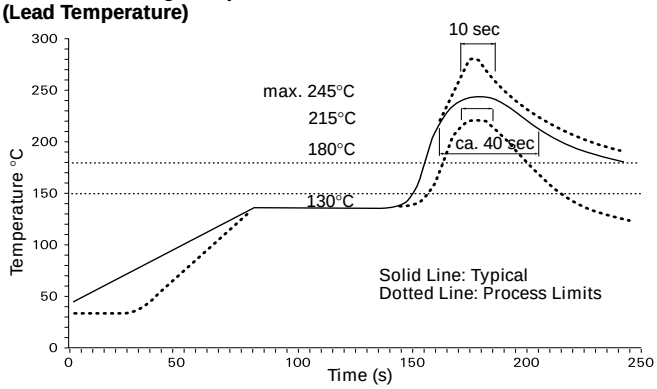


Recommended Soldering Conditions (according to CECC 00802)

Vapor Phase Soldering: Temperature/Time Profile (Lead Temperature)



Infrared Soldering: Temperature/Time Profile (Lead Temperature)



Dimensions are shown for reference purposes only.

Dimensions are in inches over (millimeters) unless otherwise specified.

Specifications and availability subject to change.

www.tycoelectronics.com
Technical support:
Refer to inside back cover.



FP2 series

DPDT Low Profile Telecom/Signal PC Board Relays

File E111441
File 169679-1079886
16501-003

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- Through hole PC board terminals.
- Meets FCC Part 68 and ITU-T K20.
- For applications in telecommunications, office automation, consumer electronics, medical equipment, measurement and control equipment.
- Immersion cleanable, plastic sealed case.
- 80mW coil for high sensitivity models, 140mW coil for sensitive types.
- Ultrasonic cleaning not recommended.

Contact Data @ 23°C (except as noted)

Arrangement: 2 Form C (DPDT) bifurcated contacts.
Material: Stationary: Silver-nickel, gold covered.
Ratings: Max. Switched Current: 2A.
Max. Carry Current: 2A (at max ambient temperature.
Max. Switched Voltage: 125VDC, 250VAC.
Max. Switched Power: 30W DC or 62.5VA AC.
UL/CSA Ratings: 500mA @ 50VDC; 1.25A @ 30VDC; 500mA @ 50VAC.
Initial Contact Resistance: <70 milliohms @ 10mA / 20mV.
Expected Mechanical Life: 100 million operations.
Expected Electrical Life: 2.5 million operations @ 10mA / 30mVDC.
2 million operations @ cable load open end.
100,000 operations @ 240mA / 125VDC.
100,000 operations @ 250mA / 250VDC.
100,000 operations @ 1.25A / 24VDC.
Thermoelectric potential: <10µV.

High Frequency Data

Capacitance: Between Open Contacts: 1pF, max.
Between Coil and Contacts: 4pF, max.
Between Poles: 1pF, max.
RF Characteristics: Isolation at 100 / 900 MHz: -40.2 db / -22.3 db.
Insertion loss at 100 / 900 MHz: -0.03 db / -0.25 db.
V. S. W. R. at 100 / 900 MHz: 1.01 db / 1.07 db.

Initial Dielectric Strength

Between Open Contacts: 700Vrms for 1 minute.
Between Coil and Contacts: 1,000Vrms for 1 minute.
Between Poles: 1,000Vrms for 1 minute.
Surge Voltage Resistance per FCC 68 (10 / 160 µs) and IEC (10 / 700 µs):
Between Open Contacts: 1,500V.
Between Coil and Contacts: 1,500V.
Between Poles: 1,500V.

Initial Insulation Resistance

Between Contact and Coil: 10^9 ohms or more @ 500VDC.

Coil Data @ 23°C

Voltage: 3 to 48VDC.
Nominal Power: 80-300mW depending on models. See coil data tables.
Duty Cycle: Continuous.

Coil Data @ 23°C

Nom. Voltage (VDC)	Operate/Set Range		Minimum Release/Reset Voltage (VDC)	Nom. Power (mW)	Resistance ±10% (Ohms)	Part Number
	Min. Voltage (VDC)	Max. Voltage (VDC)				
Non-latching 1 coil versions						
3	2.1	6.8	0.3	140	64	D3006
4.5	3.15	10.3	0.45	140	145	D3004
5	3.5	11.4	0.5	140	178	D3009
6	4.2	13.7	0.6	140	257	D3005
9	6.3	20.4	0.9	140	574	D3010
12	8.4	27.3	1.2	140	1,028	D3002
24	16.8	45.7	2.4	200	2,880	D3012
48	33.6	67.5	4.8	300	7,680	D3013
Non-latching, sensitive 1 coil versions						
3	2.25	9.0	0.3	80	113	D3021
4.5	3.38	13.5	0.45	80	253	D3022
5	3.75	15.0	0.5	80	313	D3023
6	4.5	18.0	0.6	80	450	D3024
9	6.75	27.1	0.9	80	1,013	D3025
12	9.0	36.1	1.2	80	1,800	D3026
24	18.0	54.7	2.4	140	4,114	D3027
48	36.0	72.5	4.8	260	8,882	D3028
Latching 1 coil versions						
3	2.25	8.1	-2.25	100	90	D3041
4.5	3.375	12.1	-3.375	100	203	D3042
5	3.75	13.5	-3.75	100	250	D3043
6	4.5	16.2	-4.5	100	360	D3044
9	6.75	24.2	-6.75	100	810	D3045
12	9.0	29.0	-9.0	100	1,440	D3046
24	18.0	47.5	-18.0	150	3,840	D3047
Latching 2 coil versions						
3	2.1	5.7	2.1	200	45	D3061
4.5	3.15	8.6	3.15	200	101	D3062
5	3.5	9.5	3.5	200	125	D3063
6	4.2	11.4	4.2	200	180	D3064
9	6.3	17.1	6.3	200	405	D3065
12	8.4	22.6	8.4	200	720	D3066
24	16.8	33.7	16.8	200	1,920	D3067

Operate Data @ 23°C

Operate and Release Voltage: See values in chart above.
Operate Time (at nominal voltage)**:** 3 ms, typ.; 4 ms, max.
Reset Time [latching](at nominal voltage)**:** 3 ms, typ.; 4 ms, max.
Release Time [non-latching](w/o diode in parallel)**:** 1 ms, typ.; 3 ms, max.
Release Time [non-latching](with diode in parallel)**:** 3 ms, typ.; 4 ms, max.
Bounce Time (at contact close)**:** 1 ms, typ.; 5 ms, max.
Maximum Switching Rate (no load)**:** 50 operations/s.

Environmental Data

Temperature Range: -55°C to +85°C.
Maximum Allowable Coil Temperature: 110°C.
Thermal Resistance: < 185K/W.
Shock, half sinus, 11 ms: Functional: 50g.
Shock, half sinus, 11 ms: Destructive: 1,500g.
Vibration, 10-500 Hz.: Functional: 20g.
Needle Flame Test: Application Time 20s.
Resistance to Soldering: 260°C for 10s.

Mechanical Data

Termination: Through-hole printed circuit terminals.
Mounting Position: Any.
Enclosure Type: Immersion cleanable (IP67) plastic case.
Weight: 0.08 oz. (2g) approximately.

U_I = Minimum voltage at 23° C after pre-energizing with nominal voltage without contact current

U_{II} = Maximum continous voltage at 23°

The operating voltage limits U_I and U_{II} depend on the temperature according to the formula:

$U_{I\,tamb} = K_I \cdot U_{I\,23°C}$

and

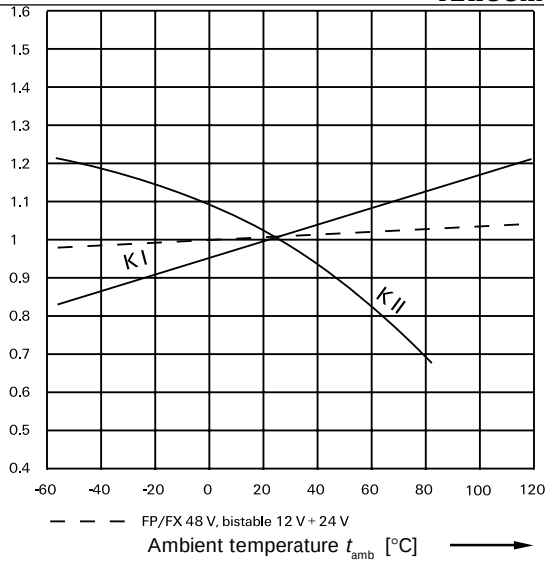
$U_{II\,tamb} = K_{II} \cdot U_{II\,23°C}$

t_{amb} = Ambient temperature

$U_{I\,tamb}$ = Minimum voltage at ambient temperature, t_{amb}

$U_{II\,tamb}$ = Maximum voltage at ambient temperature, t_{amb}

k_I, k_{II} = Factors (dependent on temperature), see diagram



Ordering Information

See "Part Number" column in Coil Data chart on previous page for available part numbers in the FP2 series.

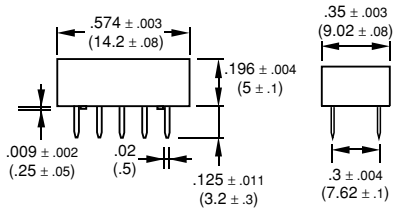
Packaging Information

FP2 series relays are shipped in tubes of 50. There are 1,000 relays in a full carton.

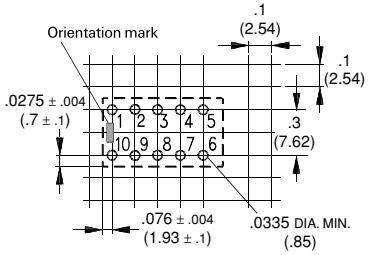
Our authorized distributors are more likely to stock the following items for immediate delivery.

None at present.

Outline Dimensions

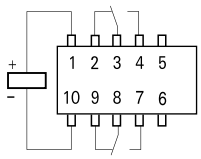


PC Board Layout (Bottom View)

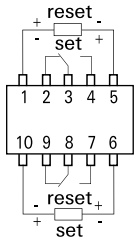


Wiring Diagrams (Bottom Views)

Non-Latching and Latching, 1 Coil Release or Reset Condition



Latching, 2 Coil Reset Condition

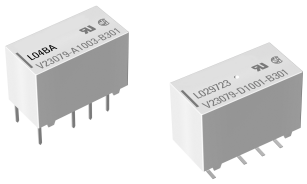


Dimensions are shown for reference purposes only.

Dimensions are in inches over (millimeters) unless otherwise specified.

Specifications and availability subject to change.

www.tycoelectronics.com
Technical support:
Refer to inside back cover.



V23079 (P2) series

5 Amp Switching, High Dielectric DPDT Polarized FCC Part 68 PC Board Relay

File E48393

File LR45064

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- Surface and through hole mounting types.
- Breakdown voltage between contacts and coil: 1,500Vrms.
- Surge withstand between contacts and coil: 2,500V (Bellcore).
- High capacity contact: 2A @ 30VDC.
- 2 Form C contact arrangement.
- Board space saving, vertical mount (14.6 x 7.2mm surface area).
- Immersion cleanable, plastic sealed case.
- Single and dual coil latching versions available.
- Basic insulation (coil-to-contact) according to EN 60950 / UL 1950.
- Ultrasonic cleaning is not recommended.

Contact Data @ 23°C

Arrangement: 2 Form C (DPDT) bifurcated contacts.
Material: Gold overlay on silver nickel.
Rating:
Max. Switching Voltage: 250VAC, 220VDC.
Max. Switching Current: 5A.
Max Carrying Current: 2A.
Max Switching Power: 60W, DC; 62.5VA, AC.
Min. Permissible Load: 100μV.
UL/CSA Rating: 1A @ 30VDC; 300mA @ 110VDC; 500mA @ 120VAC; 250mA @ 240VAC.
Expected Mechanical Life: Approx. 100 million ops.
Expected Electrical Life: 50 million ops. @ 10mA, 12V, 10 million ops. @ 100mA, 6V. 1 million ops. @ 1A, 30V, 500,000 ops. @ 500mA, 60V. 200,000 ops. @ 2A, 30V.
Initial Contact Resistance: 50 milliohms @ 10mA, 20mV.
Thermoelectric potential: <10μV.

High Frequency Data

Capacitance: **Between Open Contacts:** 2pF, max.
Between Coil and Contacts: 1.5pF, max.
Between Poles: 1pF, max.
RF Characteristics: **Isolation at 100 / 900 MHz:** -39.0 db / -20.7 db.
Insertion loss at 100 / 900 MHz: -0.02 db / -0.27 db.
V. S. W. R. at 100 / 900 MHz: 1.04 db / 1.40 db.

Initial Dielectric Strength

Between Open Contacts: 1,000Vrms for 1 minute. (1,500Vrms on request, consult factory for availability).
Between Coil and Contacts: 1,500Vrms for 1 minute. (single coil relay).
Between Poles: 1,000Vrms for 1 minute.
Surge Voltage Resistance per Bellcore TR-NWT-001089 (2 / 10 μs):
Between Open Contacts: 2,000V.
Between Coil and Contacts: 2,500V (single coil relay).
Between Poles: 2,500V.
Surge Voltage Resistance per FCC 68 (10 / 160 μs):
Between Open Contacts: 1,500V.
Between Coil and Contacts: 1,500V (single coil relay).
Between Poles: 1,500V.

Initial Insulation Resistance

Between Mutually Insulated Conductors: 10^9 ohms @ 500VDC.

Coil Data @ 23°C

Voltage: 3-24V.
Nominal Power: 70mW-140mW, dependent on model. See chart below.

Nominal Voltage (VDC)	Operating Range @ 23°C		@ 85°C	Coil Resistance @ 23°C
	Must Operate Voltage (VDC)	Max. Voltage (VDC)	Max. Voltage (VDC)	
Non-Latching, 140mW Nominal Power				
3	2.25	6.5	3.4	64.3 ± 6
4.5	3.375	9.8	5.1	145 ± 15
5	3.75	10.9	5.7	178 ± 18
6	4.50	13.0	6.8	257 ± 26
9	6.75	19.6	10.3	578 ± 58
12	9.0	26.1	13.8	1,029 ± 103
24	18.0	52.3	27.7	4,114 ± 411
Single Coil Latching, 70mW Nominal Power				
3	2.25	9.2	4.8	128 ± 13
4.5	3.375	13.8	7.3	289 ± 29
5	3.75	15.3	8.1	357 ± 36
6	4.5	18.5	9.8	514 ± 51
9	6.75	27.7	14.6	1,157 ± 116
12	9.0	37.0	19.6	2,057 ± 206
24	18.0	74.0	39.2	8,228 ± 823
Dual Coil Latching, 140mW Nominal Power				
3	2.25	6.5	–	64.3 ± 6
4.5	3.375	9.8	–	145 ± 15
5	3.75	10.9	–	178 ± 18
6	4.5	13.0	–	257 ± 26
9	6.75	19.6	–	578 ± 58
12	9.0	26.1	–	1,029 ± 103
24	18.0	52.3	–	4,114 ± 411

Operate Data @ 23°C

Must Operate Voltage: 75% of nominal or less.
Must Release Voltage: 10% of nominal or more.
Operate Time (at nominal voltage)**:** 3 ms, typ.; 5 ms, max.
Reset Time (at nominal voltage)**:** 3 ms, typ.; 5 ms, max.
Release Time (non-latching w/o diode in parallel)**:** 2 ms, typ.; 4 ms, max.
Release Time (non-latching with diode in parallel)**:** 4 ms, typ.; 6 ms, max.
Bounce Time (at contact close)**:** 1 ms, typ.; 3 ms, max.
Maximum Switching Rate (no load)**:** 50 operations/s.

Environmental Data

Temperature Range: -40°C to +85°C.
Maximum Allowable Coil Temperature: 110°C.
Thermal Resistance: < 165K/W.
Shock, half sinus, 11 ms: Functional: 50g.
Shock, half sinus, 11 ms: Destructive: 150g.
Vibration, 10-1,000 Hz.: Functional: 35g.
Needle Flame Test: Application time 20s, burning time <15s.
Resistance to Soldering Heat: 260°C for 10s.

Mechanical Data

Termination: Through hole or surface mount printed circuit terminals.
Mounting Position: Any.
Enclosure: Immersion cleanable (IP67) plastic case.
Weight: .084 oz. (2.5g) approximately.

Ordering Information

Typical Part Number ▶	V23079	A10	01	B301

1. Basic Series:
V23079 = P2 Miniature, printed circuit board relay.

2. Termination:

	Non-Latching Normal Ht.	Non-Latching Reduced Ht.	Dual Coil Latching	Single Coil Latching
Through-Hole	**A10**	**A20**(1)	**B12**	**C11**
SMT Extended Terminal	**D10**	**D20**(1)	**E12**	**F11**
SMT Short Terminal	**G10**	**G20**(1)	**H12**	**J11**

3. Coil Voltage:
08 = 3VDC 11 = 4.5VDC 01 = 5VDC 02 = 6VDC 06 = 9VDC 03 = 12VDC 05 = 24VDC(2)

4. Contact Type:
B301 = Bifurcated, 2 Form C (DPDT), Silver Nickel.

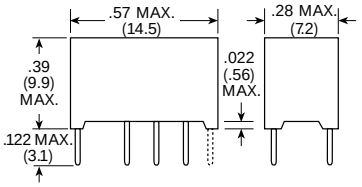
(1) Reduced mounting height of 10.0 mm, as opposed to 10.4 mm (SMT) or 9.6 mm as opposed to 9.9 (through-hole). Non-latching only, not available with 24V coil.
(2) Not available with Termination A20, D20 or G20.

Our authorized distributors are more likely to stock the following items for immediate delivery.

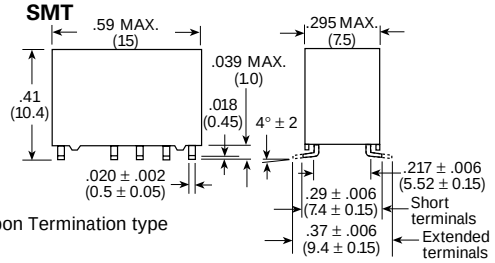
V23079A1001B301	V23079A1011B301	V23079A2011B301	V23079D1005B301	V23079D2003B301
V23079A1003B301	V23079A2001B301	V23079D1001B301	V23079D1011B301	V23079D2011B301
V23079A1005B301	V23079A2003B301	V23079D1003B301	V23079D2001B301	

Outline Dimensions

THT



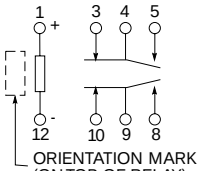
SMT



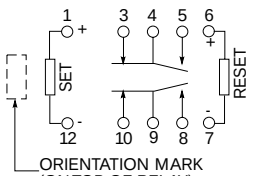
Note: Mounting height varies dependent upon Termination type selected in step 2 of Ordering Information

Wiring Diagrams (Bottom Views)

Single Coil Latching* and Single Coil Non-latching**



Dual Coil Latching***



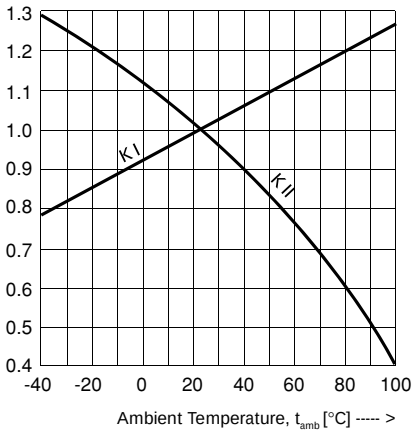
Note: All diagrams shown in de-energized or reset position.
***Note:** For non-latching versions, coil polarity must be observed.
****Note:** For single coil latching versions, polarity shown results in "set" condition. Reverse polarity results in "reset" condition.
*****Note:** The contact position illustrated shows the reset condition. If a positve potential is applied to terminal 1 or 7, the relay adopts the set position.

Coil Limits

U_I = Minimum voltage at 23° C after pre-energizing with nominal voltage without contact current
U_{II} = Maximum continous voltage at 23°

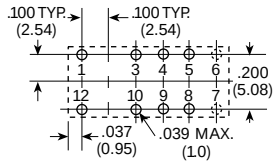
The operating voltage limits U_I and U_{II} depend on the temperature according to the formula:

$U_{I\,amb} = K_I \cdot U_{I\,23°C}$
and
$U_{II\,amb} = K_{II} \cdot U_{II\,23°C}$
t_{amb} = Ambient temperature
$U_{I\,amb}$ = Minimum voltage at ambient temperature, t_{amb}
$U_{II\,amb}$ = Maximum voltage at ambient temperature, t_{amb}
k_I, k_{II} = Factors (dependent on temperature), see diagram

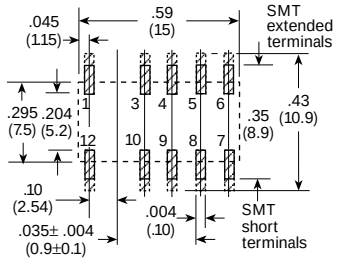


PC Board Layout (Bottom View)

THT



SMT (Solder Pad)

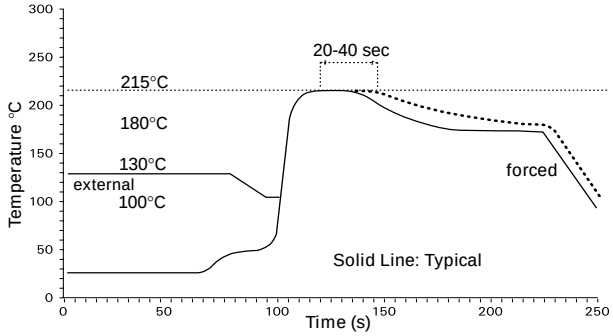


Packaging Information

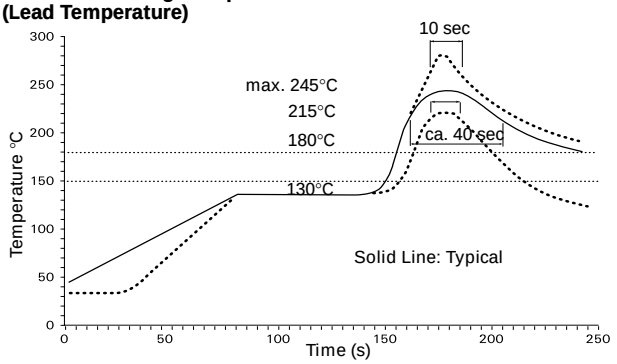
THT P2 relays are shipped in tubes of 50. There are 2,000 relays in a carton. SMT P2 relays with long terminals are shipped in reels of 400, with 2,000 relays in a carton. SMT P2 relays with short terminals are shipped in reels of 500. There are 2,500 relays in a full carton.

Recommended Soldering Conditions (according to CECC 00802)

Vapor Phase Soldering: Temperature/Time Profile (Lead Temperature)



Infrared Soldering: Temperature/Time Profile (Lead Temperature)



Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.
www.tycoelectronics.com
Technical support:
Refer to inside back cover.



FT2/FU2 series

DPDT Slim Package
Telecom/Signal PC Board Relays

File E111441
File 176679-1079886
16504-002

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- Through hole PC board terminals.
- High-dielectric (>5,000 V contact-to-coil surge) version available.
- Meets Bellcore GR 1089 and FCC Part 68 and ITU-T K20.
- For applications in telecommunications, office automation, consumer electronics, medical equipment, measurement and control equipment.
- Immersion cleanable, plastic sealed case.
- Standard or sensitive coils for 3 - 48 VDC.
- Ultrasonic cleaning not recommended.

Contact Data @ 23°C (except as noted)

Arrangement: 2 Form C (DPDT) bifurcated contacts.
Material: Stationary: Silver-nickel, gold-covered or palladium-ruthenium, gold-covered.

Contact Ratings:	**Silver-nickel**	**Palladium-ruthenium**
Max. Switched Current:	2A	2A.
Max. Carry Current: (at max ambient temp.)	1.25A	2A
Max. Switched Voltage:	125VDC, 250VAC	220VDC, 250VAC.
Max. Switched Power:	30W DC, 62.5VA AC	60W DC, 62.5VA AC.

UL/CSA Contact Ratings: 1.25A @ 125VDC; 1.25A @ 125VAC.
Initial Contact Resistance: <70 milliohms @ 10mA / 20mV.
Expected Mechanical Life: 100 million operations.
Expected Electrical Life: 2.5 million operations @ 10mA / 12VDC.
2 million operations @ cable load open end.
100,000 operations @ 250mA / 125VDC, res.
100,000 operations @ 250mA / 250VDC, res.
100,000 operations @ 1.25A / 24VDC, res.
Thermoelectric potential: <10μV.

High Frequency Data

Capacitance: **Between Open Contacts:** 1pF, max.
Between Coil and Contacts: 4pF, max.
Between Poles: 1pF, max.
RF Characteristics: **Isolation at 100 / 900 MHz:** -30.6 db / -13.7 db.
Insertion loss at 100 / 900 MHz: -0.02 db / -0.50 db.
V. S. W. R. at 100 / 900 MHz: 1.02 db / 1.27 db.

Initial Dielectric Strength

Standard Model
Between Open Contacts: 1,500Vrms for 1 minute.
Between Coil and Contacts: 1,500Vrms for 1 minute.
Between Poles: 1,500Vrms for 1 minute.
Surge Voltage Resistance per Bellcore TR-NWT-001089 (2 / 10 μs) and FCC 68 (10 / 160 μs):
Between Open Contacts: 2,500V.
Between Coil and Contacts: 1,500V.
Between Poles: 1,500V.

High-Dielectric Model
Between Open Contacts: 3,500Vrms for 1 minute.
Between Coil and Contacts: 1,800Vrms for 1 minute.
Between Poles: 1,800Vrms for 1 minute.
Surge Voltage Resistance per Bellcore TR-NWT-001089 (2 / 10 μs) and FCC 68 (10 / 160 μs):
Between Open Contacts: 5,000V.
Between Coil and Contacts: 2,500V.
Between Poles: 2,500V.

Initial Insulation Resistance

Between Contact and Coil: 10^9 ohms or more @ 500VDC.

Coil Data @ 23°C

Voltage: 3 to 48VDC.
Nominal Power: 200-300mW, depending on model. See coil data tables.
Duty Cycle: Continuous.

Coil Data @ 23°C

Nom. Voltage (VDC)	Operate/Set Range Min. Voltage (VDC)	Operate/Set Range Max. Voltage (VDC)	Minimum Release Voltage (VDC)	Nom. Power (mW)	Resistance ±10% (Ohms)	Coil & Sensitivity Code
Sensitive versions						
3	2.25	4.2	0.3	200	45	21
4	3.0	5.7	0.4	200	114	29
4.5	3.38	6.4	0.45	200	101	22
5	3.75	7.1	0.5	200	125	23
6	4.5	8.5	0.6	200	180	24
9	6.75	12.7	0.9	200	405	25
12	9.0	17.0	1.2	200	720	26
24	18.0	33.9	2.4	240	2,400	27
48	36.0	67.9	4.8	240	9,600	28
Standard versions						
3	2.25	5.2	0.3	300	30	01
4.5	3.38	7.8	0.45	300	68	02
5	3.75	8.7	0.5	300	83	03
6	4.5	10.4	0.6	300	120	04
9	6.75	15.6	0.9	300	270	05
12	9.0	20.8	1.2	300	480	06
24	18.0	40.8	2.4	300	1,920	07
48	36.0	81.6	4.8	300	768	08
High dielectric versions						
3	2.25	4.2	0.3	200	45	91
5	3.75	7.1	0.5	200	125	93
12	9.0	17.0	1.2	200	720	96
24	18.0	33.9	2.4	240	2,400	97

Part Number Structure

D3 ☐☐☐☐
- Nil THT
- W long terminals
- N short terminals

Coil voltage: 1 = 3 V, 2 = 4.5 V, 3 = 5 V, 4 = 6 V, 5 = 7 V, 6 = 12 V, 7 = 24 V, 8 = 48 V, 9 = 4 V

Sensitivity:
- 0 = 300 mW - Standard Dielectric
- 2 = 200 / 240 mW - Standard Dielectric
- 9 = 200 / 240 mW - High Dielectric Version

Terminal Shape: 4 = THT, 5 = SMT

Operate Data @ 23°C

Operate and Release Voltage: See values in chart above.
Operate Time (at nominal voltage)**:** 3 ms, typ.; 5 ms, max.
Release Time (w/o diode in parallel)**:** 2 ms, typ.; 5 ms, max.
Release Time (with diode in parallel)**:** 4 ms, typ.; 5 ms, max.
Bounce Time (at contact close)**:** 1 ms, typ.; 5 ms, max.
Maximum Switching Rate (no load)**:** 50 operations/s.

Environmental Data

Temperature Range: -55°C to +85°C.
Maximum Allowable Coil Temperature: 125°C.
Thermal Resistance: < 165K/W.
Shock, half sinus, 11 ms: Functional: 15g.
Shock, half sinus, 11 ms: Destructive: 500g.
Vibration, 10-500 Hz.: Functional: 10g.
Needle Flame Test: Application Time 20s.
Resistance to Soldering: 260°C for 10s.

Mechanical Data

Termination: Through-hole printed circuit terminals.
Mounting Position: Any.
Enclosure Type: Immersion cleanable (IP67) plastic case.
Weight: 0.12 oz. (3g) approximately.

U_I = Minimum voltage at 23° C after pre-energizing with nominal voltage without contact current

U_{II} = Maximum continous voltage at 23°

The operating voltage limits U_I and U_{II} depend on the temperature according to the formula:

$U_{I\,tamb} = K_I \cdot U_{I\,23°\,C}$

and

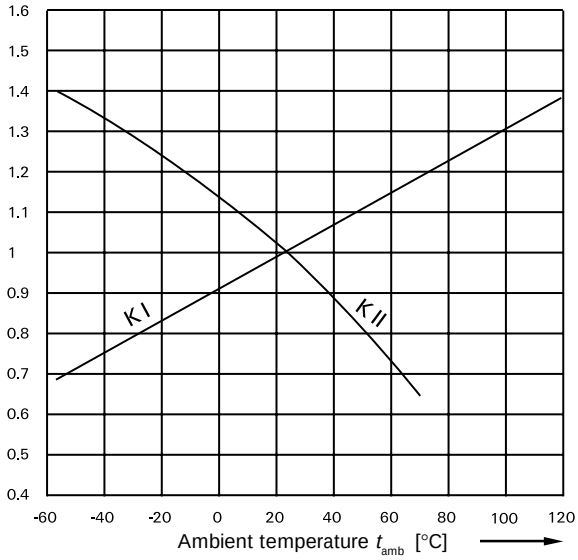
$U_{II\,tamb} = K_{II} \cdot U_{II\,23°\,C}$

t_{amb} = Ambient temperature

$U_{I\,tamb}$ = Minimum voltage at ambient temperature, t_{amb}

$U_{II\,tamb}$ = Maximum voltage at ambient temperature, t_{amb}

k_I, k_{II} = Factors (dependent on temperature), see diagram



Ordering Information

See "Part Number Structure" chart on previous page for available part numbers in the FT2/FU2 series.

Packaging Information

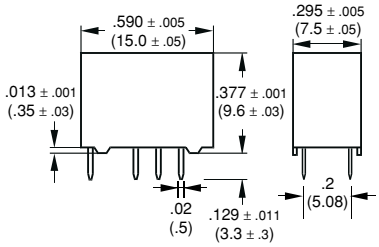
FT2 relays are shipped in tubes of 50. There are 1,000 relays in a carton. FU2 relays with long terminals are shipped in reels of 400, with 2,000 relays in a carton. FU2 relays with short terminals are shipped in reels of 500. There are 2,500 relays in a full carton.

Our authorized distributors are more likely to stock the following items for immediate delivery.

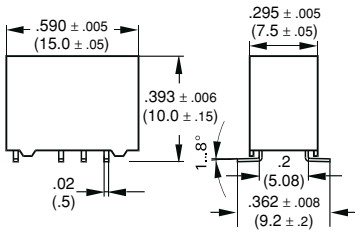
None at present.

Outline Dimensions

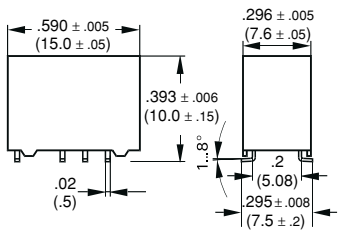
THT Version



SMT Version w/ Long Terminala

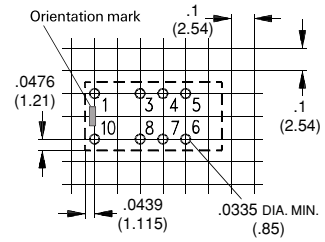


SMT Version w/ Short Terminals



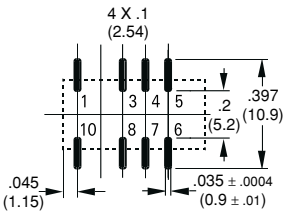
PC Board Layout (Bottom View)

THT Version

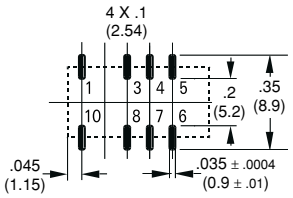


Solder Pad Layout (Bottom Views)

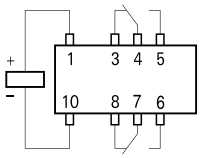
SMT Version w/ Long Terminals



SMT Version w/ Short Terminals

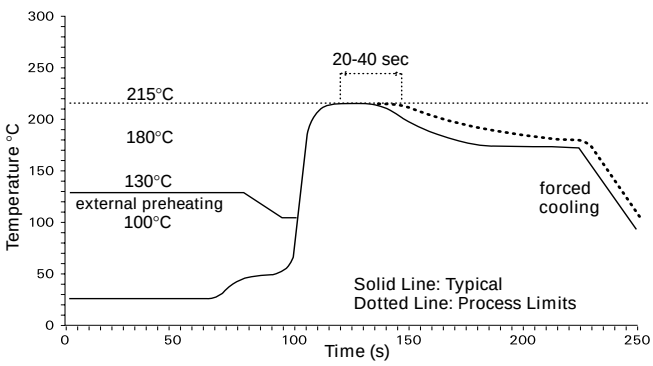


Wiring Diagram (Bottom View)

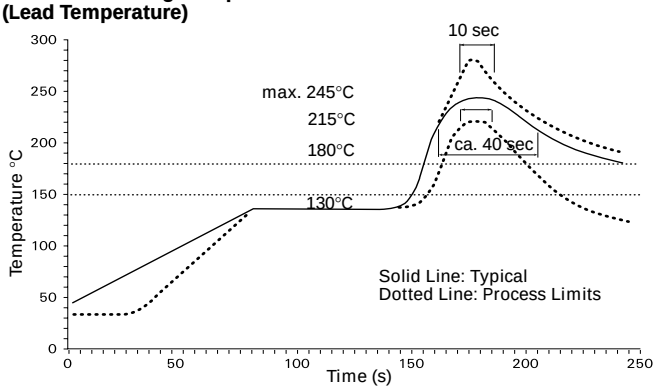


Recommended Soldering Conditions (according to CECC 00802)

Vapor Phase Soldering: Temperature/Time Profile (Lead Temperature)



Infrared Soldering: Temperature/Time Profile (Lead Temperature)



Dimensions are shown for reference purposes only.

Dimensions are in inches over (millimeters) unless otherwise specified.

Specifications and availability subject to change.

www.tycoelectronics.com
Technical support:
Refer to inside back cover.



FX2 series

DPDT Slim Package
Telecom/Signal PC Board Relays

File E111441
File 176679-1079886
16504-002

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- Through hole PC board terminals.
- Meets Bellcore GR 1089 and FCC Part 68.
- For applications in telecommunications, office automation, consumer electronics, medical equipment, measurement and control equipment.
- Immersion cleanable, plastic sealed case.
- 80mW coil for high sensitivity models, 140mW coil for sensitive types.
- Ultrasonic cleaning not recommended.

Contact Data @ 23°C (except as noted)

Arrangement: 2 Form C (DPDT) bifurcated contacts.
Material: Stationary: Palladium-ruthenium.
Ratings: Max. Switched Current: 2A.
Max. Carry Current: 2A (at max ambient temperature.)
Max. Switched Voltage: 220VDC, 250VAC.
Max. Switched Power: 60W DC or 62.5VA AC.
UL/CSA Ratings: 300mA @ 110VDC; 1A @ 30VDC;
500mA @ 120VAC; 250mA @ 240VAC.
Initial Contact Resistance: <70 milliohms @ 10mA / 20mV.
Expected Mechanical Life: 100 million operations.
Expected Electrical Life: 2.5 million operations @ 10mA / 30mVDC.
2 million operations @ cable load open end.
500,000 operations @ 250mA / 125VDC.
500,000 operations @ 1.25A / 24VDC.
500,000 operations @ 2A / 30VDC.
Thermoelectric potential: <10µV.

High Frequency Data

Capacitance: **Between Open Contacts:** 2pF, max.
Between Coil and Contacts: 4pF, max.
Between Poles: 2pF, max.
RF Characteristics: **Isolation at 100 / 900 MHz:** -34.0 db / -15.1 db.
Insertion loss at 100 / 900 MHz: -0.03 db / -0.60 db.
V. S. W. R. at 100 / 900 MHz: 1.07 db / 1.45 db.

Initial Dielectric Strength

Between Open Contacts: 1,800Vrms for 1 minute.
Between Coil and Contacts: 1,800Vrms for 1 minute.
Between Poles: 1,800Vrms for 1 minute.
Surge Voltage Resistance per Bellcore GR1089 (2 / 10 µs) and FCC 68 (10 / 160 µs):
Between Open Contacts: 2,500V.
Between Coil and Contacts: 3,500V.
Between Poles: 2,500V.

Initial Insulation Resistance

Between Contact and Coil: 10^9 ohms or more @ 500VDC.

Coil Data @ 23°C

Voltage: 3 to 48VDC.
Nominal Power: 80-300mW, depending on model. See coil data tables.
Duty Cycle: Continuous.

Coil Data @ 23°C

Nom. Voltage (VDC)	Operate/Set Range		Minimum Release/Reset Voltage (VDC)	Nom. Power (mW)	Resistance ±10% (Ohms)	Part Number
	Min. Voltage (VDC)	Max. Voltage (VDC)				
Non-latching 1 coil versions						
3	2.1	6.8	0.3	140	64	D3206
4	2.8	7.6	0.4	140	114	D3207
4.5	3.15	10.3	0.45	140	145	D3204
5	3.5	11.4	0.5	140	178	D3209
6	4.2	13.7	0.6	140	257	D3205
9	6.3	20.4	0.9	140	574	D3210
12	8.4	27.3	1.2	140	1,028	D3202
24	16.8	45.7	2.4	200	2,880	D3212
48	33.6	67.5	4.8	300	7,680	D3213
Non-latching, sensitive 1 coil versions						
3	2.25	9.0	0.3	80	113	D3221
4.5	3.38	13.5	0.45	80	253	D3222
5	3.75	15.0	0.5	80	313	D3223
6	4.5	18.0	0.6	80	450	D3224
9	6.75	27.1	0.9	80	1,013	D3225
12	9.0	36.1	1.2	80	1,800	D3226
24	18.0	54.7	2.4	140	4,114	D3227
48	36.0	72.5	4.8	260	8,882	D3228
Latching 1 coil versions						
3	2.25	8.1	-2.25	100	90	D3241
4.5	3.375	12.1	-3.375	100	203	D3242
5	3.75	13.5	-3.75	100	250	D3243
6	4.5	16.2	-4.5	100	360	D3244
9	6.75	24.2	-6.75	100	810	D3245
12	9.0	29.0	-9.0	100	1,440	D3246
24	18.0	47.5	-18.0	150	3,840	D3247

Operate Data @ 23°C

Operate and Release Voltage: See values in chart above.
Operate Time (at nominal voltage)**:** 3 ms, typ.; 4 ms, max.
Reset Time [latching](at nominal voltage)**:** 3 ms, typ.; 4 ms, max.
Release Time [non-latching](w/o diode in parallel)**:** 1 ms, typ.; 3 ms, max.
Release Time [non-latching](with diode in parallel)**:** 3 ms, typ.; 4 ms, max.
Bounce Time (at contact close)**:** 1 ms, typ.; 5 ms, max.
Maximum Switching Rate (no load)**:** 50 operations/s.

Environmental Data

Temperature Range: -55°C to +85°C.
Maximum Allowable Coil Temperature: 110°C.
Thermal Resistance: < 185K/W.
Shock, half sinus, 11 ms: Functional: 50g.
Shock, half sinus, 11 ms: Destructive: 1,500g.
Vibration, 10-500 Hz.: Functional: 20g.
Needle Flame Test: Application Time 20s.
Resistance to Soldering: 260°C for 10s.

Mechanical Data

Termination: Through-hole printed circuit terminals.
Mounting Position: Any.
Enclosure Type: Immersion cleanable (IP67) plastic case.
Weight: 0.10 oz. (2.5g) approximately.

U_I = Minimum voltage at 23° C after pre-energizing with nominal voltage without contact current

U_{II} = Maximum continous voltage at 23°

The operating voltage limits U_I and U_{II} depend on the temperature according to the formula:

$U_{I\,tamb} = K_I \cdot U_{I\,23°C}$

and

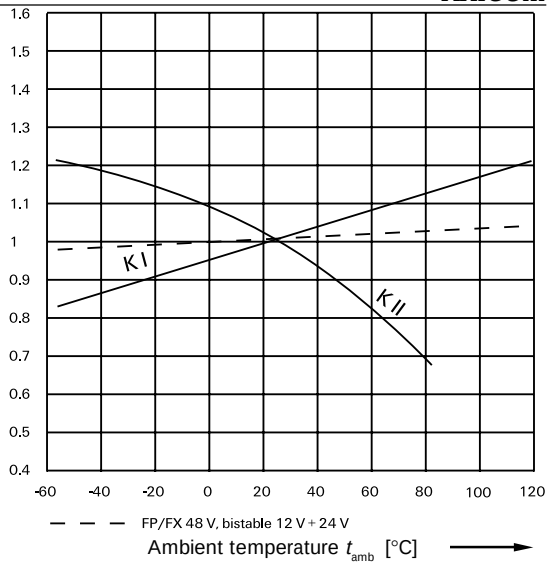
$U_{II\,tamb} = K_{II} \cdot U_{II\,23°C}$

t_{amb} = Ambient temperature

$U_{I\,tamb}$ = Minimum voltage at ambient temperature, t_{amb}

$U_{II\,tamb}$ = Maximum voltage at ambient temperature, t_{amb}

k_I, k_{II} = Factors (dependent on temperature), see diagram



Ordering Information

See "Part Number" column in Coil Data chart on previous page for available part numbers in the FX2 series.

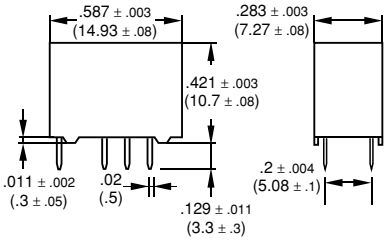
Packaging Information

FX2 series relays are shipped in tubes of 50. There are 1,000 relays in a full carton.

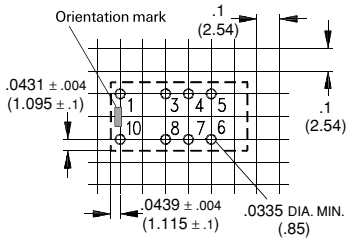
Our authorized distributors are more likely to stock the following items for immediate delivery.

None at present.

Outline Dimensions

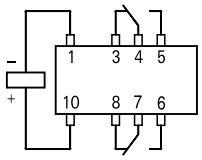


PC Board Layout (Bottom View)



Wiring Diagram (Bottom View)

Non-Latching and Latching, Release or Reset Condition



Dimensions are shown for reference purposes only.

Dimensions are in inches over (millimeters) unless otherwise specified.

Specifications and availability subject to change.



190 series

2 Amp, DPDT, High Sensitivity, DIP PC Board Relay

File E55708
File LR73303

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- Standard DIP configuration mates with 16-pin socket.
- Meets FCC Part 68 (10/160µs).
- For applications in telecommunications, office automation, security devices, measurement and control equipment.
- Immersion cleanable, plastic sealed case.
- Standard, high and ultra-sensitive coils.
- Ultrasonic cleaning not recommended.

Contact Data @ 23°C

Arrangement: Bifurcated 2 Form C (DPDT) contacts.
Material: Stationary: Silver, gold clad.
Ratings: Max. Switched Current: 2A.
Max. Carry Current: 2A.
Max. Switched Voltage (at nom. voltage): 125VDC, 125VAC.
Max. Switched Power: 60W DC or 62.5VA AC.
Min. Switching Load: 10µA, 10mVDC.
Rated Load: 500mA at 125VAC.
Initial Contact Resistance: 50 milliohms.
Expected Mechanical Life: 15,000,000 ops at 36,000 ops/hr.

Initial Dielectric Strength

Between Open Contacts: 750VAC 50/60 Hz. for 1 minute.
Between Coil and Contacts: 1,000VAC 50/60 Hz. for 1 minute.
Between Poles: 1,000VAC 50/60 Hz. for 1 minute.
Surge Voltage Resistance per FCC 68 (10 / 160 µs):
Between Open Contacts: 1,500V.
Between Coil and Contacts: 1,500V.
Between Poles: 1,500V.

Initial Insulation Resistance

Between Contact and Coil: 10^9 ohms or more @ 500VDC.

Coil Data @ 23°C

Voltage: 3 to 48VDC.
Nominal Power: 150mW to 580mW. See Coil Data table for details.
Duty Cycle: Continuous.

Coil Data @ 23°C

Nominal Voltage (VDC)	Current ±10% (mA)	Maximum Voltage (VDC)	Resistance ±10% (Ohms)	Approx. Power (mW)
Standard sensitivity (Max. Voltage stated @ 65°C, except 48V @ 60°C)				
3	166.7	3.6	18	500
5	100.0	6.0	50	500
6	83.3	7.2	72	500
9	55.6	10.8	162	500
12	41.7	14.4	288	500
24	20.8	28.8	1,152	500
48	12.0	52.8	4,000	580
High sensitivity (Max. Voltage stated @ 70°C)				
3	120.7	3.6	25	360
5	72.0	6.0	70	360
6	60.0	7.2	100	360
9	40.0	10.8	225	360
12	30.0	14.4	400	360
24	15.0	28.8	1,600	360
48	7.5	52.8	6,400	360
Ultra high sensitivity (Max. Voltage stated @ 70°C)				
3	50.0	4.5	60	150
5	30.0	7.5	167	150
6	25.0	9.0	240	150
9	16.7	13.5	540	150
12	12.5	18.0	960	150
24	8.3	36.0	2,880	200
48	6.25	72.0	7,680	300Ap

Operate Data @ 23°C

Operate Voltage: 75% of nominal voltage.
Release Voltage: 5% of nominal voltage.
Operate Time: 7 ms, max. (3.5 ms, mean).
Release Time: 3 ms, max. (0.8 ms, mean).
Bounce Time: Operate: 0.5 ms, approx.
Release: 3.5 ms, approx.
Operating Frequency: Mechanical: 36,000 ops/hr.
Electrical: 1,800 ops/hr at rated load.

Environmental Data

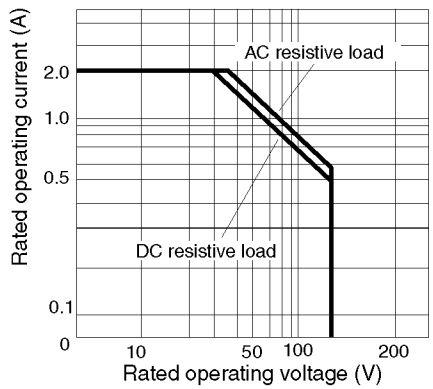
Temperature Range: -40°C to +70°C.
Relative Humidity Range: 35% to 85%.
Shock: Functional: 200m/s² (approx. 10g).
Destructive: 1,000m/s² (approx. 100g).
Vibration: 10-55 Hz., .059 in (1.5 mm) double amplitude.

Mechanical Data

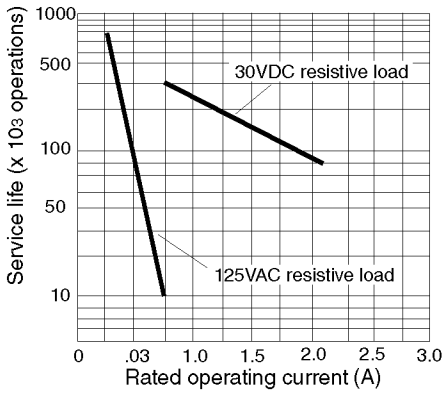
Termination: DIP compatible, printed circuit terminals.
Enclosure Type: Immersion cleanable plastic case.
Weight: 0.21 oz. (6g) approximately.

Operational Performance Curves

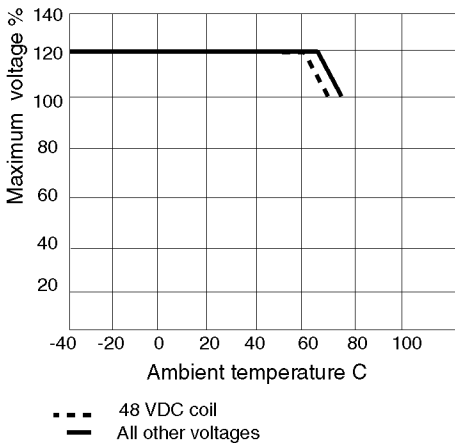
Maximum Switching Capacity



Electrical Service Life



Ambient Temp. vs. Max. Voltage



Ordering Information

Typical Part Number ➤	**190**	**- 2**	**2**	**B**	**2**	**UO**

1. Basic Series:
190 = Miniature PC board relay.

2. Enclosure and Terminals:
2= DIP, 16-pin package, sealed.

3. Contact Arrangement:
2= DPDT (2 form C).

4. Coil Voltage:

J = 3VDC	A= 6VDC	B = 12VDC	D = 48VDC
E= 5VDC	G= 9VDC	C = 24VDC	

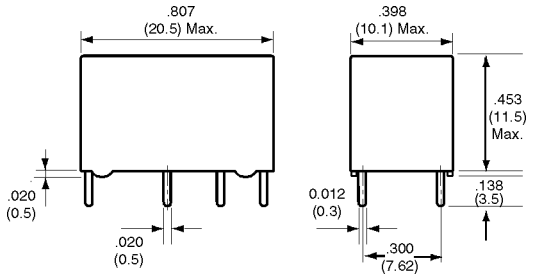
5. Contact Material and Type:
2= Silver, gold clad. Bifurcated crossbar.

6. Coil Sensitivity
UO = Standard sensitivity (Approx. 500-580mW). SO = High sensitivity. (Approx. 360mW) US = Ultra high sensitivity. (Approx. 150-200mW)

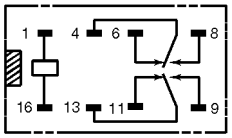
Our authorized distributors are more likely to stock the following items for immediate delivery.

190-22B2UO
190-22C2UO
190-22E2UO

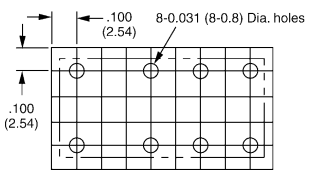
Outline Dimensions



Wiring Diagram (Bottom View)



PC Board Layout (Bottom View)



Dimensions are shown for reference purposes only.

Dimensions are in inches over (millimeters) unless otherwise specified.

Specifications and availability subject to change.

www.tycoelectronics.com
Technical support:
Refer to inside back cover.



V23105 series

3 Amp, DPDT, High Sensitivity, DIP PC Board Relay

File E48393
File LR45064-27

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- Standard DIP configuration mates with 16-pin socket.
- Meets FCC Part 68 (10/160µs).
- For applications in telecommunications, office automation, security devices, measurement and control equipment.
- Immersion cleanable, plastic sealed case.
- 150mW, 200mW, 400mW or 500mW coil.
- Ultrasonic cleaning not recommended.

Contact Data @ 23°C

Arrangement: 2 Form C (DPDT) single contacts.
Material: Stationary: Silver-nickel, gold overlaid.
Ratings: Max. Switched Current: 3A.
Max. Carry Current: 3A.
Max. Switched Voltage (at nom. voltage): 220VDC, 250VAC.
Max. Switched Power: 60W DC or 125VA AC.
Min. Switching Load: 10mVDC.
UL/CSA Ratings: 1A / 30VDC; 300mA / 100VDC;
1A / 125VAC (400 & 500mW coils only);
500mA / 125VAC (150 & 200mW coils only).
Initial Contact Resistance: 100 milliohms @ 10mA / 20mV.
Expected Mechanical Life: 15,000,000 ops.
Expected Electrical Life: 2 million operations @ 100mA / 6VDC.
500,000 operations @ 1.0A / 30VDC.
100,000 operations @ 2.0A / 30VDC for 400mW and 500mW versions only.
300,000 operations @ 500mA / 230VAC.
Thermoelectric potential: <15µV.

High Frequency Data

Capacitance: Between Open Contacts: 1pF, max.
Between Coil and Contacts: 2pF, max.
Between Poles: 1.5pF, max..
RF Characteristics: Isolation at 100 / 900 MHz: -39.0 db / -20.7 db.
Insertion loss at 100 / 900 MHz: -0.02 db / -0.27 db.
V. S. W. R. at 100 / 900 MHz: 1.04 db / 1.40 db.

Initial Dielectric Strength

Between Open Contacts: 750Vrms for 1 minute.
Between Coil and Contacts: 1,000Vrms for 1 minute.
Between Poles: 750Vrms for 1 minute.
Surge Voltage Resistance per FCC 68 (10 / 160 µs):
Between Open Contacts: 1,500V.
Between Coil and Contacts: 1,500V.
Between Poles: 1,500V.

Initial Insulation Resistance

Between Contact and Coil: 10^9 ohms or more @ 500VDC.

Coil Data @ 23°C

Voltage: 3 to 48VDC.
Nominal Power: See Coil Data table.
Duty Cycle: Continuous.

Coil Data @ 23°C

Nominal Voltage (VDC)	Minimum Voltage (VDC)	Maximum Voltage (VDC)	Resistance ±10% (Ohms)	Coil Version Voltage Code
150mW versions				
5	4.0	13.0	167	001
6	4.8	15.6	240	002
9	7.2	23.4	540	006
12	9.6	31.2	960	003
24	19.2	59.5	3,480	005
200mW versions				
3	2.1	6.7	45	308
5	3.5	11.2	125	301
6	4.2	13.5	180	302
9	6.3	20.3	405	306
12	8.4	27.0	720	303
24	16.8	54.1	2,880	305
48	33.6	108.3	11,520	307
400mW versions				
5	3.5	7.9	62	401
6	4.2	9.5	90	402
9	6.3	14.3	203	406
12	8.4	19.1	360	403
24	16.8	37.9	1,440	405
48	33.6	75.8	5,760	407
500mW versions				
5	3.5	6.3	36	501
6	4.2	8.9	70	502
9	6.3	12.5	140	506
10	7.0	15.0	200	504
12	8.4	18.0	280	503
24	16.8	36.0	1,050	505
48	33.6	72.0	4,000	507

Operate Data @ 23°C

Operate Voltage: 70% of nominal voltage (80% for 150mW coil).
Release Voltage: 5% of nominal voltage.
Operate Time (Including Bounce): <10 ms.
Release Time (Including Bounce): <10 ms.

Environmental Data

Temperature Range: 150/200mW coil: -25°C to +85°C.
400mW coil: -25°C to +75°C.
500mW coil: -25°C to +60°C.
Maximum Allowable Coil Temperature: 105°C.
Thermal Resistance: < 100K/W.
Shock: Functional: 10g.
Destructive: 40g.
Vibration, 10-55 Hz.: Functional: 10g.
Needle Flame Test: Application time 20s, burning time <15s.
Resistance to Soldering Heat: 260°C for 10S..

Mechanical Data

Termination: DIP compatible, printed circuit terminals.
Enclosure Type: Immersion cleanable (IP67) plastic case.
Weight: 0.21 oz. (6g) approximately.

Ordering Information

Typical Part Number ►	V23105-A5	4	01	A201

1. Basic Series:
V23105-A5 = Miniature PC board relay.

2. Version:
0 = 150mW coil.
3 = 200mW coil.
4 = 400mW coil.
5 = 500mW coil.

3. Coil Voltage:

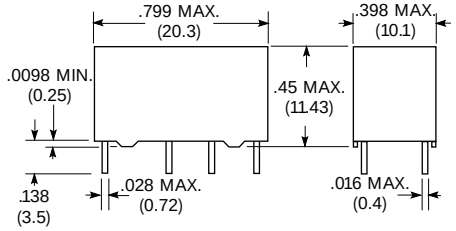
08 = 3VDC (150mW and 200mW coils only)	06 = 9VDC	05 = 24VDC
01 = 5VDC	04 = 10VDC (500mW coil only)	07 = 48VDC (not available with 150mW coil)
02 = 6VDC	03 = 12VDC	

4. Contact Type and Material:
A201 = DPDT, silver-nickel, gold overlaid.

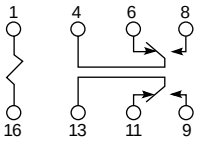
Our authorized distributors are more likely to stock the following items for immediate delivery.

V23105A5001A201	V23105A5401A201
V23105A5003A201	V23105A5403A201
V23105A5005A201	V23105A5405A201
	V23105A5407A201

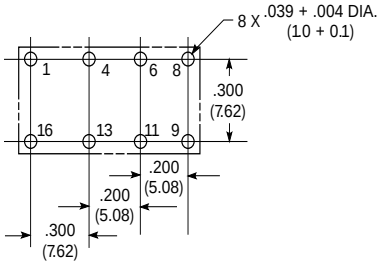
Outline Dimensions



Wiring Diagram (Bottom View)



PC Board Layout (Bottom View)



Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.
www.tycoelectronics.com
Technical support:
Refer to inside back cover.

MT2 series

DPDT Telecom/Signal PC Board Relays



File E111441
File 176679-1079886
16502-001

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- Through hole type terminals.
- Meets FCC Part 68 and ITU-T K20.
- For applications in telecommunications, office automation, consumer electronics, medical equipment, measurement and control equipment.
- Immersion cleanable, plastic sealed case.
- 150mW, 200mW, 300mW, 400mW or 550mW coil.
- Ultrasonic cleaning not recommended.

Contact Data @ 23°C (except as noted)

Arrangement: 2 Form C (DPDT) bifurcatedcontacts.
Material: Stationary: Silver-nickel, gold covered.
Ratings: Max. Switched Current: 2A.
Max. Carry Current: 1.25A (at max ambient temperature.
Max. Switched Voltage: 150VDC, 150VAC.
Max. Switched Power: 30W DC or 62.5VA AC.
UL/CSA Ratings: 400mA @ 125VAC; 1.25A @ 24VDC.
Initial Contact Resistance: <70 milliohms @ 10mA / 20mV.
Expected Mechanical Life: 100,000,000 ops.
Expected Electrical Life: 5 million operations @ 10mA / 30mVDC.
2.5 million operations @ cable load open end.
200,000 operations @ 1.25A / 24VDC, res.
200,000 operations @ 200mA / 150VDC, res.
Thermoelectric potential: <10µV.

High Frequency Data

Capacitance: Between Open Contacts: 2pF, max.
Between Coil and Contacts: 4pF, max.
Between Poles: 2pF, max..
RF Characteristics: Isolation at 100 / 900 MHz: -31.8 db / -14.2 db.
Insertion loss at 100 / 900 MHz: -0.02 db / -0.97 db.
V. S. W. R. at 100 / 900 MHz: 1.03 db / 1.31 db.

Initial Dielectric Strength

Between Open Contacts: 700Vrms for 1 minute.
Between Coil and Contacts: 1,050Vrms for 1 minute.
Between Poles: 700Vrms for 1 minute.
Surge Voltage: 1,500V surge per FCC Part 68 and IEC.

Initial Insulation Resistance

Between Contact and Coil: 10^9 ohms or more @ 500VDC.

Coil Data @ 23°C

Voltage: 4.5 to 48VDC.
Nominal Power: See Coil Data table.
Duty Cycle: Continuous.

Coil Data @ 23°C

Nominal Voltage (VDC)	Minimum Voltage (VDC)	Maximum Voltage (VDC)	Minimum Release Voltage (VDC)	Resistance ±10% (Ohms)	Part Number
150mW versions					
4.5	3.2	10.1	0.45	136	C 93406
5	3.6	11.3	0.50	168	C 93401
6	4.3	13.4	0.60	240	C 93427
9	6.4	20.3	0.90	544	C 93405
12	8.6	27.1	1.2	968	C 93402
24	174.1	54.1	2.4	3,872	C 93404
48	33.1	108.3	4.8	15,468	C 93404
200mW versions					
4.5	2.9	8.7	0.45	101	C 93415
5	3.3	9.7	0.5	125	C 93416
6	3.9	11.6	0.6	180	C 93428
9	5.9	17.5	0.9	405	C 93417
12	7.8	23.3	1.2	720	C 93418
24	15.6	46.7	2.4	2,880	C 93419
48	31.2	93.4	4.8	11,520	C 93420
300mW versions					
4.5	3.1	7.4	0.45	73	C 93433
5	3.4	8.2	0.5	90	C 93434
12	8.25	19.7	1.2	515	C 93412
24	16.5	39.5	2.4	2,060	C 93435
48	32.5	79.0	4.8	8,240	C 93436
400mW versions					
4.5	2.9	6.1	0.45	50	C 93421
5	3.3	6.9	0.5	63	C 93422
6	3.9	8.2	0.6	90	C 93429
9	5.9	12.4	0.9	203	C 93423
12	7.8	16.5	1.2	360	C 93424
24	15.6	33.0	2.4	1,440	C 93425
48	31.2	66.0	4.8	5,760	C 93426
550mW versions					
4.5	2.9	6.0	0.45	36	C 93438
5	3.3	6.8	0.5	45	C 93450
6	3.9	8.1	0.6	66	C 93437
12	7.8	16.7	1.2	280	C 93432
24	15.6	32.4	2.4	1,050	C 93431
48	31.2	64.1	4.8	4,100	C 93430

Operate Data @ 23°C

Operate and Release Voltage: See values in chart above.
Operate Time (at nominal voltage): 4 ms, typ.; 5 ms, max.
Release Time (without diode in parallel): 1 ms, typ.; 3 ms, max.
Release Time (with diode in parallel): 4 ms, typ.; 6 ms, max.
Bounce Time (at contact close): 1 ms, typ.; 5 ms, max.
Maximum Switching Rate (no load): 50 operations/s.

Environmental Data

Temperature Range: -55°C to +85°C.
Maximum Allowable Coil Temperature: 125°C.
Thermal Resistance: < 125K/W.
Shock, half sinus, 11 ms: Functional: 50g.
Destructive: 100g.
Vibration, 10-500 Hz.: Functional: 10g.
Needle Flame Test: Application Time 10s.
Resistance to Soldering: 260°C for 10s.

Mechanical Data

Termination: DIP compatible, printed circuit terminals.
Mounting Position: Any.
Enclosure Type: Immersion cleanable (IP67) plastic case.
Weight: 0.18 oz. (5g) approximately.

U_I = Minimum voltage at 23° C after pre-energizing with nominal voltage without contact current

U_{II} = Maximum continous voltage at 23°

The operating voltage limits U_I and U_{II} depend on the temperature according to the formula:

$U_{I\ tamb} = K_I \cdot U_{I\ 23° C}$

and

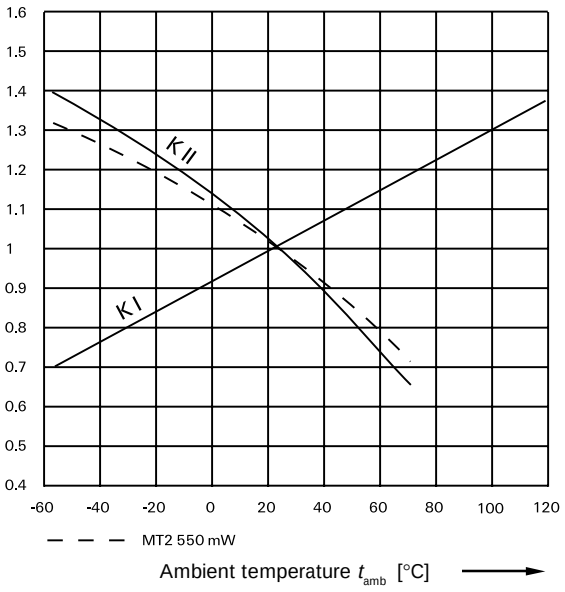
$U_{II\ tamb} = K_{II} \cdot U_{II\ 23° C}$

t_{amb} = Ambient temperature

$U_{I\ tamb}$ = Minimum voltage at ambient temperature, t_{amb}

$U_{II\ tamb}$ = Maximum voltage at ambient temperature, t_{amb}

k_I, k_{II} = Factors (dependent on temperature), see diagram



Ordering Information

See "Part Number" column in Coil Data chart on previous page for available part numbers in the MT2 series.

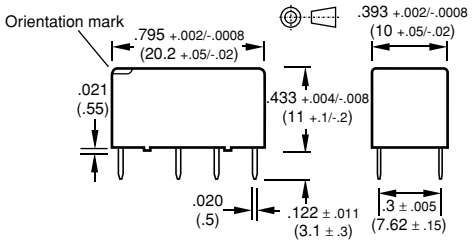
Packaging Information

MT2 series relays are shipped in tubes of 25. There are 500 relays in a full carton.

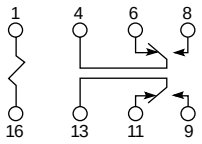
Our authorized distributors are more likely to stock the following items for immediate delivery.

None at present.

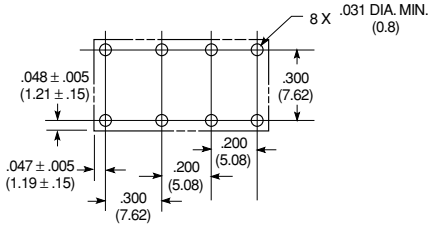
Outline Dimensions



Wiring Diagram (Bottom View)



PC Board Layout (Bottom View)



Dimensions are shown for reference purposes only.

Dimensions are in inches over (millimeters) unless otherwise specified.

Specifications and availability subject to change.

www.tycoelectronics.com
Technical support:
Refer to inside back cover.



MT4 series

4PDT Telecom/Signal PC Board Relays

File E111441
File 176679-1079886
16501-001

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- Through hole type terminals.
- Meets Bellcore GR 1089, FCC Part 68 and ITU-T K20.
- For applications in telecommunications, office automation, consumer electronics, medical equipment, measurement and control equipment.
- Immersion cleanable, plastic sealed case.
- 300mW coil.
- Ultrasonic cleaning not recommended.

Contact Data @ 23°C (except as noted)

Arrangement: 4 Form C (DPDT) bifurcatedcontacts.
Material: Stationary: Silver-nickel, gold covered.
Ratings: Max. Switched Current: 1.25A.
Max. Carry Current: 1.25A (at max ambient temperature.
Max. Switched Voltage: 150VDC, 150VAC.
Max. Switched Power: 30W DC or 62.5VA AC.
UL/CSA Ratings: 400mA @ 125VAC; 1.25A @ 24VDC.
Initial Contact Resistance: <70 milliohms @ 10mA / 20mV.
Expected Mechanical Life: 100,000,000 ops.
Expected Electrical Life: 10 million operations @ 10mA / 30mVDC.
5 million operations @ cable load open end.
200,000 operations @ 1.25A / 24VDC, res.
200,000 operations @ 200mA / 150VDC, res.
Thermoelectric potential: <10µV.

High Frequency Data

Capacitance: Between Open Contacts: 2pF, max.
Between Coil and Contacts: 4pF, max.
Between Poles: 2pF, max.
RF Characteristics: Isolation at 100 / 900 MHz: -31.2 db / -17.2 db.
Insertion loss at 100 / 900 MHz: -0.05 db / -0.91 db.
V. S. W. R. at 100 / 900 MHz: 1.03 db / 1.31 db.

Initial Dielectric Strength

Between Open Contacts: 700Vrms for 1 minute.
Between Coil and Contacts: 1,800Vrms for 1 minute.
Between Poles: 700Vrms for 1 minute.
Surge Voltage Resistance per Bellcore TR-NWT-001089 (2 / 10 µs), FCC 68 (10 / 160 µs) and IEC (10 / 700 µs):
Between Open Contacts: 1,500V.
Between Coil and Contacts: 2,500V.
Between Poles: 1,500V.

Initial Insulation Resistance

Between Contact and Coil: 10^9 ohms or more @ 500VDC.

Coil Data @ 23°C

Voltage: 4.5 to 48VDC.
Nominal Power: See Coil Data table.
Duty Cycle: Continuous.

Coil Data @ 23°C

Nominal Voltage (VDC)	Minimum Voltage (VDC)	Maximum Voltage (VDC)	Minimum Release Voltage (VDC)	Resistance ±10% (Ohms)	Part Number
300mW versions					
4.5	3.2	7.8	0.45	67	C 93807
5	3.6	8.65	0.5	83	C 93801
9	6.4	15.6	0.9	270	C 93805
12	8.6	20.8	1.2	480	C 93802
24	17.1	41.6	2.4	1,920	C 93803
48	34.1	83.2	4.8	7,680	C 93804

Operate Data @ 23°C

Operate and Release Voltage: See values in chart above.
Operate Time (at nominal voltage): 4 ms, typ.; 6 ms, max.
Release Time (without diode in parallel): 1 ms, typ.; 3 ms, max.
Release Time (with diode in parallel): 4 ms, typ.; 6 ms, max.
Bounce Time (at contact close): 1 ms, typ.; 5 ms, max.
Maximum Switching Rate (no load): 50 operations/s.

Environmental Data

Temperature Range: -55°C to +85°C.
Maximum Allowable Coil Temperature: 100°C.
Thermal Resistance: < 105K/W.
Shock, half sinus, 11 ms: Functional: 10g.
Destructive: 100g.
Vibration, 10-500 Hz.: Functional: 10g.
Needle Flame Test: Application Time 10s.
Resistance to Soldering: 260°C for 10s.

Mechanical Data

Termination: DIP compatible, printed circuit terminals.
Mounting Position: Any.
Enclosure Type: Immersion cleanable (IP67) plastic case.
Weight: 0.25 oz. (7g) approximately.

U_I = Minimum voltage at 23° C after pre-energizing with nominal voltage without contact current

U_{II} = Maximum continous voltage at 23°

The operating voltage limits U_I and U_{II} depend on the temperature according to the formula:

$U_{I\ tamb} = K_I \cdot U_{I\ 23°\ C}$

and

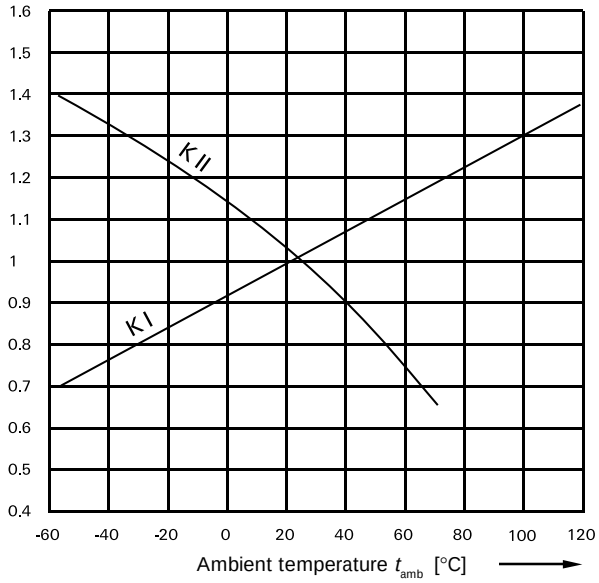
$U_{II\ tamb} = K_{II} \cdot U_{II\ 23°\ C}$

t_{amb} = Ambient temperature

$U_{I\ tamb}$ = Minimum voltage at ambient temperature, t_{amb}

$U_{II\ tamb}$ = Maximum voltage at ambient temperature, t_{amb}

k_I, k_{II} = Factors (dependent on temperature), see diagram



Ordering Information

See "Part Number" column in Coil Data chart on previous page for available part numbers in the MT4 series.

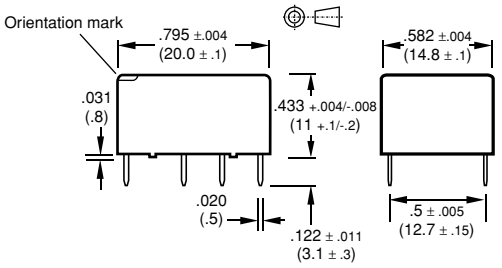
Packaging Information

MT4 series relays are shipped in tubes of 25. There are 500 relays in a full carton.

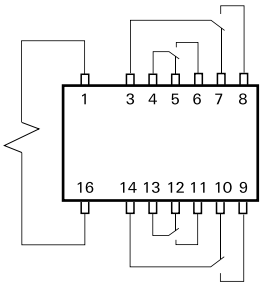
Our authorized distributors are more likely to stock the following items for immediate delivery.

None at present.

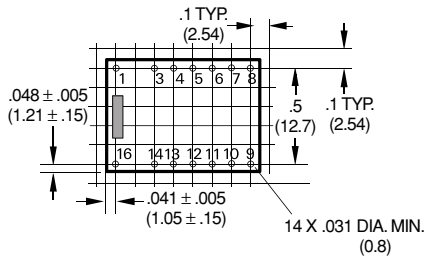
Outline Dimensions



Wiring Diagram (Bottom View)



PC Board Layout (Bottom View)



Dimensions are shown for reference purposes only.

Dimensions are in inches over (millimeters) unless otherwise specified.

Specifications and availability subject to change.

www.tycoelectronics.com
Technical support:
Refer to inside back cover.

Alphanumeric Index

Series	Type	Page
0409 (Hi-Inrush)	10A, One-pole Relay	488
0410	16A, One-pole Relay	491
0429 (Hi-Inrush)	10A, One-pole Relay	457
0430	10-16A, One- or Two-pole Relay	495
600	3-15A, One-pole Relay	497
Card E (V23057)	8A, One-pole Relay	480
IF (V23077)	16A, One-pole Relay	489
OJ/OJE	3-10A, One-pole Relay	422
OMI/OMIH	16A, One-pole Relay	458
OMI 2	5A, Two-pole Relay	460
OMIF	20A, One-pole Relay	466
OMIT	10A, One-pole Relay	464
ORWH	10A, One-pole Relay	438
OSA	3-5A, Two-pole Relay	470
OSZ	16A, One-pole Relay	472
OUDH	10A, One-pole Relay	432
OZ/OZF	16A, One-pole Relay	462
PB	10A, One-pole Relay	426
PCD/PCDF	15A, One-pole Relay	424
PCE	10A, One-pole Relay	436
PCG	5A, Two-pole Relay	493
PCH	5-10A, One-pole Relay	418
PCI	3A, Two-pole Relay	468
PCJ	5A, One-pole Relay	416
PCK	16A, One-pole Relay	478
PCN	3A, One-pole Relay	407
PE	5A, One-pole Relay	403
RE	6A, One-pole Relay	405
RP II/1	8-16A, One-pole Relay	484
RP II/2	8A, Two-pole Relay	482
RP3SL (Hi-Inrush)	16A, One-pole Relay	486
RT - AC Coil	8-16A, One- or two-pole Relay	448
RT - DC Coil	8-16A, One- or two-pole Relay	446
RT - Sensitive	10A, One-pole Relay	451
RT - Hi-Inrush	16A, One-pole Relay	455
RT - Hi-Temp	10-16A, One-pole Relay	453
RY II	8A, One-pole Relay	412
SDT	10A, One-pole Relay	474
SDT-R	5-10A, One-pole Relay	476
SNR (V23092)	6A, One-pole Relay	409
SRUDH	12A, One-pole Relay	442
SRUUH	15A, One-pole Relay	444
T7C	5-12A, One-pole Relay	440
T7N	10A, One-pole Relay	434
T73	10A, One-pole Relay	430
T75	8-14A, One-pole Relay	414
T77	3-10A, One-pole Relay	420
U/UB (V23148)	7A, One-pole Relay	428
V23057 (Card E)	8A, One-pole Relay	480
V23077 (IF)	16A, One-pole Relay	489
V23092 (SNR)	6A, One-pole Relay	409
V23148 (U/UB)	7A, One-pole Relay	428

NOTE: A question tree that may help you in selecting an appropriate relay for your application can be found on the next page.

Mid-Range PC Board Relays.... 401-498 **4**

NOTE: In addition to the products listed in this section of the databook, 3-20A relays described in other sections are available with printed circuit board terminals. Following is a list:

Relays with Forcibly Guided Contacts
SR4 D/M 606
SR6 D/M 607
SR6S 611
V23047 (SR2M) 603
V23050 (SR6) 609

Plug-in/Panel Mount Relays
K10 720
KH 709
KU 723
PCL/PCLH 713
PT 717
R10 703
RM 733

Power Relays & Contactors
KUHP 803

Latching, Impulse, Rotary & Special Application Relays
KUL 908
PCKWK 904
PE - Latching 902
RT - Latching 906

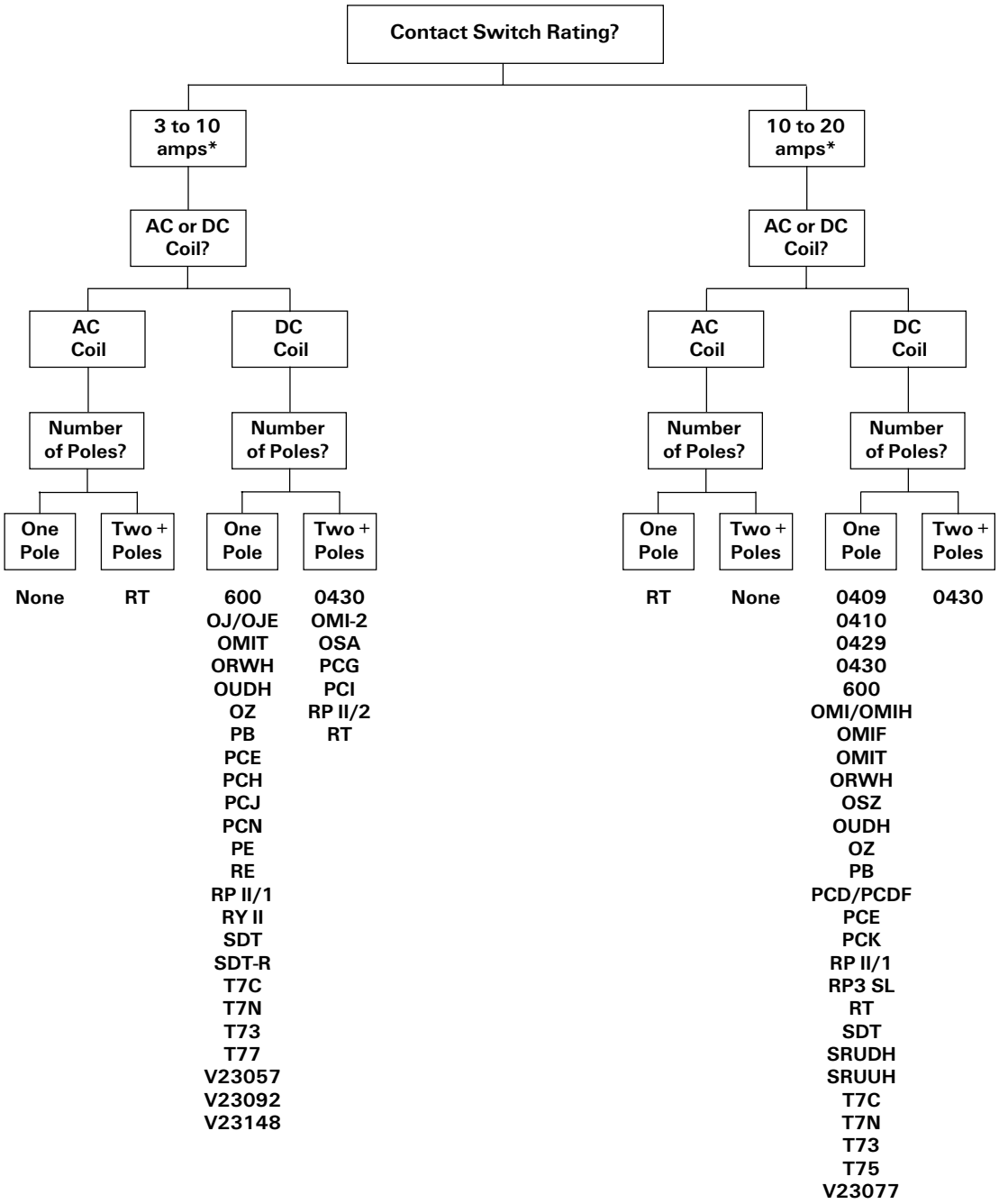
Solid State Relays & I/O Modules
OAC/ODC 1110
OACM/ODCM 1118

Products in our line of high performance relays (see overview in section 14 of this databook) are also offered with PC terminals.

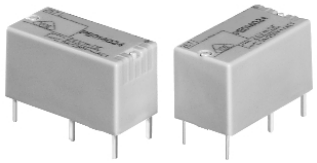
Mid Range (3-20A) PC Board Relay Question Tree

This guide helps the user select one or more relay series which may be appropriate for a given application. The user should then refer to detailed specifications elsewhere in this catalog to determine the actual part number to be specified. Of course, the user must assume ultimate responsibility for determining the suitability of a relay for a particular application.

Several relay product families are quite broad (i.e., RT), and only the basic family designator, not the actual product series designator (RT - Sensitive) is listed in this guide.



***** Typical loads at 28VDC or 120VAC, resistive, for comparison purposes. See catalog pages for a given series for detailed rating specifications.



PE series

5 Amp Miniature Printed Circuit Board Relay

c UL us File E214025
VDE File 6656UG

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- 1 Form C (SPDT).
- 5 amp rated current.
- Sensitive coil 200mW.
- 10mm height.
- Flux-tight for wave soldering.
- Supplied in tubes.
- DIP configuration.
- 4kV coil-to-contact insulation.
- Latching version available. See separate "PE Latching Series" data sheet.

Contact Data @ 85°C

Arrangement: 1 Form C (SPDT).
Material: Silver-nickel 90/10.
Expected Mechanical Life: 15 million operations minimum.
Ratings: 5 amp 250VAC resistive 100,000 operations.

Initial Dielectric Strength

Between Open Contacts: 1,000VAC.
Between Coil and Contacts: 4,000VAC.
Creepage/Clearance Coil-Contact: >3.2/4mm.

Coil Data DC @ 20°C

Nominal Coil Power: 200mW.

Nominal Voltage VDC	DC Resistance in Ohms ±10%	Must Operate Voltage VDC	Drop-out Voltage VDC	Nominal Coil Current (mA)
05	125	3.8	0.5	40.0
06	172	4.5	0.6	34.9
12	685	9.0	1.2	17.5
24	2,725	18.0	2.4	8.8
48	10,970	36.0	4.8	4.4

Operate Data

Must Operate Voltage: See Coil Data table.
Operate Time : 5 ms typical, at nom. voltage.
Release Time : 2 ms typical, at nom. voltage.
Bounce Time: 1 ms typical, at nom. voltage (N/O contact);
5 ms typical, at nom. voltage (N/C contact).
Switching Rate: 360 ops./hr. max. at rated load.

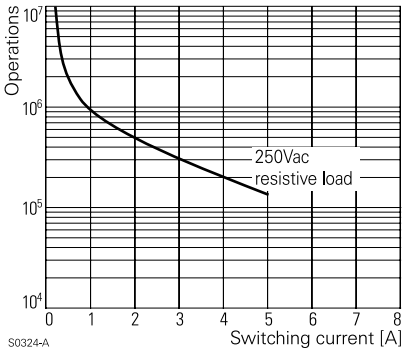
Environmental Data

Temperature Range:
Operating: -40°C to +85°C DC coil.
Vibration (30 to 500 Hz.): 15g N/O; 5g N/C.
Shock (Destructive): >100g.

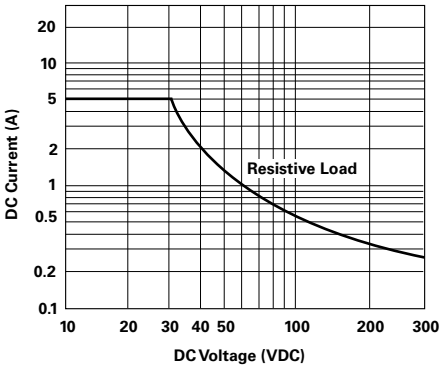
Mechanical Data

Termination: Printed circuit terminals.
Enclosure (94 V-0 rated): Flux-tight plastic case.
Weight: 0.18 oz. (5 g) approximately.

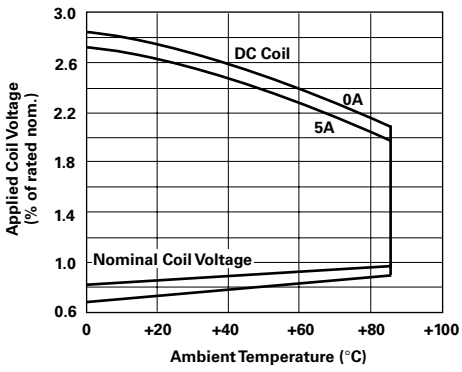
Contact Life



Max. DC Load Breaking Capacity



Coil Operating Range



Ordering Information

Typical Part Number ▶	PE	0	1	4	024

1. Basic Series:
PE = Miniature printed circuit board relay.

2. Enclosure*:
0 = Flux-tight.

3. Contact Arrangement:
1 = 1 Form C (SPDT)

4. Contact Material:
4 = Silver-nickel 90/10

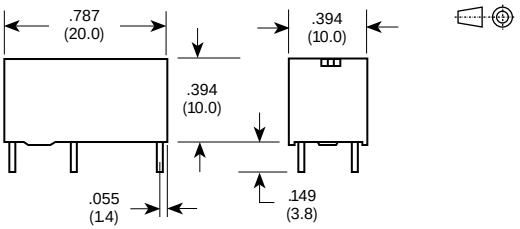
5. Coil Voltage:
005 = 5VDC 012 = 12VDC 048 = 48VDC
006 = 6VDC 024 = 24VDC

* Sealed version available on request.

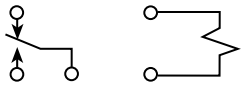
Our authorized distributors are more likely to maintain the following items in stock for immediate delivery.

PE014005 PE014024
PE014012

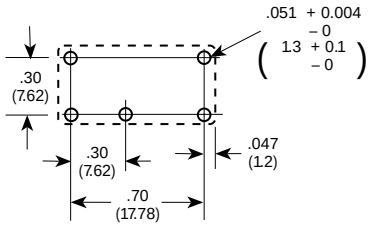
Outline Dimensions



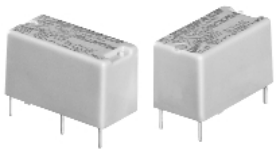
Wiring Diagram (Bottom View)



PC Board Layout (Bottom View)



Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.
www.tycoelectronics.com
Technical support:
Refer to inside back cover.



RE series

6 Amp Miniature Printed Circuit Board Relay

c UL us File E214025
VDE NR 10071
OVE NR 8841-014-02
NR 10308.ZA1A

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- 1 Form A (SPST-NO).
- 6 amp rated current.
- Sensitive coil 200 mW.
- 10.6mm height.
- Fully sealed with vent hole.
- Supplied in tubes.

Contact Data @ 70°C

Arrangements: 1 Form A (SPST-NO).
Material: Silver-cadmium oxide.
Silver-nickel 0.15 with gold plating.
Expected Mechanical Life: 30 million operations minimum.
Ratings:
6 amp 30 VDC resistive load 500,000 ops.
0.3 amp 50 VDC L/R = 40ms 3,000,000 ops.
UL/CSA AgCdO @ 25°C
6 amp 250VAC general purpose 30,000 ops.
10 amp 120VAC general purpose (+70°C) 6,000 ops.
1/4 HP 240VAC 30,000 ops.
1/6 HP 277VAC 30,000 ops.
1/8 HP 120VAC 30,000 ops.
B300 6,000 ops.
UL/CSA AgNi 0.15 @ 70°C
6 amp 250VAC general purpose 6,000 ops.
VDE 0435 @ 70°C
6 amp 250VAC general purpose 100,000 ops.
10mA 5VDC 5,000,000 ops.
VDE 0660 AC 11 @ 35°C
2 amp 400VAC 200,000 ops.

Initial Dielectric Strength

Between Open Contacts: 1,000VAC.
Between Coil and Contacts: 4,000VAC.
Creepage/Clearance Coil-Contact: 4/4mm.

Coil Data DC @ 20°C

Nominal Coil Power: 200mW.

Nominal Voltage VDC	DC Resistance in Ohms ±10%	Must Operate Voltage VDC	Drop-out Voltage VDC	Nominal Coil Current (mA)
05	125±10%	3.5	0.5	40
06	180±10%	4.2	0.6	33.3
12	720±10%	8.4	1.2	16.7
24	2,880±15%	16.8	2.4	8.3
48	11,520±15%	33.3	4.8	4.2

Operate Data

Must Operate Voltage: See Coil Data table.
Operate Time : 5 ms typical, at nom. voltage.
Release Time : 1 ms typical, at nom. voltage.
Bounce Time: 1 ms typical, at nom. voltage.
Switching Rate: 360 ops./hr. max. at rated load.
12,000

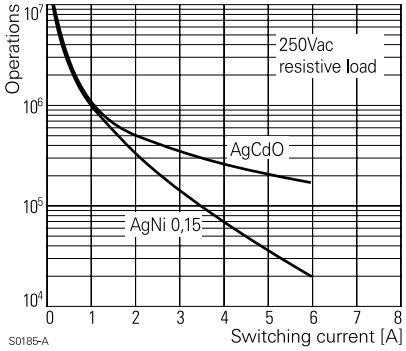
Environmental Data

Temperature Range:
Operating: -40°C to +70°C. (+85°C @ 4 amp).
Vibration: 10 to 150 Hz. at 10g N/O 20g N/C.
Shock (destructive): >100g.

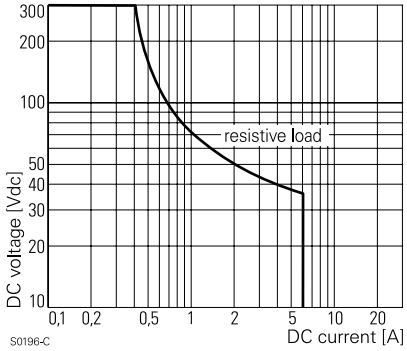
Mechanical Data

Termination: Printed circuit terminals.
Enclosure (94 V-0 rated): Sealed (RTIII) plastic case.
Weight: 0.18 oz. (5 g) approximately.

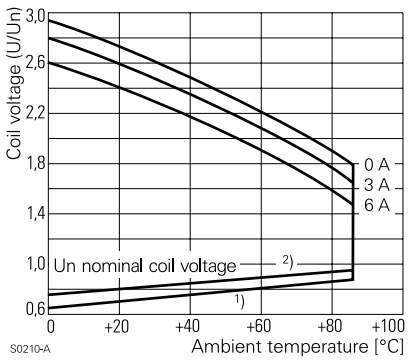
Contact Life



Max. DC Load Breaking Capacity



Coil Operating Range



Ordering Information

Typical Part Number ▶	RE	0	3	0	006

1. Basic Series:
RE = Miniature printed circuit board relay.

2. Enclosure:
0 = Sealed

3. Contact Arrangement:
3 = 1 Form A (SPST-NO)

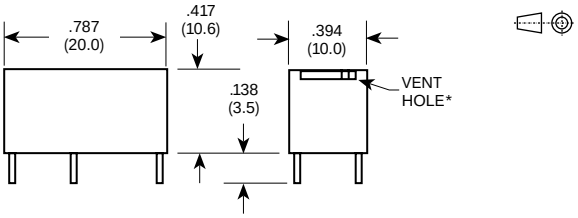
4. Contact Material:
0 = Silver-cadmium oxide.
2 = Silver-nickel 0.15 with gold plating.

5. Coil Voltage:
005 = 5VDC 012 = 12VDC 048 = 48VDC
006 = 6VDC 024 = 24VDC

Our authorized distributors are more likely to maintain the following items in stock for immediate delivery.

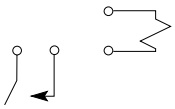
RE030005 RE030024
RE030012

Outline Dimensions

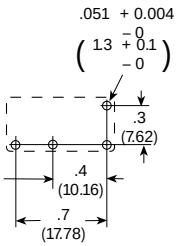


In case of full load on contacts and under extreme operating conditions (switching rate, ambient temperature) it is recommended to open the sealed (washable) relays, by opening the vent hole* provided for this purpose, after completion of the cleaning process.

Wiring Diagram (Bottom View)



PC Board Layout (Bottom View)



Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.
www.tycoelectronics.com
Technical support:
Refer to inside back cover.



PCN series

Slim, 3 Amp PC Board Relay

c UL us File No. E82292
VDE

Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- Only 5 mm wide, permitting high density spacing.
- 1 Form A contact arrangement.
- Sensitive coil requires only 120mW coil power.
- Well suited for HVAC controls, I/O panels, PLCs.

Contact Data @ 20°C

Arrangements: 1 Form A.
Type: Bifurcated.
Material: AgNi
Max. Switching Rate: 12,000 ops./min. (no load).
100 ops./min. (rated load).
Expected Mechanical Life: 20 million operations (no load).
Expected Electrical Life: 100,000 operations (rated load).
Minimum Load: 1mA @ 5VDC.

Contact Ratings

Ratings: 3A @ 250VAC resistive.
3A @ 30VDC resistive.
Max. Switched Voltage: AC: 277V; **DC:** 125V.
Rated Switched Voltage: AC: 250V.
Max. Switched Current: 3A.
Max. Switched Power: AC: 1250VA; **DC:** 150W.
Initial Contact Resistance: 50 milliohms @ 100mA, 6VDC (reference).

NOTE: A 5A rated version ot the PCN series is now in development. Consult factory regarding its availability.

Insulation Data

Insulation to IEC 664/VDE 0110
Voltage Rating: 277VAC.
Pollution Degree: 2.
Overvoltage Category: II.
Tracking Resistance of Relay Base: PTI 600.

Initial Dielectric Strength

Between Open Contacts: 750Vrms.
Between Coil and Contacts: 3,000Vrms.
Surge Voltage Between Coil and Contacts: 5,080V (1.2 / 50µs).

Coil Data

Voltage: 5 to 24VDC.
Nominal Power: 120mW.
Operate Power: 58.8mW.
Coil Temperature Rise: 35°C max., at rated coil voltage.
Max. Coil Voltage: 130% of nominal.
Duty Cycle: Continuous.

Coil Data @ 20°C

PCN				
Rated Coil Voltage (VDC)	Nominal Current (mA)	Coil Resistance (ohms) ± 10%	Must Operate Voltage (VDC)	Must Release Voltage (VDC)
5	24.0	208	3.5	0.5
6	20.0	300	4.2	0.6
9	13.3	675	6.3	0.9
12	10.0	1,200	8.4	1.2
24	5.0	4,800	16.8	2.4

Operate Data

Must Operate Voltage: 70% of nominal voltage or less.
Must Release Voltage: 10% of nominal voltage or more.
Operate Time: 5 ms typ.
Release Time: 2 ms typ.
Bounce Time: <1 ms typ.

Environmental Data

Temperature Range:
Operating: -40°C to +70°C
Vibration, Mechanical: 10 to 55Hz., 1.5mm double amplitude.
Operational: 10 to 55Hz., 1.5mm double amplitude.
Shock, Mechanical: 1,000m/s² (100G approximately).
Operational: 100m/s² (10G approximately).
Operating Humidity: 10 to 90% RH. (Non-condensing).

Mechanical Data

Termination: Printed circuit terminals.
Enclosure (94V-0 Flammability Ratings): Sealed (RT III / wash-tight) plastic case.
Weight: 0.1 oz (3g) approximately.

Ordering Information

Typical Part Number ▶	PCN	-1	06	D	3	M	H	Z	,300

1. Basic Series:
PCN = Slim 3A PC Board Relay

2. Number of Poles:
1 = 1 Pole

3. Coil Voltage:
05 = 5VDC 06 = 6VDC 09 = 9VDC 12 = 12VDC 18 = 18VDC 24= 24VDC

4. Coil Version:
D = Standard 120mW

5. Contact Material:
3 = AgNi

6. Contact Arrangement:
M = 1 Form A, SPST-NO

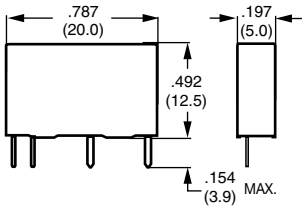
7. Enclosure Version:
H = Sealed (wash-tight)

8. Insulation:
Z = High Insulation

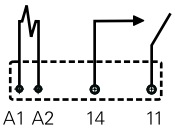
9. Suffix:
,000 = Standard model Other Suffix = Custom model

Our authorized distributors are more likely to maintain the following items in stock for immediate delivery.
None at present.

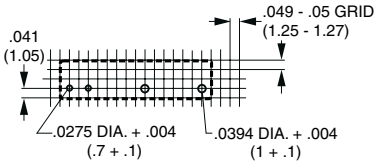
Outline Dimensions



Wiring Diagram

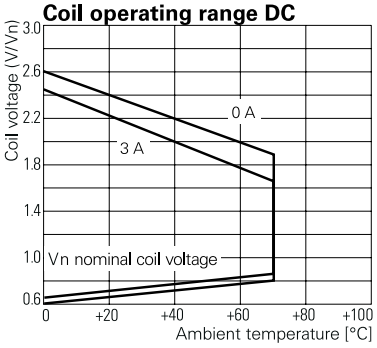


PC Board Layout (Bottom View)

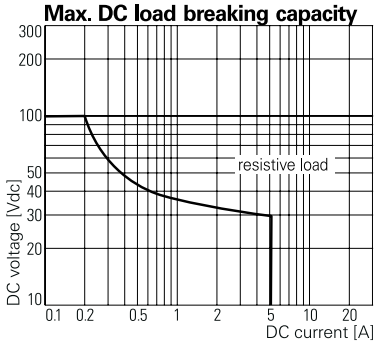


Reference Data

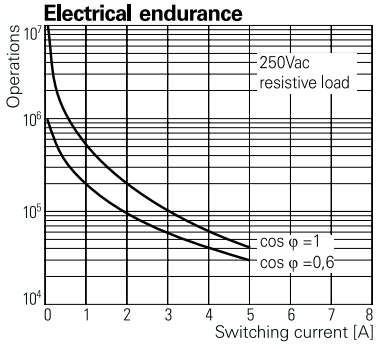
Coil operating range DC



Max. DC load breaking capacity



Electrical endurance



Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.
www.tycoelectronics.com
Technical support:
Refer to inside back cover.

V23092 (SNR) series

6 Amp Slim Miniature, PC Board Relay



File E48393

File 0631 / 0160 / 0435

Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- 1 Form A (SPST-NO) and 1 Form C (SPDT).
- 6 A rated current.
- Slim package : 5mm width.
- Sensitive coil 170mW.
- 4kV coil-to-contact insulation.
- Applications: PLCs, timers, temperature controllers, I/O modules.

Contact Data @ 20°C

Arrangements: 1 Form A (SPST-NO) and 1 Form C (SPDT).
Material: Silver tin oxide, silver tin oxide with gold plating; and silver nickel 90/10.
Max. Switching Rate: 12,000 ops./min. (no load).
60 ops./min. (rated load).
Initial Contact Resistance:
AgSnO or AgNi 90/10: 100 milliohms @ 1A, 12VDC.
AgSnO, Au plated: 50 milliohms @ 100mA, 6VDC.
Max. Switched Voltage: AC: 400V; **DC:** 300V.
Rated Voltage: AC: 250V; **DC:** 24V.
Max. Switched Current: 6A.
Max. Switched Power: 1,500VA. (See curve for DC Power).
Minimum Load: AgSnO or AgNi 90/10: >500mA, 12VAC/VDC.
AgSnO, Au plated: >10mA, 5VAC/VDC.
Expected Mechanical Life: 10 million operations.
Expected Electrical Life: See curve.

Initial Dielectric Strength

Between Open Contacts: 1,000VAC, (1 minute).
Between Contacts and Coil: 4,000VAC, (1 minute).
Surge Voltage Between Coil and Contacts: 6,000V (1.2/50µs).
Creepage/Clearance Coil-to-Contact: Min. 6/8mm. Consult factory regarding availability of 1 Form A model with 8/8mm.

Initial Insulation Resistance

Between Mutually Insulated Conductors: 100,000Mohm @ 500VDC.

Coil Data @ 20°C

Voltage: 5 to 48VDC.
Nominal Power: 170mW.

V23092				
Rated Coil Voltage (VDC)	**Nominal Current (mA)**	**Coil Resistance (ohms) ± 10%**	**Must Operate Voltage (VDC)**	**Must Release Voltage (VDC)**
5	34.0	119	3.50	0.25
12	14.2	848	8.40	0.6
24	7.1	3,390	16.80	1.20
48	4.5	10,600*	33.60	2.40

* ±15%

Operate Data @ 20°C

Must Operate Voltage: 70% of nominal voltage or less.
Must Release Voltage: 5% of nominal voltage or more.
Operate Time: 5 ms max. at nominal voltage.
Release Time: 2.5 ms max. at nominal voltage.
Bounce Time: 1.5 ms (N/O) typical at nominal voltage.
5 ms (N/C) typical at nominal voltage.

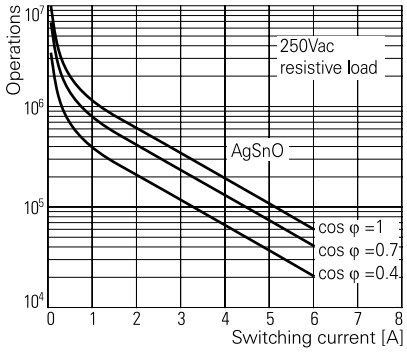
Environmental Data

Temperature Range:
Operating: -40°C to +85°C.
Operating Humidity: 20 to 85% RH.

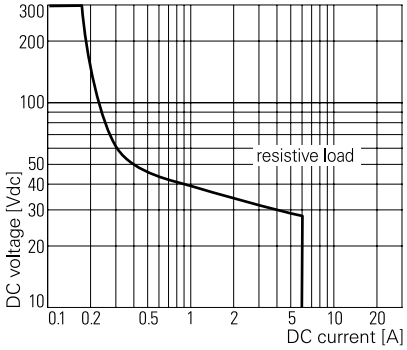
Mechanical Data

Termination: Printed circuit terminals.
Enclosure (94V-0 Flammability Ratings): Plastic sealed case (RT III wash tight).
Weight: 0.2 oz. (6g) approximately.

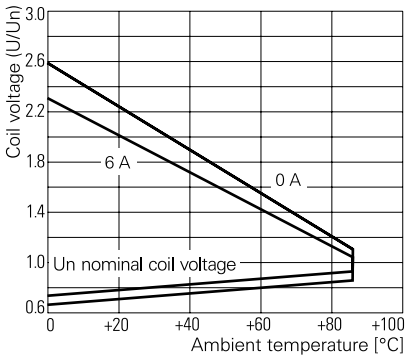
Contact Life



Max. DC Load Breaking Capacity



Coil Operating Range



Ordering Information

Typical Part Number ▶	V23092	A	1	024	A	3	01

1. Basic Series:
V23092 = Slim PC board relay.

2. Package Type:
A = PCB vertical version. B = PCB flat pack version.

3. Enclosure:
1 = Plastic sealed case.

4. Coil Input:
005 = 5VDC 012 = 12VDC 024 = 24VDC 48 = 48VDC

5. Contact System:
A = Standard.

6. Contact Material:
2 = AgSnO, Au plated. 3 = AgSnO 8 = AgNi 90/10

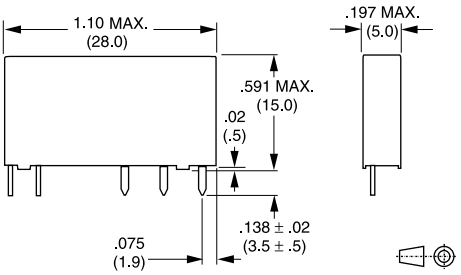
7. Contact Arangement:
01 = 1 Form C (SPDT). 02 = 1 Form A (SPST-NO).

Our authorized distributors are more likely to maintain the following items in stock for immediate delivery.

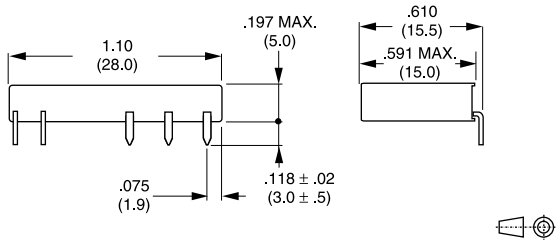
V23092A1012A301
V23092A1024A301

Outline Dimensions

Vertical Version

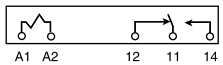


Flat Pack Version

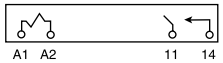


Wiring Diagrams (Bottom Views)

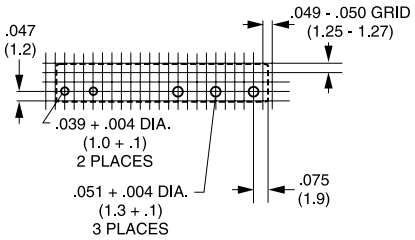
1 Form C



1 Form A



PC Board Layout (Bottom View)



Dimensions are shown for reference purposes only.

Dimensions are in inches over (millimeters) unless otherwise specified.

Specifications and availability subject to change.

www.tycoelectronics.com
Technical support:
Refer to inside back cover.



DIN Rail Interface Module and Accessories for V23092 Series (SNR) Relay PC Board Relay

Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

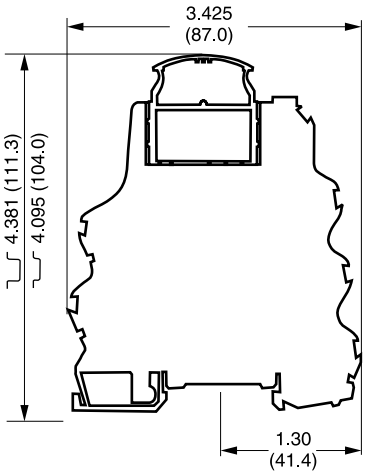
Features

- Module width is 0.2 in (5.08mm).
- Narrow width permits high density packing of modules on a DIN rail.
- Jumper bars available.
- Available as a set or as individual components.

Technical Information

Rated Current / Rated Voltage: 6A / 250VAC.
Dielectric Strength, Coil-to-Contact: >4,000Vrms.
Insulation Category (VDR 0110b): C / 250.
Operating Ambient Temperature: - 20°C to +55°C.
Protection Category: IP 20.
Protection Against Accidental Contact Meeting: VBG 4.
Wire Cross Section with/without Bootlace Crimp: 0.22 - 2.5mm².
Terminal Torque (Nominal / Maximum): .295 / .442 ft-lb (0.4 / 0.6 Nm).

Outline Dimensions



Component Parts

ST 1F 000	Socket without LED
ST 1F L24	Socket with LED for 12-24VDC.
ST 16 016	Mounting frame for relay, without marking
ST 17 002	Jumper bar, 2 pole
ST 17 005	Jumper bar, 5 pole
ST 17 010	Jumper bar, 10 pole
ST 16 040	Marking plate, consiting of 100 marking tags





Sets - Relay in frame, mounted in socket

ST 1P3 024	24VDC, $AgSnO_2$ contacts
ST 1P3 L12	12VDC, with LED, $AgSnO_2$ contacts
ST 1P3 L24	24VDC, with LED, $AgSnO_2$ contacts
ST 1P3 L48	48VDC, with LED, $AgSnO_2$ contacts
ST 1P2 L24	24VDC, with LED, Au plated $AgSnO_2$ contacts



RY II series

8 Amp Miniature Printed Circuit Board Relay

File E214025
NR 10071

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- 1 Form A (SPST-NO) and1 Form C (SPDT).
- 8 amp rated current.
- Sensitive coil 220 mW.
- 12.3 mm height.
- 8 mm coil to contact spacing.
- Flux-tight and washable (sealed) versions.

Contact Data @ 70°C

Arrangements: 1 Form A (SPST-NO) and 1 Form C (SPDT), single contact.
Material: Silver-cadmium oxide; Silver-tin oxide; and Silver-nickel 0.15 with or without gold plating.
Expected Mechanical Life: 30 million operations minimum.
Ratings:
Current: 8A
Voltage: 250VAC.
Power (breaking): 2,000 VA.
Voltage (breaking): 440VAC.
Current (making, max. 4s at 10% duty cycle): 30A.
UL508 @ 70°C (RY610 type)
8 amp 28VDC 30,000 ops.
280mA 250VDC 30,000 ops.
1/2 HP 240VAC.
1/4 HP 277VAC.
B300 120 or 240VAC
VDE 0631 @ 85°C (RY531 type)
6 (4) amp, 250VAC 100,000 ops.

Initial Dielectric Strength

Between Open Contacts: 1,000Vrms.
Between Coil and Contacts: 5,000Vrms.
Creepage/Clearance: 8/8mm.

Coil Data DC @ 20°C

Nominal Coil Power: 220mW.

Nominal Voltage VDC	DC Resistance in Ohms ±10%	Must Operate Voltage VDC	Drop-out Voltage VDC	Maximum Voltage VDC	Nominal Coil Current (mA)
5	113	3.5	0.5	11.8	44.0
6	164	4.2	0.6	14.1	36.7
12	620	8.4	1.2	28.2	19.3
24	2,350	16.8	2.4	56.4	10.2
48	9,600	33.6	4.8	112.8	5.0

Operate Data

Must Operate Voltage: See Coil Data table.
Operate Time : 7 ms, at nom. voltage.
Release Time: 3 ms, at nom. voltage.
Bounce Time (N/O contact) : 1 ms, at nom. voltage.
Switching Rate: 3,600 ops./hr. max. at rated load.

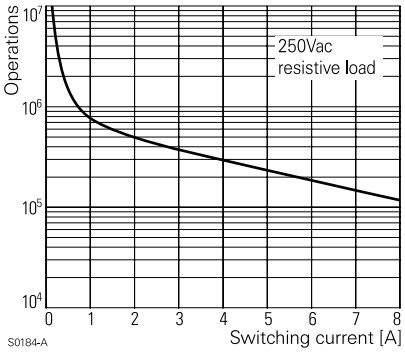
Environmental Data

Temperature Range:
Operating: -40°C to +85°C.
Vibration: (10 to 500 Hz.) 5g.
Shock (destructive): >100g.

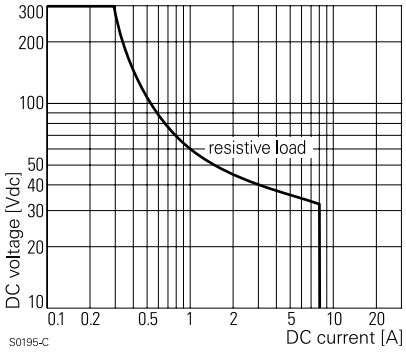
Mechanical Data

Termination: Printed circuit terminals. Sockets available.
Enclosure (94 V-0 rated): Flux-tight (RT II) or sealed (RTIII) plastic case.
Weight: 0.28 oz. (8 g) approximately.

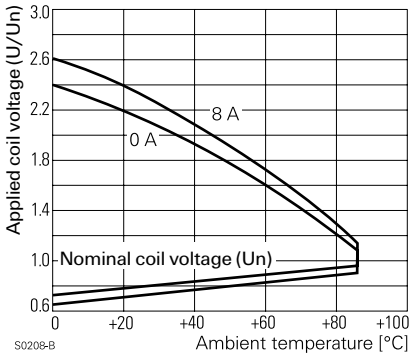
Contact Life



Max. DC Load Breaking Capacity



Coil Operating Range



Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.
www.tycoelectronics.com
Technical support:
Refer to inside back cover.

Ordering Information

Typical Part Number ▶	RY	6	1	0	012

1. Basic Series:
RY = RY II miniature printed circuit board relay.

2. Version:
2 = Flux-tight, pins on 3.2 mm spacing. Only available with contact arrangement 1.
5 = Flux-tight, pins on 5 mm spacing. Only available with contact arrangement 3.
6 = Sealed, pins on 3.2 mm spacing. Only available with contact arrangement 1.
A = Sealed, pins on 5 mm spacing. Only available with contact arrangement 3.

3. Contact Arrangement:
1 = 1 Form C (SPDT) Only available with 3.2 mm pin spacing.
3 = 1 Form A (SPST-NO) Only available with 5 mm pin spacing.

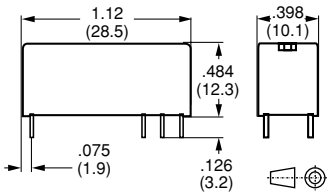
4. Contact Material:
0 = Silver-cadmium oxide.
1 = Silver-nickel 0.15
2 = Silver-nickel 0.15 with gold plating
3 = Silver-tin oxide.

5. Coil Voltage:
005 = 5VDC
006 = 6VDC
012 = 12VDC
024 = 24VDC
048 = 48VDC

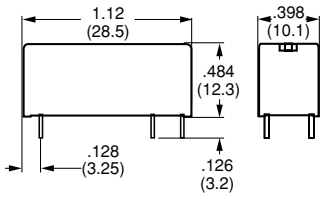
Our authorized distributors are more likely to maintain the following items in stock for immediate delivery.

None at present.

Outline Dimensions

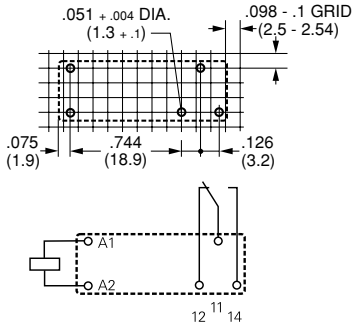


1 Form C, 3.2mm pin spacing

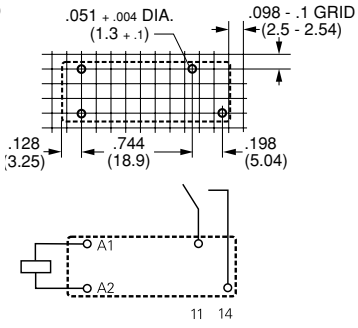


1 Form A, 5mm pin spacing

PC Board Layouts & Wiring Diagrams (Bottom Views)

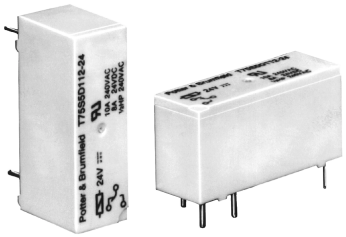


1 Form C, 3.2mm pin spacing



1 Form A, 5mm pin spacing

Sensitive, Low Profile, Hi-Current Relay Designed to Meet International Standards



T75 series

14 Amp, PC Board Miniature Relay

File E29244
File LR45064
File No. 3919

Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

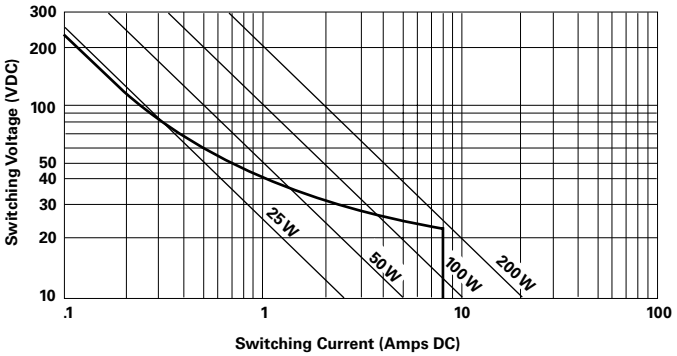
- High sensitivity – nominal coil power requirement is as low as 212mW.
- Low profile, .591 in. (15mm) tall case uses only .465 in^2 ($3cm^2$) of area on the printed circuit board, permitting high density circuit design.
- Power switching capability – contacts rated 14 amps in 1 Form A (SPST-NO) or 1 Form C (SPDT) arrangements.
- Designed to meet UL, CSA, VDE, SEMKO and SEV requirements.
- Designed to meet VDE 8mm spacing, 4kV dielectric, coil to contacts.
- Designed to meet 3 mm creepage between contacts.
- Conforms to: VDE 0110 – Insulation Group C (250V)
  VDE 435 Part 201 – High current applications
  VDE 0804 – Telecommunications equipment
  VDE 0631 – Temperature controllers and limiters
  VDE 0700 – Household appliances
  VDE 0805/5.90 – Office machines
- Immersion cleanable§, ultrasonically sealed case.
- Well suited for a broad range of applications e.g. HVAC, appliances, security and industrial control.

§ For more details, refer to application note 13C265, "Mounting, Termination and Cleaning of PC Board Relays."

Contact Ratings @ 25°C with relay properly vented. Remove vent nib after soldering and cleaning.

Arrangements: 1 Form A (SPST-NO) and 1 Form C (SPDT).
Material: Silver-cadmium oxide.
Expected Mechanical Life: 20 million operations.
Expected Electrical Life:
100,000 operations at 8 amps, 240VAC.
50,000 operations at 14 amps NO / 5 amps NC, 120VAC Res.
30,000 operations at 7.2 FLA, 45 LRA, 120VAC.
10,000 operations at 5 FLA, 30 LRA, 240VAC.
30,000 operations at B300 pilot duty (360VA, 240VAC; 470VA, 120VAC).
Contact Ratings (See Figure 1):
Maximum Switched Voltage: 380VAC.
Maximum Switched Current: 14/5 (N.O./N.C.) amps, AC resistive; 8 amps DC (see Fig. 1)
Maximum Switched Power: 200W, DC; 2,000VA, AC.
Minimum Required Contact Load: 12V, 100mA.
VDE Contact Ratings: 8 amps, 250VAC.
UL/CSA Contact Ratings: 10 amps, 240VAC; 8 amps 24VDC; 1/3 HP, 120VAC; 1/2 HP, 240VAC.

Figure 1 - DC Switching Load Limit Curve



Initial Dielectric Strength

Between Open Contacts: 1,000V rms.
Between Contacts and Coil: 4,000V rms, 8mm.

Coil Data

Voltage: 3 to 60VDC.
Maximum Power @ 25°C: 1W.
Nominal Power @ 25°C: 230mW, typ.
Temperature Rise: 85C° per Watt.
Duty Cycle: Continuous.

Coil Data

	Nominal Voltage	DC Resistance in Ohms ±10%	Must Operate Voltage	Nominal Coil Current (mA)
DC Coils	3	40	2.1	75.0
	5	118	3.6	42.4
	6	165	4.3	36.4
	9	365	6.4	24.7
	12	650	8.5	18.5
	18	1,455	12.8	12.4
	24	2,270	17.2	10.6
	36	5,460	25.4	6.4
	48	8,790	34.5	5.5
	60	15,265	42.8	3.9

Operate Data @ 25°C

Must Operate Voltage: 72% of nom. voltage or less.
Must Release Voltage: 10% of nom. voltage or more.
Operate Time (Excluding Bounce): 6 ms, typ., at nom. voltage.
Release Time (Excluding Bounce): 2.5 ms, typ., at nom. voltage.
Maximum Switching Rate: 20 operations/second.
Maximum Continuous Operating Voltage: 225% of nom. voltage.

Temperature Range

Storage: -40°C to +130°C.
Operating: -40°C to +70°C.

Mechanical Data

Termination: Printed circuit terminals.
Enclosures: Immersion cleanable, plastic sealed case.
Weight: 0.65 oz. (18.5g) approximately.

Ordering Information

Typical Part Number ▶	T75	S	5	D	1	1	2	-12

1. Basic Series:
T75 = Low profile, printed circuit board relay.

2. Enclosure:
S = Immersion cleanable, plastic sealed case.

3. Contact Arrangement:
1 = 1 Form A (SPST-NO)
5 = 1 Form C (SPDT)

4. Coil Input:
D = DC voltage

5. Coil Configuration:
1 = Single coil, non-latching (monostable)

6. Mounting and Terminals:
1 = Printed circuit terminals

7. Contact Material:
2 = Silver-cadmium oxide (AgCdO)

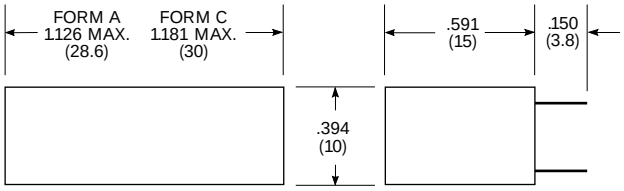
8. Coil Voltage:

03 = 3VDC	06 = 6VDC	12 = 12VDC	24 = 24VDC	48 = 48VDC
05 = 5VDC	09 = 9VDC	18 = 18VDC	36 = 36VDC	60 = 60VDC

Our authorized distributors are more likely to maintain the following items in stock for immediate delivery.

T75S5D112-05
T75S5D112-12
T75S5D112-24

Outline Dimensions



CONTACT TERMINALS: .023 x .040 (.58 x 1.02) REF.
COIL TERMINALS: .024 (.61) DIA. REF.

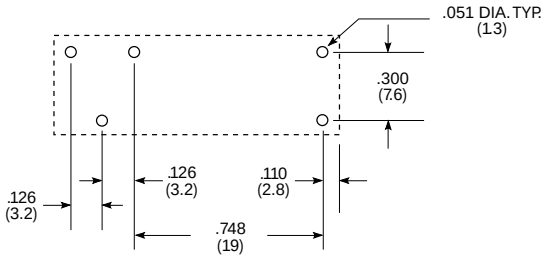
Wiring Diagram (Bottom View)



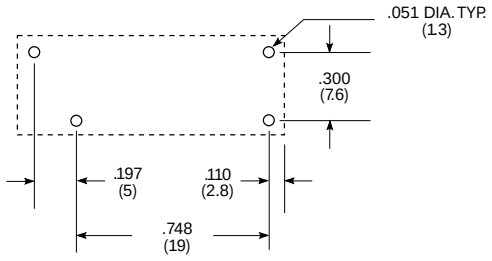
* ON SINGLE THROW MODELS, ONLY NECESSARY TERMINALS ARE PRESENT.

PC Board Layouts (Bottom Views)

1 Form C



1 Form A





PCJ series

Slim 5 Amp Miniature Power PC Board Relay

Air Conditioners, Refrigerators, Microwave Ovens

UL File No. E82292
CSA File No. 1031444
VDE File No. 122301

Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- Slim outline, L20.4 x W7 x H15 (mm).
- 1 Form A (SPST-NO) contact arrangement.
- High dielectric capacity of 4kV.
- UL, CSA, VDE approvals.
- Immersion cleanable, sealed version available.
- Cadmium-free contacts.

Contact Data @ 20°C

Arrangements: 1 Form A (SPST-NO).
Material: Ag Alloy.
Max. Switching Rate: 300 ops./ min. (no load).
20 ops./ min. (rated load).
Expected Mechanical Life: 5 million ops (no load).
Expected Electrical Life: 100,000 ops (rated load).
Minimum Load: 100mA @ 5VDC.
Initial Contact Resistance: 100Mohms @ 1A, 6VDC.

Contact Ratings

Ratings: 5A @ 250VAC resistive.
Max. Switched Voltage: **AC:** 275V.
DC: 30V.
Max. Switched Current: 5A.
Max. Switched Power: 1,250VA, 150W.

Initial Dielectric Strength

Between Open Contacts: 750VAC, 50/60 Hz. (1 min.).
Between Contacts and Coil: 4,,000VAC, 50/60 Hz. (1 min.).
Surge Voltage Between Coil and Contacts: 7,000V (1.2/50µs).

Initial Insulation Resistance

Between Mutually Insulated Conductors: 1,000Mohm @ 500VDCM.

Coil Data

Voltage: 5 to 24VDC.
Duty Cycle: Continuous.
Nominal Power: 200mW.
Max. Coil Power: 130% of nominal.

Coil Data @ 20°C

PCJ				
Rated Coil Voltage (VDC)	**Nominal Current (mA)**	**Coil Resistance (ohms) ± 10%**	**Must Operate Voltage (VDC)**	**Must Release Voltage (VDC)**
5	40.0	125	3.75	0.25
6	33.3	180	4.50	0.30
9	22.5	405	6.75	0.45
12	16.7	720	9.00	0.60
18	11.1	1,620	13.50	0.90
24	8.6	2,880	18.00	1.20

Operate Data @ 20°C

Must Operate Voltage: 75% of nominal voltage or less.
Must Release Voltage: 5% of nominal voltage or more.
Operate Time: 10ms max.
Release Time: 4ms max.

Environmental Data

Temperature Range:
Operating: -30°C to + 70°C.
Vibration, Mechanical: 10 to 55Hz., 1.5mm double amplitude.
Operational: 10 to 55Hz., 1.5mm double amplitude.
Shock, Mechanical: 1,000m/s² (100G approximately).
Operational: 100m/s² (10G approximately).
Operating Humidity: 20 to 85% RH. (Non-condensing).

Mechanical Data

Termination: Printed circuit terminals.
Weight: 0.14 oz. (4g) approximately.

Ordering Information

Typical Part Number ▶	PCJ	-1	05	D	3	M	H	,000

1. Basic Series:
PCJ = Miniature 1 Form A relay

2. Termination:
1 = 1 pole

3. Coil Voltage:
05 = 5VDC 09 = 9VDC 18 = 18VDC
06 = 6VDC 12 = 12VDC 24 = 24VDC

4. Coil Input:
D = Standard 200mW

5. Contact Material:
3 = AgNi

6. Contact Arrangement:
M = 1 Form A (NO)

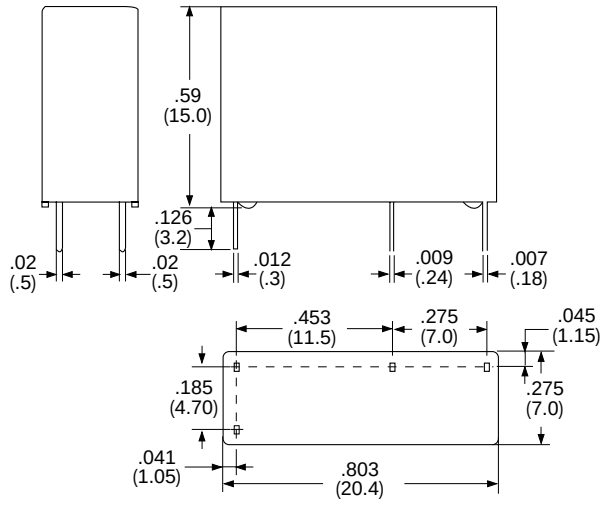
7. Enclosure:
Blank = Vented (Flux-tight) cover H = Sealed plastic case

8. Suffix:
,000 = Standard model Other Suffix = Custom model

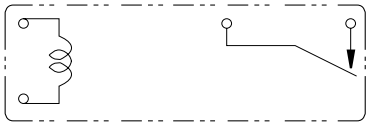
Our authorized distributors are more likely to maintain the following items in stock for immediate delivery.

PCJ-105D3MH,000
PCJ-112D3MH,000
PCJ-124D3MH,000

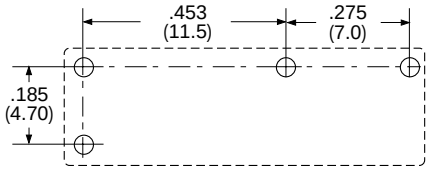
Outline Dimensions



Wiring Diagram (Bottom View)

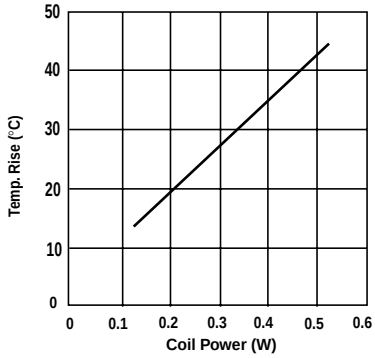


PC Board Layout (Bottom View)

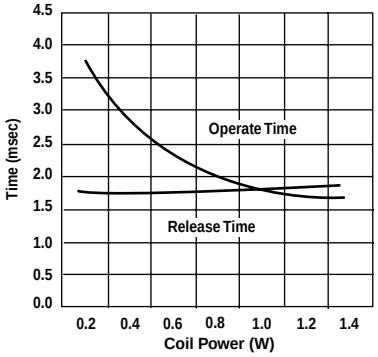


Reference Data

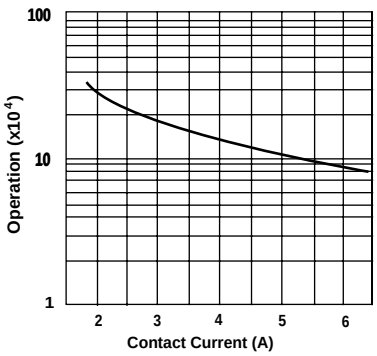
Coil Temperature Rise



Operate Time



Life Expectancy





PCH series

5 - 10 Amp Miniature 1 Form A or C Power PC Board Relay

Air Conditioners, Refrigerators, Microwave Ovens

UL File No. E82292
CSA File No. LR48471
VDE File No. 119568

Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- 1 Form A (SPST-NO) or 1 Form C (SPDT) contact arrangements.
- 5 or 10A ratings.
- Compact size 20L x 10W x 15.2H (mm).
- High surge voltage of 8000V.
- Cadmium-free contacts.
- Sensitive (200mW) coil available on 1 Form A types.
- UL, CSA, VDE approval.

Contact Data @ 20°C

Arrangements: 1 Form A (SPST-NO) and 1 Form C (SPDT).
Material: AgSnO.
Max. Switching Rate: 300ops./ min. (no load).
20ops./ min. (rated load).
Expected Mechanical Life: 5 million ops (no load).
Expected Electrical Life: 100,000ops (rated load).
Minimum Load: 100mA @ 5VDC.
Initial Contact Resistance: 100 milliohms @ 1A, 6VDC.

Contact Ratings

Ratings: **Models with 1 Form C Contacts, 400mW Coil**
5A (NO) /3A (NC) @ 30VDC resistive.
5A (NO) /3A (NC) @ 277VAC resistive.
10A (NO) @ 125VAC resistive.
TV-3 (NO).
Models with 1 Form A Contacts, 400mW Coil
5A @ 277VAC/30VDC resistive.
10A @ 125VAC resistive.
TV-3.
Models with 1 Form A Contacts, 200mW Coil
5A @ 277VAC/30VDC resistive.
10A @ 125VAC resistive.
Max. Switched Voltage: AC: 277V.
DC: 30V.
Max. Switched Current: 10A (NO) / 3A(NC).
Max. Switched Power: 1400VA, 150W (NO); 850VA, 90W (NC).

Initial Dielectric Strength

Between Open Contacts: 750VAC, 50/60 Hz. (1 min.).
Between Contacts and Coil: 4,000VAC, 50/60 Hz. (1 min.).
Surge Voltage Between Coil and Contacts: 8,000V (1.2/50µs).

Initial Insulation Resistance

Between Mutually Insulated Conductors: 1000Mohm @ 500VDCM.

Coil Data

Voltage: 5 to 48VDC.
Duty Cycle: Continuous.
Nominal Power: 200mW or 400mW.
Max. Coil Power: 130% of nominal.

Coil Data @ 20°C

200mW Coils (Only available with 1 Form A contact arrangements)				
Rated Coil Voltage (VDC)	**Nominal Current (mA)**	**Coil Resistance (ohms) ± 10%**	**Must Operate Voltage (VDC)**	**Must Release Voltage (VDC)**
5	40.0	125	3.75	0.25
6	30.0	180	4.50	0.30
9	22.5	400	6.75	0.45
12	16.7	720	9.00	0.60
24	8.6	2,800	18.00	1.20

400mW Coils				
Rated Coil Voltage (VDC)	**Nominal Current (mA)**	**Coil Resistance (ohms) ± 10%**	**Must Operate Voltage (VDC)**	**Must Release Voltage (VDC)**
5	80.0	62.5	3.75	0.25
6	66.7	90.0	4.50	0.30
9	44.4	202.5	6.75	0.45
12	33.3	360.0	9.00	0.60
18	22.2	810.0	13.50	0.90
24	11.1	1,440.0	18.00	1.20
48	5.6	5,760.0	36.00	2.40

Operate Data @ 20°C

Must Operate Voltage: 75% of nominal voltage or less.
Must Release Voltage: 5% of nominal voltage or more.
Operate Time: 10ms max.
Release Time: 5ms max.

Environmental Data

Temperature Range:
Operating: Models with Class F insulation: -30°C to +85°C.
Vibration, Mechanical: 10 to 55Hz., 1.5mm double amplitude.
Operational: 10 to 55Hz., 1.5mm double amplitude.
Shock, Mechanical: 1,000m/s^2 (100G approximately).
Operational: 100m/s^2 (10G approximately).
Operating Humidity: 20 to 85% RH. (Non-condensing).

Mechanical Data

Termination: Printed circuit terminals.
Weight: 0.25 oz (7g) approximately.

Ordering Information

Typical Part Number ▶	PCH	-1	12	D	2		H		,001

1. Basic Series:
PCH = Miniature 1 Form C relay

2. Termination:
1 = 1 pole

3. Coil Voltage:
05 = 5VDC 09 = 9VDC 24 = 24VDC
06 = 6VDC 12 = 12VDC 48 = 48VDC

4. Coil Input:
D = Standard 400mW L = Sensitive 200mW (Only available with 1 Form A contacts)

5. Contact Material:
2 = AgSnO

6. Contact Arrangement:
Blank = 1 Form C (Only available with Standard 400mW coil) M = 1 Form A

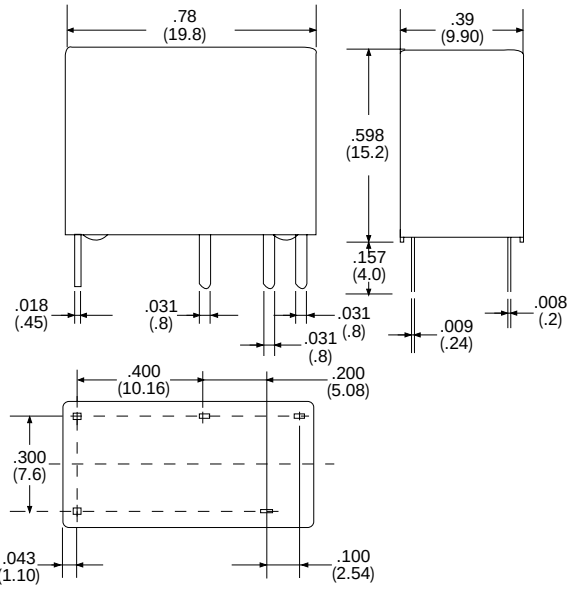
7. Enclosure:
Blank = Vented (Flux-tight) cover H = Sealed plastic case

8. Insulation class:
Blank = Class 155(F) system

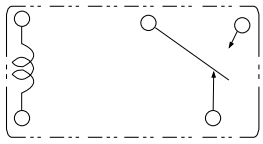
9. Option:
,001 = Standard model Other Suffix = Special options

Our authorized distributors are more likely to maintain the following items in stock for immediate delivery.
PCH-105D2H,001 PCH-124D2H,001
PCH-112D2H,001

Outline Dimensions

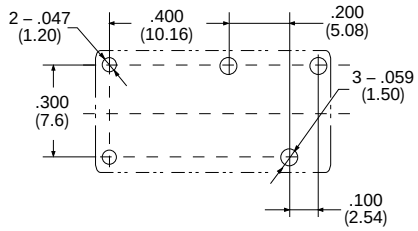


Wiring Diagram (Bottom View)



NOTE: Only necessary terminals are present on 1 Form A models.

PC Board Layout (Bottom View)

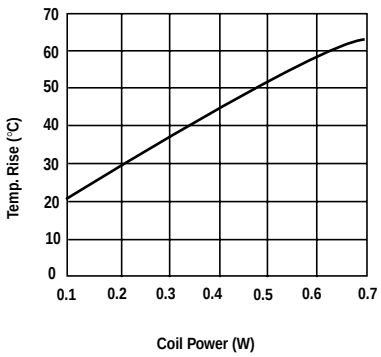


NOTE: Only necessary terminals are present on 1 Form A models.

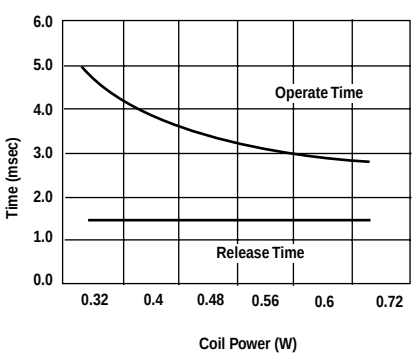
Reference Data (Typical Values)

(Only applicable for 1 Form C, 400mW coil model with 277VAC load on NO)

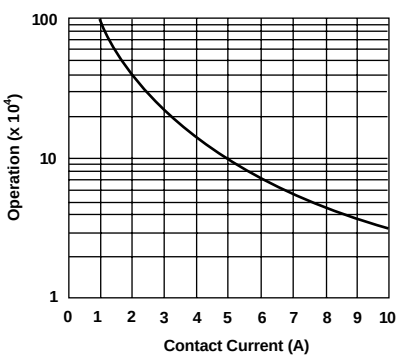
Coil Temperature Rise



Operate Time

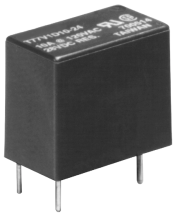


Life Expectancy



T77 series

10 Amp Miniature PC Board Relay



File E29244
File LR48471

Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- Small size for high density PC board mounting.
- 1 Form A contact arrangements.
- Creepage spacings of 6.5mm between contact and coil.
- Ideal for appliance, office equipment.
- 4,000VAC dielectric strength between contact and coil.
- UL Class F (155°C) approved insulation system.

Contact Data @ 20°C

Arrangements: 1 Form A (SPST-NO).
Material: Contact rating 3 - Silver.
Contact rating 10 - Silver alloy.
Max. Switching Rate: 300 ops./min. (no load).
30 ops./min. (rated load).
Expected Mechanical Life: 10 million operations.
Expected Electrical Life: 100,000 operations.
Minimum Contact Load: 10mA @ 5VDC.
Initial Contact Resistance: 100 milliohms max. @ 100mA, 6VDC.

Contact Ratings @ 20°C with relay properly vented. Remove vent nib after soldering and cleaning.

Contact Rating	UL/CSA Ratings	Type	Operations
3	3A @ 277VAC	Resistive	6,000
	10LRA/1.5FLA @ 120VAC	Motor	30,000**
	5.4LRA/0.9FLA @ 240VAC	Motor	30,000**
	3LRA/1.5FLA @ 120VAC	Motor	100,000*
	3A @ 250VAC	Resistive	100,000
	3A @ 250VAC UL	General Purpose	100,000
	3A @ 30VDC	Resistive	100,000
	2A @ 120VAC	Gen. Purpose	100,000***
	3A @ 120VAC	Resistive	100,000***
10	10LRA/1.5FLA @ 120VAC	Motor	30,000**
	5.4LRA/0.9FLA @ 240VAC	Motor	30,000**
	10A @ 250VAC	Resistive	100,000
	10A @ 30VDC	Resistive	100,000
	10A @ 250VAC UL	General Purpose	200,000

*Denotes test at 70°C ambient temperature.
**Denotes test at 85°C ambient temperature.
***Denotes test at 105°C ambient temperature.

Initial Dielectric Strength

Between Open Contacts: 750VAC 50/60 Hz. (1 minute).
Between Coil and Contacts: 4,000VAC 50/60 Hz. (1 minute).

Initial Insulation Resistance

Between Mutually Insulated Elements: 10^8 ohms, min. @ 500VDC.

Coil Data @ 20°C

Voltage: 3 to 24VDC.
Nominal Coil Power: Contact rating 3 = 200mW.
Contact rating 10 = 450mW.
Coil Temperature Rise: Contact rating 3 = 35°C max.
Contact rating 10 = 40°C max.
Max. Coil Power: 120% of nominal.
Duty Cycle: Continuous.

Coil Data @ 20°C

Rated Coil Voltage (VDC)	Coil Resistance (Ohms) ±10%		Must Operate Voltage (VDC)	Must Release Voltage (VDC)
	Contact Rating 3	Contact Rating 10		
3	45	20	2.25	0.15
5	125	55	3.75	0.25
12	720	320	9.00	0.60
24	2,800	1,280	18.00	1.20

Operate Data @ 20°C

Operate Time: 10 ms, max. (excluding bounce).
Release Time: 4 ms, max. (excluding bounce).

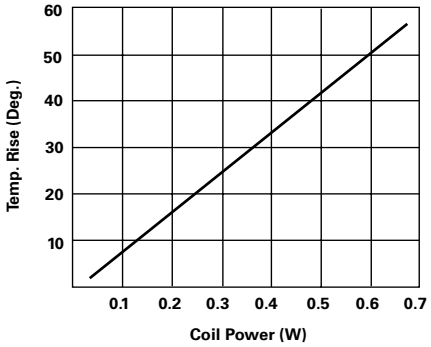
Environmental Data

Temperature Range: Storage: -40°C to +130°C.
Operating: -30°C to +55°C.
Contact Rating 3: -40°C to +80°C.
Contact Rating 10: -40°C to +55°C.
Vibration: Mechanical: 10 to 55 Hz., 1.5mm double amplitude.
Operational: 10 to 55 Hz., 1.5mm double amplitude.
Shock: Mechanical: 100g min.
Operational: 10g min.
Operating Humidity: 45 to 85% RH.

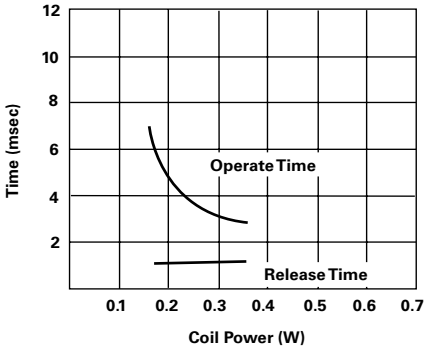
Mechanical Data

Termination: Printed circuit board.
Enclosures (94V-0 Flammability Ratings):
T77S: Immersion cleanable.
T77V: Vented, flux-tight, plastic cover.
Weight: 0.36 oz. (9g).

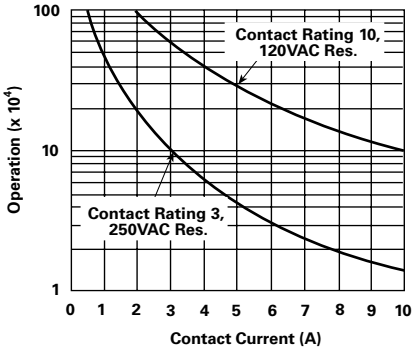
Figure 1 - Coil Temperature Rise



Operate Time



Life Expectancy



Note: Graphical data should not be used as a substitute for specific application verification. To be used for estimates only.

Ordering Information

Typical Part Number ▶	T77	V	1	D	10	-24

1. Basic Series:
T77 = Miniature PCB relay.

2. Enclosure:
V = Vented (Flux-tight)*
S = Immersion cleanable case

3. Contact Arrangement:
1 = (SPST-NO)

4. Coil Input:
D = DC Voltage

5. Contact Rating:
3 = 3A 10 = 10A

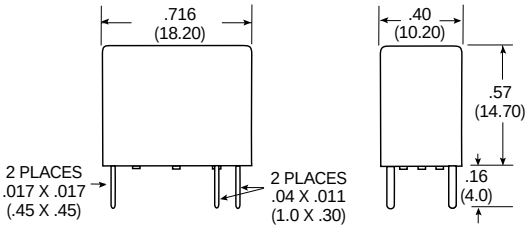
6. Coil Voltage:
03 = 3VDC 05 = 5VDC 12 = 12VDC 24 = 24VDC

*Not suitable for immersion cleaning processes.

Our authorized distributors are more likely to maintain the following items in stock for immediate delivery.

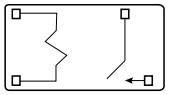
T77V1D3-12	T77V1D10-12	T77S1D3-12	T77S1D10-12
T77V1D3-24	T77V1D10-24	T77S1D3-24	T77S1D10-24

Outline Dimensions

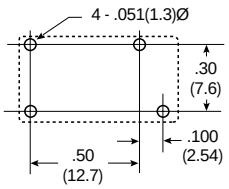


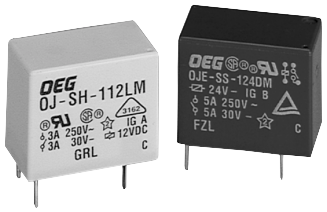
Wiring Diagram (Bottom View)

1 Form A



Suggested PC Board Layout (Bottom View)





OJ/OJE series

3-10 Amp Miniature, PC Board Relay

Appliances, HVAC, Industrial Control.

UL File No. E82292
CSA File No. LR48471
VDE File No. 10080
TUV File No. R75081

Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- Miniature size 18.2 x 10.2 x 14.7h.
- 1 Form A (SPST-NO) contact arrangement.
- Designed to meet UL, CSA, VDE, TUV requirements.
- Designed to meet 4kV dielectric between coil and contacts (OJ).
- Sensitive and standard coils available.
- Immersion cleanable, sealed version available.

Contact Data @ 20°C

Arrangements: 1 Form A (SPST-NO).
Material: Ag, Ag Alloy.
Max. Switching Rate: 300 ops./min. (no load).
30 ops./min. (rated load).
Expected Mechanical Life: 10 million operations (no load).
Expected Electrical Life: 100,000 operations (rated load).
Minimum Load: 100mA @5VDC.
Initial Contact Resistance: 100 milliohms @ 1A,6VDC.

Contact Ratings

Ratings: **OJ/OJE-LM:** 3A @ 250VAC resistive,
3A @ 28VDC resistive.
OJ/OJE-LMH: 8A @ 250VAC resistive,
8A @ 28VDC resistive.
OJ/OJE-DM: 5A @ 250VAC resistive,
5A @ 28VDC resistive.
OJ/OJE-HM: 10A @ 250VAC resistive,
10A @ 28VDC resistive.
Max. Switched Voltage: **AC:** 265V.
DC: 30V.
Max. Switched Power:
OJ/OJE-LM: 720VA, 90W
OJ/OJE-LMH: 1,800VA, 200W
OJ/OJE-DM: 1,200VA, 150W
OJ/OJE-HM: 2,500VA, 280W

Note: Consult factory regarding TV-5 rated models.

Initial Dielectric Strength

Between Open Contacts:
OJ: 750VAC 50/60 Hz. (1 minute).
OJE: 750VAC 50/60 Hz. (1 minute).
Between Coil and Contacts:
OJ: 4,000VAC 50/60 Hz. (1 minute).
OJE: 3,000VAC 50/60 Hz. (1 minute).
Surge Voltage Between Coil and Contacts:
OJ: 10,000V (1.2/50µs).
OJE: 5,000V (1.2/50µs).

Initial Insulation Resistance

Between Mutually Insulated Elements: 1,000M ohms min. @ 500VDCM.

Coil Data

Voltage: 5 to 48VDC.
Nominal Power: **OJ/OJE-LM and LMH:** 200 mW.
OJ/OJE-DMand HM: 450 mW.
Coil Temperature Rise:
OJ/OJE-LM and LMH : 30°C max., at rated coil voltage.
OJ/OJE-DM and HM: 40°C max., at rated coil voltage.
Max. Coil Power: 130% of nominal.
Duty Cycle: Continuous.

Coil Data @ 20°C

OJ/OJE-L Sensitive				
Rated Coil Voltage (VDC)	**Nominal Current (mA)**	**Coil Resistance (ohms) ± 10%**	**Must Operate Voltage (VDC)**	**Must Release Voltage (VDC)**
5	40.0	125	3.75	0.25
6	33.3	180	4.50	0.30
9	22.5	400	6.75	0.45
12	16.7	720	9.00	0.60
24	8.6	2,800	18.00	1.20
OJ/OJE-D and -H Standard				
Rated Coil Voltage (VDC)	**Nominal Current (mA)**	**Coil Resistance (ohms) ± 10%**	**Must Operate Voltage (VDC)**	**Must Release Voltage (VDC)**
5	91.0	55	3.50	0.25
6	75.0	80	4.20	0.30
9	50.0	180	6.30	0.45
12	37.5	320	8.40	0.60
24	18.8	1,280	16.80	1.20
48	9.4	5,100	33.60	2.40

Operate Data

Must Operate Voltage:
OJ/OJE -L: 75% of nominal voltage or less.
OJ/OJE -D and -H: 70% of nominal voltage or less.
Must Release Voltage:
OJ/OJE -L: 5% of nominal voltage or more.
OJ/OJE -D and -H: 5% of nominal voltage or more.

Operate Time: **OJ/OJE -L:** 15 ms max.
OJ/OJE -D and -H: 10 ms max.
Release Time: 4 ms max.

Environmental Data

Temperature Range:
Operating: **OJ/OJE-L:** -30°C to +80°C
OJ/OJE-D and -H: -30°C to +60°C.
Vibration, Mechanical: 10 to 55 Hz., 1.5mm double amplitude
Operational: 10 to 55 Hz., 1.5mm double amplitude.
Shock, Mechanical: 1,000m/s² (100G approximately).
Operational: 100m/s² (10G approximately).
Operating Humidity: 20 to 85% RH. (Non-condensing).

Mechanical Data

Termination: Printed circuit terminals.
Enclosure (94V-0 Flammability Ratings):
OJ/OJE-SS: Vented (Flux-tight), plastic cover.
OJ/OJE-SH: Sealed, plastic case.
Weight: 0.32 oz (9g) approximately.

Ordering Information

Typical Part Number ▶	OJE	-SH	-1	12	L	M	H	,095

1. Basic Series:
OJ = 4kV dielectric, coil and contacts.
OJE = 3kV dielectric, coil and contacts.

2. Enclosure:
SS = Vented (Flux-tight)*, plastic cover.
SH = Sealed, plastic case.

3. Termination:
1 = 1 pole

4. Coil Voltage:
05 = 5VDC 09 = 9VDC 24 = 24VDC
06 = 6VDC 12 = 12VDC 48 = 48VDC

5. Coil Input/Contact Rating:
L = Sensitive (200mW) Coil, 3A Contacts** D = Standard (450mW) Coil, 5A Contacts
H = Standard (450mW) Coil, 10A Contacts

6. Contact Arrangement:
M = 1 Form A, SPST-NO

7. High Capacity Contact Rating Option for Sensitive Coil:
H = 8A Contacts (Only available with Coil Input/Contact Rating code "L").

8. Suffix:
,000 = Standard model for enclosure code "SS" ,095 = Standard model for enclosure code "SH" Other Suffix = Custom model

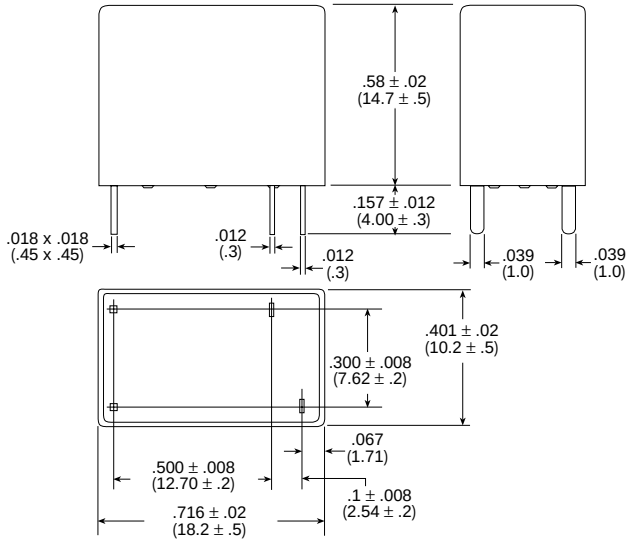
* Not suitable for immersion cleaning processes.

** For higher contact rating with sensitve coil, add suffix "H" to the end of the part number as indicated in step 7 of Ordering Information.

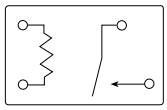
Our authorized distributors are more likely to stock the following items for immediate delivery.

OJ-SH-105HM,095
OJ-SH-112LMH,095
OJ-SH-124LMH,095
OJE-SH-105DM,095
OJE-SH-112DM,095
OJE-SH-124DM,095
OJE-SH-112HM,095
OJE-SH-105LMH,095
OJE-SH-112LMH,095
OJE-SH-124LMH,095

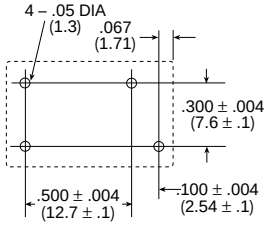
Outline Dimensions



Wiring Diagram (Bottom View)

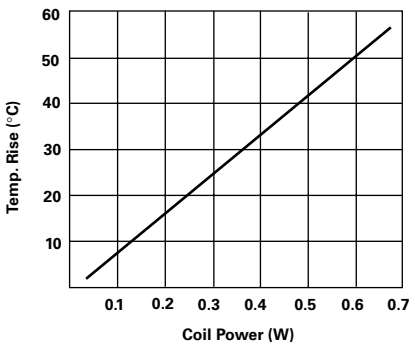


PC Board Layout (Bottom View)

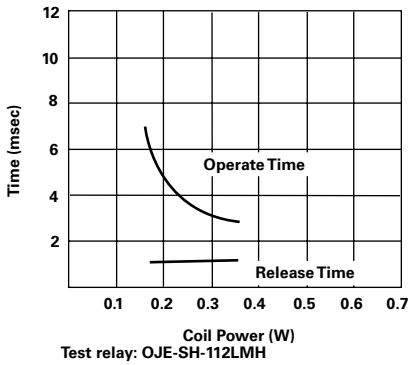


Reference Data

Coil Temperature Rise

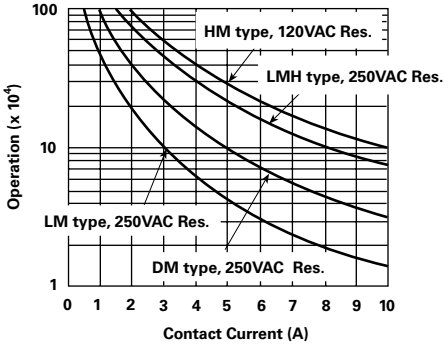


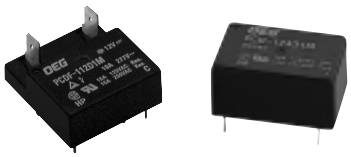
Operate Time



Test relay: OJE-SH-112LMH

Life Expectancy





PCD/PCDF series

15 Amp Low Profile Power PC Board Relay

Appliances, HVAC, Office Machines

UL File No. E82292
CSA File No. LR48471
TUV File No. R9751117

Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- Low profile (10mm), 15 Amp switching capacity.
- 1 Form A contact arrangement.
- Sensitive 200mW coil (250mW on 48VDC coil).
- Immersion cleanable, sealed version available.
- Quick connect terminals available (PCDF).

Contact Data @ 20°C

Arrangements: 1 Form A (SPST-NO).
Material: AgSnO.
Max. Switching Rate: 300 ops./min. (no load).
30 ops./min. (rated load).
Expected Mechanical Life: 10 million operations (no load).
Expected Electrical Life: 100,000 operations (rated load).
Minimum Load: 100mA @ 5VDC.
Initial Contact Resistance: 100 milliohms @ 1A, 6VDC.

Contact Ratings

Ratings: 15A @ 125VAC resistive (PCDF only, load must be carried through QC terminals to achieve this rating),
10A @ 250VAC resistive,
10A @ 24VDC resistive.

5A @ 125VAC inductive (cosø= 0.4, L/R=7msec),
5A @ 24VDC inductive (cosø= 0.4, L/R=7msec).

Max. Switched Voltage: **AC:** 250V.
DC: 24V.
Max. Switched Current: 15A.
Max. Switched Power: 1,800VA, 240W.

Initial Dielectric Strength

Between Open Contacts: 750VAC 50/60 Hz. (1 minute).
Between Coil and Contacts: 2,500VAC 50/60 Hz. (1 minute).
Surge Voltage Between Coil and Contacts: 5,000V (1.2 / 50µs).

Initial Insulation Resistance

Between Mutually Insulated Elements: 1,000M ohms min. @ 500VDCM.

Coil Data

Voltage: 5 to 48VDC.
Nominal Power: 200 mW except 48VDC coil (250mW).
Coil Temperature Rise: 20°C max., at rated coil voltage.
Max. Coil Power: 130% of nominal.
Duty Cycle: Continuous.

Coil Data @ 20°C

PCD &PCDF				
Rated Coil Voltage (VDC)	**Nominal Current (mA)**	**Coil Resistance (ohms) ± 10%**	**Must Operate Voltage (VDC)**	**Must Release Voltage (VDC)**
5	40.0	125	3.75	0.50
6	33.3	180	4.50	0.60
9	22.5	400	6.75	0.90
12	17.0	720	9.00	1.20
24	8.6	2,880	18.00	2.40
48	5.2	9,200	36.00	4.80

Operate Data

Must Operate Voltage: 75% of nominal voltage or less.
Must Release Voltage: 10% of nominal voltage or more.
Operate Time: 15 ms max.
Release Time: 8 ms max.

Environmental Data

Temperature Range:
Operating: -30°C to +70°C
Vibration, Mechanical: 10 to 55 Hz., 1.5mm double amplitude
Operational: 10 to 55 Hz., 1.5mm double amplitude.
Shock, Mechanical: 1,000m/s² (100G approximately).
Operational: 100m/s² (10G approximately).
Operating Humidity: 20 to 85% RH. (Non-condensing).

Mechanical Data

Termination: **PCD:** Printed circuit terminals.
PCDF: Printed circuit terminals and quick connect terminals.
Enclosure (94V-0 Flammability Ratings): Sealed plastic case.
Weight: **PCD:** 0.31 oz (9g) approximately.
PCDF: 0.35 oz (10g) approximately.

Ordering Information

Typical Part Number ►	PCD	-1	24	D	1	M	H	,000

1. Basic Series:
PCD = PC Board Terminals. PCDF = Quick Connect Terminals.

2. Termination:
1 = 1 pole

3. Coil Voltage:
05 = 5VDC 09 = 9VDC 24 = 24VDC
06 = 6VDC 12 = 12VDC 48 = 48VDC

4. Coil Input:
D = Standard

5. Contact Material:
1 = AgSnO

6. Contact Arrangement:
M = 1 Form A, SPST-NO

7. Enclosure:
Blank = Vented (Flux-tight)* plastic cover H = Sealed plastic case

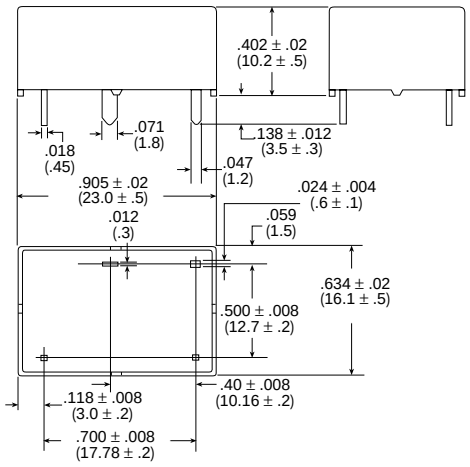
8. Suffix:
,000 = PCD standard model ,S000 = PCDF standard model Other Suffix = Custom model

* Not suitable for immersion cleaning processes.

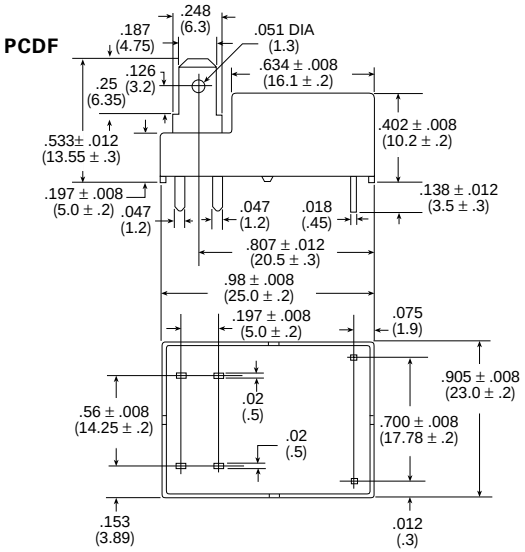
Our authorized distributors are more likely to maintain the following items in stock for immediate delivery.
None at present.

Outline Dimensions

PCD

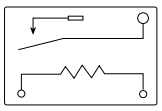


PCDF



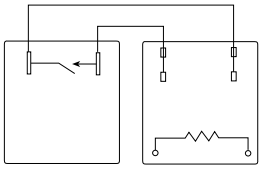
Wiring Diagrams

PCD



(Bottom View)

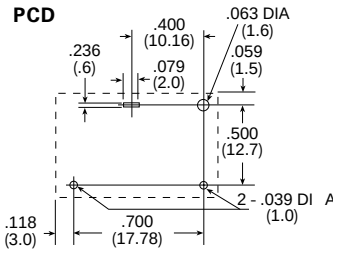
PCDF



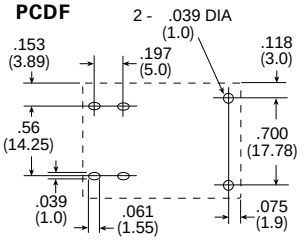
(Top View) (Bottom View)

PC Board Layouts (Bottom View)

PCD

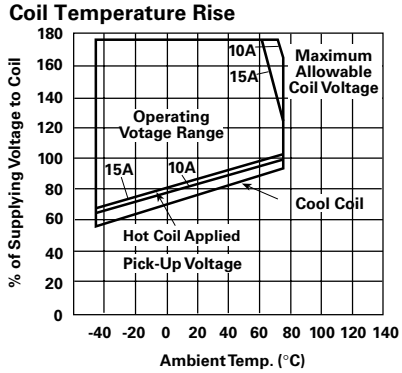


PCDF



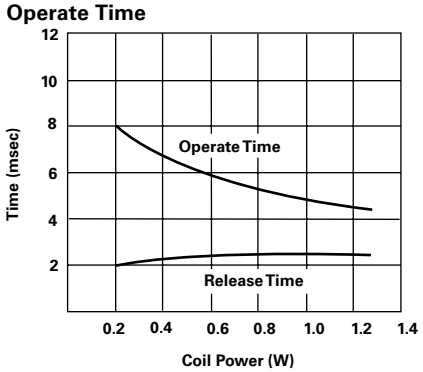
Reference Data

Coil Temperature Rise

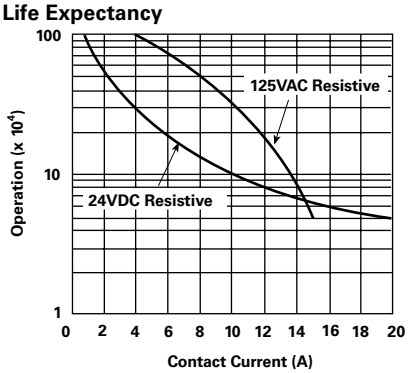


Note: This data is based on the max. allowable temperature for E type insulation coil (115°C).

Operate Time



Life Expectancy



Dimensions are shown for reference purposes only.

Dimensions are in inches over (millimeters) unless otherwise specified.

Specifications and availability subject to change.

PB series

10 Amp, PC Board Miniature Relay



c UL us File E214025

VDE File 4570-4940-0042

Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- Small size for high density PC board mounting.
- 1 Form A and 1 Form C contact arrangements.
- Creepage/clearance to VDE 0435 and VDE 0700.
- 2,500Vrms dielectric strength between contact and coil.
- UL Class F approved insulation system.
- Low-complexity design for enhanced reliability.
- High-temperature version available.

Contact Data

Arrangements: 1 Form A (SPST-NO) and 1 Form C (SPDT).
Material: Silver nickel 90/10.
Max. Switching Rate: 6,000 ops./min. (minimum load).
600 ops./min. (rated load).
Expected Mechanical Life: 5 million operations.
Expected Electrical Life :
PB1 &PB3 @85°C: 100,000 operations @ 6A, 240VAC (NO).
25,000 operations @ 10A, 240VAC (NO).
25,000 operations @ 10A/3A, 240VAC (NO/NC).
1,000 operations @ 10A/10A, 240VAC (NO/NC).
PBH @105°C: 250,000 operations @ 2A, 240VAC (NO).
150,000 operations @ 5A, 240VAC (NO).
100,000 operations @ 6A/6A, 240VAC (NO/NC).
Maximum Contact Rating: PB1 &PB3: NO (Make) 10A / NC (Break) 3A.
PBH: 6A (mtg. space 3mm); 4A (dense pack).
Maximum Switching Voltage: PB1 &PB3: 250VAC, 100 VDC.
PBH: 250VAC
Maximum Make Current (All): 15A (max. 4 sec at 10% duty cycle.)
Maximum Breaking Capacity:
PB1 &PB3: 750VA (NC contact) / 2,500VA (NO contact).
PBH: 1,500VA.

Initial Dielectric Strength

Between Open Contacts: 1,000Vrms.
Between Coil and Contacts: 2,500Vrms.
Surge Voltage Resistance Between Coil and Contacts: 4,000Vrms.
Clearance / Creeepage Distance: 3 mm / 4 mm.

Initial Insulation Resistance

Between Mutually Insulated Elements: 10^8 ohms.
Tracking Resistance of Relay Base: **PB1:** CTI 250
PB3: CTI 300
Insulation to VDE 0110b (2/79): Category C / Reference Voltage 250.

Coil Data @ 20°C

Voltage: 5, 6, 9, 12, 24 and 36VDC.
Nominal Coil Power: 360mW.
Operate Coil Power: 200mW.

Coil Data @ 20°C

Rated Coil Voltage (VDC)	Coil Resistance ±10% (ohms)	Must Operate Voltage (VDC)	Must Release Voltage (VDC)	Coil Current (mA)
5	70	3.75	0.5	72.0
6	100	4.5	0.6	60.0
9	225	6.75	0.9	40.0
12	400	9.0	1.2	30.0
24	1,600	18.0	2.4	15.0
36	3,600	27.0	3.6	60.0

Operate Data @ 20°C

Operate/Release Time: 20 ms, max. (excluding bounce).
Bounce Time: 15 ms, max.
Operate Coil Power: 200mW.

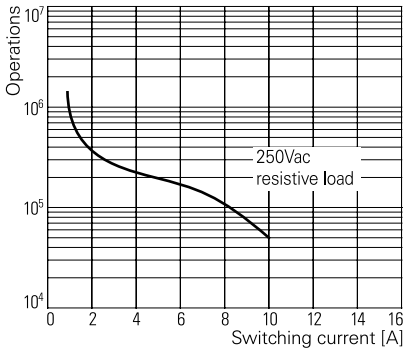
Environmental Data

Temperature Range (Operating): **PB1 or PB3:** -40°C to +85°C.
PBH: -20°C to +105°C.
Vibration: 30 to 400 Hz., 4g's, min.
Shock: Mechanical (Destruction): 30g min.
Protection Category: IP 54

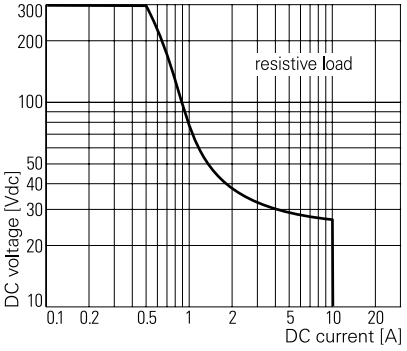
Mechanical Data

Termination: Printed circuit board.
Enclosure: Splash-resistant (unsealed) plastic case (UL Flammability Class V-0).
Weight: 0.2 oz. (5.4g).

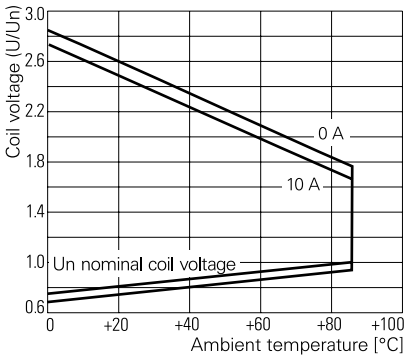
Contact Life (PB1 & PB3)



Max. DC Load Breaking Capacity (PB1 & PB3)



Coil Operating Range (PB1 & PB3)



Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.
www.tycoelectronics.com
Technical support:
Refer to inside back cover.

Ordering Information

Typical Part Number ►	PB	1	3	4	012

1. Basic Series:
PB = Miniature, 10A PC board relay.

2. Version:
1 = Standard version, CTI 250 3 = High CTI version, CTI 300 H = High Temerature (105°C) version, CTI 250

3. Contact Arrangement:
1 = 1 Form C (SPDT) 3 = 1 Form A (SPST-NO)

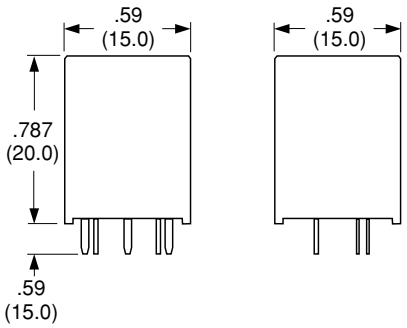
4. Contact Material:
4 = AgNi 90/10

4. Coil Input:
005 = 5VDC 006 = 6VDC 009 = 9VDC 012 = 12 VDC 024 = 24VDC 036 = 36VDC (Other voltages available as special order)

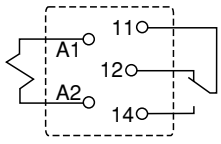
Our authorized distributors are more likely to maintain the following items in stock for immediate delivery.

PB114012
PB114024

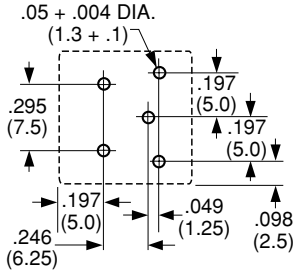
Outline Dimensions



Wiring Diagram (Bottom View)



Suggested PC Board Layout (Bottom View)





V23148 (U/UB) series

7 Amp, Latching or Non-latching, Miniature Printed Circuit Board Relay

c UL us File E214025

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- 1 Form A (SPST-NO), 1 Form B (SPST-NC) and1 Form C (SPDT).
- 8 amp rated current.
- Standard (non-latching) or latching types.
- Sensitive model requires 180mW to pull-in.
- 2,000Vrms and 4,000Vrms contact-to-coil dielectric versions.
- Washable (sealed) plastic case.

Contact Data @ 70°C

Arrangements: 1 Form A (SPST-NO) and 1 Form C (SPDT), single contact.
Material: Silver-nickel 0.15.
Expected Mechanical Life: 20 million operations.
Ratings:
Current: 7A, standard and latching types; 5A, sensitive type.
Voltage: 250VAC.
Power (breaking): 1,750 VA standard and latching; 1,250 VA, sensitive.
Voltage (breaking): 250VAC.
Current (making, max. 4s at 10% duty cycle): 12A.
Standard Type
7 amp resistive, 24VDC or 250VAC, 50,000 ops
5 amp resistive, 250VAC, 150,000 ops.
Latching Type
7 amp resistive, 24VDC or 250VAC, 50,000 ops.
5 amp resistive, 250VAC, 100,000 ops.
Sensitive Type
5 amp resistive, 250VAC, 100,000 ops.
5 amp resistive, 24VDC, 30,000 ops.

Initial Dielectric Strength

Between Open Contacts: 1,000Vrms.
Between Coil and Contacts: 2,000Vrms for standard dielectric version.
4,000Vrms for high dielectric version.
Creepage/Clearance: 2.5/2.5mm for standard dielectric version.
3.5/3.5mm for high dielectric version.
Surge Resistance Between Coil and Contacts: 5,000Vrms.

Coil Data DC @ 20°C

Nominal Coil Power: 330 - 800mW, dependent upon model.

Nominal Voltage VDC	DC Resistance in Ohms ±10%	Must Operate Voltage VDC	Drop-out Voltage VDC	Maximum Voltage VDC	Nominal Coil Current (mA)
Standard, non-latching models					
6	80	4.2	0.6	10.5	75.0
12	320	8.4	1.2	21.1	37.5
24	1,280	16.8	2.4	42.2	18.8
48	3,800	33.6	4.8	72.4	5.0
Sensitive, non-latching models					
6	110	4.4	0.6	12.6	54.6
12	440	8.8	1.2	25.3	27.3
24	1,780	17.5	2.4	50.6	13.5
48	4,000	35.0	4.8	76.3	12.0
Nominal Voltage VDC	**DC Resistance in Ohms ±10%**	**Must Operate Voltage VDC**	**Reset Voltage VDC**	**Maximum Voltage VDC**	**Nominal Coil Current (mA)**
Latching models					
6	33	4.7	1.5	6.2	181.8
12	119	9.4	3.0	12.4	100.8
24	475	18.7	6.0	24.7	50.5
48	1,750	37.4	12.0	49.4	27.4

Operate Data

Must Operate Voltage: See Coil Data table.
Operate Time: 6 ms, standard model; 7 ms, sensitive model; 5 ms, latching model.
Release (Reset) Time: 3 ms.
Bounce Time (N/O contact / N/C contact) : 2 ms / 10ms.
Switching Rate: 180,000 ops./hr. max. at rated load.

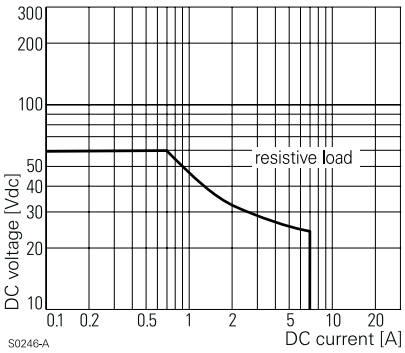
Environmental Data

Temperature Range:
Operating: -25°C to +70°C.
Vibration: (10 to 55 Hz.) 10g.
Shock (functional): 10g at 11ms, half-sine.

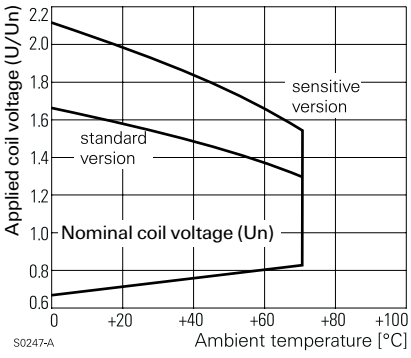
Mechanical Data

Termination: Printed circuit terminals.
Enclosure (94 V-0 rated): Sealed (RTIII) plastic case.
Weight: 0.34 oz. (9.5 g) approximately.

Max. DC Load Breaking Capacity



Coil Operating Range



Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.
www.tycoelectronics.com
Technical support:
Refer to inside back cover.

Ordering Information

Typical Part Number ▶	V23148	-A	0	0	03	-C	101

1. Basic Series:
V23148 = U/UB miniature printed circuit board relay.

2. Version
A = Non-latching. B = Latching.

3. Dielectric Strength, Coil-to-Contacts:
0 = 2,000Vrms. 1 = 4,000Vrms.

4. Coil Sensitivity:
0 = Standard. 1 = Sensitive (Not available on latching version).

5. Coil Voltage:
03 = 6VDC 05 = 12VDC 07 = 24VDC 08 = 48VDC

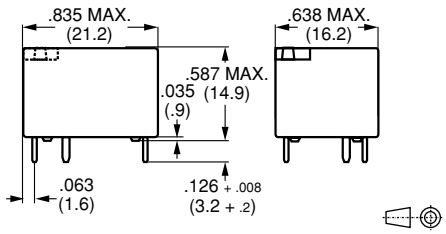
6. Contact Arrangement:
A = 1 Form C (SPDT) B = 1 Form A (SPST-NO) C = 1 Form B (SPST-NC)

7. Contact Material:
101 = Silver-nickel 0.15

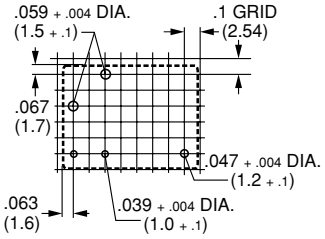
Our authorized distributors are more likely to maintain the following items in stock for immediate delivery.

None at present.

Outline Dimensions

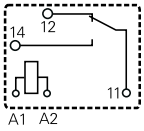


PC Board Layout (Bottom View)

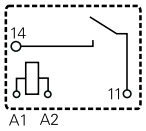


Wiring Diagrams (Bottom Views)

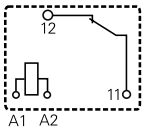
1 Form C

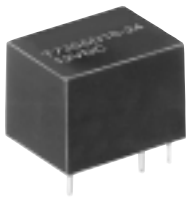


1 Form A



1 Form B





T73 series

Low Profile, 10 Amp Printed Circuit Board Relay

File E29244
File LR48471

Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- 10 amp switching capacity.
- UL Class F (155°C) coil insulation system standard.
- 1 Form A and 1 Form C contact arrangements.
- Ideal for domestic appliances, HVAC and security.
- Resists high temperature and various chemical solutions.
- Immersion cleanable, plastic sealed case available.

Contact Data @ 20°C

Arrangements: 1 Form A (SPST-NO) and 1 Form C (SPDT).
Material: Silver-cadmium oxide.
Max. Switching Rate: 240 ops./min. (no load).
30 ops./min. (rated load).
Expected Mechanical Life: 10 million operations.
Expected Electrical Life: 100,000 operations.
Minimum Load: 10mA @ 5VDC
Initial Contact Resistance: 100 milliohms max. @ 100mA, 6VDC.

Contact Ratings @ 20°C with relay properly vented. Remove vent nib after soldering and cleaning.

Contact Arrang.	Typical Ratings	Type	Operations
1 & 5	1/3HP NO @ 240VAC	Motor	30,000
	10A NO @ 120VAC	Resistive	100,000
	6A NO @ 120VAC	Resistive	100,000
	6A NO @ 24VDC	Resistive	100,000
	10A/5A @ 120VAC	Resistive	100,000
	1/4HP NO @ 120VAC	Motor	

Consult factory for other ratings.

Initial Dielectric Strength

Between Open Contacts: 750VAC 50/60 Hz. (1 minute).
Between Coil and Contacts: 2,000VAC 50/60 Hz. (1 minute).

Initial Insulation Resistance

Between Mutually Insulated Elements: 10^8 ohms min. @ 500VDC.
Ag contact rating.

Coil Data @ 20°C

Voltage: 3 to 48VDC.
Nominal Power: 450 milliwatts.
660 milliwatts for 48VDC coil.
Coil Temperature Rise: 35C° max, at rated coil voltage.
Max. Coil Power: 130% of nominal.
Duty Cycle: Continuous.

Coil Data @ 20°C

Rated Coil Voltage (VDC)	Coil Resistance (Ohms) +10%	Must Operate Voltage (VDC)	Must Release Voltage (VDC)
3	20	1.95	0.15
5	56	3.25	0.25
6	80	3.90	0.30
9	180	5.85	0.45
12	320	7.80	0.60
18	720	11.7	0.90
24	1,150	15.6	1.20
48	3,500	31.2	2.40

Operate Data @ 20°C

Operate Time: 10 ms (excluding bounce).
Release Time: 5 ms (excluding bounce).

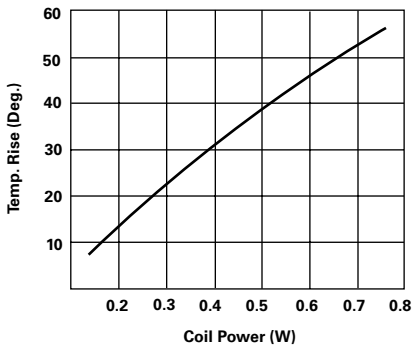
Environmental Data

Temperature Range:
Storage: -40°C to +130°C.
Operating: -30°C to +80°C.
Vibration, Mechanical: 10 to 55 Hz., 1.5mm double amplitude
Operational: 10 to 55 Hz., 1.5mm double amplitude.
Shock, Mechanical: 100g min.
Operational: 10g min.
Operating Humidity: 45 to 85% RH.

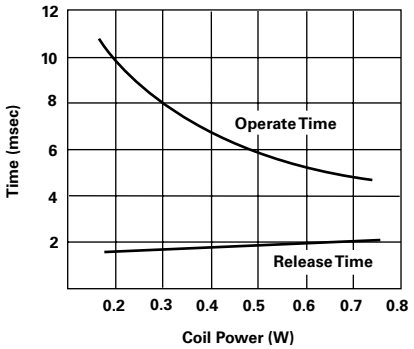
Mechanical Data

Termination: Printed circuit terminals.
Enclosure (94V-0 Flammability Ratings):
Weight: 0.42 oz. (12g).

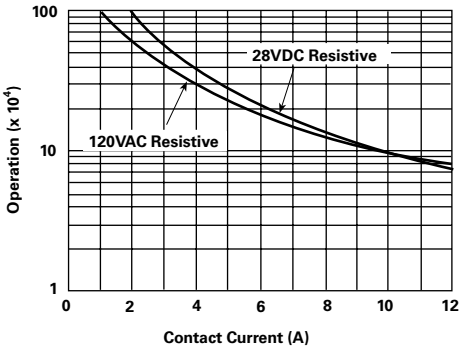
Figure 1 - Coil Temperature Rise



Operate Time



Life Expectancy



Note: Graphical data should not be used as a substitute for specific application verification. To be used for estimates only.

Ordering Information

Typical Part Number ▶	T73	S	5	D	1	5	-24

1. Basic Series:
T73 = Miniature, printed circuit board relay.

2. Enclosure:
V = Vented (Flux-tight)*
S = Immersion cleanable, plastic sealed case.

3. Contact Arrangement:
1 = 1 Form A (SPST-NO).
5 = 1 Form C (SPDT)

4. Coil Input:
D = DC voltage.

5. Relay Type:
1 = Standard coil.

6. Contact Material:
5 = Silver-Cadmium Oxide

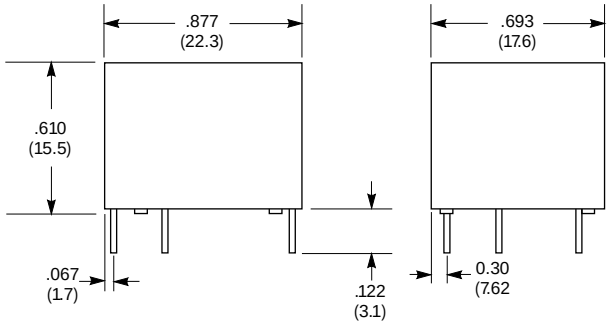
7. Coil Voltage:
03 = 3VDC 06 = 6VDC 12 = 12VDC 24 = 24VDC
05 = 5VDC 09 = 9VDC 18 = 18VDC 48 = 48VDC

* Not suitable for immersion cleaning process.

Our authorized distributors are more likely to maintain the following items in stock for immediate delivery.

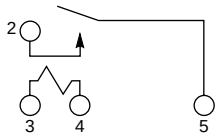
T73S5D15-05
T73S5D15-12
T73S5D15-24

Outline Dimensions

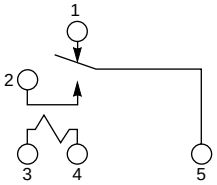


Wiring Diagrams (Bottom Views)

1 Form A

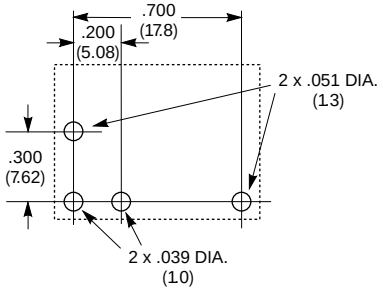


1 Form C

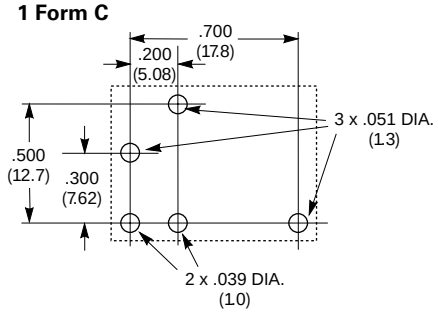


Suggested PC Board Layouts (Bottom Views)

1 Form A



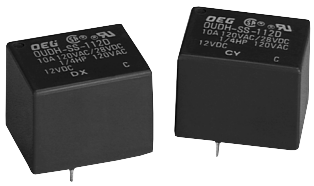
1 Form C



OUDH series

10 Amp Miniature, Sealed PC Board Relay

Appliances, HVAC, Office Machines.



UL File No. E58304
CSA File No. LR48471

Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- Low profile miniature power relay
- High density available on PC board due to small size.
- 450mW coil available.
- Meets 2kV dielectric between coil and contacts.
- Meets 5kV surge voltage.
- Immersion cleanable, sealed version available.

Contact Data @ 20°C

Arrangements: 1 Form A (SPST-NO), 1 Form C (SPDT).
Material: Ag Alloy.
Max. Switching Rate: 300 ops./min. (no load).
30 ops./min. (rated load).
Expected Mechanical Life: 10 million operations (no load).
Expected Electrical Life: 100,000 operations (rated load).
Minimum Load: 100mA @ 5VDC.
Initial Contact Resistance: 100 milliohms @ 1A, 6VDC.

Contact Ratings

Ratings: 10A @ 120VAC resistive,
10A @ 28VDC resistive,
1/4 HP @ 120VAC.

3A @ 120VAC inductive (cosø= 0.4),
3A @ 28VDC inductive (L/R= 7msec).

Max. Switched Voltage: **AC:** 240V.
DC: 110V.
Max. Switched Current: 10A.
Max. Switched Power: 1,200VA, 300W.

Initial Dielectric Strength

Between Open Contacts: 750VAC 50/60 Hz. (1 minute).
Between Coil and Contacts: 2,000VAC 50/60 Hz. (1 minute).
Surge Voltage Between Coil and Contacts: 5,000V (1.2/50µs).

Initial Insulation Resistance

Between Mutually Insulated Elements: 1,000M ohms min. @ 500VDCM.

Coil Data

Voltage: 5 to 48VDC.
Nominal Power: 450mW except 48VDC coil (660mW)
Coil Temperature Rise: 60°C max., at rated coil voltage.
Max. Coil Power: 130% of nominal.
Duty Cycle: Continuous.

Coil Data @ 20°C

OUDH				
Rated Coil Voltage (VDC)	**Nominal Current (mA)**	**Coil Resistance (ohms) ± 10%**	**Must Operate Voltage (VDC)**	**Must Release Voltage (VDC)**
5	89.6	56	3.75	0.50
6	75.0	80	4.50	0.60
9	50.0	180	6.75	0.90
12	37.5	320	9.00	1.20
24	20.9	1,280	18.00	2.40
48	13.7	3,500	36.00	4.80

Operate Data

Must Operate Voltage: 75% of nominal voltage or less.
Must Release Voltage: 10% of nominal voltage or more.
Operate Time: 10 ms max.
Release Time: 5 ms max.

Environmental Data

Temperature Range:
Operating: -30°C to +60°C
Vibration, Mechanical: 10 to 55 Hz., 1.5mm double amplitude
Operational: 10 to 55 Hz., 1.5mm double amplitude.
Shock, Mechanical: 1,000m/s² (100G approximately).
Operational: 100m/s² (10G approximately).
Operating Humidity: 20 to 85% RH. (Non-condensing).

Mechanical Data

Termination: Printed circuit terminals.
Enclosure (94V-0 Flammability Ratings):
OUDH-SS: Vented (Flux-tight), plastic cover.
OUDH-SH: Sealed, plastic case.
Weight: 0.35 oz (10g) approximately.

Ordering Information

Typical Part Number ▶	OUDH	-SH	-1	12	D	M	,000

1. Basic Series:
OUDH = Miniature, sealed PC board relay.

2. Enclosure:
SS = Vented (Flux-tight)* plastic cover.
SH = Sealed, plastic case.

3. Termination:
1 = 1 pole

4. Coil Voltage:
05 = 5VDC 09 = 9VDC 24 = 24VDC
06 = 6VDC 12 = 12VDC 48 = 48VDC

5. Coil Input:
D = Standard

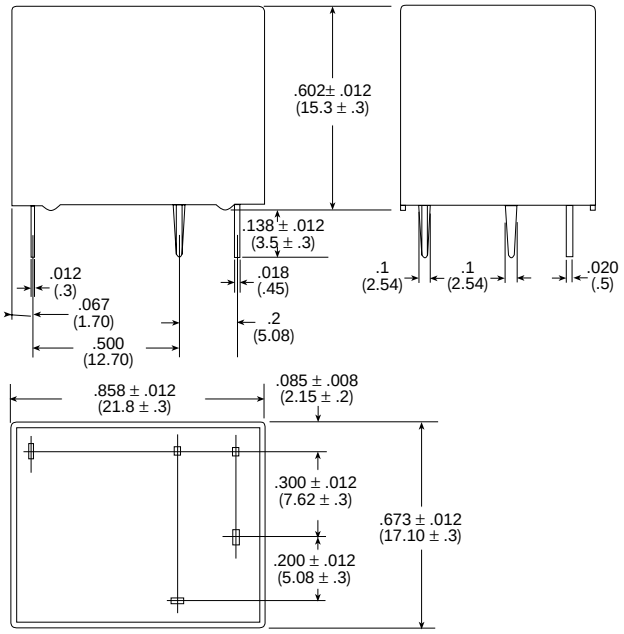
6. Contact Arrangement:
Blank = 1 Form C, SPDT M = 1 Form A, SPST-NO

7. Suffix:
,000 = Standard model Other Suffix = Custom model

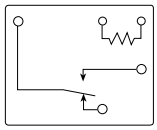
* Not suitable for immersion cleaning processes.

Our authorized distributors are more likely to maintain the following items in stock for immediate delivery.
None at present.

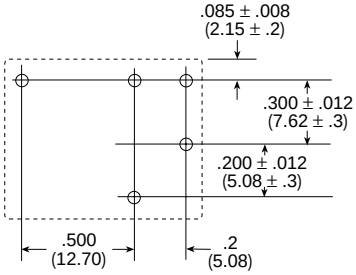
Outline Dimensions



Wiring Diagram (Bottom View)

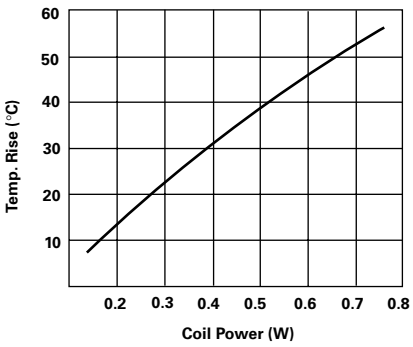


PC Board Layout (Bottom View)

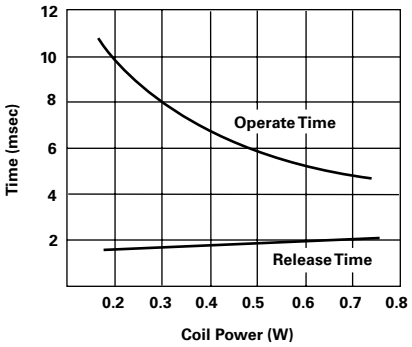


Reference Data

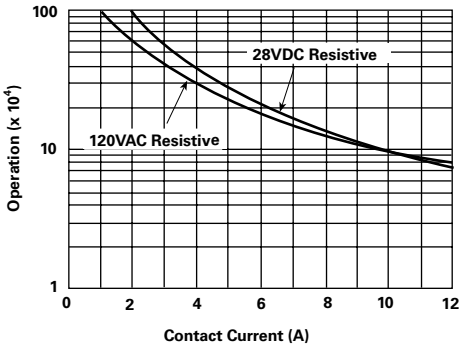
Coil Temperature Rise



Operate Time



Life Expectancy

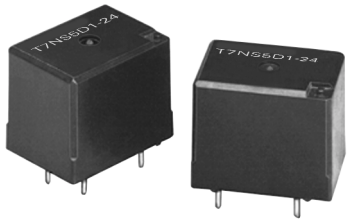


Dimensions are shown for reference purposes only.

Dimensions are in inches over (millimeters) unless otherwise specified.

Specifications and availability subject to change.

www.tycoelectronics.com
Technical support:
Refer to inside back cover.



T7N series

10 Amp Miniature PC Board Relay

File E22575
File LR48471

Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- Low cost, reduced height, 10A relay.
- 1 Form A and 1 Form C contact arrangement.
- Plastic materials employ UL 94V-0 flammability.
- UL class F (155°C) coil standard.
- Immersion cleanable, sealed package.
- Applications include appliance, HVAC, security system, garage opener light, emergency lighting.
- European "white goods" version available by special order.

Contact Data @ 20°C

Arrangements: 1 Form A (SPST-NO) and 1 Form C (SPDT).
Material: Silver-cadmium oxide.
Max. Switching Rate: **Mechanical:** 300 operations/min.
Electrical: 30 operations/min.
Expected Mechanical Life: 10 million operations min. (no load).
Expected Electrical Life: 100,000 operations min. (at rated coil voltage).
Minimum Contact Load: 10mA @ 5VDC.
Initial Contact Resistance: 100 milliohms, max. @ 1A, 6VDC.

UL Contact Ratings @ 20°C with relay properly vented. Remove vent nib after soldering and cleaning.

Contact Arrang.	UL/CSA Ratings	Type	Operations
1 & 5	1/4HP @ 240VAC	Motor	1,000*
	1/3HP @ 120VAC	Motor	6,000
	1/3HP NO @ 120VAC	Motor	6,000
	1/3HP NO @ 240VAC	Motor	6,000**
	5A/5A @ 240VAC	Resistive	6,000*
	10A NO @ 240VAC	Resistive	6,000
	10A/5A @ 240VAC	Gen. Purpose	6,000
	8A NC @ 240VAC	Resistive	6,000
	1/6HP NC @ 240VAC	Motor	6,000**
	1/4HP NO @ 240VAC	Motor	6,000**
	1/10HP NO @ 120VAC	Motor	6,000**
	10A/5A @ 240VAC	Resistive	6,000**
	TV-3 NO @ 120VAC	Tungsten	25,000
	6A NC @ 240VAC	Resistive	25,000**
	10A/5A @ 240VAC	Resistive	30,000
	10A/5A @ 28VDC	Resistive	30,000
	10A NO @ 240VAC	Resistive	30,000**
	10A NO @ 240VAC	Gen. Purpose	30,000**
	34.8LRA/6FLA NO @ 120VAC	Motor	100,000
	10A/5A @ 120VAC	Resistive	100,000
	5A/5A @ 240VAC	Resistive	100,000
	10A/5A @ 28VDC	Resistive	100,000

*Denotes test at 70°C ambient temperature.
**Denotes test at 85°C ambient temperature.

Initial Dielectric Strength

Between Open Contacts: 750VAC, 50/60 Hz. (1 min.)
Between Coil and Contacts: 2,000VAC, 50/60 Hz. (1 min.)

Initial Insulation Resistance

Between Mutually Insulated Elements: 10^8 ohms, min. @ 500VDC.

Coil Data

Voltage: 3 through 48VDC.
Nom. Power: 360mW.
Coil Temp. Rise: See Figure 1.
Max. Coil Power: 150% of nominal.
Duty Cycle: Continuous.

Coil Data @ 20°C

Rated Coil Voltage (VDC)	Coil Resistance ±10% (Ohms)	Must Operate Voltage (VDC)	Must Release Voltage (VDC)
3	25	2.1	.15
5	70	3.5	.25
6	100	4.2	.30
9	225	6.3	.45
12	400	8.4	.60
18	900	12.6	.90
24	1,600	16.8	1.20
36	3,600	25.2	1.80
48	6,400	33.6	2.40

Operate Data @ 20°C

Operate Time: 10 ms, max. (excluding bounce).
Release Time: 5 ms, max. (excluding bounce).

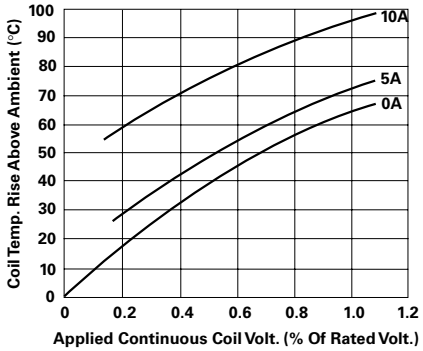
Environmental Data

Temperature Range:
Storage: -40°C to +130°C.
Operating: -40°C to +85°C. (no water condensation and no water drop).
Vibration: 10-55 Hz., .063" (1.6mm) double amplitude;
10-55 Hz., .079" (2.0mm) double amplitude.
Shock: **Mechanical:** 100g minimum.
Operational: 10g minimum.
Operating Humidity: 45 to 85% RH.

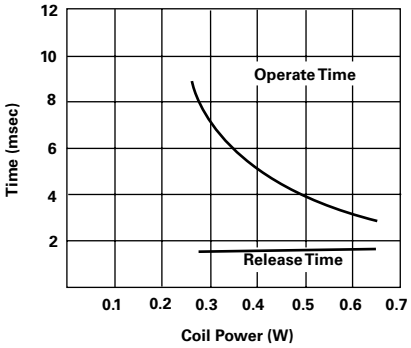
Mechanical Data

Termination: Printed circuit terminals.
Enclosure (UL 94V-O Flammability Ratings):
T7NS: Immersion cleanable case with knock-off nib for ventilation.
T7NV: Vented, flux-tight plastic cover.
Weight: 0.38 oz. (11g) approximately.

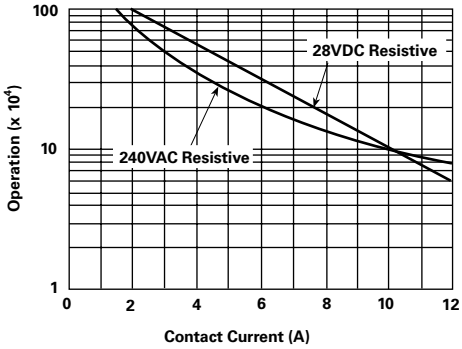
Figure 1 – Coil Temperature Rise



Operate Time



Life Expectancy



Note: Graphical data should not be used as a substitute for specific application verification. To be used for estimates only.

Ordering Information

Typical Part Number ▶	T7N	S	5	D	1	-24

1. Basic Series:
T7N = Miniature, printed circuit board relay.

2. Enclosure:
V = Vented, flux-tight* S = Immersion cleanable case with knock-off nib.

3. Contact Arrangement:
1 = 1 Form A(SPST-NO) 5 = 1 Form C (SPDT)

4. Coil Input:
D = DC Coil.

5. Contact Material:
1 = Silver-cadmium oxide contacts.

6. Coil Voltage:

03 = 3VDC	06 = 6VDC	12 = 12VDC	24 = 24VDC	48 = 48VDC
05 = 5VDC	09 = 9VDC	18 = 18VDC	36 = 36VDC	

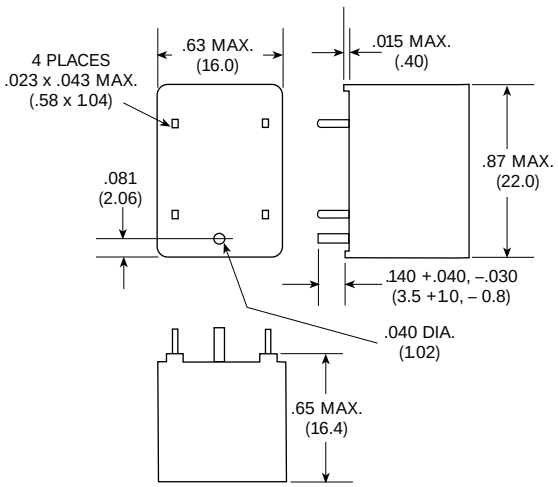
* Not suitable for immersion cleaning.

Our authorized distributors are more likely to maintain the following items in stock for immediate delivery.

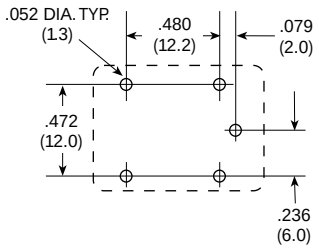
T7NS1D1-12	T7NS5D1-05	T7NS5D1-24
T7NS1D1-24	T7NS5D1-12	T7NS5D1-48

Outline Dimensions

Tolerance (unless otherwise noted): 3 decimal: ±.010 (±.254); 2 decimal: ±.015 (±.381).

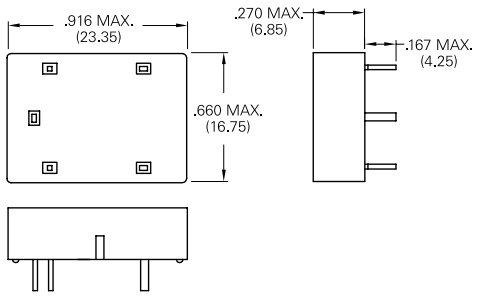


Suggested PC Board Layout (Bottom View)

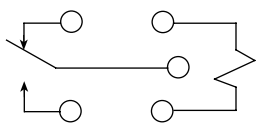


Socket

27E1064 socket is rated 10A @ 300VAC. UL Recognized for US and Canada. Designed to fit same suggested board layout as relay.



Wiring Diagram (Bottom View)



PCE series

10 Amp Miniature Power PC Board Relay

Appliances, HVAC, Office Machines



UL File No. E82292
CSA File No. LR48471
VDE File No. 6175

Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- Small, low profile package, 10 Amp switching capacity.
- 1 Form A and 1 Form C contact arrangements.
- UL Class F (155°C) insulation system standard
- Immersion cleanable, sealed version available.
- Applications include appliance, HVAC, security system, garage opener control, emergency lighting.

Contact Data @ 20°C

Arrangements: 1 Form A (SPST-NO) and 1 Form C (SPDT).
Material: Ag Alloy, AgSnO.
Max. Switching Rate: 300 ops./min. (no load).
30 ops./min. (rated load).
Expected Mechanical Life: 10 million operations (no load).
Expected Electrical Life: 100,000 operations (rated load).
Minimum Load: 100mA @ 5VDC.
Initial Contact Resistance: 100 milliohms @ 1A, 6VDC.

Contact Ratings

Ratings: 10A @ 250VAC resistive,
10A @ 120VAC resistive,
10A @ 28VDC resistive.

3A @ 250VAC inductive (cosø= 0.4),
3A @ 120VAC inductive (cosø= 0.4),
3A @ 28VDC inductive (L/R=7msec).

Max. Switched Voltage: **AC:** 250V.
DC: 28V.
Max. Switched Current: 10A.
Max. Switched Power: 2,500VA, 280W.

Initial Dielectric Strength

Between Open Contacts: 750VAC 50/60 Hz. (1 minute).
Between Coil and Contacts: 2,000VAC 50/60 Hz. (1 minute).
Surge Voltage Between Coil and Contacts: 4,000V (1.2 / 50µs).

Initial Insulation Resistance

Between Mutually Insulated Elements: 1,000M ohms min. @ 500VDCM.

Coil Data

Voltage: 6 to 48VDC.
Nominal Power: 360 mW
Coil Temperature Rise: 35°C max., at rated coil voltage.
Max. Coil Power: 130% of nominal.
Duty Cycle: Continuous.

Coil Data @ 20°C

PCE				
Rated Coil Voltage (VDC)	Nominal Current (mA)	Coil Resistance (ohms) ± 10%	Must Operate Voltage (VDC)	Must Release Voltage (VDC)
6	60	100	4.50	0.30
9	40	225	6.75	0.45
12	30	400	9.00	0.60
24	15	1,600	18.00	1.20
48	7	6,400	36.00	2.40

Operate Data

Must Operate Voltage: 75% of nominal voltage or less.
Must Release Voltage: 5% of nominal voltage or more.
Operate Time: 10 ms max.
Release Time: 5 ms max.

Environmental Data

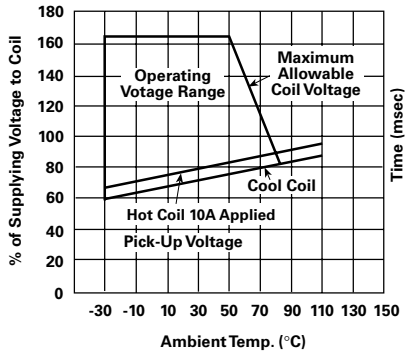
Temperature Range:
Operating: -30°C to +70°C
Vibration, Mechanical: 10 to 55 Hz., 1.5mm double amplitude
Operational: 10 to 55 Hz., 1.5mm double amplitude.
Shock, Mechanical: 1,000m/s² (100G approximately).
Operational: 100m/s² (10G approximately).
Operating Humidity: 20 to 85% RH. (Non-condensing).

Mechanical Data

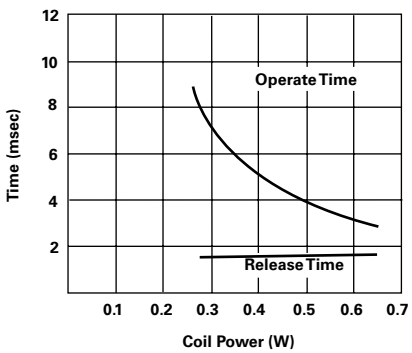
Termination: Printed circuit terminals.
Enclosure (94V-0 Flammability Ratings):
PCE: Sealed plastic case with knock-off nib for ventilation
Weight: 0.32 oz (11g) approximately.

Reference Data

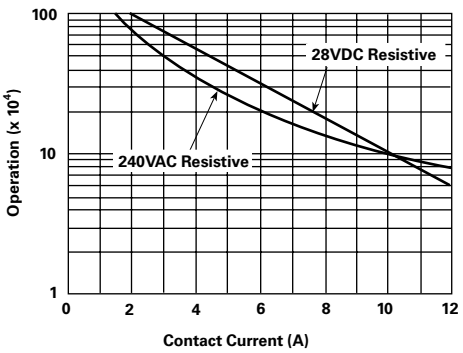
Coil Temperature Rise



Operate Time



Life Expectancy



Note: This data is based on the max. allowable temperature for E type insulation coil (115°C).

Ordering Information

Typical Part Number ►	PCE	-1	24	D	1	M		,000

1. Basic Series:
PCE = Miniature Power PC board relay.

2. Termination:
1 = 1 pole

3. Coil Voltage:
06 = 6VDC 12 = 12VDC 48 = 48VDC
09 = 9VDC 24 = 24VDC

4. Coil Input:
D = Standard

5. Contact Material:
1 = AgCdO 2 = AgSnO

6. Contact Arrangement:
Blank = 1 Form C, SPDT M = 1 Form A, SPST-NO

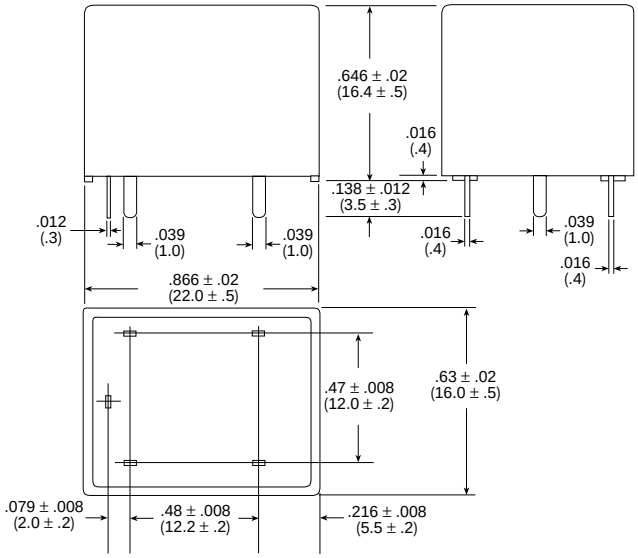
7. Enclosure:
Blank = Flux-tight plastic case. H = Sealed plastic case with knock-off nib for ventilation

8. Suffix:
,000 = Standard model Other Suffix = Custom model

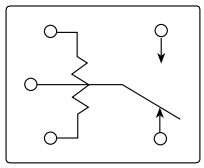
Our authorized distributors are more likely to maintain the following items in stock for immediate delivery.

PCE-112D1MH,000 PCE-112D1H,000
PCE-124D1MH,000 PCE-124D1H,000

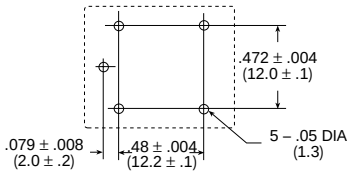
Outline Dimensions



Wiring Diagram (Bottom View)

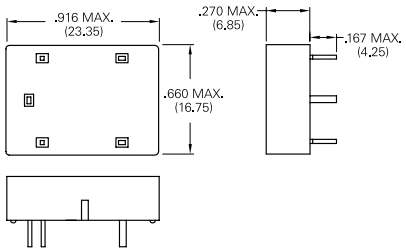


PC Board Layout (Bottom View)



Socket

27E1064 socket is rated 10A @ 300VAC. UL Recognized for US and Canada. Designed to fit same suggested board layout as relay.





ORWH series

10 Amp Miniature Power PC Board Relay

c UL us File No. E82292

Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- Compact relay with 1 Form A and 1 Form C contact arrangements.
- 10 Amp switching capacity.
- Flux-tight or sealed version available.
- Applications include appliance, HVAC, security system, garage opener control, emergency lighting.

Contact Data @ 20°C

Arrangements: 1 Form A (SPST-NO) and 1 Form C (SPDT).
Material: AgCdO.
Max. Switching Rate: 300 ops./min. (no load).
20 ops./min. (rated load).
Expected Mechanical Life: 10 million operations (no load).
Expected Electrical Life: 100,000 operations at 10A @ 250VAC res. (NO).
Minimum Load: 100mA @ 5VDC.
Initial Contact Resistance: 100 milliohms @ 1A, 6VDC.

Contact Ratings

Ratings: 10A/6A @ 250VAC resistive (NO/NC),
10A/6A @ 28VDC resistive (NO/NC),
15A @ 120VAC resistive (NO),
15A @ 28VDC resistive (NO),
10A @ 277VAC resistive (NO).
Max. Switched Voltage: **AC:** 277V.
DC: 30V.
Max. Switched Current: 15A.
Max. Switched Power: 2,770VA, 360W.

Initial Dielectric Strength

Between Open Contacts: 750VAC 50/60 Hz. (1 minute).
Between Coil and Contacts: 1,500VAC 50/60 Hz. (1 minute).
Surge Voltage Between Coil and Contacts: 3,000V (1.2 / 50µs).

Initial Insulation Resistance

Between Mutually Insulated Elements: 1,000M ohms min. @ 500VDC.

Coil Data @ 20°C

Voltage: 3 to 48VDC.
Nominal Power: 360 mW
Max. Coil Power: 130% of nominal.
Duty Cycle: Continuous.

Coil Data @ 20°C

ORWH				
Rated Coil Voltage (VDC)	Nominal Current (mA)	Coil Resistance (ohms) ± 10%	Must Operate Voltage (VDC)	Must Release Voltage (VDC)
3	120.0	25	2.1	0.3
5	71.4	70	3.5	0.5
6	60.0	100	4.2	0.6
9	44.4	225	6.3	0.9
12	40.0	400	8.4	1.2
24	15.0	1,600	16.8	2.4
48	7.5	6,400	33.6	4.8

Operate Data

Must Operate Voltage: 70% of nominal voltage or less.
Must Release Voltage: 10% of nominal voltage or more.
Operate Time: 10 ms max.
Release Time: 5 ms max.

Environmental Data

Temperature Range:
Operating: -30°C to +70°C
Vibration, Mechanical: 10 to 55 Hz., 1.5mm double amplitude
Operational: 10 to 55 Hz., 1.5mm double amplitude.
Shock, Mechanical: 1,000m/s² (100G approximately).
Operational: 100m/s² (10G approximately).
Operating Humidity: 20 to 85% RH. (Non-condensing).

Mechanical Data

Termination: Printed circuit terminals.
Enclosure (94V-0 Flammability Ratings):
ORWH-SS: Vented (flux-tight) cover.
ORWH-SH: Sealed plastic case. Note: Vent nib should be removed after soldering and cleaning.
Weight: 0.33 oz (9.5g) approximately.

Ordering Information

Typical Part Number ▶	ORWH	-SS	-1	12	D	M	,N000

1. Basic Series:
ORWH = Miniature Power PC board relay.

2. Enclosure:
SS = Vented (flux-tight)* plastic case. SH = Sealed plastic case

3. Number of Poles:
1 = 1 pole

4. Coil Voltage:
03 = 3VDC 06 = 6VDC 12 = 12VDC 48 = 48VDC
05 = 5VDC 09 = 9VDC 24 = 24VDC

5. Coil Input:
D = Standard

6. Contact Arrangement:
Blank = 1 Form C, SPDT M = 1 Form A, SPST-NO

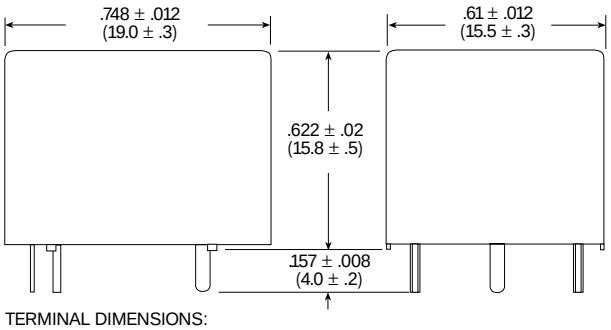
7. Option:
,N000= Standard model. Other Suffix = Custom model.

* Not suitable for immersion cleaning

Our authorized distributors are more likely to maintain the following items in stock for immediate delivery.

ORWH-SH-112DM,N000
ORWH-SH-124DM,N000
ORWH-SH-105D,N000
ORWH-SH-106D,N000
ORWH-SH-109D,N000
ORWH-SH-112D,N000
ORWH-SH-124D,N000
ORWH-SH-148D,N000
ORWH-SS-112DM,N000
ORWH-SS-124DM,N000
ORWH-SS-148DM,N000
ORWH-SS-105D,N000
ORWH-SS-106D,N000
ORWH-SS-109D,N000
ORWH-SS-112D,N000
ORWH-SS-124D,N000
ORWH-SS-148D,N000

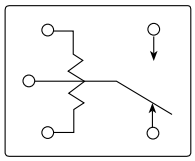
Outline Dimensions



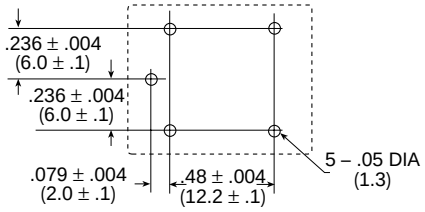
TERMINAL DIMENSIONS:
COIL: 0.024 (0.6) DIA.
LOAD: 0.12 x 0.35 (0.3 x 0.9)

Note: Only necessary terminals are present on 1 Form A models.

Wiring Diagram (Bottom View)

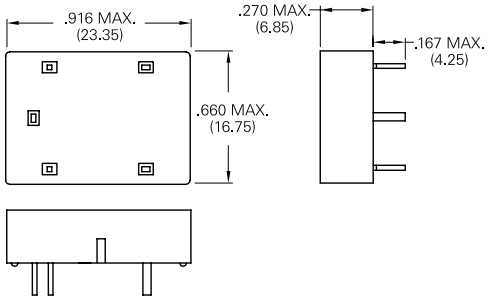


PC Board Layout (Bottom View)



Socket

27E1064 socket is rated 10A @ 300VAC. UL Recognized for US and Canada. Designed to fit same suggested board layout as relay.



T7C series

5 - 12 Amp Miniature Power PC Board Relay



File E22575

File LR48471

Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- Up to 12 amp switching capacity.
- UL Class F (155°C) coil insulation system.
- 1 Form A and 1 Form C contact arrangements.
- Ideal for domestic appliances, HVAC and security.
- Resists high temperature and various chemical solutions.

Contact Data @ 20°C

Arrangements: 1 Form A (SPST-NO) and 1 Form C (SPDT).
Material: Silver-cadmium oxide or silver.
Max. Switching Rate: 300 ops./min. (no load).
30 ops./min. (rated load).
Expected Mechanical Life: 10 million operations.
Expected Electrical Life: 100,000 operations.
Minimum Load: 10mA @ 5VDC
Initial Contact Resistance: Ag: 100 milliohms max. @ 100mA, 6VDC.
AgCdO: 100 milliohms max. @ 1A, 6VDC.

Silver Cadmium Oxide Contact Ratings @ 20°C with relay properly vented. Remove vent nib after soldering and cleaning.

Contact Arrang.	UL/CSA Ratings	Type	Operations
1 & 5	1/3HP NO @ 120VAC	Motor	6,000**
	TV-2 NO @ 120VAC	Tungsten	25,000**
	5.4LRA/0.9FLA NO @ 240VAC	Motor	30,000***
	10LRA/1.5FLA @ 120VAC	Motor	30,000***
	12A NO @ 120VAC	Resistive/GP	100,000*
	34.8LRA/6FLA NO @ 120VAC	Motor	100,000**
	10A/5A @ 240VAC	Resistive/GP	100,000**
	10A/5A @ 28VDC	Resistive	100,000**
	240VA, 240VAC	Pilot Duty	100,000**
	4LRA/4FLA NO @ 120VAC	Motor	100,000****
	4LRA/2FLA NC @ 120VAC	Motor	100,000****
	6LRA/6FLA NO @ 120VAC	Motor	100,000***
	7A @ 277VAC	Resistive/GP	100,000
	10LRA/2.5FLA NO @ 277VAC	Motor	100,000

Consult factory for other ratings.

*Denotes test at 60°C ambient temperature.
**Denotes test at 70°C ambient temperature.
***Denotes test at 85°C ambient temperature.
****Denotes test at 105°C ambient temperature.

Silver Contact Ratings @ 20°C with relay properly vented. Remove vent nib after soldering and cleaning.

Contact Arrang.	Ratings	Type	Operations
1 & 5	5A @ 120VAC	Resistive	6,000
	5A @ 28VDC	Resistive	6,000

Initial Dielectric Strength

Between Open Contacts: 750VAC 50/60 Hz. (1 minute).
Between Coil and Contacts: 1,500VAC 50/60 Hz. (1 minute).

Initial Insulation Resistance

Between Mutually Insulated Elements: 10^8 ohms min. @ 500VDC.

Coil Data @ 20°C

Voltage: 3 to 48VDC.
Nominal Power: 360 milliwatts.
510 milliwatts for 48VDC coil.
Coil Temperature Rise: 35C° max, at rated coil voltage.
Max. Coil Voltage: 130% of nominal.
Duty Cycle: Continuous.

Coil Data @ 20°C

Rated Coil Voltage (VDC)	Coil Resistance (Ohms) +10%	Must Operate Voltage (VDC)	Must Release Voltage (VDC)
3	25	2.25	0.15
5	70	3.50	0.25
6	100	4.50	0.30
9	225	6.75	0.45
12	400	9.00	0.60
24	1,600	18.00	1.20
48	4,500	36.00	2.40

Operate Data @ 20°C

Operate Time: 10 ms (excluding bounce).
Release Time: 5 ms (excluding bounce).

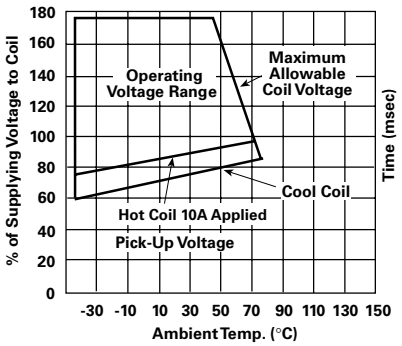
Environmental Data

Temperature Range:
Storage: -40°C to +130°C.
Operating: -40°C to +85°C.
Vibration, Mechanical: 10 to 55 Hz., 1.5mm double amplitude
Operational: 10 to 55 Hz., 1.5mm double amplitude.
Shock, Mechanical: 100g min.
Operational: 10g min.
Operating Humidity: 45 to 85% RH.

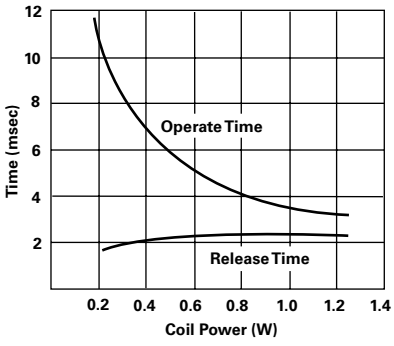
Mechanical Data

Termination: Printed circuit terminals.
Enclosure (94V-0 Flammability Ratings):
T7CS: Immersion cleanable with knock-off nib.
T7CV: Vented, flux-tight, plastic cover with knock-off nib.
Weight: 0.42 oz. (12g).

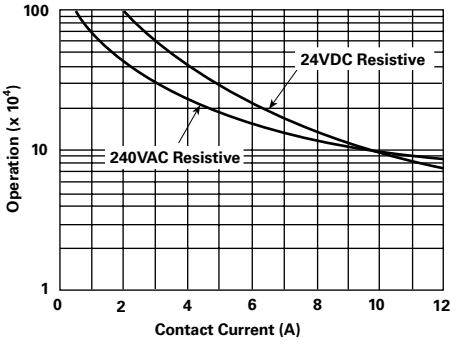
Figure 1 - Coil Temperature Rise



Operate Time



Life Expectancy



Note: Graphical data should not be used as a substitute for specific application verification. To be used for estimates only. Graphical data applicable to model with silver cadmium oxide contacts.

Ordering Information

Typical Part Number ▶	T7C	V	5	D		-24

1. Basic Series:
T7C = Miniature power relay.

2. Enclosure:
V = Vented (Flux-tight)* S = Immersion cleanable case with knock-off nib.

3. Contact Arrangement:
1 = 1 Form A (SPST-NO) 5 = 1 Form C (SPDT)

4. Coil Input:
D = DC Voltage

5. Contact Material:
Leave Blank = Silver Cadmium Oxide (12A Max. Rating) 2 = Silver (5A Max. Rating)

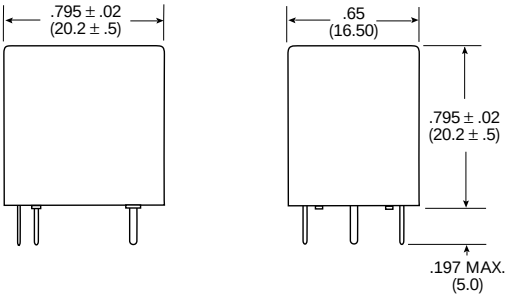
6. Coil Voltage:
03 = 3VDC 05 = 5VDC 06 = 6VDC 09 = 9VDC
12 = 12VDC 18 = 18VDC 24 = 24VDC 48 = 48VDC

* Not suitable for immersion cleaning processes.

Our authorized distributors are more likely to maintain the following items in stock for immediate delivery.

T7CV5D-05	T7CV5D-12	T7CS5D-05	T7CS5D-12
T7CV5D-06	T7CV5D-24	T7CS5D-06	T7CS5D-24

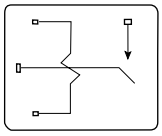
Outline Dimensions



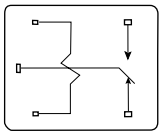
Movable Contact Terminal:
.012 x.039 (0.3 x 1.0)
Stationary Contact Terminals:
.012 x .039 (0.3 x 1.0)
Coil Terminals:
.022 x .022 (.56 x .56)

Wiring Diagrams (Bottom Views)

1 Form A

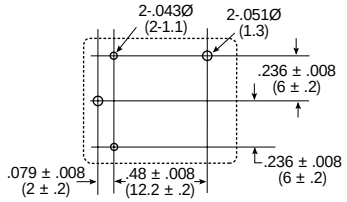


1 Form C

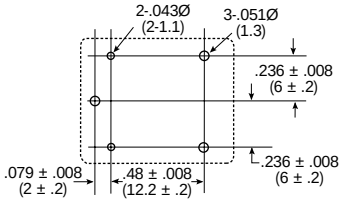


Suggested PC Board Layouts (Bottom Views)

1 Form A

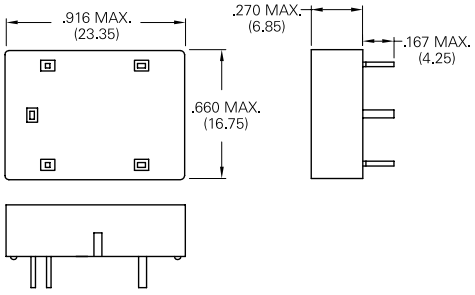


1 Form C



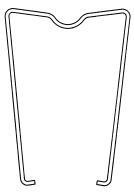
Socket

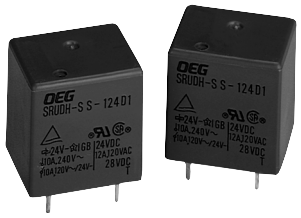
27E1064 socket is rated 10A @ 300VAC. UL Recognized for US and Canada. Designed to fit same suggested board layout as relay.



Hold-Down Spring

20C430 spring is designed to secure T7C relay in 27E1064 socket.





SRUDH series

12 Amp Miniature Power PC Board Relay

Appliances, HVAC, Office Machines

UL File No. E82292
CSA File No. LR48471
TUV File No. R60271

Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- Small package, 12 Amp switching capcity.
- 1 Form A and 1 Form C contact arrangements.
- Immersion cleanable, sealed version available.
- Applications include appliance, HVAC, security system, garage opener control, emergency lighting.

Contact Data @ 20°C

Arrangements: 1 Form A (SPST-NO) and 1 Form C (SPDT).
Material: Ag Alloy.
Max. Switching Rate: 300 ops./min. (no load).
30 ops./min. (rated load).
Expected Mechanical Life: 10 million operations (no load).
Expected Electrical Life: 100,000 operations (rated load).
Minimum Load: 100mA @ 5VDC.
Initial Contact Resistance: 100 milliohms @ 1A, 6VDC.

Contact Ratings

Ratings: 12A @ 120VAC resistive,
10A @ 240VAC resistive,
10A @ 28VDC resistive.

4A @ 120VAC inductive (cosø= 0.4),
4A @ 28VDC inductive (L/R=7msec)

Max. Switched Voltage: **AC:** 240V.
DC: 28V.
Max. Switched Current: 12A.
Max. Switched Power: 2,400VA, 300W.

Initial Dielectric Strength

Between Open Contacts: 750VAC 50/60 Hz. (1 minute).
Between Coil and Contacts: 1,500VAC 50/60 Hz. (1 minute).
Surge Voltage Between Coil and Contacts: 3,000V (1.2 / 50µs).

Initial Insulation Resistance

Between Mutually Insulated Elements: 1,000M ohms min. @ 500VDCM.

Coil Data

Voltage: 6 to 48VDC.
Nominal Power: 360 mW except 48VDC coil (510mW)
Coil Temperature Rise: 35°C max., at rated coil voltage.
Max. Coil Power: 130% of nominal.
Duty Cycle: Continuous.

Coil Data @ 20°C

SRUDH				
Rated Coil Voltage (VDC)	Nominal Current (mA)	Coil Resistance (ohms) ± 10%	Must Operate Voltage (VDC)	Must Release Voltage (VDC)
6	60	100	4.50	0.60
9	40	225	6.75	0.90
12	30	400	9.00	1.20
24	15	1,600	18.00	2.40
48	10	4,500	36.00	4.80

Operate Data

Must Operate Voltage: 75% of nominal voltage or less.
Must Release Voltage: 10% of nominal voltage or more.
Operate Time: 15 ms max.
Release Time: 5 ms max.

Environmental Data

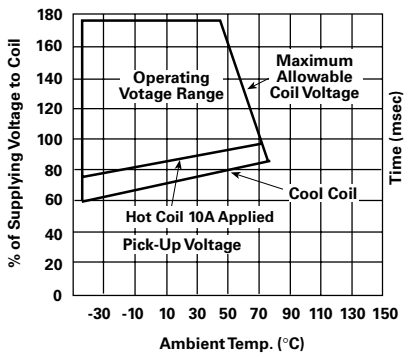
Temperature Range:
Operating: -30°C to +60°C
Vibration, Mechanical: 10 to 55 Hz., 1.5mm double amplitude
Operational: 10 to 55 Hz., 1.5mm double amplitude.
Shock, Mechanical: 1,000m/s² (100G approximately).
Operational: 100m/s² (10G approximately).
Operating Humidity: 20 to 85% RH. (Non-condensing).

Mechanical Data

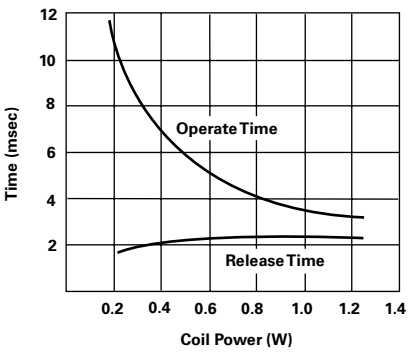
Termination: Printed circuit terminals.
Enclosure (94V-0 Flammability Ratings):
SRUDH-SS: Vented (Flux-tight) plastic cover
SRUDH-SH: Sealed plastic case
Weight: 0.42 oz (12g) approximately.

Reference Data

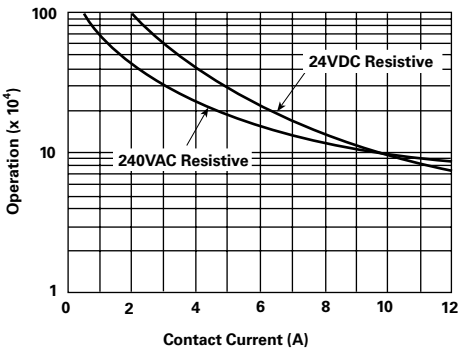
Coil Temperature Rise



Operate Time



Life Expectancy



Note: Rise data is based on the max. allowable temp. for E type insulation coil (115°C).

Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.
www.tycoelectronics.com
Technical support:
Refer to inside back cover.

Ordering Information

Typical Part Number ►	SRUDH	-SS	-1	12	D	M	1	,000

1. Basic Series:
SRUDH = Miniature Power PC board relay.

2. Enclosure:
SS = Vent (Flux-tight)* plastic cover.
SH = Sealed, plastic case.

3. Termination:
1 = 1 pole

4. Coil Voltage:
06 = 6VDC 12 = 12VDC 48 = 48VDC
09 = 9VDC 24 = 24VDC

5. Coil Input:
D = Standard

6. Contact Arrangement:
Blank = 1 Form C, SPDT M = 1 Form A, SPST-NO

7. Contact Material:
1 = AgCdO

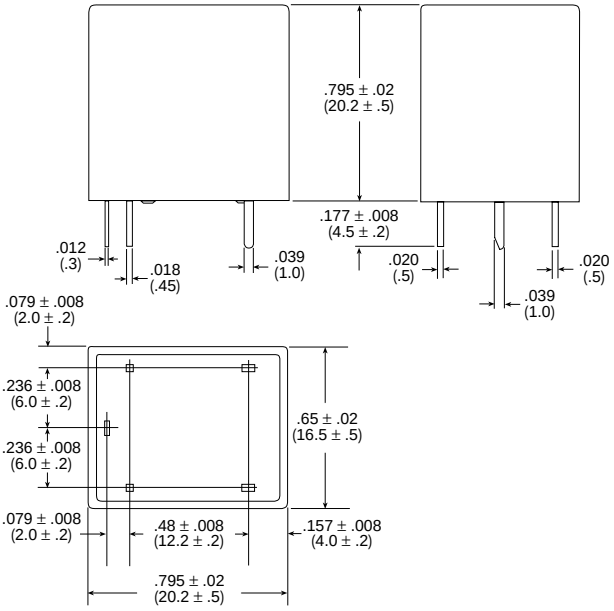
8. Suffix:
,000 = Standard model Other Suffix = Custom model

* Not suitable for immersion cleaning processes.

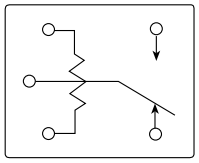
Our authorized distributors are more likely to maintain the following items in stock for immediate delivery.

SRUDH-SH-112D1,000 SRUDH-SH-112DM1,000
SRUDH-SH-124D1,000 SRUDH-SH-124DM1,000

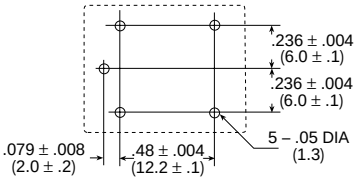
Outline Dimensions



Wiring Diagram (Bottom View)

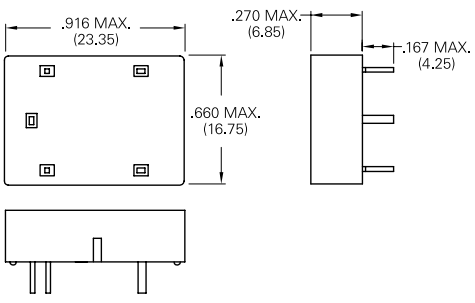


PC Board Layout (Bottom View)



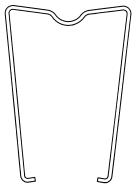
Socket

27E1064 socket is rated 10A @ 300VAC. UL Recognized for US and Canada. Designed to fit same suggested board layout as relay.



Hold-Down Spring

20C430 spring is designed to secure SRUDH relay in 27E1064 socket.





SRUUH series

15 Amp Miniature Power PC Board Relay

UL File No. E82292
TUV File No. R60271

Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- 15 Amp switching capacity.
- 1 Form A and 1 Form C contact arrangements.
- Immersion cleanable, sealed version available.
- Applications include appliance, HVAC, security system, garage opener control, emergency lighting.

Contact Data @ 20°C

Arrangements: 1 Form A (SPST-NO) and 1 Form C (SPDT).
Material: Silver cadmium oxide.
Max. Switching Rate: 300 ops./min. (no load).
20 ops./min. (rated load).
Expected Mechanical Life: 10 million operations (no load).
Expected Electrical Life: 100,000 operations (rated load, relay vented).
Minimum Load: 100mA @ 5VDC.
Initial Contact Resistance: 100 milliohms @ 1A, 6VDC.

Contact Ratings

Ratings: 15A @ 120VAC resistive,
10A @ 240VAC resistive,
10A @ 28VDC resistive.
Max. Switched Voltage: AC: 240V.
DC: 28V.
Max. Switched Current: 15A.
Max. Switched Power: 2,400VA, 300W.

Note: Sealed relays should be vented after soldering and cleaning in order to achieve listed ratings.

Initial Dielectric Strength

Between Open Contacts: 750VAC 50/60 Hz. (1 minute).
Between Coil and Contacts: 1,500VAC 50/60 Hz. (1 minute).
Surge Voltage Between Coil and Contacts: 3,000V (1.2 / 50µs).

Initial Insulation Resistance

Between Mutually Insulated Elements: 100M ohms min. @ 500VDC.

Coil Data

Voltage: 3 to 48VDC.
Nominal Power: 360 mW except 48VDC coil (510mW).
Coil Temperature Rise: 60°C max., at rated coil voltage.
Max. Coil Power: 130% of nominal.
Duty Cycle: Continuous.

Coil Data @ 20°C

SRUUH				
Rated Coil Voltage (VDC)	**Nominal Current (mA)**	**Coil Resistance (ohms) ± 10%**	**Must Operate Voltage (VDC)**	**Must Release Voltage (VDC)**
3	120	25	2.25	0.30
6	60	100	4.50	0.60
9	40	225	6.75	0.90
12	30	400	9.00	1.20
24	15	1,600	18.00	2.40
48	10	4,500	36.00	4.80

Operate Data

Must Operate Voltage: 75% of nominal voltage or less.
Must Release Voltage: 10% of nominal voltage or more.
Operate Time: 15 ms max.
Release Time: 5 ms max.

Environmental Data

Temperature Range:
Operating: -30°C to +60°C
Vibration, Mechanical: 10 to 55 Hz., 1.5mm double amplitude
Operational: 10 to 55 Hz., 1.5mm double amplitude.
Shock, Mechanical: 1,000m/s² (100G approximately).
Operational: 100m/s² (10G approximately).
Operating Humidity: 20 to 85% RH. (Non-condensing).

Mechanical Data

Termination: Printed circuit terminals.
Enclosure (94V-0 Flammability Ratings):
SRUUH-SS: Vented (Flux-tight) plastic cover
SRUUH-SH: Sealed plastic case
Weight: 0.42 oz (12g) approximately.

Ordering Information

Typical Part Number ▶	SRUUH	-SS	-1	12	D	1	M	,000

1. Basic Series:
SRUUH = Miniature Power PC board relay.

2. Enclosure:
SS = Vent (Flux-tight)* plastic cover. SH = Sealed, plastic case.

3. Termination:
1 = 1 pole

4. Coil Voltage:
03 = 3VDC 09 = 9VDC 24 = 24VDC
06 = 6VDC 12 = 12VDC 48 = 48VDC

5. Coil Input:
D = Standard

6. Contact Material:
1 = Silver Cadmium Oxide

6. Contact Arrangement:
Leave Blank = 1 Form C, SPDT M = 1 Form A, SPST-NO

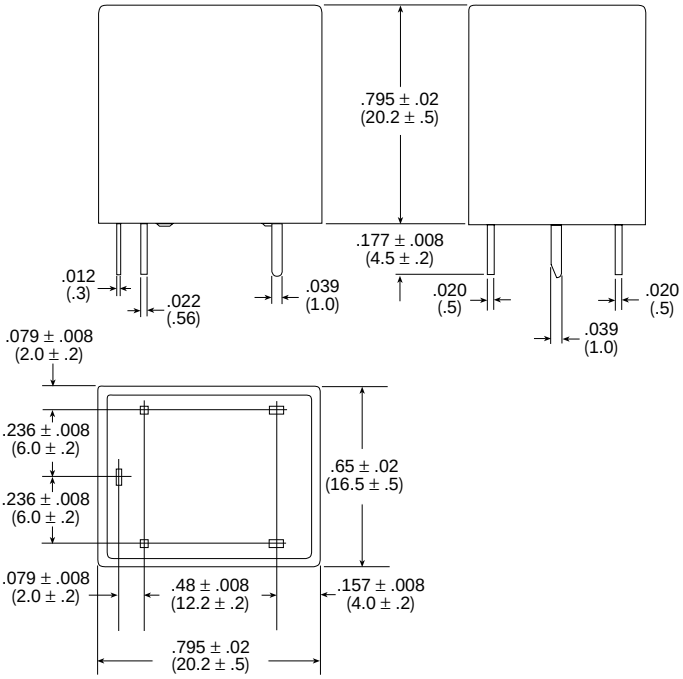
7. Option:
,000= Standard model. Other Suffix = Custom model.

* Not suitable for immersion cleaning processes.

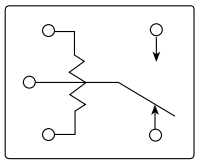
Our authorized distributors are more likely to maintain the following items in stock for immediate delivery.

SRUUH-SH112D1M,000 SRUUH-SH112D1,000
SRUUH-SH124D1M,000 SRUUH-SH124D1,000

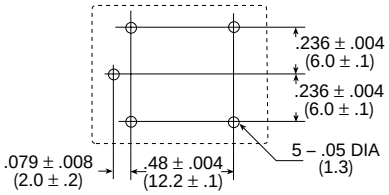
Outline Dimensions



Wiring Diagram (Bottom View)



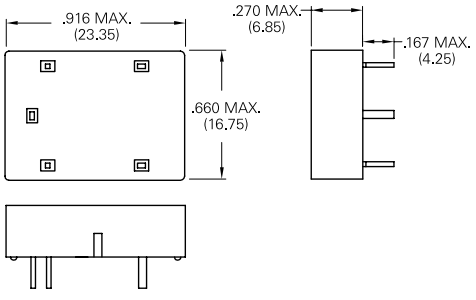
PC Board Layout (Bottom View)



Note: Only necessary terminals are present on 1 Form A (SPST-NO) models.

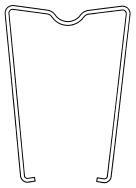
Socket

27E1064 socket is rated 10A @ 300VAC. UL Recognized for US and Canada. Designed to fit same suggested board layout as relay.



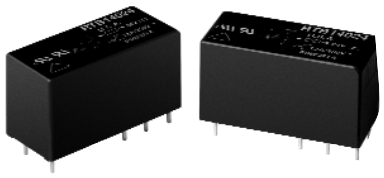
Hold-Down Spring

20C430 spring is designed to secure SRUUH relay in 27E1064 socket.



RT series (DC Coil)

16 Amp PC Board Miniature Relay



c UL us File E22575
File LR15734
NR 6106

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- SPST through DPDT contact arrangements.
- Immersion cleanable and flux tight versions available.
- VDE 10mm spacing, 5kV dielectric, coil to contacts.
- UL Class F (155°C) coil insulation system.
- Conforms to UL 508, 1873, 353 and 1950.
- Low profile; 15.7mm height.
- Sensitive coil; 400mW.
- Withstand surge voltage of 10,000V.
- Potter & Brumfield or Schrack brand.

Contact Data

Arrangements: 1 Form A (SPST-NO) Wiring Diagram Code 1, 2,3.
2 Form A (DPST-NO) Wiring Diagram Code 5.
1 Form C (SPDT) Wiring Diagram Code 1, 2, 3.
2 Form C (DPDT) Wiring Diagram Code 5.
Material: Silver-nickel 90/10.
Minimum Load: 12V/100mA.
Expected Mechanical Life: 10 million operations.
Initial Contact Resistance: 100 milliohms max @ 1A 12VDC.

Designed to meet UL/CSA/VDE ratings with relay properly vented. Remove vent nib after soldering and cleaning.

UL/CSA/VDE Ratings @ 25°C

Code	NO/NC Load	Type	Operations
1	10A/10A @ 277VAC	Resistive/GP	100K
	10A/10A @ 30VDC	Resistive	100K
	12A/12A @ 250VAC	Resistive/GP	30K
	12A/12A @ 30VDC	Resistive	30K
	3/4 HP @ 480VAC*	Motor	6K
	1/2 HP @ 240VAC*	Motor	6K
	1/3 HP @ 120VAC*	Motor	6K
	48 LRA/10 FLA @ 240VAC*	Motor	30K
	TV-3 @ 120VAC*	Tungsten	25K
	A300, 720VA @ 240VAC*	Pilot Duty	30K
3	16A/16A @ 250VAC	Resistive/GP	50K
	20A/20A @ 277VAC	Resistive/GP	30K
	20A/20A @ 24VDC	Resistive	30K
	16A/16A @ 30VDC	Resistive	30K
	1 HP @ 480VAC*	Motor	6K
	1 HP @ 240VAC*	Motor	6K
	1/2 HP @ 120VAC*	Motor	6K
	60 LRA/10 FLA @ 250VAC*	Motor	30K
	TV-5 @ 120VAC*	Tungsten	25K
	A300, 720VA @ 240VAC*	Pilot Duty	30K
	B300, 360VA @ 240VAC**	Pilot Duty	30K
5	8A/8A @ 277VAC	Resistive/GP	100K
	8A/8A @ 30VDC	Resistive	100K
	10A/10A @ 250VAC	Resistive/GP	30K
	10A/10A @ 30VDC	Resistive	30K
	1/2 HP @ 240VAC*	Motor	6K
	1/4 HP @ 120VAC*	Motor	6K
	34.8 LRA/6 FLA @ 120VAC*	Motor	30K
	17.4 LRA/5 FLA @ 240VAC*	Motor	30K
	B300, 360VA @ 240VAC*	Pilot Duty	30K
	TV-3 @120VAC*	Tungsten	25K

* Form A only
** Form B only

Initial Dielectric Strength

Between Open Contacts: >1,000VAC (1 minute).
Between Poles (code 5): >2,500VAC (1 minute).
Between Coil and Contacts: >5,000VAC (1 minute).
Surge Voltage (DC): >10,000VAC x (1.2 x 50 µsec).

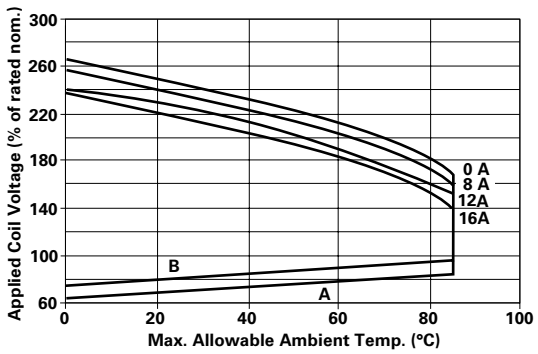
Coil Data @ 25°C

Voltage: 5 to 110VDC.
Nominal Power @ 25°C: 400mW.
Duty Cycle: Continuous.
Initial Insulation Resistance: 10,000 megohms, min., at 25°C, 500VDC and 50% rel. humidity.
Coil Construction: UL Class F (155°C).

Coil Data @ 25°C

Nominal Voltage VDC	DC Resistance in Ohms ±10%	Must Operate Voltage VDC	Nominal Coil Current (mA) – 50/60Hz.
005	62	3.5	80
006	90	4.2	66.7
009	202	6.3	44.4
012	360	8.4	33.3
018	810	12.6	22.2
024	1,440	16.8	16.7
048	5,760	33.6	8.3
060	9,000	42.0	8.0
110	30,250	77.0	4.3

Max. Ambient Temp. vs. Coil Voltage



A: Coil temperature = Ambient temperature.
B: 110% of nominal coil voltage at rated contact load.

Operate Data @ 25°C

Must Operate Voltage(DC): 70% of nominal.
Must Release Voltage(DC): 10% of nominal.
Operate Time (Excluding Bounce):
7 ms, typ., 15ms max. at nom. voltage.
Release Time (Excluding Bounce):
3 ms, typ., 6ms max. at nom. voltage.

Environmental Data

Temperature Range:
Storage: -40°C to +105°C.
Operating: -40°C to +85°C at rated current.
Vibration, Operational
N.O.:0.065"(1.65mm) max. excursions from 10 - 55 Hz:
N.C.:0.032"(0.82mm) max. excursions from 10 - 55 Hz:
with no contact opening >10µs.

Mechanical Data

Termination: Printed circuit terminals.
Enclosures: RT 1, 2, 3, 4: Flux-tight, top vented, plastic case.
RT B, C, D, E: Immersion cleanable, plastic case.
Weight: 0.35 oz. (10g) approximately.

Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.
www.tycoelectronics.com
Technical support:
Refer to inside back cover.

Ordering Information (DC Coil Models)

Typical Part Number ▸	RT	B	3	4	012	F

1. Basic Series:
RT = Miniature, printed circuit board relay.

2. Enclosure:
1 = 1 pole 12A, Pinning 3.5mm, flux-tight (Code 1).
2 = 1 pole 12A, Pinning 5mm, flux-tight (Code 2).
3 = 1 pole 16A, Pinning 5mm, flux-tight (Code 3).
4 = 2 pole 8A, Pinning 5mm, flux-tight (Code 5).
B = 1 pole 12A, Pinning 3.5mm, sealed (Code 1).
C = 1 pole 12A, Pinning 5mm, sealed (Code 2).
D = 1 pole 16A, Pinning 5mm, sealed (Code 3).
E = 2 pole 8A, Pinning 5mm, sealed (Code 5).

3. Contact Arrangement:
1 = 1 Form C (SPDT) (Requires wiring diagram codes 1, 2 or 3.)
2 = 2 Form C (DPDT) (Requires wiring diagram code 5.)
3 = 1 Form A (SPST-NO) (Requires wiring diagram codes 1, 2 or 3.)
4 = 2 Form A (DPST-NO) (Requires wiring diagram code 5.)

4. Contact Material:
4 = Silver-nickel 90/10 (standard stock).

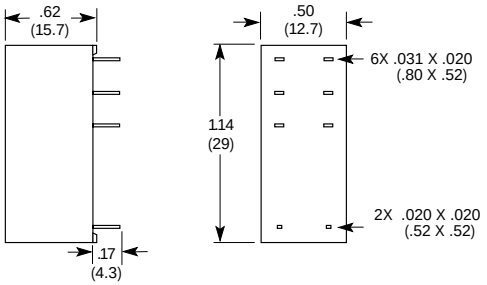
5. Coil Voltage:
005 = 5VDC
006 = 6VDC
009 = 9VDC
012 = 12VDC
018 = 18VDC
024 = 24VDC
048 = 48VDC
060 = 60VDC
110 = 110VDC

5. Coil Insulation Classification, Brand and Case Color
F = UL Class F, Potter & Brumfield Brand, Black Case
Leave Blank = UL Class F, Schrack Brand, Orange Case

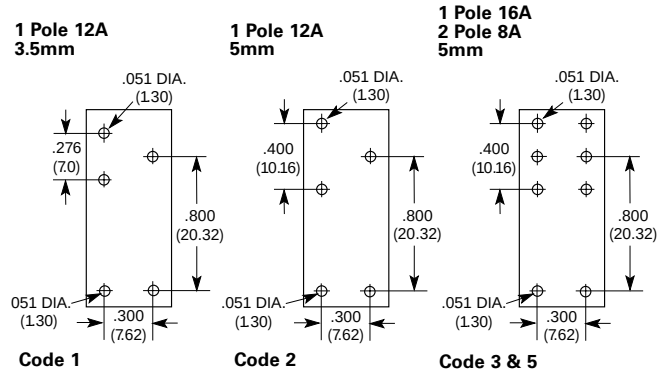
Our authorized distributors are more likely to stock the following items for immediate delivery.

RT114012F	RTB14012F	RTB34024F	RTD14005F	RTD34012F	RTE24005F	RTE44012F
RT114024F	RTB14024F	RT314012F	RTD14012F	RT424012F	RTE24012F	RTE44024F
RTB14005F	RTB34012F	RT314024F	RTD14024F	RT424024F	RTE24024F	

Outline Dimensions

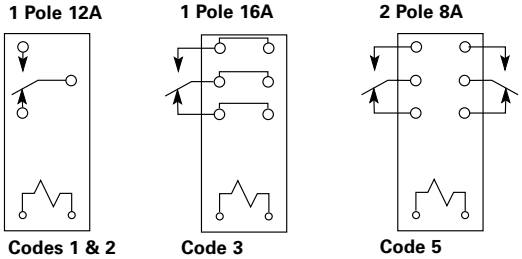


PC Board Layouts (Bottom View)



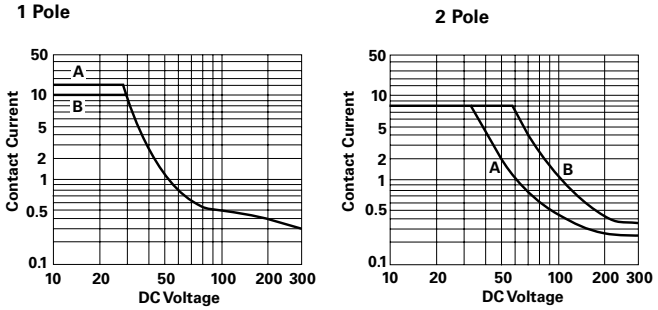
Notes: 1. On single throw models, only necessary terminals are present.
2. With the recommended PCB hole sizes, a grid with a pattern from 0.0984 to 0.1 in (2.5 - 2.54 mm) can be used.

Wiring Diagrams (Bottom View)



Note: On single throw models, only necessary terminals are present.

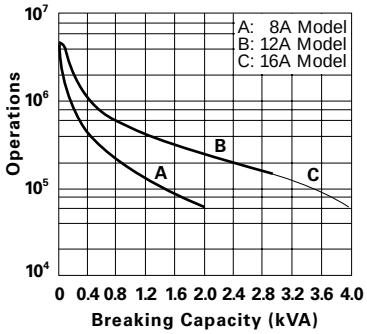
Breaking Capacity



A: 16A Version.
B: 12A Version.

A: 1 Contact.
B: 2 Contacts in series.

Contact Life for Resistive AC Load (Typical)



Note: Data from 250VAC @ 70°C.

Dimensions are shown for reference purposes only.

Dimensions are in inches over (millimeters) unless otherwise specified.

Specifications and availability subject to change.



RT series (AC Coil)

16 Amp Miniature Printed Circuit Board Relay

c UL us File E214025

VDE NR 6106

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- SPST through DPDT contact arrangements.
- Immersion cleanable and flux tight versions available.
- Meets VDE 10mm spacing, 5kV dielectric, coil to contacts.
- Conforms to UL 508, 1873 and 353.
- UL Class F (155°C) coil construction
- Schrack brand

Contact Data

Arrangements: 1 Form A (SPST-NO) Wiring Diagram Code 1, 2, 3.
2 Form A (DPST-NO) Wiring Diagram Code 5.
1 Form C (SPDT) Wiring Diagram Code 1, 2, 3.
2 Form C (DPDT) Wiring Diagram Code 5.
Material: Silver-nickel 90/10.
Minimum Load: 12V/100mA.
Expected Mechanical Life: 10 million operations.

Designed to meet UL/CSA/VDE ratings with relay properly vented. Remove vent nib after soldering and cleaning.

UL/CSA Ratings @ 25°C:

Code	NO/NC Load	Type	Operations
1	12A NO @ 240VAC	GP	30K
	10A/5A @ 240VAC	Resistive/GP	100K
	8A @ 28VDC	Resistive	30K
	1 HP @ 240VAC*	Motor	6K
	1/2 HP @ 120VAC*	Motor	6K
	8A @ 28VDC*	Resistive	30K
	B300	Pilot Duty	6K
3	16A/8A @ 240VAC	GP	6K
	8A @ 28VDC	Resistive	30K
	1/2 HP @ 120VAC*	Motor	6K
	1HP @ 240VAC*	Motor	6K
	48 LRA, 8 FLA @ 240VAC	Motor	30K
	B300	Pilot Duty	6K
5	8A @ 240VAC	Resistive	30K
	8A @ 28VDC	Resistive/GP	30K
	1/2 HP @ 240VAC	Motor	6K
	1/4 HP @ 120VAC	Motor	6K
	B300	Pilot Duty	6K

* Form A only

VDE Ratings @ 25°C:

Code	NO/NC Load	Type	Operations
1	12A @ 250VAC	Resistive	30K
	12A @ 250VAC	Resistive	100K
3	16A @ 250VAC	Resistive	10K
	16A @ 250VAC	Resistive	50K
5	8A @ 250VAC	Resistive	30K
	8A @ 250VAC	Resistive	50K

Initial Dielectric Strength

Between Open Contacts: >1,000VAC (1 minute).
Between Poles (code 5): >2,500VAC (1 minute).
Between Coil and Contacts: >5,000VAC (1 minute).
Creepage/Clearance, Coil to Contact: 10/10mm.

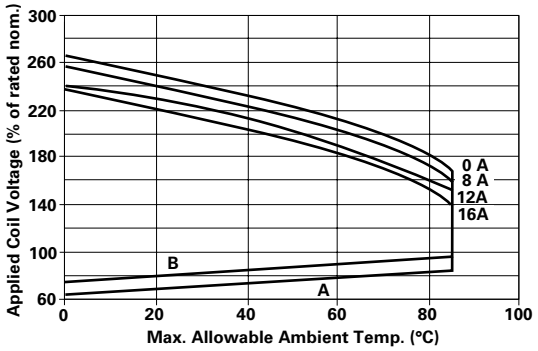
Coil Data @ 20°C

Voltage: 24, 115, 230VAC (consult factory for availability of other voltages).
Nominal Power @ 25°C: .75VA.
Duty Cycle: Continuous.
Initial Insulation Resistance: 10,000 megohms, min., at 20°C, 500VDC and 50% rel. humidity.
Coil Construction: UL Class F (155°C).

Coil Data

Nominal Voltage VAC	DC Resistance in Ohms ±10%	Must Operate Voltage VAC	Drop-out Voltage VAC	Nominal Coil Current (mA)–50Hz.	Nominal Coil Current (mA)–60Hz.
24	350	18.0	3.6	31.6	24.3
115	8,100	86.3	17.3	6.6	5.1
230	32,500	172.5	34.5	3.3	2.3

Max. Ambient Temp. vs. Coil Voltage



A: Coil temperature = Ambient temperature.
B: 110% of nominal coil voltage at rated contact load.

Operate Data

Must Operate Voltage: See coil data.
Operate Time (Excluding Bounce): 8 ms, typ., at nom. voltage.
Release Time (Excluding Bounce): 11 ms, typ., at nom. voltage.

Environmental Data

Temperature Range:
Storage: -40°C to +105°C.
Operating: -40°C to +70°C at rated current.
Vibration: 30 - 150 Hz:
at 20g with no contact opening >10µs on the N.O. contact;
at 5g with no contact opening >10µs on the N.C. contact.

Mechanical Data

Termination: Printed circuit terminals.
Enclosures: RT 1, 2, 3, 4: Flux-tight, top vented, plastic case.
RT B, C, D, E: Immersion cleanable, plastic case.
Weight: 0.42 oz. (12g) approximately.

Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.
www.tycoelectronics.com
Technical support:
Refer to inside back cover.

Ordering Information (AC Coil Model)

Typical Part Number ▸	RT	D	1	4	524

1. Basic Series:
RT = Miniature, printed circuit board relay.

2. Enclosure:
1 = 1 pole 12A, Pinning 3.5mm, flux-tight (Code 1).
2 = 1 pole 12A, Pinning 5mm, flux-tight (Code 2).
3 = 1 pole 16A, Pinning 5mm, flux-tight (Code 3).
4 = 2 pole 8A, Pinning 5mm, flux-tight (Code 5).
B = 1 pole 12A, Pinning 3.5mm, sealed (Code 1).
C = 1 pole 12A, Pinning 5mm, sealed (Code 2).
D = 1 pole 16A, Pinning 5mm, sealed (Code 3).
E = 2 pole 8A, Pinning 5mm, sealed (Code 5).

3. Contact Arrangement:
1 = 1 Form C (SPDT) (Requires wiring diagram codes 1, 2 or 3.)
2 = 2 Form C (DPDT) (Requires wiring diagram code 5.)
3 = 1 Form A (SPST-NO) (Requires wiring diagram codes 1, 2 or 3.)
4 = 2 Form A (DPST-NO) (Requires wiring diagram code 5.)

4. Contact Material:
4 = Silver-nickel 90/10.

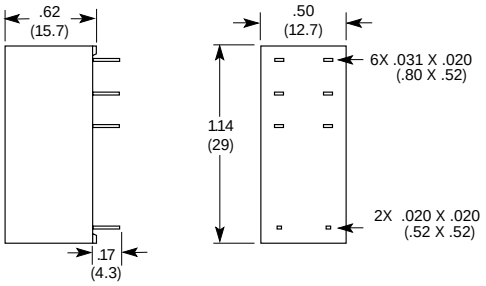
5. Coil Voltage:
524 = 24VAC 615 = 115VAC 730 = 230VAC

Note: All AC coil model RT part numbers are Schrack brand, are orange in color and have UL Class F (155°C) coil construction.

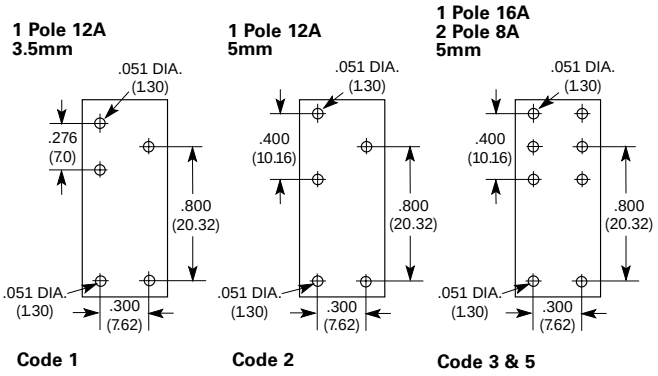
Our authorized distributors are more likely to stock the following items for immediate delivery.

RTB14524	RTD14524	RTE24524
RTB14615	RTD14615	RTE24615
RTB14730	RTD14730	RTE24730

Outline Dimensions

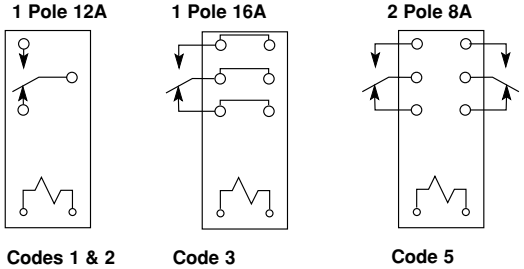


PC Board Layouts (Bottom View)



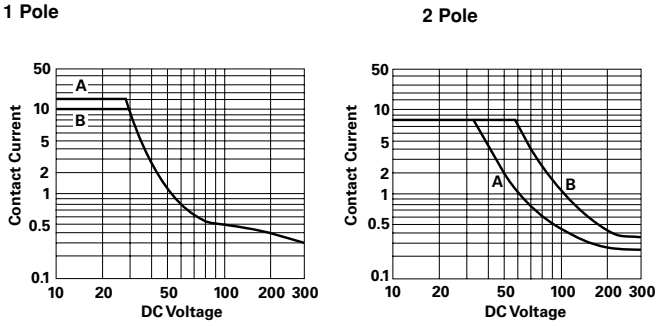
Notes: 1. On single throw models, only necessary terminals are present.
2. With the recommended PCB hole sizes, a grid with a pattern from 0.0984 to 0.1 in (2.5 - 2.54 mm) can be used.

Wiring Diagrams (Bottom View)



Note: On single throw models, only necessary terminals are present.

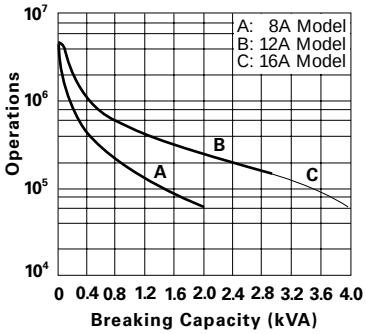
Breaking Capacity



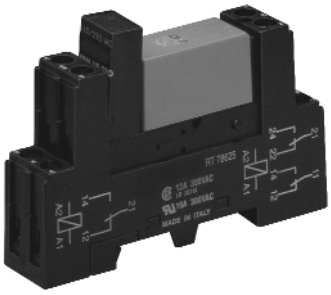
A: 16A Version.
B: 12A Version.

A: 1 Contact.
B: 2 Contacts in series.

Contact Life for Resistive AC Load (Typical)



Note: Data from 250VAC @ 70°C.



RT78625 with RPMU0730



RP78601



RT16016

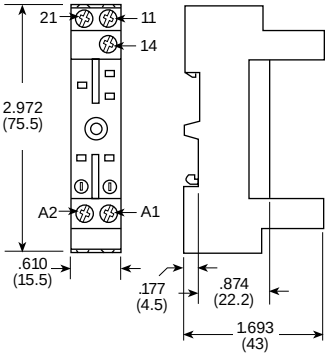
RT series

Sockets and Accessories

File E135149
File LR14385
NR 5318

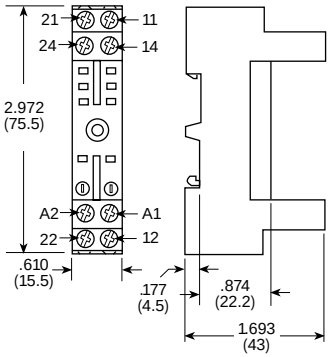
Sockets for RT Series Relays

RT78624[1]
10A, 300VAC
3.5mm Pinning



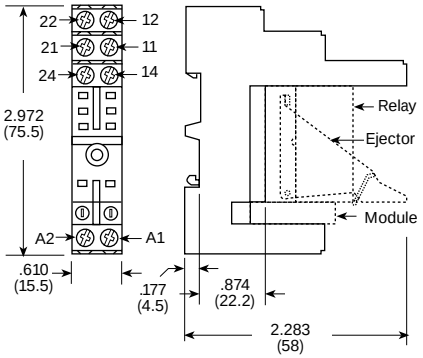
Hold-Down Spring RT16016

RT78625[1,2]
1 Pole 10A, 250VAC
2 Pole 2x 10A, 250VAC
5mm Pinning



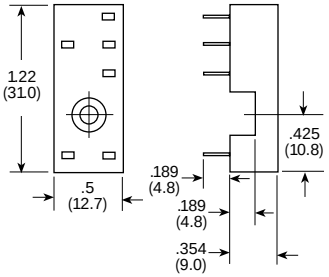
Hold-Down Spring RT16016

RT78626[1,2]
1 Pole 12A, 300VAC
2 Pole 2x 12A, 300VAC
5mm Pinning



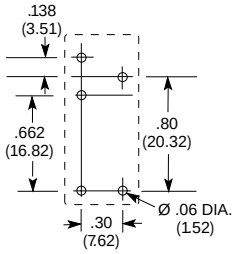
Ejector/Hold-Down Spring RT16016[3]

RP78601[1]
10A, 250VAC
3.5mm Pinning

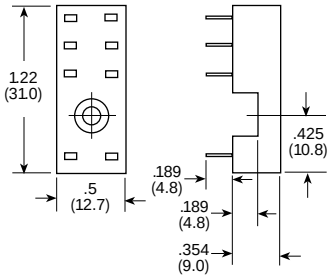


Hold-Down Spring RP16041

PC Board Layout
(Bottom View)

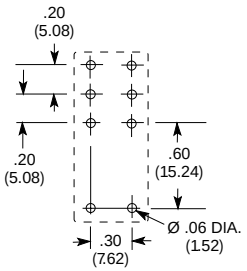


RP78602[1]
1 Pole 10A, 250VAC
2 Pole 2x 10A, 250VAC
5mm Pinning



Hold-Down Spring RP16041

PC Board Layout
(Bottom View)



Socket and Accessory Selection Table

Stock items are boldfaced.

Socket	Socket Termination	Hold-Down Spring
RT78624[1,2]	DIN Screw Terminal Socket	**RT16016**
RT78625[1,2]	DIN Screw Terminal Socket	**RT16016**
RT78626[1]	DIN Screw Terminal Socket	**RT16016**
RP78601[1]	PCB Terminal Socket	RY16041
RP78602[1]	PCB Terminal Socket	RY16041
RPMT00A0	Protection Diode Module 1N4007[4]	–
RPMU0548	RC Network Module 24-48VAC	–
RPMU0730	RC Network Module 110-230VAC	–
RPML0024	LED Module 12-24VDC[4]	–
RPML0524	LED Module 12-48VAC/VDC	–
RPML0110	LED Module 110VDC[4]	–
RPML0730	LED Module 110-230VAC	–

*** Note**

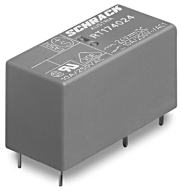
1. Not suitable for bistable relay with two coils.
2. For a 16A 1 pole relay the following jumpers have to be connected; 11 to 21, 12 to 22 and 14 to 24.
3. Insertion of the relay.
   First the ejector (and eventually the module) has to be mounted onto the socket. Then the relay has to be set in the correct position and pressed into the socket until the ejector snaps over the top of the relay.
4. Standard polarity: A1:+, A2:–

Dimensions are shown for reference purposes only.

Dimensions are in inches over (millimeters) unless otherwise specified.

Specifications and availability subject to change.

www.tycoelectronics.com
Technical support:
Refer to inside back cover.



RT series (Sensitive)

10 Amp, 1 Pole PC Board Relay with 250mW Coil

File E214025

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- Sensitive coil requires only 250mW.
- 10A contacts in 1 Form A (SPST-NO) or 1 Form C (SPDT) arrangement.
- UL Class F coil construction.
- 5kV/10mm contact-to-coil.

Contact Data

Arrangements: 1 Form A (SPST-NO) or 1 Form C (SPDT), single contact.
Material: Silver-nickel 90/10.
Expected Mechanical Life: 30 million operations.
Ratings:
Current: 10A.
Voltage: 250VAC.
Power (breaking): 2,500 VA.
Voltage (breaking): 440VAC.
Current (making, max. 4s at 10% duty cycle): 15A.
Load/Life
8A, 250VAC; 430,000 ops.
370W, 230VAC, compressor, NO contact; >330,000 ops.
550W, 250VAC, incandescent, NO contact; 190,000 ops.
$0.8A_{peak}$ /0.08A, 230VAC, cosφ=0.23,
contactor 190 / 90 VA, NO contact; >8.8 million ops.

Initial Dielectric Strength

Between Open Contacts: 1,000Vrms
Between Coil and Contacts: 5,000Vrms.
Creepage/Clearance: 10/10mm.

Coil Data DC @ 20°C

Nominal Coil Power: 250mW.

Nominal Voltage VDC	DC Resistance in Ohms	Must Operate Voltage VDC	Drop-out Voltage VDC	Maximum Voltage VDC	Nominal Coil Current (mA)
5	100 ± 10%	3.7	0.5	15.0	50.0
6	144 ± 10%	4.5	0.6	18.0	41.7
12	576 ± 10%	9.0	1.2	36.0	20.8
24	2,304 ± 10%	18.0	2.4	72.0	10.4
48	9,216 ± 10%	36.0	4.8	144.0	5.4
60	12,857 ± 12%	45.0	6.0	180.0	4.7

Operate Data

Must Operate Voltage: See Coil Data table.
Operate Time (typical): 7 ms.
Release Time (typical): 3 ms.
Bounce Time (typical): **NO:** 2 ms; **NC:** 4 ms.
Switching Rate: 3,600 ops./hr. max. at rated load.

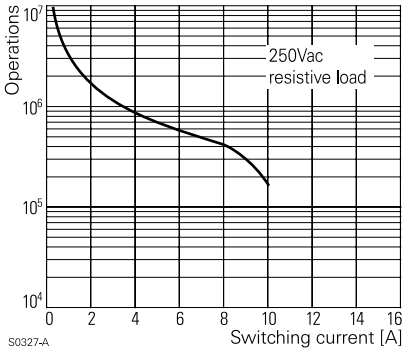
Environmental Data

Temperature Range:
Operating: -40°C to +85°C.
Vibration (30-150 Hz.): 5g.
Shock (destructive): 100g.

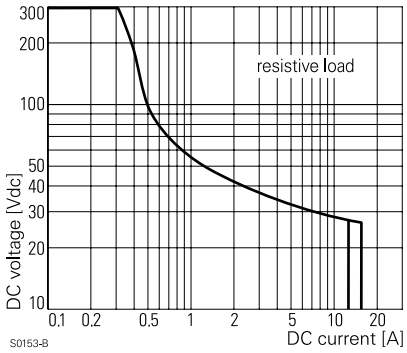
Mechanical Data

Termination: Printed circuit terminals.
Enclosure (94 V-0 Rated): Flux-tight (RT II) or sealed (RT III) plastic case.
Weight: .49 oz. (14 g) approximately.

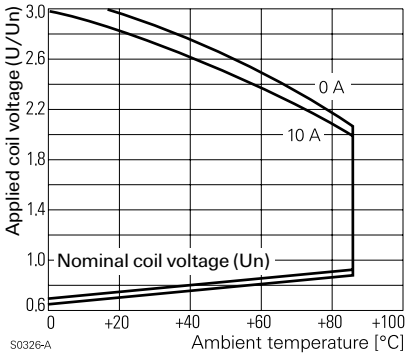
Contact Life



Max. DC Load Breaking Capacity



Coil Operating Range



Ordering Information

Typical Part Number ▶	RT	1	7	4	012

1. Basic Series:
RT = Printed circuit board relay.

2. Version:
1 = 10A, 3.5mm pin spacing, flux-tight case. B = 10A, 3.5mm pin spacing, sealed case.

3. Contact Configuration:
7 = 1 Form C (SPDT) 8 = 1 Form A (SPST-NO)

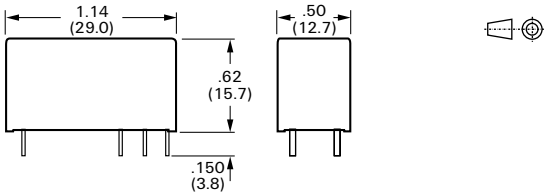
4. Contact Material:
K = Silver-nickel 90/10.

5. Coil Voltage:
005 = 5VDC 012 = 12VDC 048 = 48VDC
006 = 6VDC 024 = 24VDC 060 = 60VDC

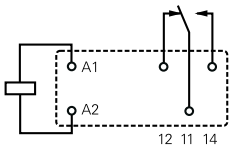
Stock Items – Authorized distributors are more likely to stock the following items.

None at present.

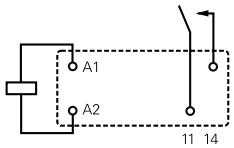
Outline Dimensions



Wiring Diagrams (Bottom Views)

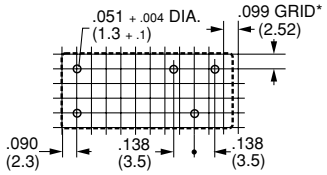


1 Form C



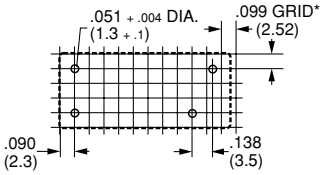
1 Form A

PC Board Layouts (Bottom Views)



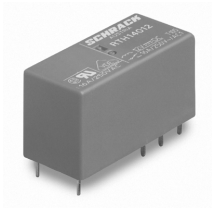
1 Form C

* With the recommended hole size, a grid pattern from .0984 - .1 in (2.5 - 2.54 mm) can be used.



1 Form A

* With the recommended hole size, a grid pattern from .0984 - .1 in (2.5 - 2.54 mm) can be used.



RTH series

10-16 Amp, 1 Pole
PC Board Relay for Operation to 105°C

c UL us File E214025

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- Sensitive (250mW) version with 10A, 1 Form A (SPST-NO) contacts.
- 16A version with 1 Form A (SPST-NO) or 1 Form C (SPDT) contacts.
- UL Class F coil construction.
- 5kV/10mm contact-to-coil.
- DC coil.

Contact Data

Arrangements: 1 Form A (SPST-NO) and 1 Form C (SPDT). 1 Form C not available with sensitive coil.
Material: Silver-nickel 90/10.
Expected Mechanical Life: 10 million operations.
Ratings:
Current: Standard Coil: 16A; **Sensitive Coil:** 10A.
Voltage: 250VAC.
Power (breaking): Standard Coil: 4,000 VA; **Sensitive Coil:** 2,500VA.
Voltage (breaking): 440VAC.
Current (making, max. 4s at 10% duty cycle):
Standard Coil: 30A; **Sensitive Coil:** 15A.
Load/Life – Standard Coil – Standard 1 Form A Contact
10 amp, 250VAC, 105°C; 150,000 ops.
16 amp, 250VAC, 105°C; 20,000 ops.
Load/Life – Standard Coil – High Performance 1 Form A Contact
10 amp, 250VAC, 105°C; 300,000 ops.
16 amp ON / 8 amp OFF, 250VAC, 105°C; 250,000 ops.
Load/Life – Sensitive Coil – 1 Form A Contact
12 amp, 250VAC, 105°C, dry switching; >500,000 ops.
10 amp, 250VAC, cyclical heat 105/40°C; 200,000 ops.
10 amp, 250VAC, 105°C; 150,000 ops.

Initial Dielectric Strength

Between Open Contacts: 1,000Vrms
Between Coil and Contacts: 5,000Vrms.
Creepage/Clearance: 10/10mm.

Coil Data DC @ 20°C

Nominal Coil Power: Sensitive Coil: 250mW.; **Standard Coil:** 400mW†

† Standard coil continuous thermal load >10A at 105°C requires reduction of coil power to 64% of nominal after 100ms.

Nominal Voltage VDC	DC Resistance in Ohms ±10%	Must Operate Voltage VDC	Drop-out Voltage VDC	Maximum Voltage VDC	Nominal Coil Current (mA)
Sensitive Coils (10A max. rating, 1 Form A only)					
12	576	9.0	1.2	36.0	20.8
24	2,304	18.0	2.4	72.0	10.4
Standard Coils (16A max. rating, 1 Form A or 1 Form C)					
9	203	6.3	0.9	22.9	44.3
12	360	8.4	1.2	30.6	33.3
24	1,440	16.8	2.4	61.2	16.7

Operate Data

Must Operate Voltage: See Coil Data table.
Operate Time (typical): **Standard Coil:** 7 ms.
Sensitive Coil: 8 ms.
Release Time (typical): **Standard or Sensitive Coil:** 3 ms.
Bounce Time (typical): **Standard Coil NO / NC:** 1 / 3 ms.
Sensitive Coil: 2 ms.
Switching Rate: 3,600 ops./hr. max. at rated load.

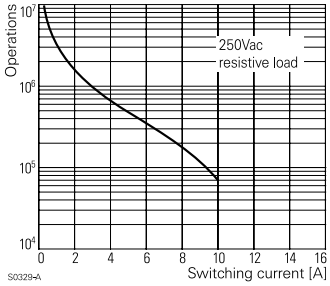
Environmental Data

Temperature Range:
Operating: -40°C to +105°C.
Vibration (30-150 Hz.): **Standard Coil NO / NC:** 20 / 5g.
Sensitive Coil: 5g.
Shock (destructive): 100g.

Mechanical Data

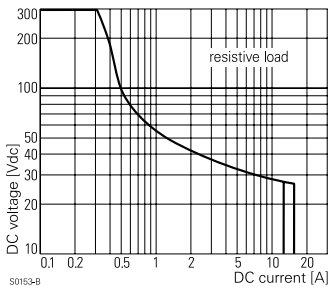
Termination: Printed circuit terminals.
Enclosure (94 V-0 Rated): Flux-tight (RT II) plastic case.
Weight: .49 oz. (14 g) approximately.

Contact Life

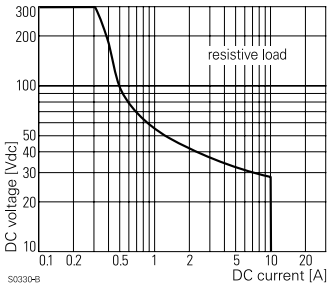


Models with Sensitive Coil

Max. DC Load Breaking Capacity

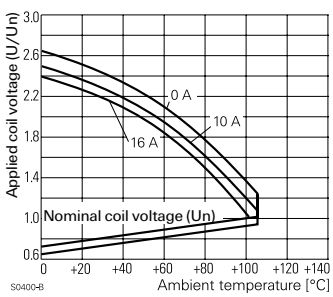


Models with Standard Coil

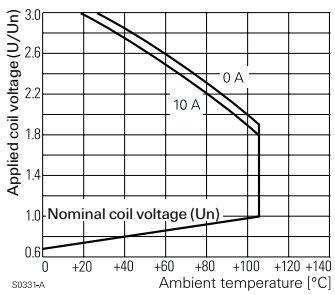


Models with Sensitive Coil

Coil Operating Range



Models with Standard Coil



Models with Sensitive Coil

Ordering Information

Typical Part Number ▶	RTH	1	4	012

1. Basic Series:
RTH = Printed circuit board relay for high temperature (105°C) applications.

2. Coil Type and Contacts:
1 = Standard coil, standard 1 Form C (SPDT) contacts, 16A rating
3 = Standard coil, standard 1 Form A (SPST-NO) contacts, 16A rating
H = Standard coil, "high performance" 1 Form A (SPST-NO) contacts, 16A rating
8 = Sensitive coil, standard 1 Form A (SPST-NO) contacts, 10A rating

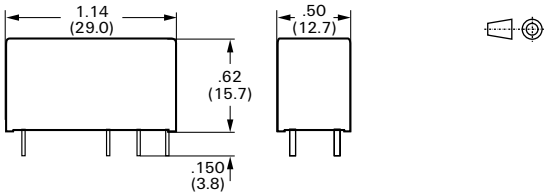
3. Contact Material:
4 = Silver-nickel 90/10.

4. Coil Voltage:
009 = 9VDC (standard version coil only) 012 = 12VDC 024 = 24VDC

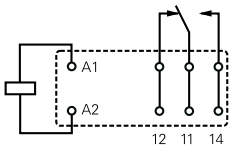
Our authorized distributors are more likely to maintain the following items in stock for immediate delivery.

None at present.

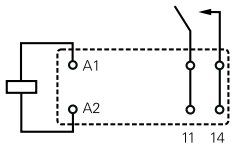
Outline Dimensions



Wiring Diagrams (Bottom Views)

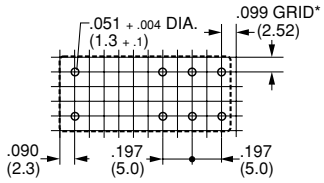


1 Form C, Standard Coil Only



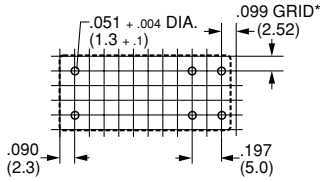
1 Form A, Standard or Sensitive Coil

PC Board Layouts (Bottom Views)



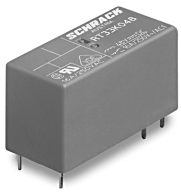
1 Form C, Standard Coil Only

* With the recommended hole size, a grid pattern from .0984 - .1 in (2.5 - 2.54 mm) can be used.



1 Form A, Standard or Sensitive Coil

* With the recommended hole size, a grid pattern from .0984 - .1 in (2.5 - 2.54 mm) can be used.



RT series (High Inrush)

16 Amp, 1 Pole PC Board Relay for Inrush Currents to 80A

cULus File E214025

VDE

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- Capable of handling 80A inrush currents.
- 16A, 1 Form A (SPST-NO) contacts.
- UL Class F coil construction.
- 5kV/10mm contact-to-coil.
- 400mW DC coil.

Contact Data

Arrangements: 1 Form A (SPST-NO), single contact.
Material: Silver-nickel 90/10 or Silver-tin oxide.
Expected Mechanical Life: 30 million operations.
Ratings:
Current: 16A.
Voltage: 250VAC.
Power (breaking): 4,000 VA.
Voltage (breaking): 440VAC.
Current (making, max. 4s at 10% duty cycle): 30A.
Peak Inrush Current (20ms): 80A.
Load/Life – Silver-nickel contacts
1000W, 250VAC, incandescent lamps; 90,000 ops.
Load/Life – Silver-tin oxide contacts
1000W, 250VAC, incandescent lamps; 80,000 ops.
Compressor, 230VAC, $I_{in} \leq 21A_{peak}$, I_{off}=3.5A, cosφ=0.5; 230,000 ops.

Initial Dielectric Strength

Between Open Contacts: 1,000Vrms
Between Coil and Contacts: 5,000Vrms.
Creepage/Clearance: 10/10mm.

Coil Data DC @ 20°C

Nominal Coil Power: 400mW.

Nominal Voltage VDC	DC Resistance in Ohms	Must Operate Voltage VDC	Drop-out Voltage VDC	Maximum Voltage VDC	Nominal Coil Current (mA)
12	360 ± 10%	8.4	1.2	30.6	33.3
24	1,440 ± 10%	16.8	2.4	61.2	16.7
48	5,520 ± 10%	33.6	4.8	122.4	8.7
60	7,340 ± 12%	42.0	6.0	153.0	8.1

Operate Data

Must Operate Voltage: See Coil Data table.
Operate Time (typical): 8 ms.
Release Time (typical): 3 ms.
Bounce Time (typical): 2 ms.
Switching Rate: 3,600 ops./hr. max. at rated load.

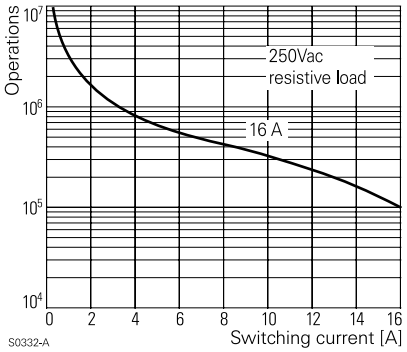
Environmental Data

Temperature Range:
Operating: -40°C to +85°C.
Vibration (30-500 Hz.): 20g.
Shock (destructive): 100g.

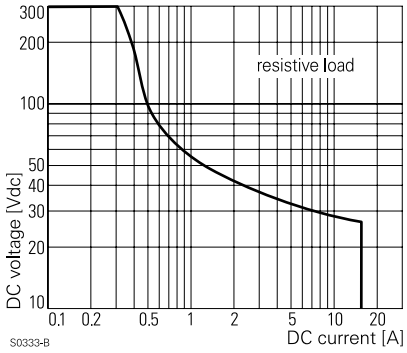
Mechanical Data

Termination: Printed circuit terminals.
Enclosure (94 V-0 Rated): Flux-tight (RT II) plastic case.
Weight: .49 oz. (14 g) approximately.

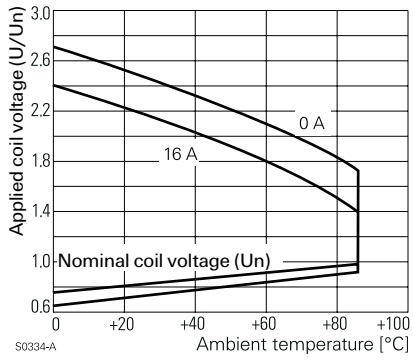
Contact Life



Max. DC Load Breaking Capacity



Coil Operating Range



Ordering Information

Typical Part Number ▶	RT	3	3	K	012

1. Basic Series:
RT = Printed circuit board relay.

2. Version:
3 = 16A, 5mm pin spacing, flux-tight case.

3. Contact Configuration:
3 = 1 Form A (SPST-NO)

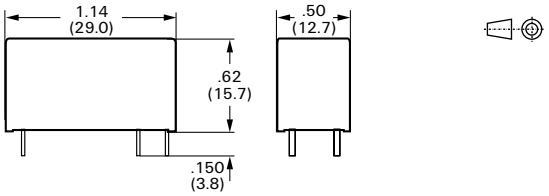
4. Contact Material:
K = Silver-nickel 90/10 contacts for high inrush currents. L = Silver-tin oxide contacts for high inrush currents.

5. Coil Voltage:
012 = 12VDC 048 = 48VDC
024 = 24VDC 060 = 60VDC

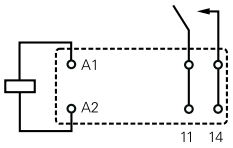
Our authorized distributors are more likely to maintain the following items in stock for immediate delivery.

None at present.

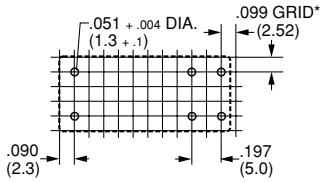
Outline Dimensions



Wiring Diagram (Bottom View)



PC Board Layout (Bottom View)



* With the recommended hole size, a grid pattern from .0984 - .1 in (2.5 - 2.54 mm) can be used.



0429 series

High Inrush (80A/20ms), Miniature Printed Circuit Board Relay

File E214025

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- 1 Form A (SPST-NO).
- Tungsten prerun contact and silver-tin oxide contact.
- 10 amp rated current, 80A/20ms inrush current.
- 4kV/8mm contact-to-coil, insulation to VDE 0631 and 0700.
- Sensitive coil (480mW).
- Low-profile (.59 in [15 mm]) flux-tight case.
- Well suited for lighting systems, motors, lamp loads.

Contact Data

Arrangements: 1 Form A (SPST-NO), single contact.
Material: Tungsten prerun contact and silver-tin oxide contact.
Expected Mechanical Life: 5 million operations.
Ratings:
Current: 10A.
Current (making, max. 4s at 10% duty cycle): 16A.
Current (peak inrush 20ms): 80A.
Voltage: 250VAC.
Voltage (breaking): 400VAC.
Load/Life
10 amp resistive, 250VAC, 50,000 ops.
2,500W, incandescent lamps, 30,000 ops.
1,300W, fluorescent lamps (140µF), 30,000 ops.
1,000W, Dulux lamps (140µF), 30,000 ops.

Initial Dielectric Strength

Between Open Contacts: 1,000Vrms.
Between Coil and Contacts: 4,000Vrms.
Creepage/Clearance: 8/8mm.

Coil Data DC @ 20°C

Nominal Coil Power: 480mW.

Nominal Voltage VDC	DC Resistance in Ohms ±10%	Must Operate Voltage VDC	Drop-out Voltage VDC	Maximum Voltage VDC	Nominal Coil Current (mA)
6	80	4.2	0.4	12.0	75.0
12	300	8.4	0.9	24.0	40.0
24	1,200	16.8	1.8	48.0	20.0
48	4,825	33.6	3.6	96.0	10.0
60	7,500	42.0	4.5	120.0	8.0

Operate Data

Must Operate Voltage: See Coil Data table.
Operate Time (typical): 6 ms.
Release Time (typical): 4 ms.
Bounce Time (typical): 3 ms.
Switching Rate: 6,000 ops./hr. max. at rated load.

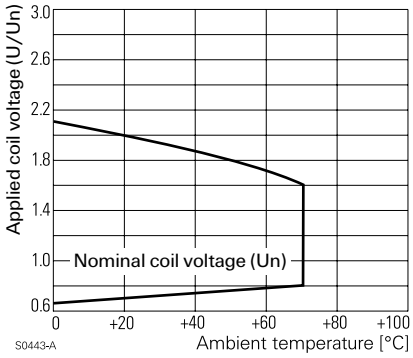
Environmental Data

Temperature Range:
Operating: -40°C to +70°C.
Shock (destructive): 100g.

Mechanical Data

Termination: Printed circuit terminals.
Enclosure (94 V-0 rated): Flux-tight (RTII) plastic case.
Weight: 0.35 oz. (10 g) approximately.

Coil Operating Range



Ordering Information

Typical Part Number ▶	0429 03	13	12	00

1. Basic Series:
0429 03 = Miniature printed circuit board relay for high inrush currents.

2. Coil Voltage:
16 = 6VDC 13 = 12VDC 08 = 24VDC 05 = 48VDC 03 = 60VDC

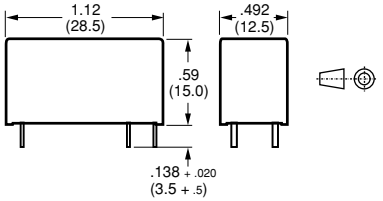
3. Contact Material:
12 = Tungsten prerun contact and silver-tin oxide contact.

4. Version:
00 = Standard

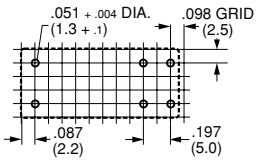
Our authorized distributors are more likely to stock the following items for immediate delivery.

None at present.

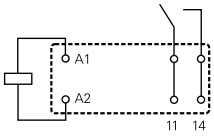
Outline Dimensions



PC Board Layout (Bottom View)



Wiring Diagram (Bottom View)



Dimensions are shown for reference purposes only.

Dimensions are in inches over (millimeters) unless otherwise specified.

Specifications and availability subject to change.

OMI/OMIH series

16A Miniature Power PC Board Relay

Appliances, HVAC, Office Machines.



- UL File No. E58304
- CSA File No. LR48471
- VDE File No. 6678
- SEMKO File No. 9517235 (OMI)
  9143112 (OMIH)

Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- Meet UL 508, VDE0435 and SEMKO requirements.
- 1 Form A and 1 Form C contact arrangements.
- Immersion cleanable, sealed version available.
- Meet 5,000V dielectric voltage between coil and contacts.
- Meet 10,000V surge voltage between coil and contacts (1.2 / 50µs).

Contact Data @ 20°C

Arrangements: 1 Form A (SPST-NO) and 1 Form C (SPDT).
Material: Ag Alloy (OMI), AgSnO (OMIH).
Max. Switching Rate: 300 ops./min. (no load).
30 ops./min. (rated load).
Expected Mechanical Life: 10 million operations (no load).
Expected Electrical Life: 100,000 operations (rated load).
Minimum Load: 100mA @ 5VDC.
Initial Contact Resistance: 100 milliohms @ 1A, 6VDC.

Contact Ratings

Ratings: OMI: 10A @ 240VAC resistive,
10A @ 30VDC resistive,
3A @ 240VAC inductive (cosø= 0.4),
3A @ 30VDC inductive (L/R=7msec).
OMIH: 16A @ 240VAC resistive,
16A @ 30VDC resistive,
4A @ 240VAC inductive (cosø= 0.4),
4A @ 24VDC inductive (L/R=7msec).

Max. Switched Voltage: AC: 250V.
DC: 30V.
Max. Switched Current: 10A (OMI), 16A (OMIH).
Max. Switched Power: OMI: 2,400VA, 300W.
OMIH: 3,800VA, 480W.

Initial Dielectric Strength

Between Open Contacts: 1,000VAC 50/60 Hz. (1 minute).
Between Coil and Contacts: 5,000VAC 50/60 Hz. (1 minute).
Surge Voltage Between Coil and Contacts: 10,000V (1.2 / 50µs).

Initial Insulation Resistance

Between Mutually Insulated Elements: 1,000M ohms min. @ 500VDC.

Coil Data

Voltage: 5 to 48VDC.
Nominal Power: 720 mW (OMI-D), 540mW (OMI-L).
Coil Temperature Rise: 45°C max., at rated coil voltage.
Max. Coil Power: 130% of nominal.
Duty Cycle: Continuous.

Coil Data @ 20°C

OMI/OMIH-L Sensitive				
Rated Coil Voltage (VDC)	**Nominal Current (mA)**	**Coil Resistance (ohms) ± 10%**	**Must Operate Voltage (VDC)**	**Must Release Voltage (VDC)**
5	106.4	47	3.75	0.50
6	88.0	68	4.50	0.60
9	58.0	155	6.75	0.90
12	44.4	270	9.00	1.20
24	21.8	1,100	18.00	2.40
48	10.9	4,400	36.00	4.80
OMI/OMIH-D Standard				
Rated Coil Voltage (VDC)	**Nominal Current (mA)**	**Coil Resistance (ohms) ± 10%**	**Must Operate Voltage (VDC)**	**Must Release Voltage (VDC)**
5	138.9	36	3.50	0.50
6	120.0	50	4.20	0.60
9	78.3	115	6.30	0.90
12	60.0	200	8.40	1.20
24	29.3	820	16.80	2.40
48	14.5	3,300	33.60	4.80

Operate Data

Must Operate Voltage:
OMI/OMIH-D: 70% of nominal voltage or less.
OMI/OMIH-L: 75% of nominal voltage or less.
Must Release Voltage: 5% of nominal voltage or more.
Operate Time: OMI/OMIH-D: 15 ms max.
OMI/OMIH-L: 20 ms max.
Release Time: 8 ms max.

Environmental Data

Temperature Range:
Operating: OMI/OMIH-D:
-30°C to +55°C
OMI/OMIH-L:
-30°C to +70 °C
Vibration, Mechanical: 10 to 55 Hz., 1.5mm double amplitude
Operational: 10 to 55 Hz., 1.5mm double amplitude.
Shock, Mechanical: 1,000m/s² (100G approximately).
Operational: 100m/s² (10G approximately).
Operating Humidity: 20 to 85% RH. (Non-condensing).

Mechanical Data

Termination: Printed circuit terminals.
Enclosure (94V-0 Flammability Ratings):
OMI/OMIH-SS: Vented (Flux-tight) plastic cover.
OMI/OMIH-SH: Sealed plastic case.
Weight: 0.46 oz (13g) approximately.

Ordering Information

Typical Part Number ▶	OMIH	-SH	-1	24	L	,294

1. Basic Series:
OMI = 10A rating OMIH = 16A rating

2. Enclosure:
SS = Vent (Flux-tight)* plastic cover.
SH = Sealed, plastic case.

3. Termination:
1 = 1 pole

4. Coil Voltage:
05 = 5VDC 09 = 9VDC 24 = 24VDC
06 = 6VDC 12 = 12VDC 48 = 48VDC

5. Coil Input:
D = Standard (720mW) L = Sensitive (540mW)

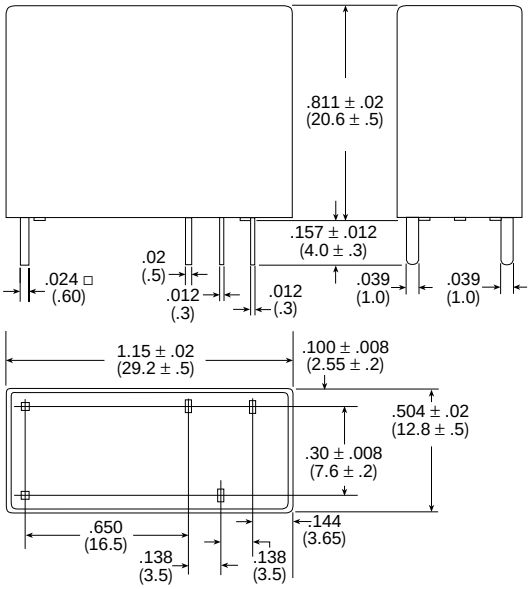
6. Contact Arrangement:
Blank = 1 Form C, SPDT M = 1 Form A, SPST-NO

7. Suffix:
,300 = Standard model for "SS" enclosure ,394 = Standard model for "SH" enclosure Other Suffix = Custom model

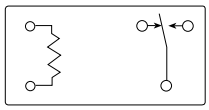
Our authorized distributors are more likely to stock the following items for immediate delivery.

OMIH-SH-105D,394 OMIH-SH-105L,394
OMIH-SH-112D,394 OMIH-SH-112L,394
OMIH-SH-124D,394 OMIH-SH-124L,394

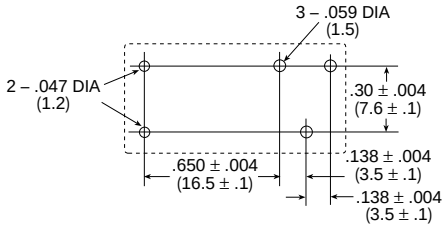
Outline Dimensions



Wiring Diagram (Bottom View)

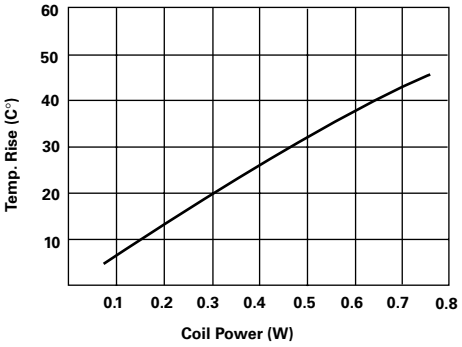


PC Board Layout (Bottom View)

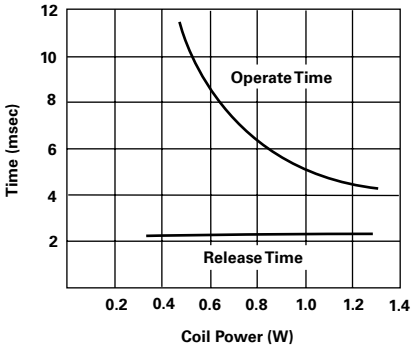


Reference Data

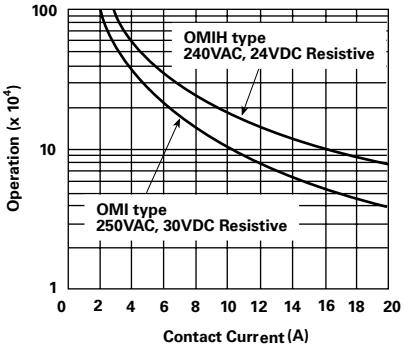
Coil Temperature Rise



Operate Time



Life Expectancy





OMI 2 Pole series

2 Pole Miniature Power PC Board Relay

Appliances, HVAC, Office Machines.

- UL File No. E58304
- CSA File No. LR48471
- VDE File No. 6678
- SEMKO File No. 9517235

Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- Meet UL 508, VDE0435 and SEMKO requirements.
- 2 Form A and 2 Form C contact arrangements.
- Immersion cleanable, sealed version available.
- Meet 5,000V dielectric voltage between coil and contacts.
- Meet 10,000V surge voltage between coil and contacts (1.2 / 50µs).

Contact Data @ 20°C

Arrangements: 2 Form A (DPST-NO) and 2 Form C (DPDT).
Material: Ag Alloy.
Max. Switching Rate: 300 ops./min. (no load).
30 ops./min. (rated load).
Expected Mechanical Life: 10 million operations (no load).
Expected Electrical Life: 100,000 operations (rated load).
Minimum Load: 100mA @ 5VDC.
Initial Contact Resistance: 100 milliohms @ 1A, 6VDC.

Contact Ratings

Ratings: 5A @ 240VAC resistive,
5A @ 120VAC resistive,
5A @ 30VDC resistive,
1/8 HP @ 250VAC.

1.5A @ 240VAC inductive (cosø= 0.4),
1.5A @ 120VAC inductive (cosø= 0.4),
1.5A @ 24VDC inductive (L/R=7msec).

Max. Switched Voltage: **AC:** 240V.
DC: 30V.
Max. Switched Current: 5A.
Max. Switched Power: **OMI:** 1,200VA, 150W.

Initial Dielectric Strength

Between Open Contacts: 1,000VAC 50/60 Hz. (1 minute).
Between Coil and Contacts: 5,000VAC 50/60 Hz. (1 minute).
Surge Voltage Between Coil and Contacts: 10,000V (1.2 / 50µs).

Initial Insulation Resistance

Between Mutually Insulated Elements: 1,000M ohms min. @ 500VDCM.

Coil Data

Voltage: 5 to 48VDC.
Nominal Power: 720mW (OMI-D), 540mW (OMI-L).
Coil Temperature Rise: 45°C max., at rated coil voltage.
Max. Coil Power: 130% of nominal.
Duty Cycle: Continuous.

Coil Data @ 20°C

OMI-L Sensitive				
Rated Coil Voltage (VDC)	**Nominal Current (mA)**	**Coil Resistance (ohms) ± 10%**	**Must Operate Voltage (VDC)**	**Must Release Voltage (VDC)**
5	106.4	47	4.00	0.50
6	88.0	68	4.80	0.60
9	58.0	155	7.20	0.90
12	44.4	270	9.60	1.20
24	21.8	1,100	19.20	2.40
48	10.9	4,400	38.40	4.80
OMI-D Standard				
Rated Coil Voltage (VDC)	**Nominal Current (mA)**	**Coil Resistance (ohms) ± 10%**	**Must Operate Voltage (VDC)**	**Must Release Voltage (VDC)**
5	138.9	36	3.75	0.50
6	120.0	50	4.50	0.60
9	78.3	115	6.75	0.90
12	60.0	200	9.00	1.20
24	29.3	820	18.00	2.40
48	14.5	3,300	36.00	4.80

Operate Data

Must Operate Voltage:
OMI-D: 75% of nominal voltage or less.
OMI-L: 80 % of nominal voltage or less.
Must Release Voltage: 5% of nominal voltage or more.
Operate Time: **OMI-D:** 15 ms max.
OMI-L: 20 ms max.
Release Time: 8 ms max.

Environmental Data

Temperature Range:
Operating: **OMI-D:**
-30°C to +55°C
OMI-L:
-30°C to +70 °C
Vibration, Mechanical: 10 to 55 Hz., 1.5mm double amplitude
Operational: 10 to 55 Hz., 1.5mm double amplitude.
Shock, Mechanical: 1,000m/s² (100G approximately).
Operational: 100m/s² (10G approximately).
Operating Humidity: 20 to 85% RH. (Non-condensing).

Mechanical Data

Termination: Printed circuit terminals.
Enclosure (94V-0 Flammability Ratings):
OMI-SS: Vented (Flux-tight) plastic cover.
OMI-SH: Sealed plastic case.
Weight: 0.46 oz (13g) approximately.

Ordering Information

Typical Part Number ►	OMI	-SS	-2	12	L	M	,594

1. Basic Series:
OMI = 2 Pole Miniature Power PC Board Relay.

2. Enclosure:
SS = Vent (Flux-tight)* plastic cover.
SH = Sealed, plastic case.

3. Termination:
2 = 2 pole

4. Coil Voltage:
05 = 5VDC 09 = 9VDC 24 = 24VDC
06 = 6VDC 12 = 12VDC 48 = 48VDC

5. Coil Input:
D = Standard (720mW) L = Sensitive (540mW)

6. Contact Arrangement:
Blank = 2 Form C, DPDT M = 2 Form A, DPST-NO

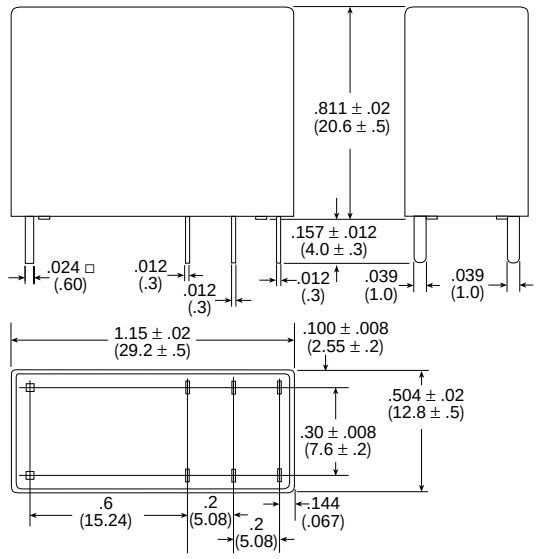
7. Suffix:
,500 = Standard model for "SS" enclosure ,594 = Standard model for "SH" enclosure Other Suffix = Custom model

* Not suitable for immersion cleaning processes.

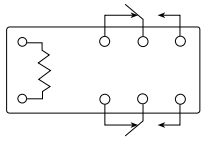
Our authorized distributors are more likely to stock the following items for immediate delivery.

OMI-SH-205D,594 OMI-SH-205L,594
OMI-SH-212D,594 OMI-SH-212L,594
OMI-SH-224D,594 OMI-SH-224L,594

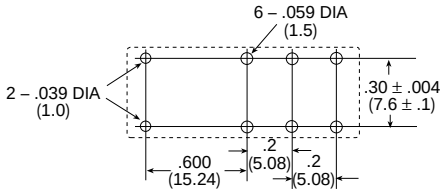
Outline Dimensions



Wiring Diagram (Bottom View)

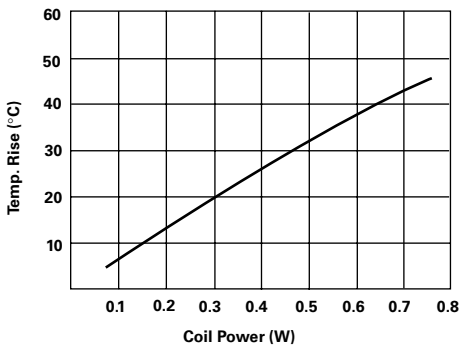


PC Board Layout (Bottom View)

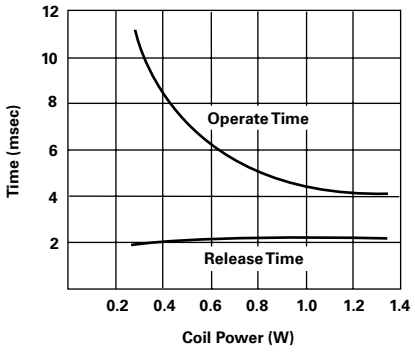


Reference Data

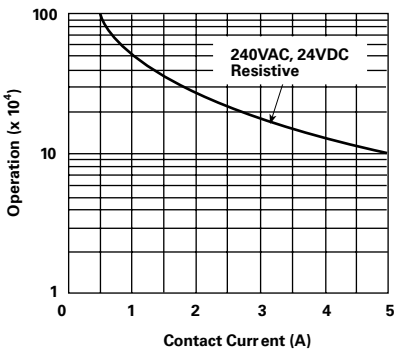
Coil Temperature Rise

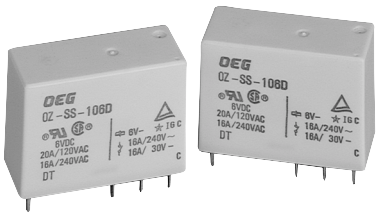


Operate Time



Life Expectancy





OZ/OZF series

16A Miniature Power PC Board Relay

Appliances, HVAC, Office Machines.

UL File No. E82292
CSA File No. LR48471
TUV File No. R85447

Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- Meet UL 508, CSA and TUV requirements.
- 1 Form A and 1 Form C contact arrangements.
- Immersion cleanable, sealed version available.
- Meet 5,000V dielectric voltage between coil and contacts.
- Meet 10,000V surge voltage between coil and contacts (1.2 / 50µs).
- Quick Connect Terminal type available (OZF).
- UL TV-8 rating available (OZT).

Contact Data @ 20°C

Arrangements: 1 Form A (SPST-NO) and 1 Form C (SPDT).
Material: Ag Alloy (1 Form C) and AgSnO (1 Form A).
Max. Switching Rate: 300 ops./min. (no load).
30 ops./min. (rated load).
Expected Mechanical Life: 10 million operations (no load).
Expected Electrical Life: 100,000 operations (rated load).
Minimum Load: 100mA @ 5VDC.
Initial Contact Resistance: 100 milliohms @ 1A, 6VDC.

Contact Ratings

Ratings: OZ/OZF: 20A @ 120VAC resistive,
16A @ 240VAC resistive,
5A @ 120VAC inductive (cosø= 0.4),
5A @ 24VDC inductive (L/R= 7msec).

OZT: 8A @ 240VAC resistive,
TV-8 @ 120VAC tungsten, 25,000ops.

Max. Switched Voltage: AC: 240V.
DC: 110V.
Max. Switched Current: 16A (OZ/OZF), 8A (OZT).
Max. Switched Power: 3,850VA, 600W.

Initial Dielectric Strength

Between Open Contacts: 1,000VAC 50/60 Hz. (1 minute).
Between Coil and Contacts: 5,000VAC 50/60 Hz. (1 minute).
Surge Voltage Between Coil and Contacts: 10,000V (1.2 / 50µs).

Initial Insulation Resistance

Between Mutually Insulated Elements: 1,000M ohms min. @ 500VDC.

Coil Data

Voltage: 5 to 48VDC.
Nominal Power: 720 mW (OZ-D), 540mW (OZ-L).
Coil Temperature Rise: 45°C max., at rated coil voltage.
Max. Coil Power: 130% of nominal.
Duty Cycle: Continuous.

Coil Data @ 20°C

OZ-L Sensitive				
Rated Coil Voltage (VDC)	**Nominal Current (mA)**	**Coil Resistance (ohms) ± 10%**	**Must Operate Voltage (VDC)**	**Must Release Voltage (VDC)**
5	106.4	47	3.75	0.25
6	88.0	68	4.50	0.30
9	58.0	155	6.75	0.45
12	44.4	270	9.00	0.60
24	21.8	1,100	18.00	1.20
48	10.9	4,400	36.00	2.40
OZ-D Standard				
Rated Coil Voltage (VDC)	**Nominal Current (mA)**	**Coil Resistance (ohms) ± 10%**	**Must Operate Voltage (VDC)**	**Must Release Voltage (VDC)**
5	138.9	36	3.50	0.25
6	120.0	50	4.20	0.30
9	78.3	115	6.30	0.45
12	60.0	200	8.40	0.90
24	29.3	820	16.80	1.20
48	14.5	3,300	33.60	2.40

Operate Data

Must Operate Voltage:
OZ-D: 70% of nominal voltage or less.
OZ-L: 75% of nominal voltage or less.
Must Release Voltage: 5% of nominal voltage or more.
Operate Time: OZ-D: 15 ms max.
OZ-L: 20 ms max.
Release Time: 8 ms max.

Environmental Data

Temperature Range:
Operating: OZ-D: -30°C to +55°C
OZ-L: -30°C to +70 °C
Vibration, Mechanical: 10 to 55 Hz., 1.5mm double amplitude
Operational: 10 to 55 Hz., 1.5mm double amplitude.
Shock, Mechanical: 1,000m/s² (100G approximately).
Operational: 100m/s² (10G approximately).
Operating Humidity: 20 to 85% RH. (Non-condensing).

Mechanical Data

Termination: Printed circuit terminals.
Enclosure (94V-0 Flammability Ratings):
OZ-S: Vented (Flux-tight) plastic cover.
OZF-SS: Vented (Flux-tight) plastic cover.
OZ-SH: Sealed plastic case.
Weight: 0.46 oz (13g) approximately.

Ordering Information

Typical Part Number ▶	OZ	-SH	-1	24	L	M	1		,294

1. Basic Series:
OZ = 16A PC Board Terminals OZF = Quick Connect Terminals
OZT = TV-8 Rating PC Board Terminals

2. Enclosure:
S = Vent (Flux-tight)* plastic cover (only available with OZF)
SS = Vent (Flux-tight)* plastic cover. SH = Sealed, plastic case.

3. Termination:
1 = 1 pole

4. Coil Voltage:
05 = 5VDC 09 = 9VDC 24 = 24VDC
06 = 6VDC 12 = 12VDC 48 = 48VDC

5. Coil Input:
D = Standard (720mW) L = Sensitive (540mW)

6. Contact Arrangement:
Blank = 1 Form C, SPDT M = 1 Form A, SPST-NO

7. Contact Material:
Blank = AgCdO (1 Form C) 1 = AgSnO (1 Form A, only available with OZ....LM1 or DM1)

8. Mounting and Termination:
Blank = PC Board Terminals P = PC Board and Quick Connect Terminals (only available only with OZF-S-1..LM1P).

9. Suffix:
,200 = Standard model for "SS" enclosure on OZ and OZT ,000 = Standard model for coil input "D" on OZF Other Suffix = Custom model
,294 = Standard model for "SH" enclosure on OZ and OZT ,300 = Standard model for coil input "L" on OZF

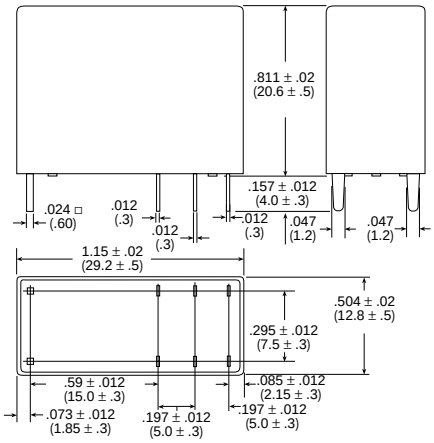
* Not suitable for immersion cleaning processes.

Our authorized distributors are more likely to maintain the following items in stock for immediate delivery.

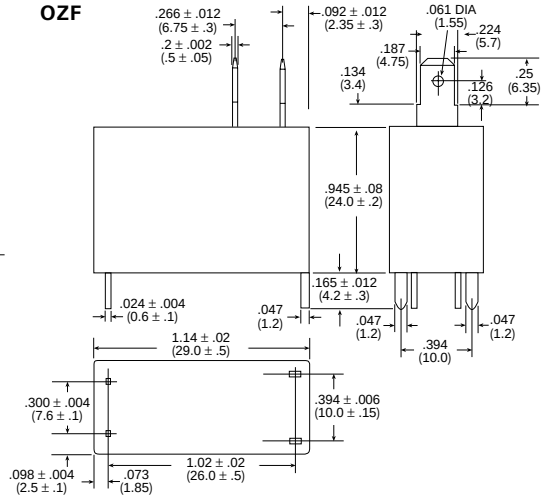
OZ-SH-105D,294 OZ-SH-124D,294 OZ-SH-112LM1,294 OZ-SH-105L,294 OZ-SH-124L,294
OZ-SH-112D,294 OZ-SH-105LM1,294 OZ-SH-124LM1,294 OZ-SH-112L,294

Outline Dimensions

OZ

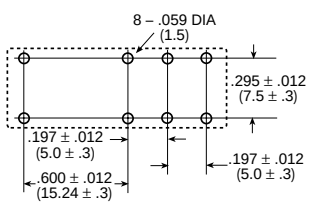


OZF

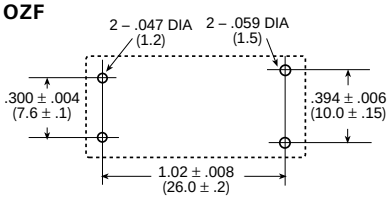


PC Board Layouts (Bottom View)

OZ

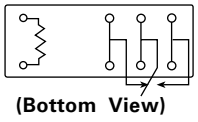


OZF



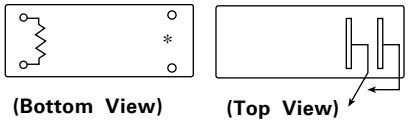
Wiring Diagrams

OZ



(Bottom View)

OZF

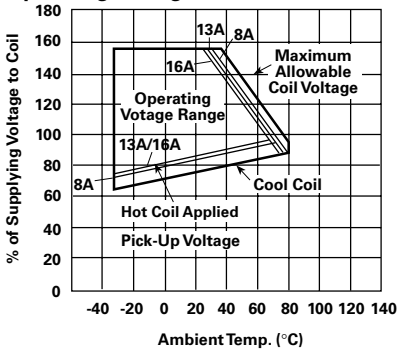


(Bottom View) (Top View)

* No electrical connection, for board attachment only.

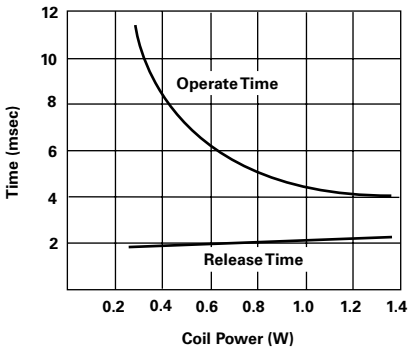
Reference Data

Operating Voltage

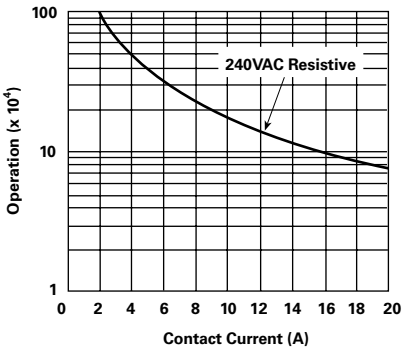


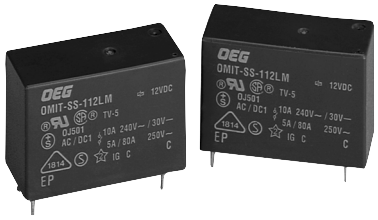
Note: This data is based on the max. allowable temperature for E type insulation coil (115°C).

Operate Time



Life Expectancy





OMIT series

10A Miniature Power PC Board Relay

Appliances, HVAC, Office Machines.

- UL File No. E58304
- CSA File No. LR48471
- VDE File No. 6678
- SEMKO File No. 8713114
- SEV File No. 97550375

Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- Meet UL 508, VDE0435, SEMKO and SEV requirements.
- 1 Form A contact arrangements.
- UL TV-5 rating available.
- Immersion cleanable, sealed version available.
- Meet 5,000V dielectric voltage between coil and contacts.
- Meet 10,000V surge voltage between coil and contacts (1.2 / 50µs).

Contact Data @ 20°C

Arrangements: 1 Form A.
Material: AgSnO
Max. Switching Rate: 300 ops./min. (no load).
30 ops./min. (rated load).
Expected Mechanical Life: 10 million operations (no load).
Expected Electrical Life: 100,000 operations (rated load).
Minimum Load: 100mA @ 5VDC.
Initial Contact Resistance: 100 milliohms @ 1A, 6VDC.

Contact Ratings

Ratings: 10A @ 240VAC resistive,
TV-5 @ 120VAC tungsten 25,000ops.
Max. Switched Voltage: **AC:** 240V.
DC: 30V.
Max. Switched Current: 10A.
Max. Switched Power: 2,400VA, 300W.

Initial Dielectric Strength

Between Open Contacts: 1,000VAC 50/60 Hz. (1 minute).
Between Coil and Contacts: 5,000VAC 50/60 Hz. (1 minute).
Surge Voltage Between Coil and Contacts: 10,000V (1.2 / 50µs).

Initial Insulation Resistance

Between Mutually Insulated Elements: 1,000M ohms min. @ 500VDC.

Coil Data

Voltage: 5 to 48VDC.
Nominal Power: 720 mW (OMI-D), 540mW (OMI-L).
Coil Temperature Rise: 45°C max., at rated coil voltage (OMI-D).
35°C max., at rated coil voltage (OMI-L).
Max. Coil Power: 130% of nominal.
Duty Cycle: Continuous.

Coil Data @ 20°C

OMIT-L Sensitive				
Rated Coil Voltage (VDC)	**Nominal Current (mA)**	**Coil Resistance (ohms) ± 10%**	**Must Operate Voltage (VDC)**	**Must Release Voltage (VDC)**
5	106.4	47	3.75	0.25
6	88.0	68	4.50	0.30
9	58.0	155	6.75	0.45
12	44.4	270	9.00	0.90
24	21.8	1,100	18.00	1.20
48	10.9	4,400	36.00	2.40
OMIT-D Standard				
Rated Coil Voltage (VDC)	**Nominal Current (mA)**	**Coil Resistance (ohms) ± 10%**	**Must Operate Voltage (VDC)**	**Must Release Voltage (VDC)**
5	138.9	36	3.50	0.25
6	120.0	50	4.20	0.30
9	78.3	115	6.30	0.45
12	60.0	200	8.40	0.90
24	29.3	820	16.80	1.20
48	14.5	3,300	33.60	2.40

Operate Data

Must Operate Voltage:
OMIT-D: 70% of nominal voltage or less.
OMIT-L: 75% of nominal voltage or less.
Must Release Voltage: 5% of nominal voltage or more.
Operate Time: **OMIT-D:** 15 ms max.
OMIT-L: 20 ms max.
Release Time: 8 ms max.

Environmental Data

Temperature Range:
Operating: **OMT-D:**
-30°C to +55°C
OMT-L:
-30°C to +70 °C
Vibration, Mechanical: 10 to 55 Hz., 1.5mm double amplitude
Operational: 10 to 55 Hz., 1.5mm double amplitude.
Shock, Mechanical: 1,000m/s² (100G approximately).
Operational: 100m/s² (10G approximately).
Operating Humidity: 20 to 85% RH. (Non-condensing).

Mechanical Data

Termination: Printed circuit terminals.
Enclosure (94V-0 Flammability Ratings):
OMIT-SS: Vented (Flux-tight) plastic cover.
OMIT-SH: Sealed plastic case.
Weight: 0.46 oz (13g) approximately.

Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.

Ordering Information

Typical Part Number ▶	OMIT	-SS	-1	12	L	M	,300

1. Basic Series:
OMIT = Miniature Sealed PC Board Relay

2. Enclosure:
SS = Vent (Flux-tight)* plastic cover.
SH = Sealed, plastic case.

3. Termination:
1 = 1 pole

4. Coil Voltage:
05 = 5VDC 09 = 9VDC 24 = 24VDC
06 = 6VDC 12 = 12VDC 48 = 48VDC

5. Coil Input:
D = Standard (720mW) L = Sensitive (540mW)

6. Contact Arrangement:
Blank = 1 Form C, SPDT M = 1 Form A, SPST-NO

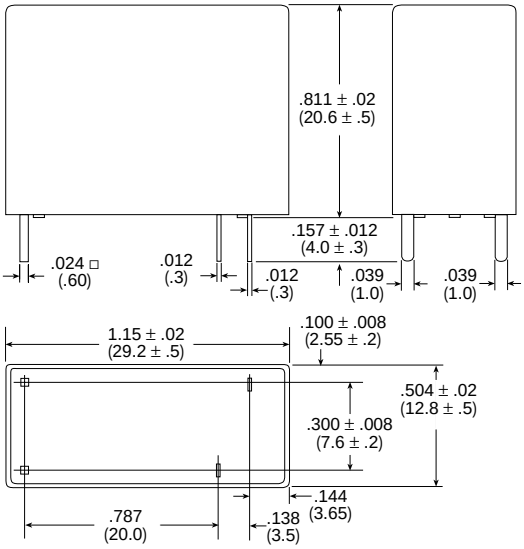
7. Suffix:
,300 = Standard model for "SS" enclosure ,394 = Standard model for "SH" enclosure Other Suffix = Custom model

* Not suitable for immersion cleaning processes.

Our authorized distributors are more likely to maintain the following items in stock for imnmediate delivery.

None at present.

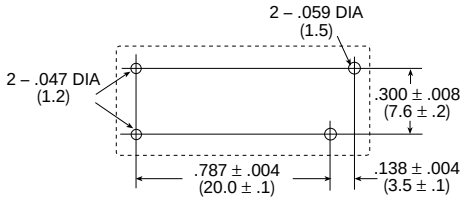
Outline Dimensions



Wiring Diagram (Bottom View)

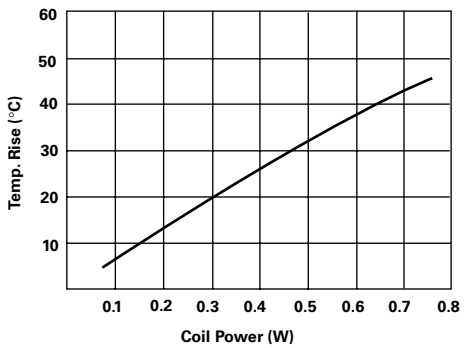


PC Board Layout (Bottom View)

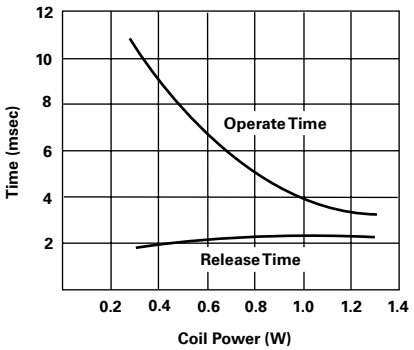


Reference Data

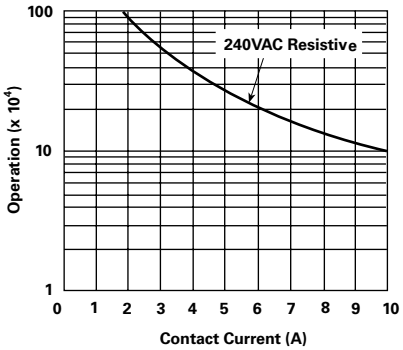
Coil Temperature Rise

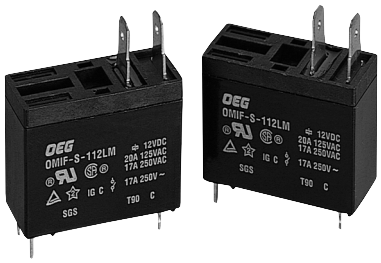


Operate Time



Life Expectancy





OMIF series

20A Miniature Power PC Board Relay

Appliances, HVAC, Office Machines.

UL File No. E82292
CSA File No. LR48471
VDE File No. 6031
TUV File No. R85447

Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- Meet UL 508, CSA, VDE0435 and TUV requirements.
- 1 Form A contact arrangements.
- Quick Connect Terminal type.
- Meet 5,000V dielectric voltage between coil and contacts.
- Meet 10,000V surge voltage between coil and contacts (1.2 / 50µs).

Contact Data @ 20°C

Arrangements: 1 Form A.
Material: AgSnO
Max. Switching Rate: 300 ops./min. (no load).
30 ops./min. (rated load).
Expected Mechanical Life: 10 million operations (no load).
Expected Electrical Life: 100,000 operations (rated load).
Minimum Load: 100mA @ 5VDC.
Initial Contact Resistance: 100 milliohms @ 1A, 6VDC.

Contact Ratings

Ratings: 20A @ 125VAC resistive.
16A @ 250VAC resistive,
16A @ 24VDC resistive.

Max. Switched Voltage: **AC:** 250V.
DC: 24V.
Max. Switched Current: 20A.
Max. Switched Power: 4,000VA, 385W.

Initial Dielectric Strength

Between Open Contacts: 1,000VAC 50/60 Hz. (1 minute).
Between Coil and Contacts: 5,000VAC 50/60 Hz. (1 minute).
Surge Voltage Between Coil and Contacts: 10,000V (1.2 / 50µs).

Initial Insulation Resistance

Between Mutually Insulated Elements: 1,000M ohms min. @ 500VDC.

Coil Data

Voltage: 12 to 24VDC.
Nominal Power: 540mW.
Coil Temperature Rise: 35°C max., at rated coil voltage.
Max. Coil Power: 130% of nominal.
Duty Cycle: Continuous.

Coil Data @ 20°C

OMIF				
Rated Coil Voltage (VDC)	Nominal Current (mA)	Coil Resistance (ohms) ± 10%	Must Operate Voltage (VDC)	Must Release Voltage (VDC)
12	44.4	270	9.00	0.60
18	30.0	600	13.50	0.90
24	21.8	1,100	18.00	1.20

Operate Data

Must Operate Voltage: 75% of nominal voltage or less.
Must Release Voltage: 5% of nominal voltage or more.
Operate Time: 20 ms max.
Release Time: 10 ms max.

Environmental Data

Temperature Range:
Operating: -30°C to +70°C
Vibration, Mechanical: 10 to 55 Hz., 1.5mm double amplitude
Operational: 10 to 55 Hz., 1.5mm double amplitude.
Shock, Mechanical: 1,000m/s² (100G approximately).
Operational: 100m/s² (10G approximately).
Operating Humidity: 20 to 85% RH. (Non-condensing).

Mechanical Data

Termination: Printed circuit terminals with quick connect terminals.
Enclosure (94V-0 Flammability Ratings):
OMIF-S: Vented (Flux-tight) plastic cover.
Weight: 0.53 oz (15g) approximately.

Ordering Information

Typical Part Number ▶	OMIF	-S	-1	24	L	M	,300

1. Basic Series:
OMIF = 20A PC Board Terminals

2. Enclosure:
S = Vented (Flux-tight)* plastic cover

3. Termination:
1 = 1 pole

4. Coil Voltage:
12 = 12VDC 18 = 18VDC 24= 24VDC

5. Coil Input:
L = Sensitive (540mW)

6. Contact Arrangement:
M = 1 Form A, SPST-NO

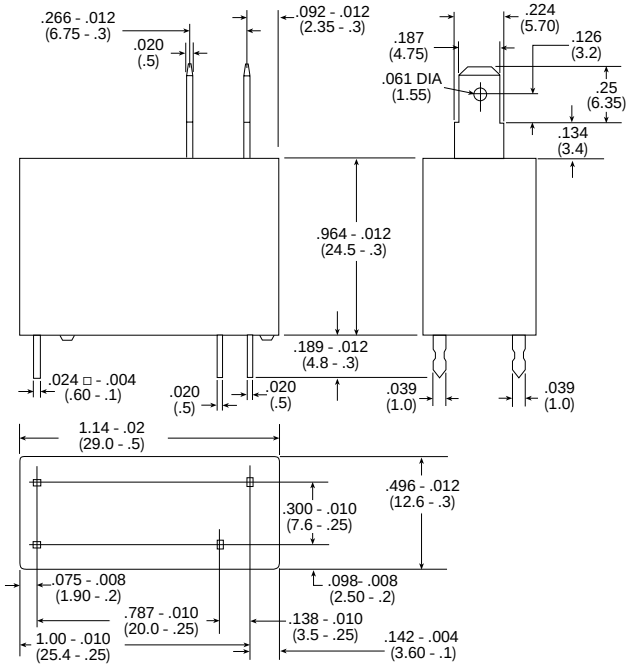
7. Suffix:
,300 = Standard model Other Suffix = Custom model

* Not suitable for immersion cleaning processes.

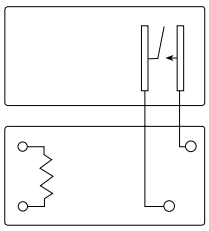
Our authorized distributors are more likely to stock the following items for immediate delivery.

None at present.

Outline Dimensions



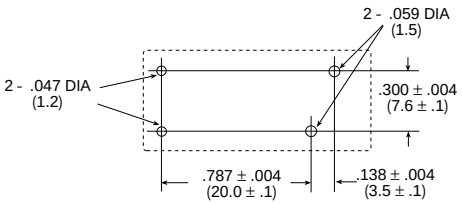
Wiring Diagram



(Top View)

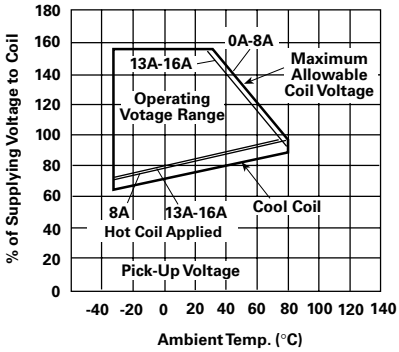
(Bottom View)

PC Board Layout (Bottom View)

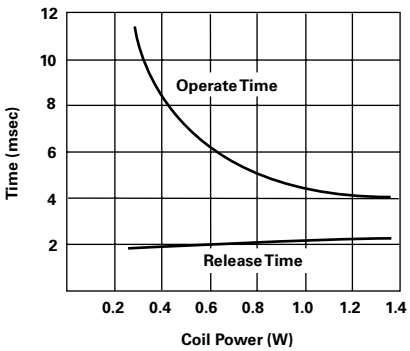


Reference Data

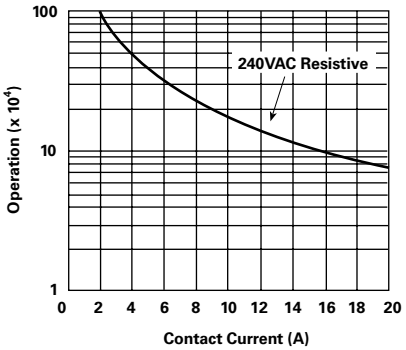
Operating Voltage



Operate Time



Life Expectancy



Note: This data is based on the max. allowable temperature for E type insulation coil (115°C).



PCI series

Slim 2 Form A Miniature PC Board Relay

Appliances, Audio Equipment, Office Machines

UL File No. E82292
CSA File No. LR48471

Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- Slim and simple architecture.
- 2 Form A (DPST-NO) contact arrangement.
- Cadmium-free contacts.
- UL, CSA, approvals.
- Immersion cleanable, sealed version available.
- Magnetic blow-out available for DC loads.

Contact Data @ 20°C

Arrangements: 2 Form A (DPST-NO).
Material: Ag-GS Alloy.
Max. Switching Rate: 300ops./ min. (no load).
30ops./ min. (rated load).
Expected Mechanical Life: 1 million ops (no load).
Expected Electrical Life: 100,000 ops (rated load).
Minimum Load: 1mA @ 1VDC.
Initial Contact Resistance: 50 milliohms @ 1mA, 6VDC.

Contact Ratings

Ratings: 3A @ 24VDC resistive.
3A @ 120VAC resistive.
Max. Switched Voltage: AC: 240V.
DC: 50V.
Max. Switched Current: 5A.
Max. Switched Power: 300VA, 90W.

Initial Dielectric Strength

Between Open Contacts: 1,000VAC, 50/60 Hz. (1 min.).
Between Adjacent Contacts: 2,000VAC, 50/60 Hz (1 min).
Between Contacts and Coil: 4,000VAC, 50/60 Hz. (1 min.).
Surge Voltage Between Coil and Contacts: 7,000V (1.2/50µs).

Initial Insulation Resistance

Between Mutually Insulated Conductors: 1,000Mohm @ 500VDCM.

Coil Data

Voltage: 5 to 48VDC.
Duty Cycle: Continuous.
Nominal Power: 350mW.
Max. Coil Power: 130% of nominal at 20°C.

Coil Data @ 20°C

PCI				
Rated Coil Voltage (VDC)	**Nominal Current (mA)**	**Coil Resistance (ohms) ± 10%**	**Must Operate Voltage (VDC)**	**Must Release Voltage (VDC)**
5	69.4	72	3.50	0.50
6	58.8	102	4.20	0.60
9	39.1	230	6.30	0.90
12	29.1	413	8.40	1.20
24	14.5	1,650	16.80	2.40

Operate Data @ 20°C

Must Operate Voltage: 70% of nominal voltage or less.
Must Release Voltage: 10% of nominal voltage or more.
Operate Time : 15ms max.
Release Time : 5ms max.

Environmental Data

Temperature Range:
Operating: -30°C to +70°C.
Vibration, Mechanical: 10 to 55Hz., 1.5mm double amplitude.
Operational: 10 to 55Hz., 1.5mm double amplitude.
Shock, Mechanical: 1,000m/s^2 (100G approximately).
Operational: 100m/s^2 (10G approximately).
Operating Humidity: 20 to 85% RH. (Non-condensing).

Mechanical Data

Termination: Printed circuit terminals.
Enclosure: Plastic sealed case with enclosure option "H".
Otherwise, vented (flux-tight) cover.
Weight: 0.41 oz (10.5g) approximately.

Typical Part Number ▶	PCI	-2	05	D	M		,000

1. Basic Series:
PCI = Miniature relay

2. Termination:
2 = 2 pole

3. Coil Voltage:
05 = 5VDC 09 = 9VDC 24 = 24VDC
06 = 6VDC 12 = 12VDC 48 = 48VDC

4. Coil Input:
D = Standard

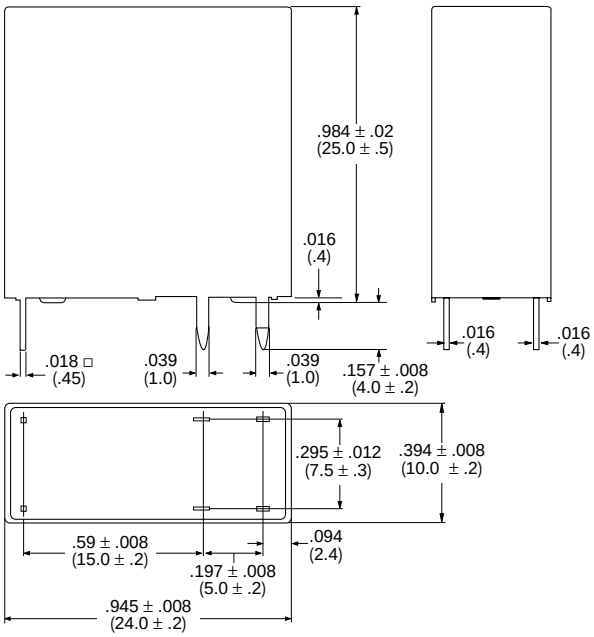
5. Contact Arrangement:
M = 2 Form A

6. Enclosure:
Blank = Vented (Flux-tight) cover H = Sealed plastic case

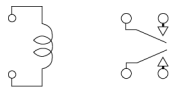
7. Optional:
Blank = Standard M = with magnetic blow-out

8. Suffix:
,000 = Standard model Other Suffix = Custom model

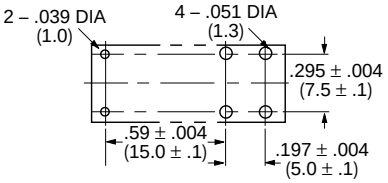
Our authorized distributors are more likely to maintain the following items in stock for immediate delivery.
None at present.

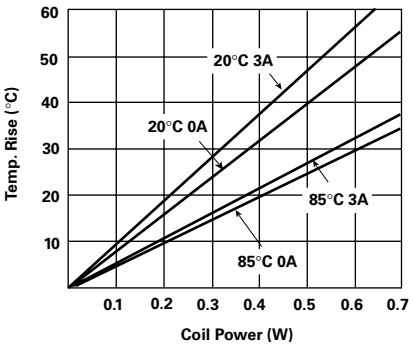


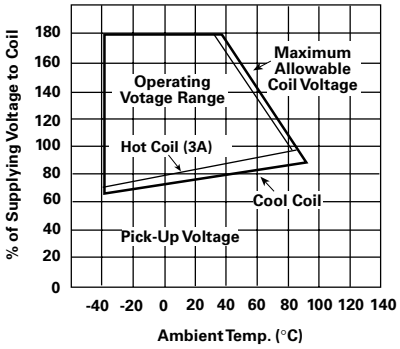
Wiring Diagram (Bottom View)



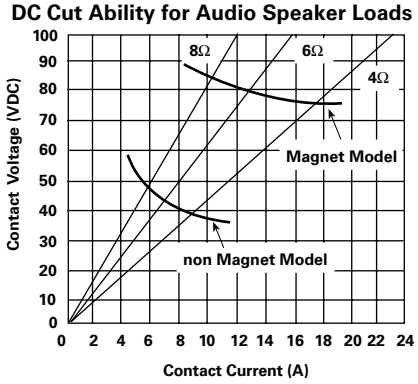
PC Board Layout (Bottom View)



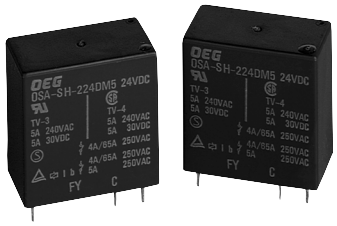




DC Cut Ability for Audio Speaker Loads



Note: This data is based on the max. allowable temperature for E type insulation coil (115°C).



OSA series

2 Pole Miniature Power PC Board Relay

Appliances, Audio Equipment, Office Machines

- UL File No. E82292
- CSA File No. LR48471
- SEMKO File No. 9452086 (available for DM5)
- TUV File No. R9551879 (available for DM5)

Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- Meet UL TV-3 and CSA TV-4 rating available for DM5 type.
- 2 Form A contact arrangements.
- Immersion cleanable, sealed version available.
- Meet 3,000V dielectric voltage between coil and contacts.
- Meet 5,000V surge voltage between coil and contacts (1.2 / 50µs).

Contact Data @ 20°C

Arrangements: 2 Form A (DPST-NO).
Material: Ag-GS Alloy (DM3) and AgSnO (DM5).
Max. Switching Rate: 300 ops./min. (no load).
30 ops./min. (rated load).
Expected Mechanical Life: 10 million operations (no load).
Expected Electrical Life: 100,000 operations (rated load).
Minimum Load:
OSA-DM3: 1mA @ 1VDC.
OSA-DM5: 100mA @ 5VDC.
Initial Contact Resistance: 50 milliohms @ 1A, 6VDC.

Contact Ratings

Ratings: **OSA-DM3:** 3A @ 120VAC resistive,
3A @ 24VDC resistive,

OSA-DM5: 5A @ 240VAC resistive,
5A @ 30VDC resistive,
TV-3 @ 120VAC Tungsten (UL),
TV-4 @ 120VAC Tungsten (CSA).
Max. Switched Voltage:
OSA-DM3: AC: 240V. **DC:** 50V.
OSA-DM5: AC: 250V. **DC:** 30V.
Max. Switched Current: 5A
Max. Switched Power:
OSA-DM3: 300VA.
OSA-DM5: 1,100VA.

Initial Dielectric Strength

Between Open Contacts: 1,000VAC 50/60 Hz. (1 minute).
Between Coil and Contacts: 3,000VAC 50/60 Hz. (1 minute).
Surge Voltage Between Coil and Contacts: 5,000V (1.2 / 50µs).

Initial Insulation Resistance

Between Mutually Insulated Elements: 1,000M ohms min. @ 500VDC.

Coil Data

Voltage: 5 to 48VDC.
Nominal Power: 540 mW
Coil Temperature Rise: 50°C max., at rated coil voltage.
Max. Coil Power: 130% of nominal.
Duty Cycle: Continuous.

Coil Data @ 20°C

OSA				
Rated Coil Voltage (VDC)	**Nominal Current (mA)**	**Coil Resistance (ohms) ± 10%**	**Must Operate Voltage (VDC)**	**Must Release Voltage (VDC)**
5	106.4	47	3.75	0.50
6	88.0	68	4.50	0.60
9	58.0	155	6.75	0.90
12	44.4	270	9.00	1.20
24	21.8	1,100	18.00	2.40
48	11.0	4,400	36.00	4.80

Operate Data

Must Operate Voltage: 75% of nominal voltage or less.
Must Release Voltage: 10% of nominal voltage or more.
Operate Time: 20 ms max.
Release Time: 10 ms max.

Environmental Data

Temperature Range:
Operating: -30°C to +60°C
Vibration, Mechanical: 10 to 55 Hz., 1.5mm double amplitude
Operational: 10 to 55 Hz., 1.5mm double amplitude.
Shock, Mechanical: 1,000m/s² (100G approximately).
Operational: 100m/s² (10G approximately).
Operating Humidity: 20 to 85% RH. (Non-condensing).

Mechanical Data

Termination: Printed circuit terminals.
Enclosure (94V-0 Flammability Ratings):
OSA-SS: Vented (Flux-tight) plastic cover.
OSA-SH: Sealed plastic case.
Weight: 0.46 oz (13g) approximately.

Ordering Information

Typical Part Number ▶	OSA	-SS	-2	24	D	M	3	,000

1. Basic Series:
OSA = Miniature Power PC board relay.

2. Enclosure:
SS = Vent (Flux-tight)* plastic cover.
SH = Sealed, plastic case.

3. Termination:
2 = 2 pole

4. Coil Voltage:
05 = 5VDC 09 = 9VDC 24 = 24VDC
06 = 6VDC 12 = 12VDC 48 = 48VDC

5. Coil Input:
D = Standard

6. Contact Arrangement:
M = 2 Form A, DPST-NO

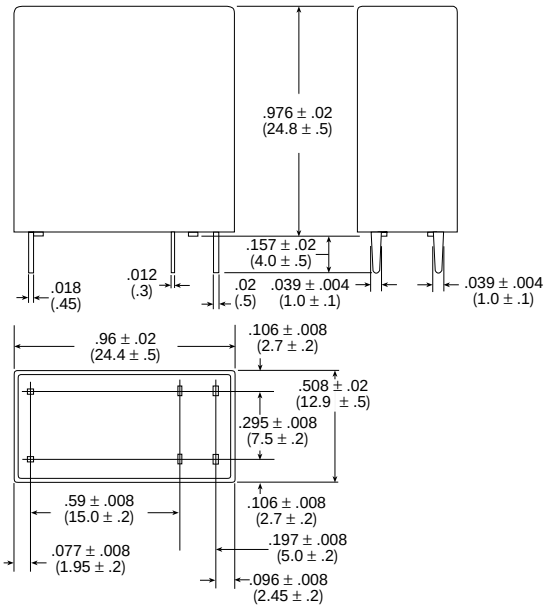
7. Contact Rating:
3 = 3A @ 120VAC resistive (DM3). 5 = 5A @ 240VAC resistive (DM5).

8. Suffix:
,000 = Standard model Other Suffix = Custom model

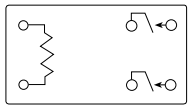
* Not suitable for immersion cleaning processes.

Our authorized distributors are more likely to maintain the following items in stock for immediate delivery.
None at present.

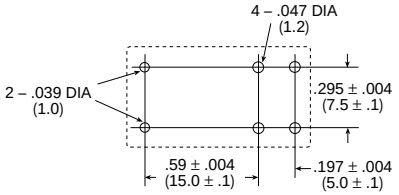
Outline Dimensions



Wiring Diagram (Bottom View)

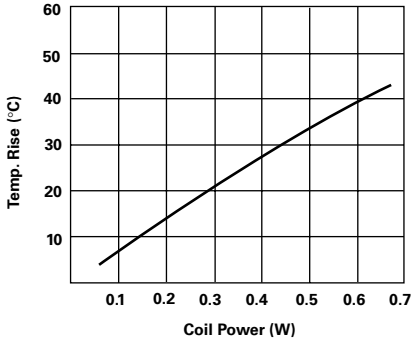


PC Board Layout (Bottom View)

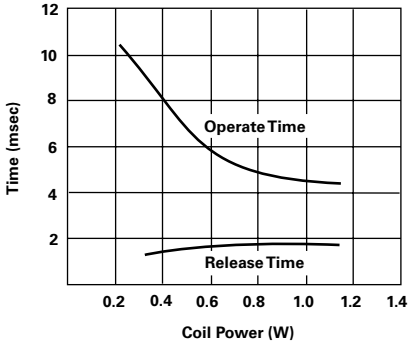


Reference Data

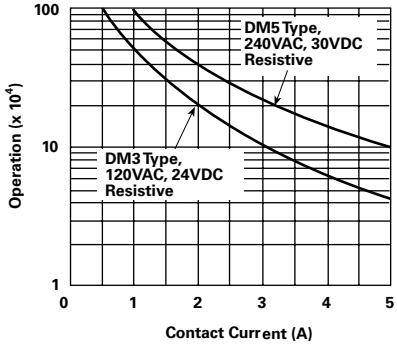
Coil Temperature Rise

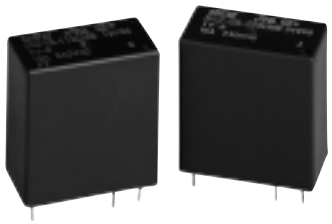


Operate Time



Life Expectancy





OSZ series

1 Pole Miniature Power PC Board Relay

Appliances, HVAC, Office Machines

UL File No. E58304
CSA File No. LR48471

Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- Meet UL Tungsten TV-8 rating.
- 1 Form A contact arrangements.
- Immersion cleanable, sealed version available.
- Meet 4,000V dielectric voltage between coil and contacts.
- Meet 7,000V surge voltage between coil and contacts (1.2 / 50µs).

Contact Data @ 20°C

Arrangements: 1 Form A (SPST-NO).
Material: AgSnO.
Max. Switching Rate: 300 ops./min. (no load).
30 ops./min. (rated load).
Expected Mechanical Life: 10 million operations (no load).
Expected Electrical Life: 100,000 operations (rated load).
Minimum Load: 100mA @ 5VDC.
Initial Contact Resistance: 100 milliohms @ 1A, 6VDC.

Contact Ratings

Ratings: 16A @ 240VAC resistive,
16A @ 24VDC resistive,
TV-8 @ 120VAC Tungsten, 25,000ops.

Max. Switched Voltage: **AC:** 240V.
DC: 24V.
Max. Switched Current: 16A.
Max. Switched Power: 2,400VA, 380W.

Initial Dielectric Strength

Between Open Contacts: 1,000VAC 50/60 Hz. (1 minute).
Between Coil and Contacts: 4,000VAC 50/60 Hz. (1 minute).
Surge Voltage Between Coil and Contacts: 7,000V (1.2 / 50µs).

Initial Insulation Resistance

Between Mutually Insulated Elements: 1,000M ohms min. @ 500VDC.

Coil Data

Voltage: 5 to 48VDC.
Nominal Power: 540 mW
Coil Temperature Rise: 55°C max., at rated coil voltage.
Max. Coil Power: 130% of nominal.
Duty Cycle: Continuous.

Coil Data @ 20°C

OSZ				
Rated Coil Voltage (VDC)	**Nominal Current (mA)**	**Coil Resistance (ohms) ± 10%**	**Must Operate Voltage (VDC)**	**Must Release Voltage (VDC)**
5	106.4	47	3.75	0.25
6	88.0	68	4.50	0.30
9	58.0	155	6.75	0.45
12	44.4	270	9.00	0.60
24	21.8	1,100	18.00	1.20
48	11.0	4,400	36.00	2.40

Operate Data

Must Operate Voltage: 75% of nominal voltage or less.
Must Release Voltage: 5% of nominal voltage or more.
Operate Time: 20 ms max.
Release Time: 10 ms max.

Environmental Data

Temperature Range:
Operating: -30°C to +65°C
Vibration, Mechanical: 10 to 55 Hz., 1.5mm double amplitude
Operational: 10 to 55 Hz., 1.5mm double amplitude.
Shock, Mechanical: 1,000m/s² (100G approximately).
Operational: 100m/s² (10G approximately).
Operating Humidity: 20 to 85% RH. (Non-condensing).

Mechanical Data

Termination: Printed circuit terminals.
Enclosure (94V-0 Flammability Ratings):
OSZ-SS: Vented (Flux-tight) plastic cover.
OSZ-SH: Sealed plastic case.
Weight: 0.45 (13g) approximately.

Ordering Information

Typical Part Number ►	OSZ	-SS	-1	12	D	M	8	,000

1. Basic Series:
OSZ = Miniature Power PC board relay.

2. Enclosure:
SS = Vent (Flux-tight)* plastic cover.
SH = Sealed, plastic case.

3. Termination:
1 = 1 pole

4. Coil Voltage:
05 = 5VDC 09 = 9VDC 24 = 24VDC
06 = 6VDC 12 = 12VDC 48 = 48VDC

5. Coil Input:
D = Standard

6. Contact Arrangement:
M = 1 Form A, SPST-NO.

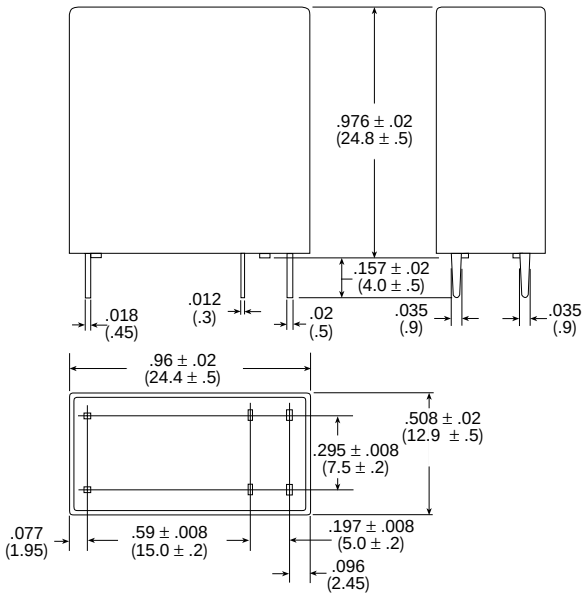
7. Contact Rating:
8 = TV-8 rating

8. Suffix:
,000 = Standard model Other Suffix = Custom model

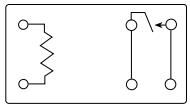
* Not suitable for immersion cleaning processes.

Our authorized distributors are more likely to maintain the following items in stock for immediate delivery.
None at present.

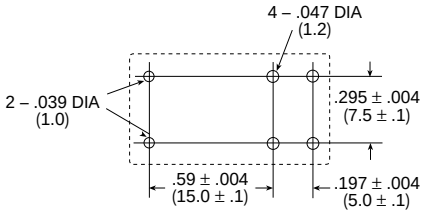
Outline Dimensions



Wiring Diagram (Bottom View)

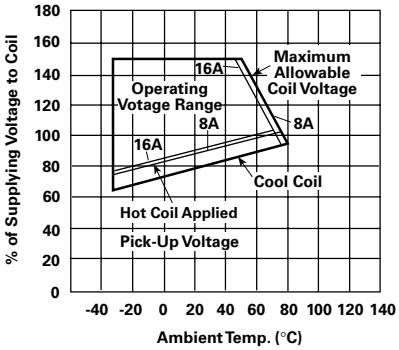


PC Board Layout (Bottom View)



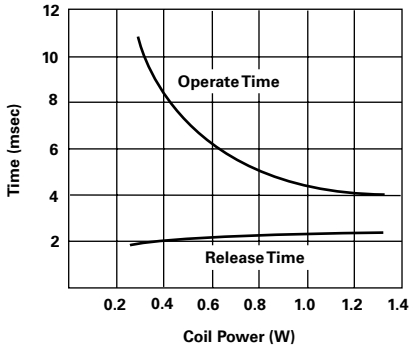
Reference Data

Coil Temperature Rise

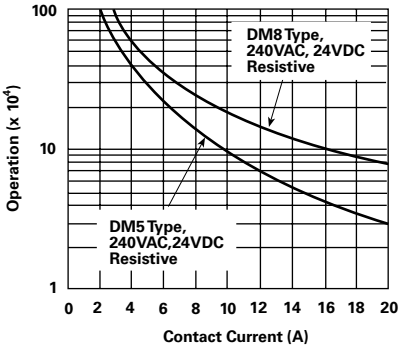


Note: This data is based on the max. allowable temperature for E type insulation coil (115°C).

Operate Time



Life Expectancy





SDT series

10 Amp Miniature Power PC Board Relay

Appliances, HVAC, CTV, Monitor Display

- UL File No. E82292
- CSA File No. LR48471
- SEMKO File No. 9308008
- TUV File No. R9551731
- SEV File No. 97550375

Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- UL TV-5 rating relay.
- 1 Form A contact arrangement.
- Immersion cleanable, sealed version available.
- Applications include appliance, HVAC, CTV, monitor, emergency lighting.

Contact Data @ 20°C

Arrangements: 1 Form A (SPST-NO)
Material: AgSnO.
Max. Switching Rate: 300 ops./min. (no load).
30 ops./min. (rated load).
Expected Mechanical Life: 10 million operations (no load).
Expected Electrical Life: 100,000 operations (rated load).
Minimum Load: 100mA @ 5VDC.
Initial Contact Resistance: 100 milliohms @ 1A, 6VDC.

Contact Ratings

Ratings: 5A Tungsten @ 120VAC (TV-5) 25,000ops.
10A @ 250VAC resistive,
10A @ 120VAC resistive,
10A @ 30VDC resistive.

3A @ 250VAC inductive (cosø= 0.4),
3A @ 30VDC inductive (L/R=7msec).

Max. Switched Voltage: **AC:** 250V.
DC: 30V.
Max. Switched Current: 10A.
Max. Switched Power: 2,500VA, 300W.

Initial Dielectric Strength

Between Open Contacts: 900VAC 50/60 Hz. (1 minute).
Between Coil and Contacts: 4,000VAC 50/60 Hz. (1 minute).
Surge Voltage Between Coil and Contacts: 10,000V (1.2 / 50µs).

Initial Insulation Resistance

Between Mutually Insulated Elements: 1,000M ohms min. @ 500VDCM.

Coil Data

Voltage: 5 to 48VDC.
Nominal Power: 540 mW
Coil Temperature Rise: 40°C max., at rated coil voltage.
Max. Coil Power: 130% of nominal.
Duty Cycle: Continuous.

Coil Data @ 20°C

SDT				
Rated Coil Voltage (VDC)	**Nominal Current (mA)**	**Coil Resistance (ohms) ± 10%**	**Must Operate Voltage (VDC)**	**Must Release Voltage (VDC)**
5	106.4	47	3.75	0.50
6	88.0	68	4.50	0.60
9	58.0	155	6.75	0.90
12	44.4	270	9.00	1.20
24	21.8	1,100	18.00	2.40
48	10.9	4,400	36.00	4.80

Operate Data

Must Operate Voltage: 75% of nominal voltage or less.
Must Release Voltage: 10% of nominal voltage or more.
Operate Time: 15 ms max.
Release Time: 8 ms max.

Environmental Data

Temperature Range:
Operating: -30°C to +70°C
Vibration, Mechanical: 10 to 55 Hz., 1.5mm double amplitude
Operational: 10 to 55 Hz., 1.5mm double amplitude.
Shock, Mechanical: 1,000m/s² (100G approximately).
Operational: 100m/s² (10G approximately).
Operating Humidity: 20 to 85% RH. (Non-condensing).

Mechanical Data

Termination: Printed circuit terminals.
Enclosure (94V-0 Flammability Ratings):
SDT-SS: Vented (Flux-tight) plastic cover
SDT-SH: Sealed plastic case
Weight: 0.39 oz (11g) approximately.

Ordering Information

Typical Part Number ▶	SDT	-SS	-1	12	D	M	,000

1. Basic Series:
SDT = Miniature Power PC board relay.

2. Enclosure:
SS = Vented (Flux-tight) * plastic cover.
SH = Sealed, plastic case.

3. Termination:
1 = 1 pole

4. Coil Voltage:
05 = 5VDC 09 = 9VDC 24 = 24VDC
06 = 6VDC 12 = 12VDC 48 = 48VDC

5. Coil Input:
D = Standard

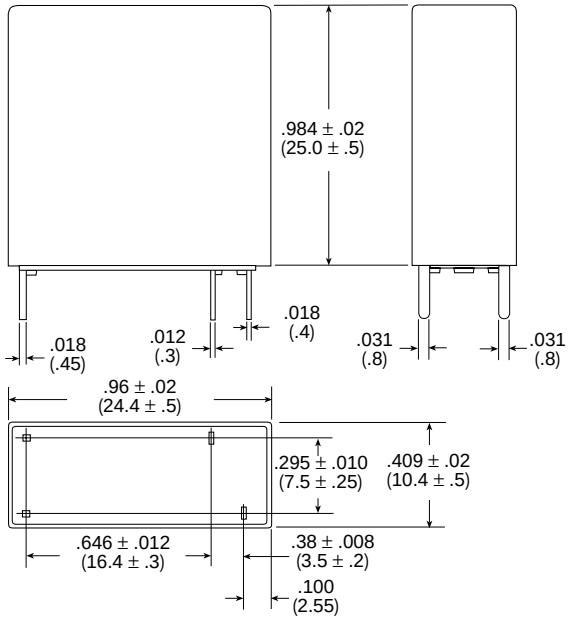
6. Contact Arrangement:
M = 1 Form A, SPST-NO

7. Suffix:
,000 = Standard model Other Suffix = Custom model

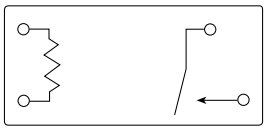
* Not suitable for immersion cleaning processes.

Our authorized distributors are more likely to maintain the following items in stock for immediate delivery.
None at present.

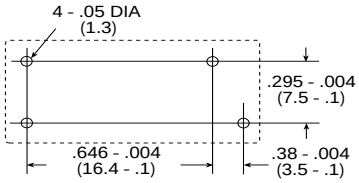
Outline Dimensions



Wiring Diagram (Bottom View)

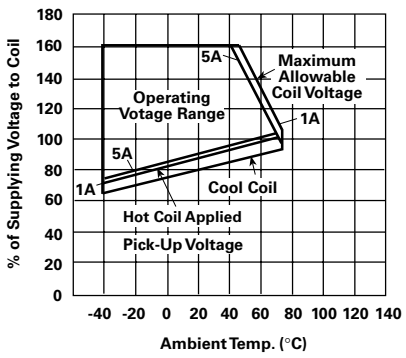


PC Board Layout (Bottom View)



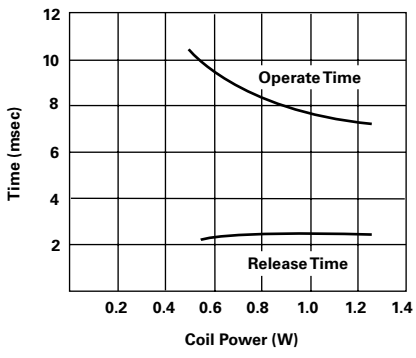
Reference Data

Operating Voltage

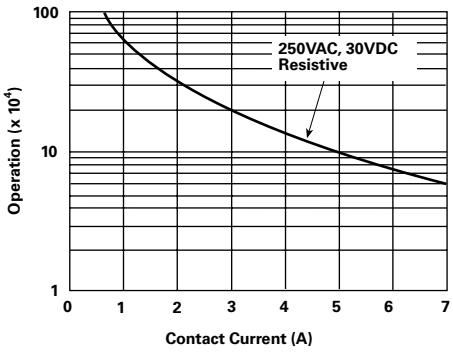


Note: This data is based on the max. allowable temperature for E type insulation coil (115°C).

Operate Time



Life Expectancy





SDT–R series

10 Amp Miniature Power PC Board Relay

Appliances, HVAC, CTV, Monitor Display.

UL File No. E58304
CSA File No. LR48471
SEMKO FileNo. 9722134, 9803052
TUV File No. R9750487

Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- UL TV-5 and TV-8 rating relay.
- 1 Form A contact arrangement.
- Sensitive and standard coils available.
- Applications include appliance, HVAC, CTV, Monitor, emergency lighting.

Contact Data @ 20°C

Arrangements: 1 Form A (SPST-NO)
Material: AgSnO
Max. Switching Rate: 300 ops./min. (no load).
30 ops./min. (rated load).
Expected Mechanical Life: 10 million operations (no load).
Expected Electrical Life: 100,000 operations (rated load).
Minimum Load: 100mA @ 5VDC.
Initial Contact Resistance: 100 milliohms @ 1A, 6VDC.

Contact Ratings

Ratings:
SDT-LMR: 5A Tungsten @ 120VAC (TV-5) 25,000ops.
5A @ 250VAC resistive,
5A @ 30VDC resistive.

SDT-DMR: 8A Tungsten @ 120VAC (TV-8) 25,000ops.
10A @ 250VAC resistive,
10A @ 30VDC resistive.

Max. Switched Voltage: **AC:** 250V.
DC: 30V.
Max. Switched Current: 5A (SDT-LMR), 10A (SDT-DMR)
Max. Switched Power: 1,250VA, 150W (SDT-LMR),
2,500VA, 300W (SDT-DMR).

Initial Dielectric Strength

Between Open Contacts: 1,000VAC 50/60 Hz. (1 minute).
Between Coil and Contacts: 4,000VAC 50/60 Hz. (1 minute).
Surge Voltage Between Coil and Contacts: 10,000V (1.2 / 50µs).

Initial Insulation Resistance

Between Mutually Insulated Elements: 1,000M ohms min. @ 500VDCM.

Coil Data

Voltage: 5 to 48VDC.
Nominal Power:
SDT-LMR : 250 mW
SDT-DMR : 540 mW
Coil Temperature Rise: 40°C max., at rated coil voltage.
Max. Coil Power: 130% of nominal.
Duty Cycle: Continuous.

Coil Data @ 20°C

SDT-LMR (250mW)				
Rated Coil Voltage (VDC)	**Nominal Current (mA)**	**Coil Resistance (ohms) ± 10%**	**Must Operate Voltage (VDC)**	**Must Release Voltage (VDC)**
5	50.0	100	3.75	0.50
6	41.7	144	4.50	0.60
9	27.7	325	6.75	0.90
12	20.7	580	9.00	1.20
24	10.5	2,300	18.00	2.40
SDT-DMR (400mW)				
Rated Coil Voltage (VDC)	**Nominal Current (mA)**	**Coil Resistance (ohms) ± 10%**	**Must Operate Voltage (VDC)**	**Must Release Voltage (VDC)**
5	106.4	47	3.75	0.50
6	88.0	68	4.50	0.60
9	58.0	155	6.75	0.90
12	44.4	270	9.00	1.20
24	21.8	1,100	18.00	2.40
48	10.9	4,400	36.00	4.80

Operate Data

Must Operate Voltage: 75% of nominal voltage or less.
Must Release Voltage: 10% of nominal voltage or more.
Operate Time: 15 ms max.
Release Time: 5 ms max.

Environmental Data

Temperature Range:
Operating: -30°C to +70°C
Vibration, Mechanical: 10 to 55 Hz., 1.5mm double amplitude
Operational: 10 to 55 Hz., 1.5mm double amplitude.
Shock, Mechanical: 1,000m/s^2 (100G approximately).
Operational: 100m/s^2 (10G approximately).
Operating Humidity: 20 to 85% RH. (Non-condensing).

Mechanical Data

Termination: Printed circuit terminals.
Enclosure (94V-0 Flammability Ratings):
SDT-S: Snap-on dust cover (Flux-tight).
Weight: 0.38 oz. (11g) approximately.

Ordering Information

Typical Part Number ►	SDT	-S	-1	12	L	M	R	,000

1. Basic Series:
SDT = Miniature Power PC board relay.

2. Enclosure:
S = Snap-on (Flux-tight)* cover.

3. Termination:
1 = 1 pole

4. Coil Voltage:
05 = 5VDC 09 = 9VDC 24 = 24VDC
06 = 6VDC 12 = 12VDC 48 = 48VDC

5. Coil Input:
L = Sensitive (250mW) D = Standard (540mW)

6. Contact Arrangement:
M = 1 Form A, SPST-NO

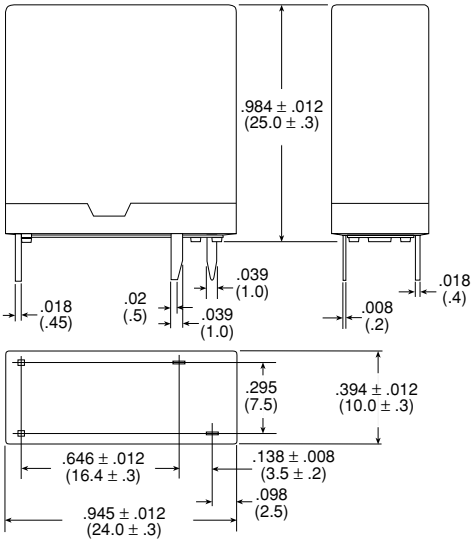
7. Construction:
R = New construction

8. Suffix:
,000 = Standard model Other Suffix = Custom model

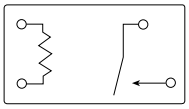
* Not suitable for immersion cleaning processes.

Our authorized distributors are more likely to maintain the following items in stock for immediate delivery.
None at present.

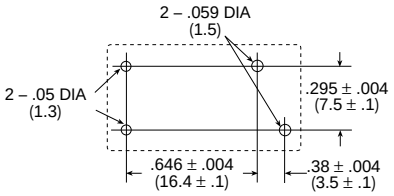
Outline Dimensions



Wiring Diagram (Bottom View)

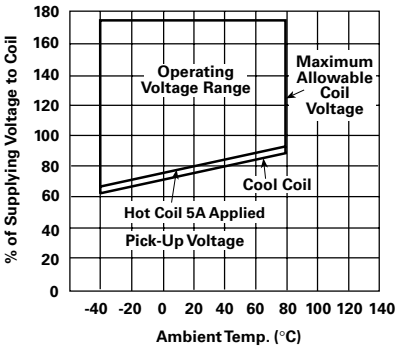


PC Board Layout (Bottom View)

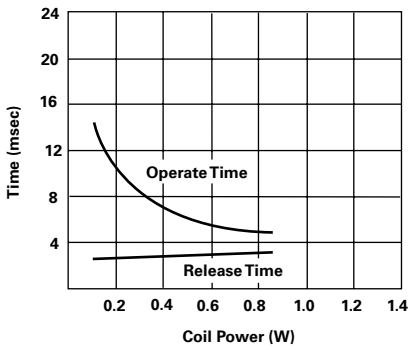


Reference Data

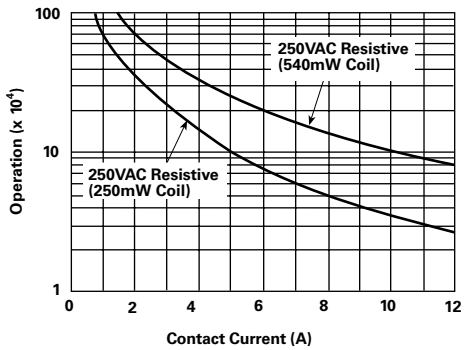
Operating Voltage (SDT-LMR)



Operate Time



Life Expectancy



Note: This data is based on the max. allowable temperature for E type insulation coil (115°C).

PCK series



Slim 16 Amp Miniature Power PC Board Relay

Appliances, HVAC, Office Machines.

UL File No. E82292
CSA File No. LR48471

Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- Slim outline to save board space.
- 1 Form A contact arrangement.
- Quick connect terminal type.
- Meet 5,000V dielectric voltage between coil and contacts.
- Meet 10,000V surge voltage between coil and contacts.

Contact Data @ 20°C

Arrangements: 1 Form A (SPST-NO) .
Material: AgSnO.
Max. Switching Rate: 300ops./ min. (no load).
20ops./ min. (rated load).
Expected Mechanical Life: 2 million ops (no load).
Expected Electrical Life: 100,000 ops (rated load).
Minimum Load: 100mA @ 5VDC.
Initial Contact Resistance: 100 milliohms @ 1A, 6VDC.

Contact Ratings

Ratings: 16A @ 250VAC resistive.
16A @ 24VDC resistive.
Max. Switched Voltage: **AC:** 277V.
DC: 24V.
Max. Switched Current: 16A.
Max. Switched Power: 4,000VA, 385W.

Initial Dielectric Strength

Between Open Contacts: 1,000VAC, 50/60 Hz. (1 min.).
Between Contacts and Coil: 5,000VAC, 50/60 Hz. (1 min.).
Surge Voltage Between Coil and Contacts: 10,000V (1.2/50µs).

Initial Insulation Resistance

Between Mutually Insulated Conductors: 1,000Mohm @ 500VDC.

Coil Data

Voltage: 5 to 24VDC.
Duty Cycle: Continuous.
Nominal Power: 500mW.
Max. Coil Power: 130% of nominal at 20°C.

Coil Data @ 20°C

PCK				
Rated Coil Voltage (VDC)	**Nominal Current (mA)**	**Coil Resistance (ohms) ± 10%**	**Must Operate Voltage (VDC)**	**Must Release Voltage (VDC)**
5	100.0	50.0	3.75	0.25
6	83.3	72.0	4.50	0.30
9	55.6	162.0	6.75	0.45
12	41.7	288.0	9.00	0.60
18	27.8	648.0	13.50	0.90
24	20.9	1,150.0	18.00	1.20

Operate Data @ 20°C

Must Operate Voltage: 75% of nominal voltage or less.
Must Release Voltage: 5% of nominal voltage or more.
Operate Time: 20ms max.
Release Time: 10ms max.

Environmental Data

Temperature Range:
Operating: -30°C to +70°C.
Vibration, Mechanical: 10 to 55Hz., 1.5mm double amplitude.
Operational: 10 to 55Hz., 1.5mm double amplitude.
Shock, Mechanical: 1000m/s² (100G approximately).
Operational: 100m/s² (10G approximately).
Operating Humidity: 20 to 85% RH. (Non-condensing).

Mechanical Data

Termination: Printed circuit terminals with quick connect terminals.
Enclosure: Vented (Flux-tight) plastic cover.
Weight: 0.46 oz (13g) approximately.

Ordering Information

Typical Part Number ▶	PCK	-1	12	D	2	M	,000

1. Basic Series:
PCK = 16A PC board terminals

2. Termination:
1 = 1 pole

3. Coil Voltage:
05 = 5VDC 09 = 9VDC 18 = 18VDC
06 = 06VDC 12 = 12VDC 24 = 24VDC

4. Coil Input:
D = Standard

5. Contact Material:
2 = AgSnO

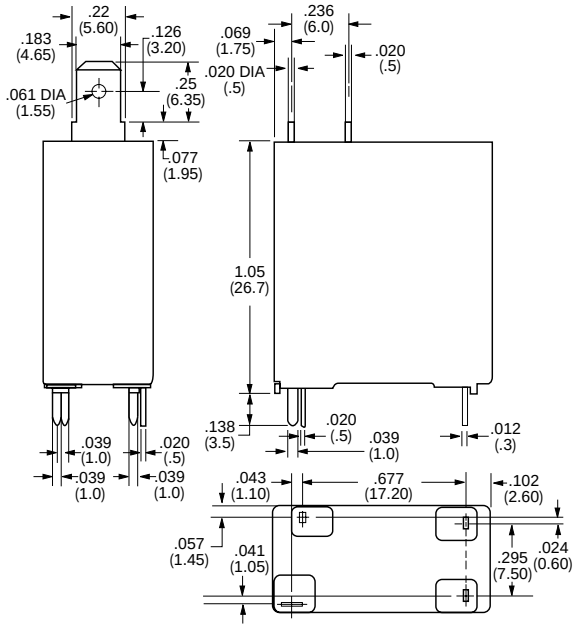
6. Contact Arrangement:
M = 1 Form A (SPST-NO)

7. Suffix:
,000 = Standard model Other Suffix = Custom model

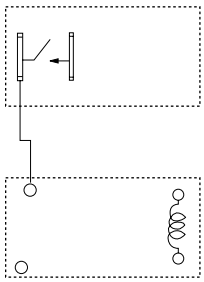
Our authorized distributors are more likely to maintain the following items in stock for immediate delivery.

None at present.

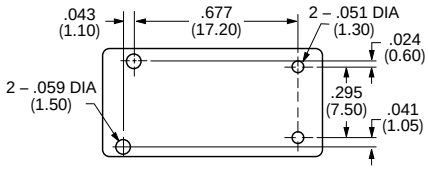
Outline Dimensions



Wiring Diagram (Bottom View)

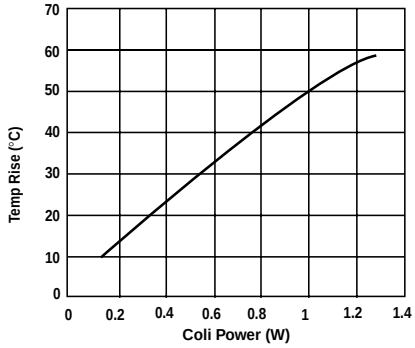


PC Board Layout (Bottom View)

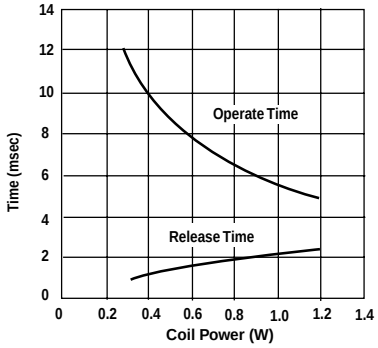


Reference Data

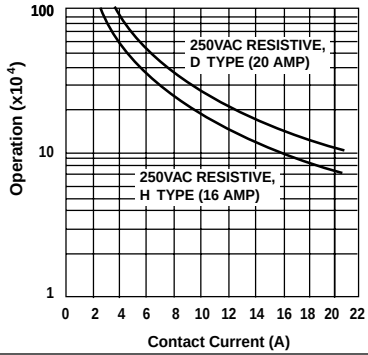
Coil Temperature Rise

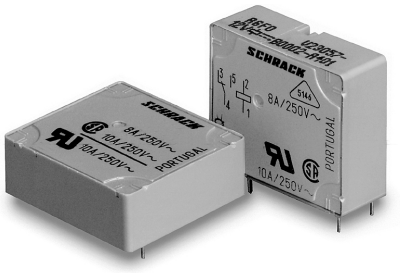


Operate Time



Life Expectancy





V23057 (Card E) series

8 Amp, Miniature Printed Circuit Board Relay

File E214025

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- 1 Form A (SPST-NO) and 1 Form C (SPDT).
- 8 amp rated current.
- Vertical or horizontal version.
- Single or bifurcated contacts.
- 4,000Vrms contact-to-coil dielectric.
- Washable (sealed) plastic case.

Contact Data

Arrangements: 1 Form A (SPST-NO) and 1 Form C (SPDT), single or bifurcated contact.
Material: Silver-nickel 0.15, silver-nickel 20 or silver-cadmium oxide.
Expected Mechanical Life: 20 million operations.
Ratings:
Current: 8A; 5A with silver-nickel 0.15 contacts.
Voltage: 250VAC.
Power (breaking): 2,000 VA.
Voltage (breaking): 440VAC.
Current (making, max. 4s at 10% duty cycle): 15A.
Silver-nickel 0.15
4 amp resistive, 30VDC, 2 million ops
1 amp inductive L / R = 40 ms, 24VDC, 200,000 ops.
Silver-cadmium oxide
1 amp cosj = 0.4, 230VAC, 500,000 ops.

Initial Dielectric Strength

Between Open Contacts: 1,000Vrms.
Between Coil and Contacts: 4,000Vrms.
Creepage/Clearance: 4/4mm.

Coil Data DC @ 20°C

Nominal Coil Power: 450 - 500mW, dependent upon model.

Nominal Voltage VDC	DC Resistance in Ohms	Must Operate Voltage VDC	Drop-out Voltage VDC	Maximum Voltage VDC	Nominal Coil Current (mA)
6	80 ±10%	4.0	0.6	10.6	75.0
12	330 ±10%	8.0	1.2	21.5	36.4
24	1,200 ±15%	16.0	2.4	40.0	20.0
48	4,700 ±15%	32.0	4.8	79.0	10.2
60	7,200 ±15%	40.0	6.0	98.0	8.3

Operate Data

Must Operate Voltage: See Coil Data table.
Operate Time: 7 ms.
Release Time: 3 ms.
Bounce Time (N/O contact / N/C contact) : 0.5 ms / 3 ms.
Switching Rate: 3,600 ops./hr. max. at rated load.

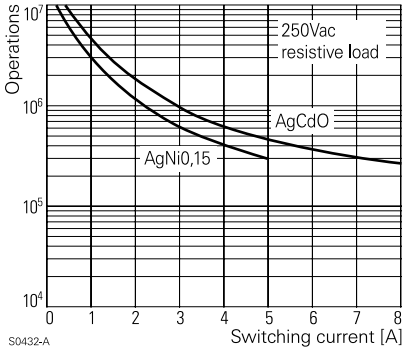
Environmental Data

Temperature Range:
Operating: -40°C to +70°C.

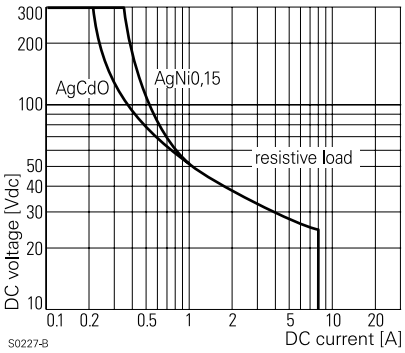
Mechanical Data

Termination: Printed circuit terminals.
Enclosure (94 V-0 rated): Sealed (RTIII) plastic case.
Weight: 0.28 oz. (8 g) approximately.

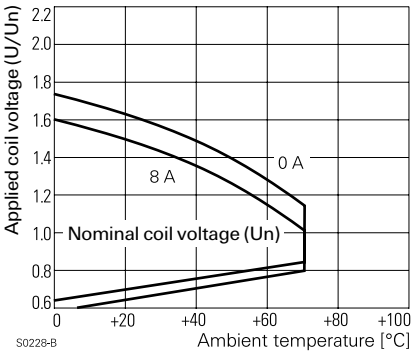
Contact Life



Max. DC Load Breaking Capacity



Coil Operating Range



Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.
www.tycoelectronics.com
Technical support:
Refer to inside back cover.

Ordering Information

Typical Part Number ▶	V23057	-A	0	006	-A	1	01

1. Basic Series:
V23057 = Card E miniature printed circuit board relay.

2. Mounting Orientation:
A = Horizontal. B = Vertical.

3. Version:
0 = Standard

4. Coil Voltage:
001 = 6VDC 002 = 12VDC 006 = 24VDC 013 = 48VDC 023 = 60VDC

5. Contact Type:
A = Single contact. B = Bifurcated contact (Not available on 1 Form A version).

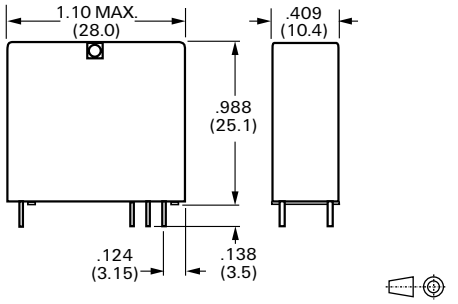
6. Contact Material:
1 = Silver-nickel 0.15 2 = Silver-nickel 20 4 = Silver-cadmium oxide

7. Contact Arrangement:
01 = 1 Form C (SPDT) 02 = 1 Form A (SPST-NO)

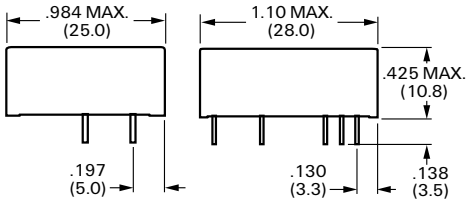
Our authorized distributors are more likely to stock the following items for immediate delivery.

None at present.

Outline Dimensions

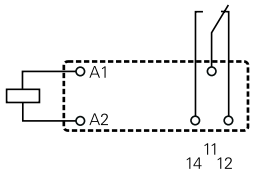


Vertical Version

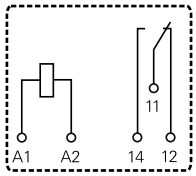


Horizontal Version

Wiring Diagrams (Bottom Views)

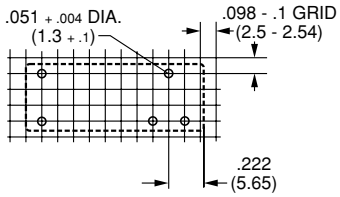


Vertical Version

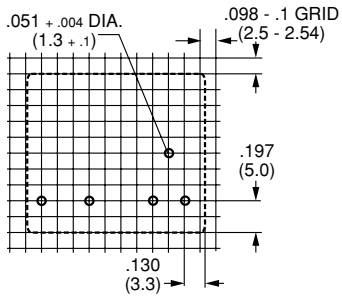


Horizontal Version

PC Board Layouts (Bottom Views)



Vertical Version



Horizontal Version



RP II/2 series

8 Amp, 2 Pole PC Board Relay

File E214025

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- 2 Form A (DPST-NO) or 2 Form C (DPDT).
- 8 amp rating with terminals on 5 mm pin spacing.
- 4kV/8mm contact-to-coil.
- Sockets available.

Contact Data

Arrangements: 2 Form A (DPST-NO) and 2 Form C (DPDT), single contact.
Material: Silver-cadmium oxide or silver-nickel 0.15.
Expected Mechanical Life: 20 million operations.
Ratings:
Current: 8A (UL: 10A)
Voltage: 250VAC
Power (breaking): 2,000VA
Voltage (breaking): 440VAC
Make Current (max. 4s at 10% duty cycle): 14A

Load/Life

Type	Load	Life (Ops.)
RP440	64A ON, 2A OFF, 250VAC	10,000
RP421	2A, 50VDC, resistive	2 million
RP421	1/10 HP, 240VAC, per contact	UL 508
RP421	3A, 380VAC, AC11	30,000
RP421	0.18A, 110VDC, DC11	100,000
RP420	0.6A, 220VAC, cosφ = 0.8, single phase motor	1.3 million

Initial Dielectric Strength

Between Open Contacts: 1,000Vrms
Between Coil and Contacts: 4,000Vrms.
Between Contact Sets: 2,500Vrms.
Creepage/Clearance: 8/8mm.

Coil Data DC @ 20°C

Nominal Coil Power: 500mW.

Nominal Voltage VDC	DC Resistance in Ohms	Must Operate Voltage VDC	Drop-out Voltage VDC	Maximum Voltage VDC	Nominal Coil Current (mA)
5	54 ± 10%	3.5	0.5	9.0	92.6
6	68 ± 10%	4.2	0.6	10.8	88.2
12	270 ± 10%	8.4	1.2	21.6	44.4
24	1,100 ± 15%	16.8	2.4	43.2	21.8
48	4,400 ± 15%	33.6	4.8	86.4	10.9
60	6,540 ± 15%	42.0	6.0	108.0	9.2
110	23,100 ± 15%	77.0	11.0	198.0	4.8

Operate Data

Must Operate Voltage: See Coil Data table.
Operate Time (typical): 9 ms.
Release Time (typical): 3 ms.
Bounce Time (typical): N/O: 2 ms; **N/C:** 3 ms.
Switching Rate: 6.000 ops./hr. max. at rated load.

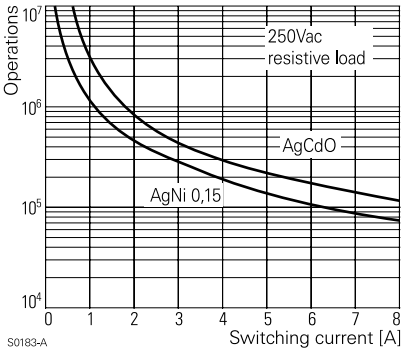
Environmental Data

Temperature Range:
Operating: -40°C to +70°C.
Vibration (30-150 Hz.): N/O: 11g; **N/C:** 15g.
Shock (destructive): 100g.

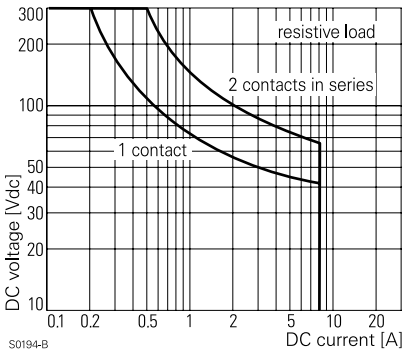
Mechanical Data

Termination: Printed circuit terminals.
Enclosure: Flux-tight (RT II) plastic case or sealed (RT III) cover.
Weight: .63 oz. (18 g) approximately.

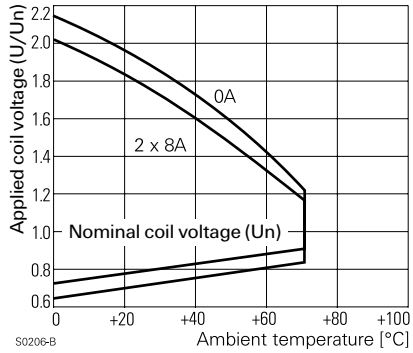
Contact Life



Max. DC Load Breaking Capacity



Coil Operating Range



Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.
www.tycoelectronics.com
Technical support:
Refer to inside back cover.

Ordering Information

Typical Part Number ▶	RP	4	1	0	012

1. Basic Series:
RP = Printed circuit board relay.

2. Version:
4 = 8A, flux-tight. 8 = 8A, sealed.

3. Contact Arrangement:
2 = 2 Form C (DPDT). 4 = 2 Form A (DPST-NO).

4. Contact Material and Pin Spacing:
0 = Silver-cadmium oxide, 5 mm pin spacing.
1 = Silver-nickel 0.15, 5 mm pin spacing.

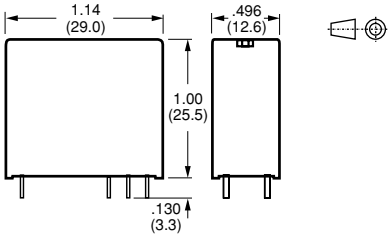
5. Coil Voltage:

005 = 5VDC	012 = 12VDC	048 = 48VDC	110 = 110VDC
006 = 6VDC	024 = 24VDC	060 = 60VDC	

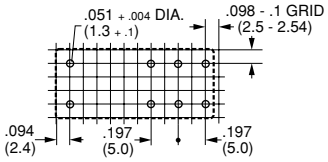
Our authorized distributors are more likely to maintain the following items in stock for immediate delivery.

None at present.

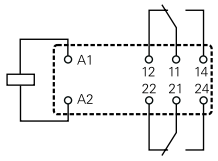
Outline Dimensions



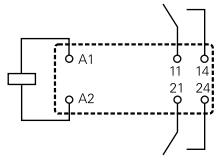
PC Board Layout (Bottom View)



Wiring Diagrams (Bottom Views)



2 Form C



2 Form A



RP II/1 series

8-16 Amp, 1 Pole PC Board Relay

File E214025

12A Version Only

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- 1 Form A (SPST-NO) or 1 Form C (SPDT).
- 8 and 12 amp models available with 3.5 or 5mm pin spacing.
- 16 amp models available with 5mm pin spacing.
- 4kV/8mm contact-to-coil.
- Sockets available.

Contact Data

Arrangements: 1 Form A (SPST-NO) and 1 Form C (SPDT), single contact.
Material: Silver-cadmium oxide or silver-nickel 0.15.
Expected Mechanical Life: 30 million operations.
Ratings:

Current:	8A	12A	16A
Voltage:	250VAC	250VAC	250VAC
Power (breaking):	2,000VA	3,000VA	4,000VA
Voltage (breaking):	400VAC	400VAC	400VAC
Make Current:	16A	20A	25A
Material:	AgNi 0.15	AgCdO	AgCdO

Load/Life

Type	Load	Life (Ops.)
RP410	12A, 250VAC, cosφ = 1, 1200/h, 40% duty cycle	110,000
RP410	9.1A, 220VAC, cosφ = 1, 360/h, 15% duty cycle	200,000
RP418	3.4A ON, 0.42A OFF, 220VAC, cosφ = 0.6	> 11 million
RP411	8A, 250VAC, cosφ = 1, 50% duty cycle	100,000
RP412	8A, 250VAC, cosφ = 1, 50% duty cycle	100,000
RP330	18.2A, 250VAC, cosφ = 1, 600/h, 15% duty cycle	110,000
RP330	96A ON, 16A OFF, 250VAC, cosφ = 0.6, 450/h	>30,000

Initial Dielectric Strength

Between Open Contacts: 1,000Vrms
Between Coil and Contacts: 4,000Vrms.
Creepage/Clearance: 8/8mm.

Coil Data DC @ 20°C

Nominal Coil Power: 500mW.

Nominal Voltage VDC	DC Resistance in Ohms	Must Operate Voltage VDC	Drop-out Voltage VDC	Maximum Voltage VDC	Nominal Coil Current (mA)
5	54 ± 10%	3.5	0.5	9.0	92.6
6	68 ± 10%	4.2	0.6	10.8	88.2
12	270 ± 10%	8.4	1.2	21.6	44.4
24	1,100 ± 15%	16.8	2.4	43.2	21.8
48	4,400 ± 15%	33.6	4.8	86.4	10.9
60	6,540 ± 15%	42.0	6.0	108.0	9.2
110	23,100 ± 15%	77.0	11.0	198.0	4.8

Operate Data

Must Operate Voltage: See Coil Data table.
Operate Time (typical): 8 ms.
Release Time (typical): 2 ms.
Bounce Time (typical): N/O: 2 ms; **N/C:** 4 ms.
Switching Rate: 6.000 ops./hr. max. at rated load.

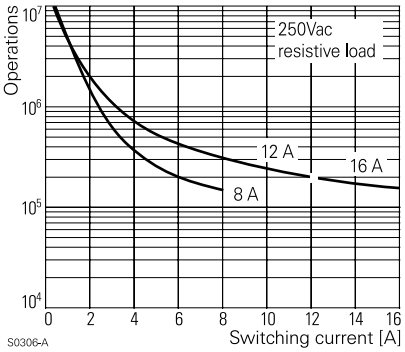
Environmental Data

Temperature Range:
Operating: -40°C to +70°C.
Vibration (30-300 Hz.): N/O: >10g; **N/C:** 2g.
Shock (destructive): 100g.

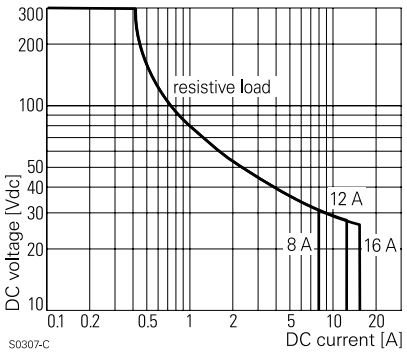
Mechanical Data

Termination: Printed circuit terminals.
Enclosure: Flux-tight (RT II) plastic case or sealed (RT III) cover.
Weight: .63 oz. (18 g) approximately.

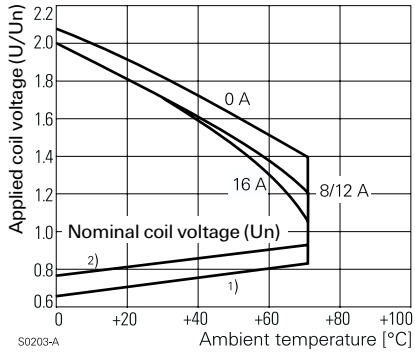
Contact Life



Max. DC Load Breaking Capacity



Coil Operating Range



Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.
www.tycoelectronics.com
Technical support:
Refer to inside back cover.

Ordering Information

Typical Part Number ▶	RP	4	1	0	012

1. Basic Series:
RP = Printed circuit board relay.

2. Version:
3 = 16A, flux tight. 4 = 8/12A, flux-tight. 7 = 16A, sealed. 8 = 8/12A, sealed.

3. Contact Arrangement:
1 = 1 Form C (SPDT). 3 = 1 Form A (SPST-NO).

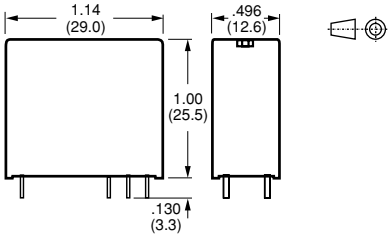
4. Contact Material and Pin Spacing:
0 = Silver-cadmium oxide, 16A or 12A, 5 mm pin spacing.
1 = Silver-nickel 0.15, 8A, 5 mm pin spacing.
2 = Silver-nickel 0.15, 8A, 3.5 mm pin spacing.
8 = Silver-cadmium oxide, 12A, 3.5 mm pin spacing.

5. Coil Voltage:
005 = 5VDC
006 = 6VDC
012 = 12VDC
024 = 24VDC
048 = 48VDC
060 = 60VDC
110 = 110VDC

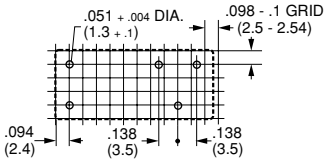
Our authorized distributors are more likely to maintain the following items in stock for immediate delivery.

None at present.

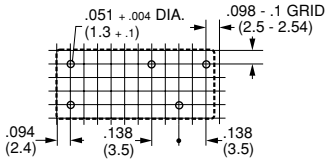
Outline Dimensions



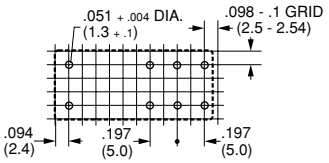
PC Board Layouts (Bottom Views)



8/12A, 3.5 mm Pin Spacing

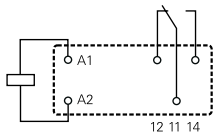


8/12A, 5 mm Pin Spacing

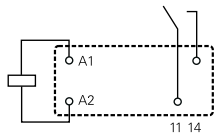


16A, 5 mm Pin Spacing

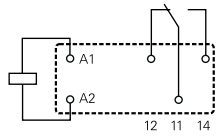
Wiring Diagrams (Bottom Views)



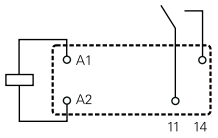
1 Form C, 8/12A, 3.5 mm



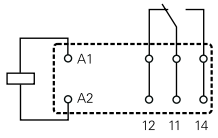
1 Form A, 8/12A, 3.5 mm



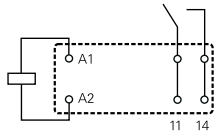
1 Form C, 8/12A, 5 mm



1 Form A, 8/12A, 5 mm



1 Form C, 16A, 5 mm



1 Form A, 16A, 5 mm



RP 3 SL series

16 Amp, 1 Pole
PC Board Relay for High Inrush Loads

c UL us File E214025

VDE KEMA KEUR

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- 1 Form A (SPST-NO).
- 16 amp models handles up to 120A peak inrush current.
- 4kV/8mm contact-to-coil.
- Latching and non-latching types.

Contact Data

Arrangements: 1 Form A (SPST-NO), single contact.
Material: Silver-tim oxide.
Expected Mechanical Life: 30 million operations.
Ratings:
Current: 16A
Voltage: 250VAC
Power (breaking): 4,000VA
Voltage (breaking): 440VAC
Make Current (max 4s at 10% duty cycle): 25A
Peak Inrush Current: 120A
Load/Life
12A, 250VAC, cosφ = 1; 300,000 ops.
TV8; 25,000 ops.
2,500W, 230VAC, Halogen lamps; > 10,000 ops.
1,000W, 250VAC, Incandescent lamps; 230,000 ops.
3,000W, 250VAC, Incandescent lamps; 36,000 ops.
1,500VA, Fluorescent lamps, 163µF; 10,000 ops.

Initial Dielectric Strength

Between Open Contacts: 2,000Vrms
Between Coil and Contacts: 4,000Vrms.
Creepage/Clearance: 8/8mm.

Coil Data DC @ 20°C

Nominal Coil Power: Non-latching: 500mW.
Single-coil latching: 1.2 - 1.4W.
Dual-coil latching: 1.2 - 1.5W.

Nominal Voltage VDC	DC Resistance in Ohms	Must Operate Voltage VDC	Drop-out Voltage VDC	Maximum Voltage VDC	Nominal Coil Current (mA)
Non-Latching Models					
12	270 ± 10%	9.0	1.2	21.6	44.4
24	1,100 ± 15%	18.0	2.4	43.2	21.8
48	4,400 ± 15%	36.0	4.8	86.4	10.9
60	6,540 ± 15%	45.0	6.0	108.0	9.2
Nominal Voltage VDC	**DC Resistance in Ohms**	**Must Operate Voltage VDC**	**Reset Voltage VDC**	**Reset R1 Ohms / W**	**Nominal Coil Current (mA)**
Single-coil Latching Models – Reset Voltage 70-110% of Nom.					
5	21 ± 10%	3.7	3.6	39 / 0.5	238.1
12	115 ± 10%	9.0	8.7	220 / 0.5	104.3
24	460 ± 10%	18.0	16.7	820 / 0.5	52.2
Dual-coil Latching Models – Reset Voltage 75-120% of Nom.					
12	105 ± 15%	9.0	9.0	–	114.3
24	460 ± 15%	18.0	18.0	–	52.2

Operate Data

Must Operate Voltage: See Coil Data table.
Operate / Release Time (Non-latching, typical): 8 ms / 2 ms.
Operate / Reset Time (Latching, typical): 6 ms / 2 ms.
Bounce Time (typical): 2 ms.
Switching Rate: 6.000 ops./hr. max. at rated load.

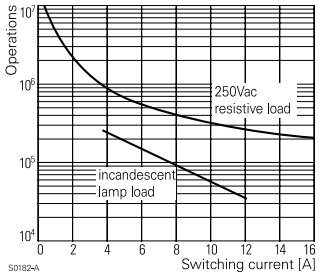
Environmental Data

Temperature Range:
Operating: -40°C to +70°C.
Vibration (30-300 Hz.): 20g.
Shock (destructive): 100g.

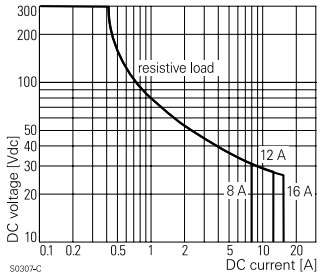
Mechanical Data

Termination: Printed circuit terminals.
Enclosure: Flux-tight (RT II) plastic case or sealed (RT III) cover.
Weight: .63 oz. (18 g) approximately.

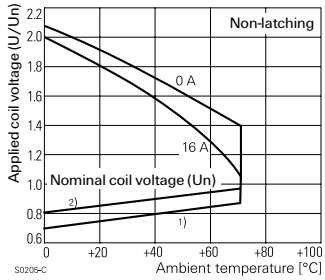
Contact Life



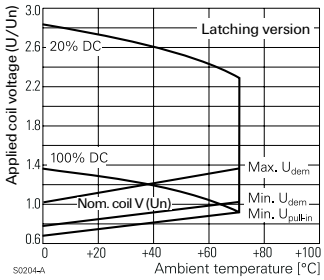
Max. DC Load Breaking Capacity



Coil Operating Range



Non-Latching Models



Latching Models

Dimensions are shown for reference purposes only.

Dimensions are in inches over (millimeters) unless otherwise specified.

Specifications and availability subject to change.

www.tycoelectronics.com
Technical support:
Refer to inside back cover.

Ordering Information

	Typical Part Number ▶	RP	3	SL	F12

1. Basic Series:
RP = Printed circuit board relay.

2. Version:
3 = Flux tight. 7 = Sealed.

3. Contact Arrangement / Material:
SL = 1 Form A (SPST-NO), Silver-tin oxide.

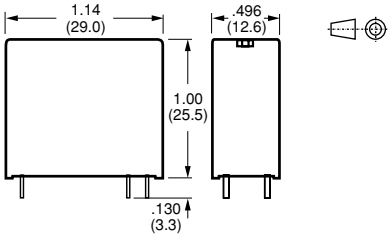
4. Coil Voltage:

Non-Latching Models:	012 = 12VDC	024 = 24VDC	048 = 48VDC	060 = 60VDC
Single-Coil Latching Models:	A05 = 5VDC	A12 = 12VDC	A24 = 24VDC	
Dual-Coil Latching Models:	F12 = 12VDC	F24 = 24VDC		

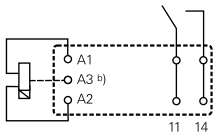
Our authorized distributors are more likely to maintain the following items in stock for immediate delivery.

TBD

Outline Dimensions



Wiring Diagram (Bottom View)

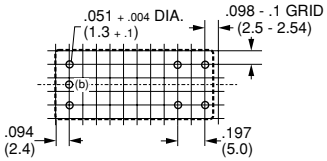


Terminal b) only present on two-coil latching models

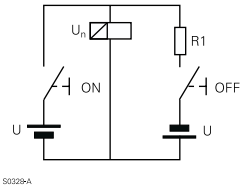
Latching Versions:
Contact position shown results during or after Coil energization with reset voltage.

Two-Coil Versions:
Operate: A2, A3
Reset A1, A3

PC Board Layout (Bottom View)



Circuit Diagram for Single-Coil Latching Model





0409 series

High Inrush (500A/10µs) Printed Circuit Board Relay

File E214025

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- 1 Form A (SPST-NO).
- Tungsten prerun contact and silver-cadmium oxide contact.
- 10 amp rated current, 500A/10µs inrush current.
- 4kV/8mm contact-to-coil, insulation to VDE 0631 and 0700.
- Non-latching and latching types.
- Well suited for lighting systems, motors, lamp loads.

Contact Data

Arrangements: 1 Form A (SPST-NO), single contact.
Material: Tungsten prerun contact and silver-cadmium oxide contact.
Expected Mechanical Life: 30 million operations.
Ratings:
Current: 10A.
Current (making, max. 4s at 10% duty cycle): 16A.
Current (peak inrush 10µs): 500A.
Voltage: 250VAC.
Voltage (breaking): 400VAC.
Load/Life
10 amp resistive, 250VAC; 250,000 ops.
2,500W, incandescent lamps; 30,000 ops.
1,300W, fluorescent lamps (140µF); 30,000 ops.
1,000W, Dulux lamps (140µF); 30,000 ops.

Initial Dielectric Strength

Between Open Contacts: 1,000Vrms.
Between Coil and Contacts: 4,000Vrms.
Creepage/Clearance: 8/8mm.

Non-Latching Coil Data DC @ 20°C

Nominal Coil Power: Non-latching: 820mW.

Nominal Voltage VDC	DC Resistance in Ohms ±10%	Must Operate Voltage VDC	Drop-out Voltage VDC	Maximum Voltage VDC	Nominal Coil Current (mA)
6	80	4.2	0.4	12.0	75.0
12	300	8.4	0.9	24.0	40.0
24	1,200	16.8	1.8	48.0	20.0
48	4,825	33.6	3.6	96.0	10.0
60	7,500	42.0	4.5	120.0	8.0

Latching Coil Data DC @ 20°C

Nominal Coil Power: Latching: 0.8 - 1W.
Minimum Energization Time: 20 ms.

Nominal Voltage VDC	DC Resistance in Ohms ±10%	Must Operate Voltage VDC	Min. Reset Voltage VDC	Max. Reset Voltage VDC	Nominal Coil Current (mA)
12	118	8.9	0.7	2.5	40.0
24	457	18.0	1.3	5.0	20.0

Operate Data

Must Operate Voltage: See Coil Data table.
Operate Time /Release Time (typical): 10 ms / 3ms.
Bounce Time (typical): 3 ms.
Switching Rate: 9,000 ops./hr. max. at rated load.

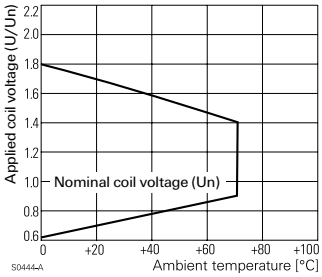
Environmental Data

Temperature Range: Operating: -20°C to +70°C.
Vibration (30-300 Hz.): 20g.
Shock (destructive): 100g.

Mechanical Data

Termination: Printed circuit terminals.
Enclosure (94 V-0 rated): Flux-tight (RTII) plastic case.
Weight: 0.35 oz. (10 g) approximately.

Coil Operating Range



Ordering Information

	Typical Part Number ▶	0409	47	031	001

1. Basic Series:
0409 = Miniature printed circuit board relay for high inrush currents.

2. Type:
47 = Non-latching 67 = Latching

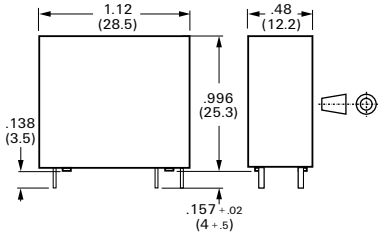
3. Coil Voltage:
Non latching Coil: 031 = 12VDC 027 = 24VDC 024 = 48VDC 023 = 60VDC
Latching Coil: 032 = 12VDC 029 = 24VDC

4. Contact Configuration:
001 = 1 Form A (SPST-NO)

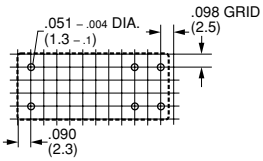
Our authorized distributors are more likely to stock the following items for immediate delivery.

None at present.

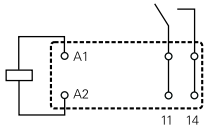
Outline Dimensions



PC Board Layout (Bottom View)



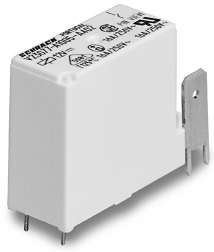
Wiring Diagram (Bottom View)



Dimensions are shown for reference purposes only.

Dimensions are in inches over (millimeters) unless otherwise specified.

Specifications and availability subject to change.



V23077 (IF) series

16 Amp, Miniature Printed Circuit Board Relay

c UL us File E214025

VDE

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- 1 Form A (SPST-NO) and 1 Form B (SPST-NC).
- 16 amp rated current.
- Quick connect terminals for load.
- Ambient temperature up tp 125°C.
- 4kV/8mm contact-to-coil, insulation to VDE 0631 and 0700.
- Flux-tight plastic case.

Contact Data

Arrangements: 1 Form A (SPST-NO) and 1 Form B (SPST-NC), single contact.
Material: Silver-cadmium oxide.
Expected Mechanical Life: 30 million operations.
Ratings:
Current: 16A.
Voltage: 250VAC.
Power (breaking): 4,000 VA.
Voltage (breaking): 440VAC.
Current (making, max. 4s at 10% duty cycle): 25A.
1 Form A Contacts
10 amp resistive, 400VAC, 125°C, 200,000 ops.
16 amp resistive, 250VAC, 125°C, 100,000 ops.
1 Form B Contacts
10 amp resistive, 400VAC, 125°C, 50,000 ops.
16 amp resistive, 250VAC, 125°C, 50,000 ops.

Initial Dielectric Strength

Between Open Contacts: 1,000Vrms.
Between Coil and Contacts: 4,000Vrms.
Creepage/Clearance: 8/8mm.

Coil Data DC @ 20°C

Nominal Coil Power: 360mW.

Nominal Voltage VDC	DC Resistance in Ohms ±10%	Must Operate Voltage VDC	Drop-out Voltage VDC	Maximum Voltage VDC	Nominal Coil Current (mA)
6	100	3.8	0.6	16.9	60.0
12	400	7.5	1.2	33.8	30.0
24	1,600	14.9	2.4	67.7	15.0
48	6,400	30.0	4.8	135.3	7.5

Operate Data

Must Operate Voltage: See Coil Data table.
Operate Time: 10 ms.
Release Time: 2 ms.
Bounce Time (N/O contact / N/C contact) : 1 ms / 2 ms.
Switching Rate: 3,600 ops./hr. max. at rated load.

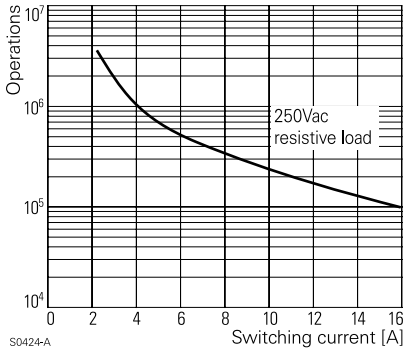
Environmental Data

Temperature Range:
Operating: -40°C to +125°C.

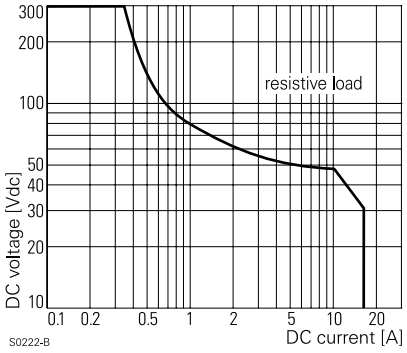
Mechanical Data

Termination: Printed circuit terminals, plus quick connects for load.
Enclosure (94 V-0 rated): Flux-tight (RTII) plastic case.
Weight: 0.92 oz. (26 g) approximately.

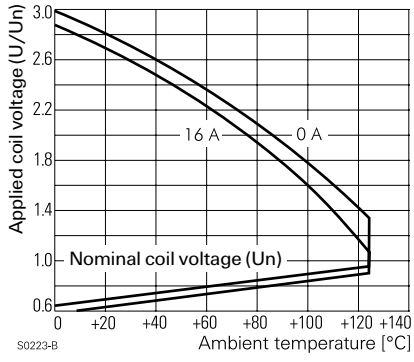
Contact Life



Max. DC Load Breaking Capacity



Coil Operating Range



Ordering Information

Typical Part Number ▶	V23077	-A	1	005	-A	4	03

1. Basic Series:
V23077 = IF 125°C miniature printed circuit board relay..

2. Termination:
A = PC terminals for coil, .25" (6.35mm) quick connects for load.

3. Version:
1 = Standard.

4. Coil Voltage:
003 = 6VDC 005 = 12VDC 007 = 24VDC 009 = 48VDC

5. Contact Type:
A = Single contact.

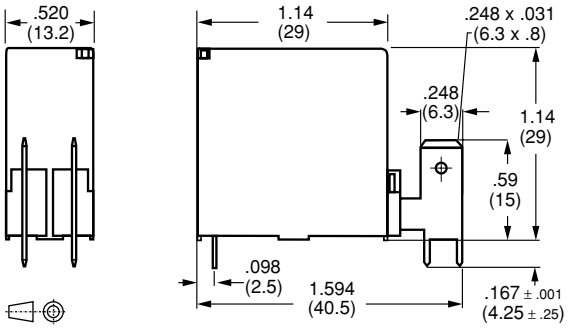
6. Contact Material:
4 = Silver-cadmium oxide.

7. Contact Arrangement:
02 = 1 Form A (SPST-NO). 03 = 1 Form B (SPST-NC).

Our authorized distributors are more likely to stock the following items for immediate delivery.

None at present.

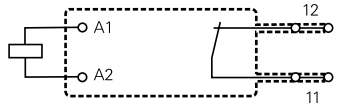
Outline Dimensions



Wiring Diagrams (Bottom Views)

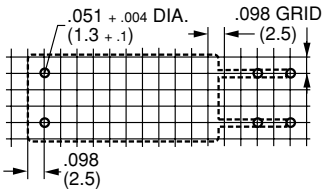


1 Form A



1 Form C

PC Board Layout (Bottom View)



Dimensions are shown for reference purposes only.

Dimensions are in inches over (millimeters) unless otherwise specified.

Specifications and availability subject to change.



0410 series

16 Amp, Miniature Printed Circuit Board Relay

File E214025

NOTE: 0410 83 version is VDE only, not UL, CSA or SEMCO.

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- 1 Form A (SPST-NO), 1 Form B (SPST-NC) and 1 Form X (SPST-NO-DM).
- 16 amp rated current.
- Quick connect terminals for load.
- 410 63 types operate in ambient temperature up to 125°C.
- 4kV/8mm contact-to-coil, insulation to VDE 0631 and 0700.
- 410 83 version provides 3 mm contact gap.
- Flux-tight plastic case.

Contact Data

Arrangements:
410 63: 1 Form A (SPST-NO) and 1 Form B (SPST-NC), single contact.
410 83: 1 Form X (SPST-NO-DM).
Material: 410 63: Silver-cadmium oxide.; **410 83:** Silver-nickel.
Expected Mechanical Life: 10 million operations.
Ratings:
Current: 16A.
Voltage: 250VAC.
Power (breaking): 4,000 VA.
Voltage (breaking): 440VAC.
Current (making, max. 4s at 10% duty cycle):
410 63: 25A.; **410 83:** 20A.
410 63 – 1 Form A Contacts
16 amp resistive, 250VAC, 125°C, 100,000 ops.
12 amp resistive, 250VAC, 70°C, 450,000 ops.
10 amp resistive, 400VAC, 125°C, 50,000 ops.
12 amp cosφ = 0.6, 250VAC, 125°C, 50,000 ops.
410 63 – 1 Form B Contacts
16 amp resistive, 250VAC, 125°C, 150,000 ops.
410 83 – 1 Form X Contacts
16 amp resistive, 250VAC, 85°C, 30,000 ops.
10 amp resistive, 250VAC, 85°C, 100,000 ops.
10 amp resistive, 400VAC, 85°C, 10,000 ops.

Initial Dielectric Strength

Between Open Contacts: 410 63: 1,000Vrms.; **410 83:** 2,000Vrms.
Between Coil and Contacts: 4,000Vrms.
Creepage/Clearance: 8/8mm.

Coil Data DC @ 20°C

Nominal Coil Power: 360mW.

Nominal Voltage VDC	DC Resistance in Ohms ±10%	Must Operate Voltage VDC	Drop-out Voltage VDC	Maximum Voltage VDC	Nominal Coil Current (mA)
410 63 models (1 Form A or 1 Form B)					
6	100	3.8	0.6	16.9	60.0
12	400	7.5	1.2	33.8	30.0
24	1,600	14.9	2.4	67.7	15.0
48	6,400	30.0	4.8	135.3	7.5
410 83 models (1 Form X with 3 mm contact gap)					
6	100	3.6	0.45	16.9	60.0
12	400	7.3	0.9	33.8	30.0
24	1,600	14.6	1.8	67.7	15.0
48	6,400	29.2	3.6	135.3	7.5
60	10,000	36.5	4.5	135.3	6.0

Operate Data

Must Operate Voltage: See Coil Data table.
Operate Time (typical): 410 63: 10ms.; **410 83:** 14 ms.
Release Time (typical): 5 ms.
Bounce Time (typical): 3 ms.
Switching Rate: 6,000 ops./hr. max. at rated load.

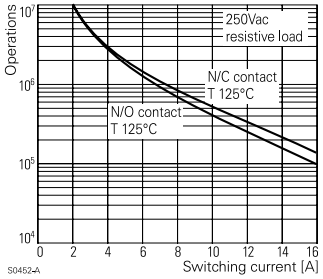
Environmental Data

Temperature Range:
Operating: 410 63: -20°C to +125°C; **410 83:** -20°C to +85°C.
Vibration: (10 to 500 Hz.) 10g [410 83].
Shock (functional): 100g [410 83].

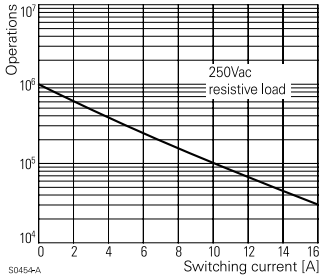
Mechanical Data

Termination: Printed circuit terminals, plus quick connects for load.
Enclosure (94 V-0 rated): Flux-tight (RTII) plastic case.
Weight: 0.85 oz. (24 g) approximately.

Contact Life

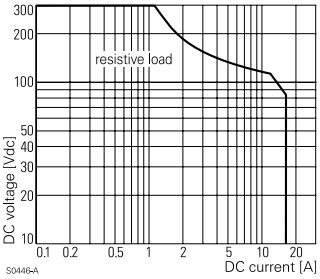


410 63 Type
1 Form A or 1 Form C



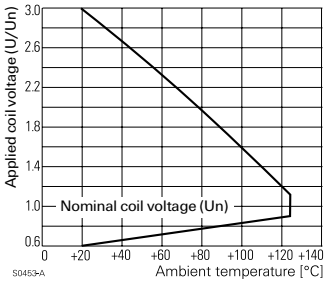
410 83 Type
1 Form X, 3 mm Contact Gap

Max. DC Load Breaking Capacity

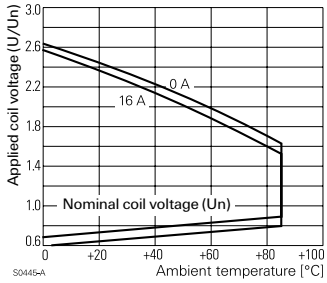


410 63 Type
1 Form A or 1 Form C

Coil Operating Range



410 63 Type
1 Form A or 1 Form C



410 83 Type
1 Form X, 3 mm Contact Gap

Ordering Information

Typical Part Number ▶	0410	83	046	001

1. Basic Series:
0410 = Miniature printed circuit board relay with quick connect terminals for load.

2. Version:
63 = Model for ambient temperature up to 125°C.
83 = Model with 3 mm contact gap, for ambient temperature up to 85°C

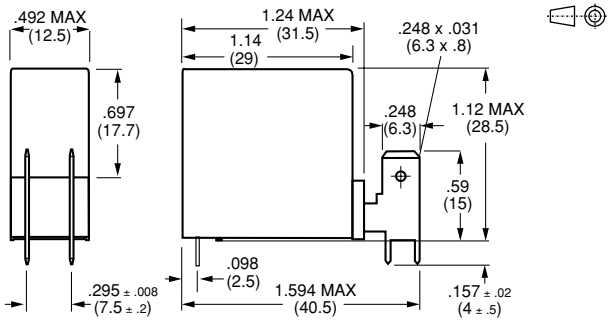
3. Coil Voltage:
054 = 6VDC 050 = 12VDC 046 = 24VDC 043 = 48VDC 042 = 60VDC
(Note: 60VDC coil is not available with version 63)

4. Contact Arrangement:
01 = 1 Form A (SPST-NO) on version 63; 1 Form X (SPST-NO-DM) on version 83.
02 = 1 Form B (SPST-NC), not available on version 83.

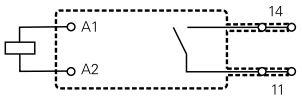
Our authorized distributors are more likely to stock the following items for immediate delivery.

None at present.

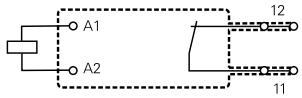
Outline Dimensions



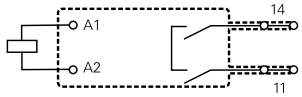
Wiring Diagrams (Bottom Views)



410 63, 1 Form A

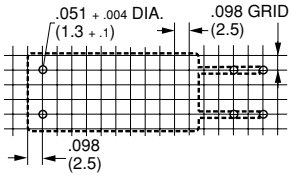


410 63, 1 Form B



410 83, 1 Form X

PC Board Layout (Bottom View)



Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.
www.tycoelectronics.com
Technical support:
Refer to inside back cover.

PCG series

2 Pole Miniature Power PC Board Relay

Appliances, Audio Equipment, Office Machines



UL File No. E82292
CSA File No. LR48471
SEMKO File No. 8744066
SEV File No. 98110096

Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- Meet UL Tungsten TV-5 rating.
- 2 Form A contact arrangements.
- Meet UL, CSA, SEMKO and SEV requirements.
- Meet 4,000V dielectric voltage between coil and contacts.
- Meet 10,000V surge voltage between coil and contacts (1.2 / 50µs).

Contact Data @ 20°C

Arrangements: 2 Form A (DPST-NO).
Material: AgSnO.
Max. Switching Rate: 300 ops./min. (no load).
30 ops./min. (rated load).
Expected Mechanical Life: 10 million operations (no load).
Expected Electrical Life: 100,000 operations (rated load).
Minimum Load: 100mA @ 5VDC.
Initial Contact Resistance: 100 milliohms @ 1A, 6VDC.

Contact Ratings

Ratings: 5A @ 250VAC resistive, 100,000ops.
8A @ 250VDC resistive, 50,000ops.
TV-5 @ 120VAC Tungsten, 25,000ops.

Max. Switched Voltage: **AC:** 277V.
DC: 30V.
Max. Switched Current: 10A.
Max. Switched Power: 1,250VA, 380W.

Initial Dielectric Strength

Between Open Contacts: 1,000VAC 50/60 Hz. (1 minute).
Between Coil and Contacts: 4,000VAC 50/60 Hz. (1 minute).
Surge Voltage Between Coil and Contacts: 10,000V (1.2 / 50µs).
Surge Voltage Between Contact and other Pole: 6,000V (1.2 / 50µs).

Initial Insulation Resistance

Between Mutually Insulated Elements: 1,000M ohms min. @ 500VDCM.

Coil Data

Voltage: 5 to 48VDC.
Nominal Power: 540 mW
Coil Temperature Rise: 50°C max., at rated coil voltage.
Max. Coil Power: 130% of nominal.
Duty Cycle: Continuous.

Coil Data @ 20°C

PCG				
Rated Coil Voltage (VDC)	**Nominal Current (mA)**	**Coil Resistance (ohms) ± 10%**	**Must Operate Voltage (VDC)**	**Must Release Voltage (VDC)**
5	106.4	47	4.00	0.25
6	88.0	68	4.80	0.30
9	58.0	155	7.20	0.45
12	44.4	270	9.60	0.60
24	21.8	1,100	19.20	1.20
48	11.0	4,400	38.40	2.40

Operate Data

Must Operate Voltage: 80% of nominal voltage or less.
Must Release Voltage: 5% of nominal voltage or more.
Operate Time: 15 ms max.
Release Time: 5 ms max.

Environmental Data

Temperature Range:
Operating: -30°C to +70°C
Vibration, Mechanical: 10 to 55 Hz., 1.5mm double amplitude
Operational: 10 to 55 Hz., 1.5mm double amplitude.
Shock, Mechanical: 1,000m/s² (100G approximately).
Operational: 100m/s² (10G approximately).
Operating Humidity: 20 to 85% RH. (Non-condensing).

Mechanical Data

Termination: Printed circuit terminals.
Enclosure (94V-0 Flammability Ratings):
PCG-N: Vented (Flux-tight) snap-on cover.
Weight: 0.63 oz (18g) approximately.

Ordering Information

Typical Part Number ▶	PCG	-2	24	D	2	M	N	,000

1. Basic Series:
PCG = Miniature Power PC board relay.

2. Termination:
2 = 2 pole.

3. Coil Voltage:
05 = 5VDC 09 = 9VDC 24 = 24VDC
06 = 6VDC 12 = 12VDC 48 = 48VDC

4. Coil Input:
D = Standard

5. Contact Material:
2 = AgSnO

6. Contact Arrangement:
M = 2 Form A, DPST-NO.

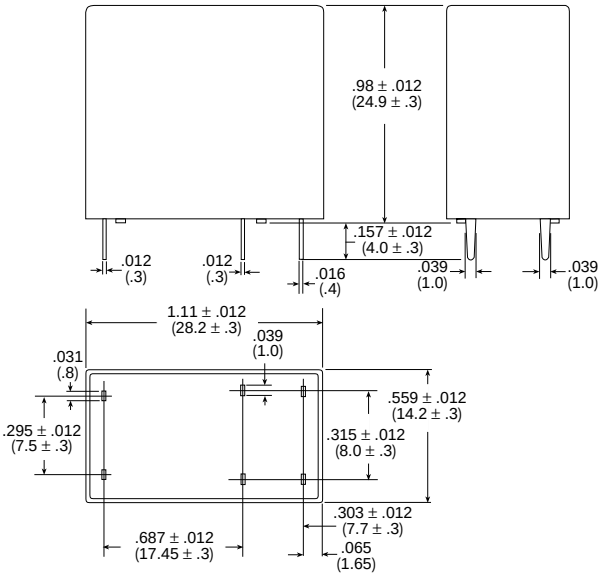
7. Contact Rating:
N = Vented (Flux-tight)* snap-on cover.

8. Suffix:
,000 = Standard model Other Suffix = Custom model

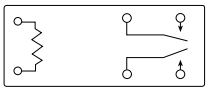
* Not suitable for immersion cleaning processes.

Our authorized distributors are more likely to maintain the following items in stock for immediate delivery.
None at present.

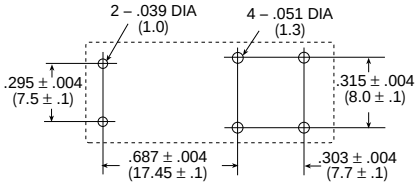
Outline Dimensions



Wiring Diagram (Bottom View)

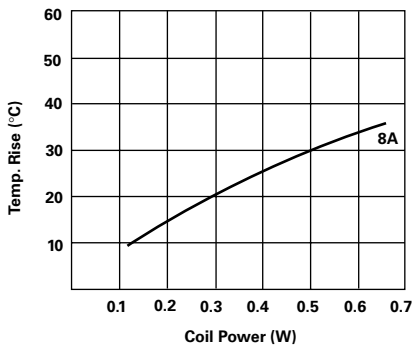


PC Board Layout (Bottom View)

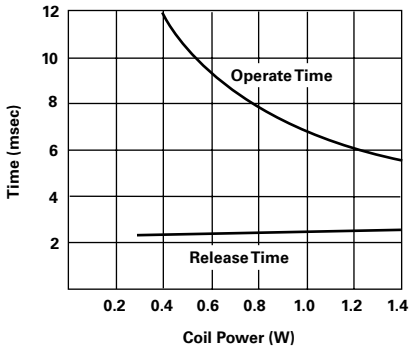


Reference Data

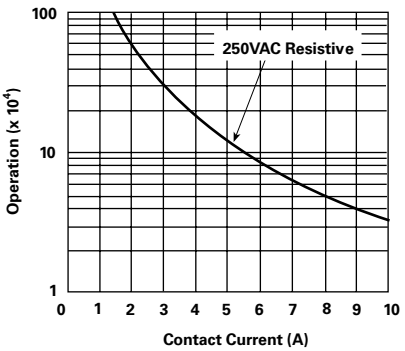
Coil Temperature Rise



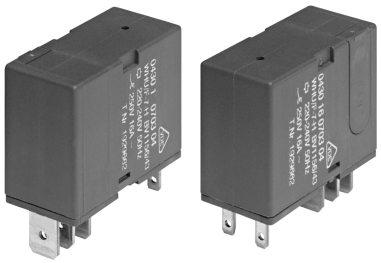
Operate Time



Life Expectancy



Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.
www.tycoelectronics.com
Technical support:
Refer to inside back cover.



0430 series

10-16 Amp, 1 or 2 Pole PC Board or Panel Relay

File E214025

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- 1 Form A (SPST-NO) through 2 Form C (DPDT).
- 16 amp rated current (1 pole) or 10 amp (2 pole).
- Printed circuit or quick connect terminals.
- 4kV/8mm contact-to-coil.
- 3 mm contact gap version available.
- Optional magnetic blowout on 3mm contact gap version.
- PC board, bracket or panel mount.

Contact Data

Arrangements: 1 Form A (SPST-NO), 1 Form B (SPST-NC), 1 Form C (SPDT), 2 Form A (DPST-NO), 2 Form B (DPST-NC), 2 Form C (DPDT).
Material: Silver-cadmium oxide or silver-copper 3.
Expected Mechanical Life: 250,000 operations.
Ratings:
Current: One pole: 16A; **Two pole:** 10A.
Voltage: 250VAC.
Power (breaking): One pole: 4,000 VA; **Two pole:** 2,500VA.
Voltage (breaking): 400VAC.
Current (making, max. 4s at 10% duty cycle):
One pole: 25A; **Two pole:** 15A.
Load/Life – One Pole – Model with Standard Contact Gap
16 amp resistive, 250VAC, 250,000 ops.
Load/Life – One Pole – Model with 3mm Contact Gap
16 amp resistive, 250VAC, 70°C, 150,000 ops.
10 amp resistive, 250VAC, 105°C, 150,000 ops.
Load/Life – Two Pole
10 amp resistive, 250VAC, 250,000 ops.

Initial Dielectric Strength

Between Open Contacts: **Standard Contact Gap:** 1,000Vrms
3mm Contact Gap: 2,000Vrms.
Between Coil and Contacts: 4,000Vrms.
Creepage/Clearance: 8/8mm.

Coil Data DC @ 20°C

Nominal Coil Power: DC Coil : 1W.; **AC Coil:** 1.8VA

Nominal Voltage VDC	DC Resistance in Ohms ±10%	Must Operate Voltage VDC	Drop-out Voltage VDC	Maximum Voltage VDC	Nominal Coil Current (mA)
DC Coils					
12	145	7.8	0.6	15.6	83.0
24	580	15.6	1.2	31.2	41.0
48	2,200	31.2	2.4	62.4	22.0
110	13,000	71.5	5.5	143.0	9.0
AC Coils – Models with Standard Contact Gap					
24	200	18.0	3.6	27.0	75.0
60	1,250	45.0	9.0	69.0	30.0
110	4,500	83.0	16.0	127.0	16.0
230	17,500	170.0	35.0	253.0	10.0
AC Coils – Models with 3mm Contact Gap					
24	145	18.0	3.6	27.0	75.0
60	950	45.0	9.0	69.0	30.0
110	3,100	83.0	16.0	127.0	16.0
230	11,400	170.0	35.0	253.0	9.0

Operate Data

Must Operate Voltage: See Coil Data table.
Operate Time (typical): **Standard Contact Gap:** 18 ms.
3mm Contact Gap: 15 ms.
Release Time (typical): **Standard Contact Gap:** 3 ms.
3mm Contact Gap: 8 ms.
Bounce Time (typical): **Standard Contact Gap:** 3 ms.
3mm Contact Gap: 4 ms.
Switching Rate: 9,000 ops./hr. max. at rated load.

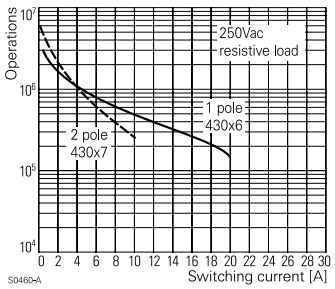
Environmental Data

Temperature Range:
Operating: 410 63: -20°C to +70°C.
Shock (destructive): 100g.

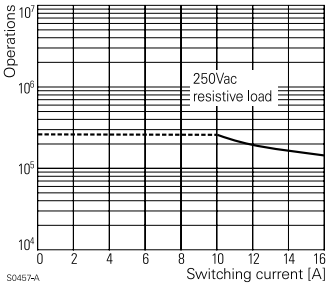
Mechanical Data

Termination: Printed circuit or quick connect terminals.
Enclosure: Plastic dust cover.
Weight: 1.13 oz. (32 g) approximately.

Contact Life

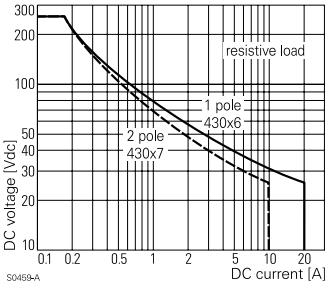


Models with Std. Contact Gap

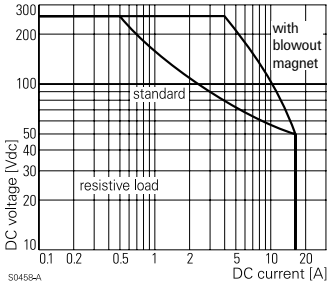


Models with 3mm Contact Gap

Max. DC Load Breaking Capacity



Models with Std. Contact Gap



Models with 3mm Contact Gap

Ordering Information

Typical Part Number ▶	0430	1	6	10	1	100

1. Basic Series:
0430 = Miniature printed circuit board or panel mount relay.

2. Mounting:
0 = PC board 1 = Mounting brackets 2 = Snap mounting 5 = DIN rail mounting

3. Version:
4 = 1 pole, 3mm gap. 5 = 1 pole, 3mm gap, magnetic blowout. 6 = 1 pole, Std. gap. 7 = 2 pole, Std. gap.

4. Coil Voltage:

DC Coils for all Types:	09 = 12VDC	10 = 24VDC	11 = 48VDC	13 = 110VDC
AC Coils for Std. Gap Types:	03 = 24VAC	05 = 60VAC	06 = 110VAC	07 = 230VAC
AC Coils for 3 mm Gap Types:	23 = 24VAC	25 = 60VAC	26 = 110VAC	27 = 230VAC

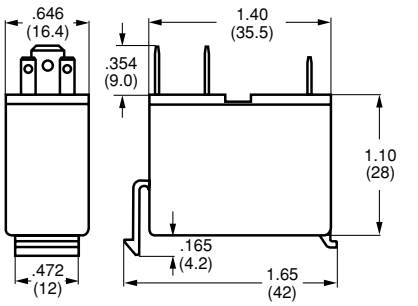
5. Contact Material:
0 = Silver-copper 3 1 = Silver-cadmium oxide.

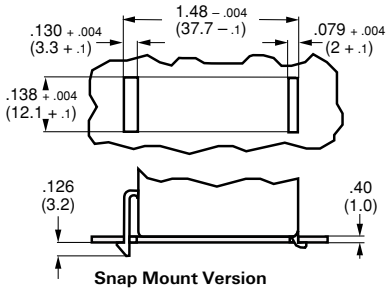
6. Contact Arrangement:
100 = 1 Form A (SPST-NO) 200 = 1 Form B (SPST-NC) 300 = 1 Form C (SPDT).
400 = 2 Form A (DPST-NO) 500 = 2 Form B (DPST-NC) 600 = 2 Form C (DPDT). Note: 2 pole forms not available with 3mm contact gap.

Our authorized distributors are more likely to stock the following items for immediate delivery.

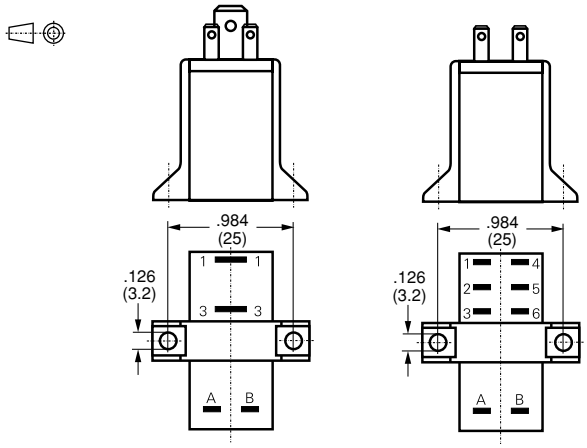
None at present.

Outline Dimensions

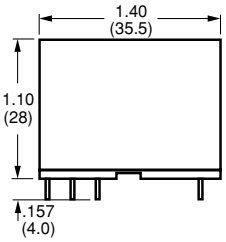




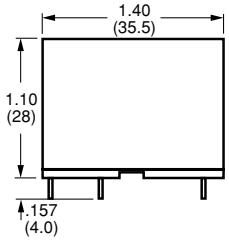
Snap Mount Version



Mounting Bracket Versions

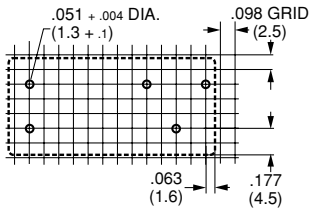


PC Board Version, Std. Gap.

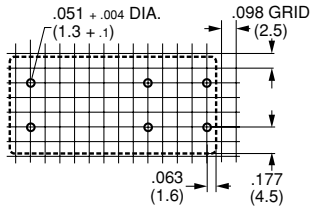


PC Board Version, 3mm Gap

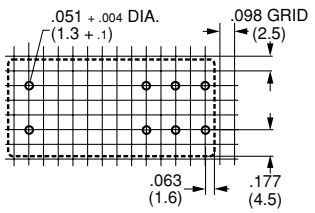
PC Board Layouts (Bottom Views)



1 Form A, Standard Contact Gap

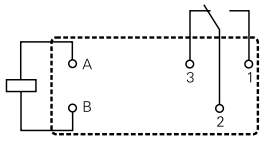


1 Form A, 3mm Contact Gap

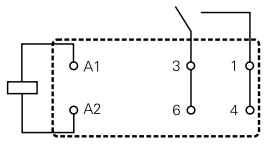


2 Form A, Standard Contact Gap

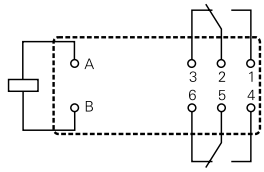
Wiring Diagrams (Bottom Views)



1 Form A, Standard Contact Gap



1 Form A, 3mm Contact Gap



2 Form A, Standard Contact Gap

Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.
www.tycoelectronics.com
Technical support:
Refer to inside back cover.



600 series
15 Amp Sensitive PC Board Relay

File E39006 and E42149
File LR48569

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features
- Low power sensitive coil.
- 1 Form A, 1 Form B and 1 Form C contact arrangements.
- Various contact materials and types for ratings to 15 amps.
- Coil assembly rated 130°C, 94V-O.
- Applications include sensor and timer controls, emergency lighting, instrmentation, alarm systems, smoke and fire detectors, business equipment and vending machines.

Contact Data
Arrangements: 1 Form A (SPST-NO), 1 Form B (SPST-NC) and 1 Form C (SPDT).
Material and Type: Gold-silver crossbar, silver-cadmium crossbar, palladium crossbar, gold-flashed silver cadmium, silver sadmium oxide, find silver, gold-flashed coin silver.
Expected Mechanical Life: 10 million operations, minimum.
Expected Electrical Life: 100,000 operations, minimum, at rated load.

UL/CSA Ratings @ 25°C

Code	Contact Material	Rating
B	Au Flashed AgCd	75VA@24VAC Pilot Duty§ 1A@120VAC General Purpose 1.5A@50VDC Resistive 600W@277VAC Gen'l. Purpose SPST-NO Only 240W@277VAC Gen'l. Purpose SPST-NC Only 480VA@277VAC Pilot Duty SPDT Only 480VA@Ballast SPDT Only 1/10 HP@120VAC
G	Au Ag	3A@28VDC Resistive 125VA@120VAC Pilot Duty§ 1/8 HP@120/240 VAC
H	AgCdO	15A@150VAC Inductive 0.4 PF NO Only 10A@277VAC Resistive 15A@28VDC Resistive TV5@NO Contacts TV2@NC Contacts 600W@277VAC Tungsten SPDT-NO Only 240W@277VAC Tungsten SPDT-NC Only 480VA@277VAC Pilot Duty SPDT Only § 480VA@277VAC Ballast SPDT Only 1/3 HP@120/240VAC NO 1/6 HP@120/240VAC NC
K	Au Flashed Coin Ag	5A@240VAC Resistive 5A@28VDC 125VA@240VAC Pilot Duty § 125VA@125VAC Pilot Duty §
R	Fine Ag	15A@150VAC Resistive 15A@28VDC Resistive 10A@277VAC Resistive 480VA@240VAC Pilot Duty TV2@NC Contacts TV4@NO Contacts 480W@120VAC Tungsten NO 240W@120VAC Tungsten NC
S	Ag Cd	3A@240VAC Resistive 3A@28VDC Resistive
V	Palladium	2A@28VDC Resistive

§ Only when Code Y Electrical Spacing is specified.

Initial Dielectric Strength
Between Open Contacts: 500VAC, 60 Hz., 2 seconds.
Between Coil and Contacts: 1,000VAC, 60 Hz., 2 seconds.

Coil Data @ 25°C
Rated Voltage: 3 to 48VDC.
Maximum Voltage @ 85°C: 120% of Rated Voltage.
Nominal Power @ 25°C: 110mW for 3A and 5A rated models;
240mW for 15A rated models.
Maximum Power @ 25°C: 1W.
Duty Cycle: Continuous.
Initial Insulation Resistance: 10,000 megohms, min., at 25°C, 500VDC and 50% rel. humidity.

Coil Data @ 25°C

Nominal Voltage VDC	DC Resistance in Ohms ±10%		Must Operate Voltage VDC	Must Release Voltage VDC
	3 A & 5A Types	15A Types		
003	82	38	2.25	0.3
006	327	150	4.5	0.6
009	736	338	6.75	0.9
012	1,309	600	9.0	1.2
018	2,945	1,350	13.5	1.8
024	5,236	2,400	18.0	2.4
028	7,127	3,267	21.0	2.8
048	20,945	9,600	36.0	4.8

Operate Data @ 25°C
Must Operate Voltage: 75% of nominal.
Must Release Voltage: 10% of nominal.
Operate Time: 10 ms, typ.
Release Time: 10 ms, typ.

Environmental Data
Temperature Range:
Storage: -55°C to +85°C.
Operating: -55°C to +85°C.

Mechanical Data
Termination: Printed circuit terminals.
Enclosures: Unsealed dust cover or sealed plastic case.
Weight: 1.6 oz. (45g) approximately.

Ordering Information

Typical Part Number ▶	60	3	– 24	V	Y	Q

1. Basic Series Type:
60 = Miniature, PC board relay rated 3A or 5A (Contact Material Code G, S, V or B only)
61 = Miniature, PC board relay rated 15A (Contact Material Code H or R only)
65 = Miniature, PC board relay rated 5A (Contact Material Code K only)

2. Contact Arrangement:
1 = 1 Form A (SPST-NO) 2 = 1 Form B (SPST-NC) 3 = 1 Form C (SPDT)

3. Coil Voltage:
003 = 3VDC 009 = 9VDC 018 = 18VDC 028 = 28VDC
006 = 6VDC 012 = 12VDC 024 = 24VDC 048 = 48VDC

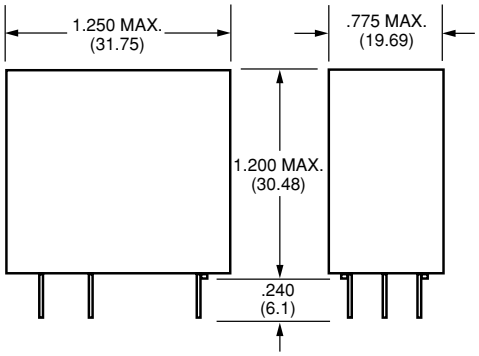
4. Contact Material:
G = Au Ag crossbar, rated 3A (Only available with Basic Series Type 60).
S = Au Cd crossbar, rated 3A (Only available with Basic Series Type 60).
V = Pd crossbar, rated 3A (Only available with Basic Series Type 60).
B = Au-flashed AgCd crossbar, rated 5A (Only available with Basic Series Type 60).
H = AgCdO, rated 15A (Only available with Basic Series Type 61).
R = Fine Ag, rated 15A (Only available with Basic Series Type 61).
K = Au-flashed coin Ag, rated 5A (Only available with Basic Series Type 65).

5. Electrical Spacing:
Leave Blank = 0.125 in (3.175 mm) Clearance and 0.125 in (3.175 mm) Creepage
Y = 0.125 in (3.175 mm) Clearance and 0.250 in (6.35 mm) Creepage

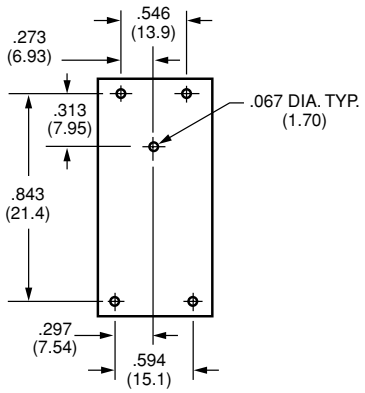
6. Enclosure Type
Leave Blank = Unsealed dust cover Q = Sealed cover

Our authorized distributors are more likely to stock the following items for immediate delivery.
None at present.

Outline Dimensions

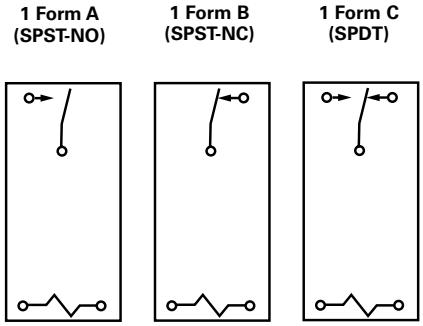


PC Board Layout (Bottom View)



Note: On single throw models, only necessary terminals are present.

Wiring Diagrams (Bottom Views)



Note: On single throw models, only necessary terminals are present.

Alphanumeric Index

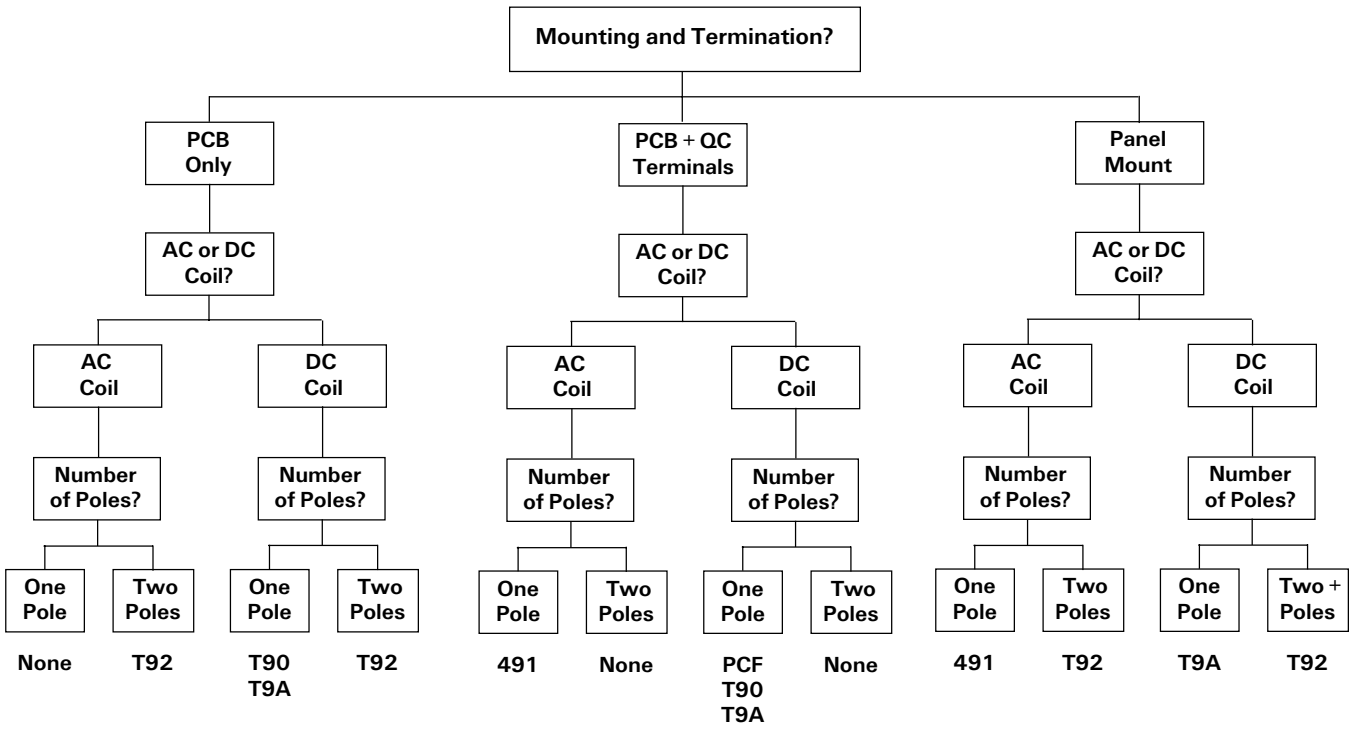
Series	Type	Page
491	20A AC Coil PCB or Panel Mt. Relay	509
PCF	25A DC Coil PCB Relay	502
T9A	30A DC Coil PCB or Panel Mt. Relay	506
T90	30A DC Coil PCB Relay	504
T92	30A AC or DC Coil PCB or Panel Mt. Relay	511

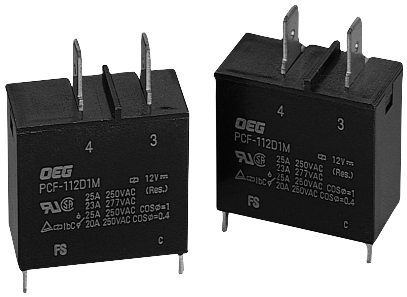
NOTE: Some of the relay series described in the Power Relays and Contactors section are also available with printed circuit board terminals as an option.

Power PC Board Relays 501-512 **5**

Power (20-30A) PC Board Relay Question Tree

This guide helps the user select one or more relay series which may be appropriate for a given application. The user should then refer to detailed specifications elsewhere in this catalog to determine the actual part number to be specified. Of course, the user must assume ultimate responsibility for determining the suitability of a relay for a particular application.





PCF series

25A Miniature Power PC Board Relay

Appliances, HVAC, Office Machines.

UL File No. E58304
CSA File No. LR48471
TUV File No. R9551880

Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- Meet UL 508, CSA, TUV requirements.
- 1 Form A contact arrangements.
- Quick connect terminal type and PC board type.
- Meet 5,000V dielectric voltage between coil and contacts.
- Meet 10,000V surge voltage between coil and contacts (1.2 / 50µs).

Contact Data @ 20°C

Arrangements: 1 Form A.
Material: AgSnO
Max. Switching Rate: 300 ops./min. (no load).
30 ops./min. (rated load).
Expected Mechanical Life: 10 million operations (no load).
Expected Electrical Life: 100,000 operations (rated load).
Minimum Load: 100mA @ 5VDC.
Initial Contact Resistance: 100 milliohms @ 1A, 6VDC.

Contact Ratings

Ratings: 25A @ 250VAC resistive.
23A @ 277VAC resistive.

20A @ 250VAC inductive (cosø= 0.4).

Max. Switched Voltage: AC: 250V.
Max. Switched Current: 25A.
Max. Switched Power: 6,370VA.

Initial Dielectric Strength

Between Open Contacts: 1,000VAC 50/60 Hz. (1 minute).
Between Coil and Contacts: 5,000VAC 50/60 Hz. (1 minute).
Surge Voltage Between Coil and Contacts: 8,000V (1.2 / 50µs).

Initial Insulation Resistance

Between Mutually Insulated Elements: 1,000M ohms min. @ 500VDC.

Coil Data

Voltage: 6 to 24VDC.
Nominal Power: 900 mW.
Coil Temperature Rise: 55°C max., at rated coil voltage.
Max. Coil Power: 130% of nominal.
Duty Cycle: Continuous.

Coil Data @ 20°C

PCF / PCFN				
Rated Coil Voltage (VDC)	Nominal Current (mA)	Coil Resistance (ohms) ± 10%	Must Operate Voltage (VDC)	Must Release Voltage (VDC)
06	150.0	40	4.50	0.30
09	100.0	90	6.75	0.45
12	75.0	160	9.00	0.60
24	37.5	640	18.00	1.20

Operate Data

Must Operate Voltage: 75% of nominal voltage or less.
Must Release Voltage: 5% of nominal voltage or more.
Operate Time: 20 ms max.
Release Time: 10 ms max.

Environmental Data

Temperature Range:
Operating: -30°C to +55°C
Vibration, Mechanical: 10 to 55 Hz., 1.5mm double amplitude
Operational: 10 to 55 Hz., 1.5mm double amplitude.
Shock, Mechanical: 1,000m/s² (100G approximately).
Operational: 100m/s² (10G approximately).
Operating Humidity: 20 to 85% RH. (Non-condensing).

Mechanical Data

Termination PCF: Printed circuit terminals with quick connect terminals.
PCFN: Printed circuit terminals.
Enclosure (94V-0 Flammability Ratings):
PCF / PCFN: Vented (Flux-tight) plastic cover.
Weight: 0.99 oz (28g) approximately.

Ordering Information

Typical Part Number ►	PCFN	-1	24	D	2	M	,000

1. Basic Series:
PCFN = 25A PC Board Terminals PCF = Quick Connect Terminals

2. Enclosure:
1 = 1 pole

3. Coil Voltage:
06 = 6VDC 09 = 9VDC 12 = 12VDC 18 = 18VDC 24 = 24VDC

4. Coil Input:
D = Standard

5. Contact Material:
2 = AgSnO

6. Contact Arrangement:
M = 1 Form A, SPST-NO

7. Suffix:
,000 = Standard model Other Suffix = Custom model

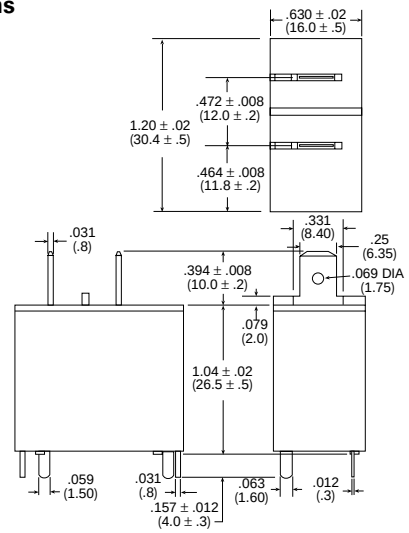
* Not suitable for immersion cleaning processes.

Our authorized distributors are more likely to maintain the following items in stock for immediate delivery.

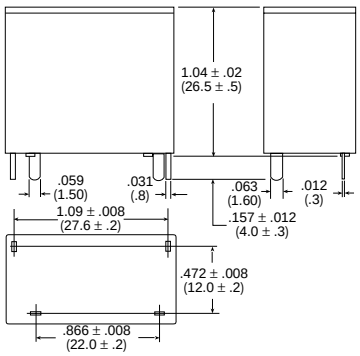
None at present.

Outline Dimensions

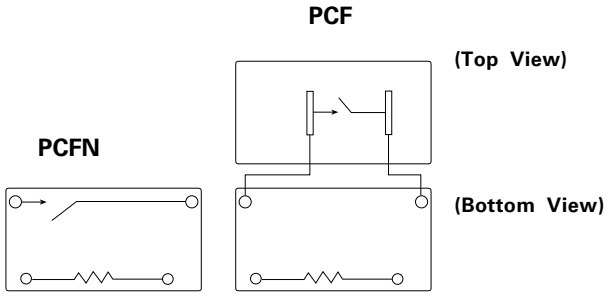
PCF



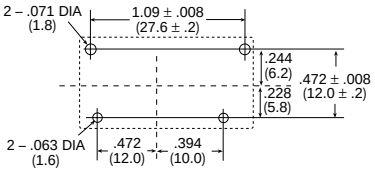
PCFN



Wiring Diagram

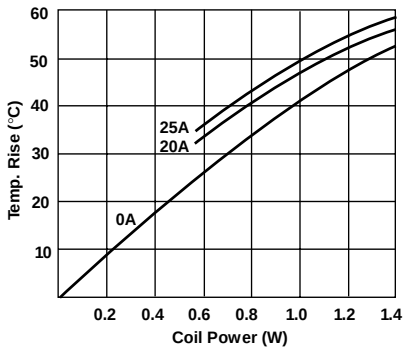


PC Board Layout (Bottom View)

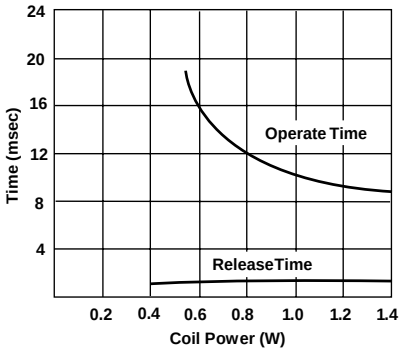


Reference Data

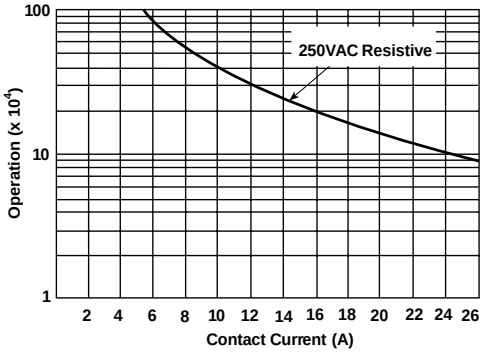
Coil Temperature Rise



Operate Time



Life Expectancy

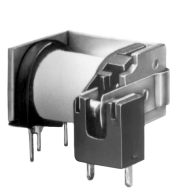


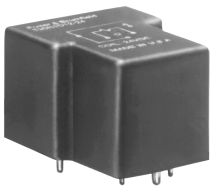
Dimensions are shown for reference purposes only.

Dimensions are in inches over (millimeters) unless otherwise specified.

Specifications and availability subject to change.

www.tycoelectronics.com
Technical support:
Refer to inside back cover.





T90 series

30 Amp Printed Circuit Board Relay

File E22575 File LR15734

Patented

Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- Up to 30A switching in SPST and 20A switching in SPDT arrangements.
- Silver cadmium oxide contacts.
- Available as an open-frame relay, with a snap-on dust cover or with an immersion cleanable(6), plastic sealed case.
- Meets UL 508 & UL 873 spacing – 1/8" through air, 1/8" over surface. (1/4" over surface with terminal code 4)
- UL class F insulation standard.
- Well suited for various industrial, commercial and residential applications, as well as many others.

Contact Ratings @ 25°C

Arrangements: 1 Form A (SPST-NO) and 1 Form C (SPDT).
Material: Silver-cadmium oxide.
Mechanical Life: 10 million operations, typical.

Contact Ratings @ 25°C with relay properly vented. Remove vent nib after soldering and cleaning.

Typical Electrical Load & Life (Open Style Relay)

Form & Contact Material	Contact Load	Type of Load	Ops
(1) Silver-cadmium oxide	30A @ 240VAC	UL General Purpose	100,000
	20A @ 240VAC	Resistive Heater	100,000
(5) Silver-cadmium oxide	20A/10A @ 240VAC	UL General Purpose	100,000
	20A/10A @ 28VDC	Resistive	100,000

Minimum Contact Load:
Silver Contacts: 500mA @ 5VDC or 12VAC.
Silver Cadmium Oxide Contacts: 1A @ 5VDC or 12VAC.
Initial Contact Resistance: 75 mΩ, max., @ min. rated current (switched).

Initial Dielectric Strength

Between Open Contacts: 1,500V rms.
Between Contacts and Coil: 1,500V rms (terminal code 1).
2,500V rms (UL 873 version terminal code 4).

Initial Insulation Resistance

Between Mutually Insulated Elements: 10^9 ohms, min., @ 500VDC, 25°C and 50% R.H.

Coil Data @ 25°C

Voltage: 5 to 110VDC.
Maximum Coil Power: 2.8 Watt
Maximum Coil Temperature(5): Class F: 155°C.
Duty Cycle: Continuous.

Coil Data

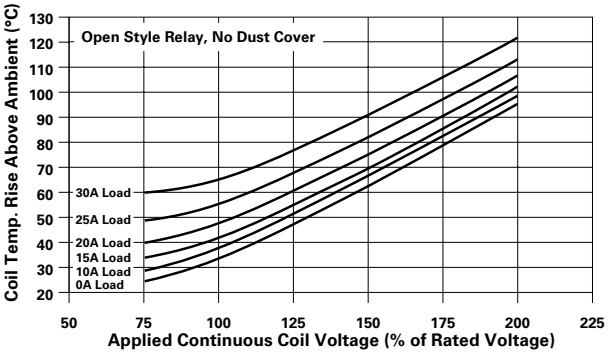
Nominal Voltage (VDC)	Resistance ± 10% (Ohms)	Nominal Power (mW)	Nominal Current (mA)
5	27	930	185
6	40	900	150
9	97	840	93
12	155	930	77
15	256	880	59
18	380	850	47
24	660	870	36
48	2,560	900	19
110	13,450	900	8

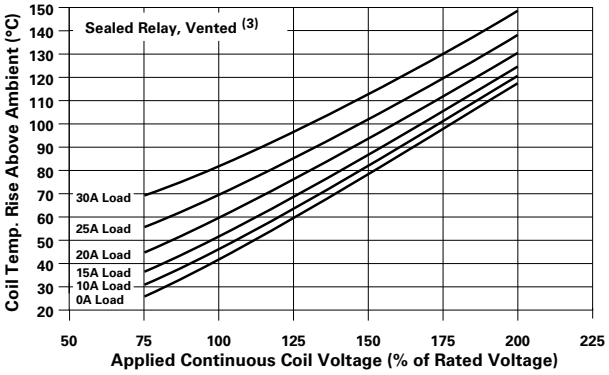
Operate Data @ 25°C

Must Operate Voltage: 75% of nominal voltage or less.
Must Release Voltage: 10% of nominal voltage or more.
Operate Time (Including Bounce)†: 15 ms, max.
Release Time (Including Bounce)†: 15 ms, max.
† At or From Nominal Coil Voltage

Typical Coil Temperature Rise

Data below are average values and should be verified in application. Tests were conducted within a 2' (.6 m) cube (still air) with relay mounted to a 30A, single side P.C. board (6); at nominal coil power @ 25°C; with normally open contact loaded; and with 4' (1.22 m) long, #10 AWG load wires.





Environmental Data

Storage Temperature Range: -40°C to 130°C.
Operating Temperature Range: -55°C to +85°C(1).
Vibration, Operational: 0.065" (1.65mm) max. excursions from 10-55 Hz. with no contact opening >100µs.
Shock, Operational: 10g for 11 ms with no contact opening >100µs.
Shock, Mechanical: 100g.

Mechanical Data

Termination: Printed circuit terminals(4).
Enclosures (all have 94V-0 flammability rating, Class F temp. rating):
Optional dust cover: Snap-on plastic dust cover is available for use on open style T90N.
Sealed case (T90S): Immersion cleanable, sealed plastic case(2).
Weight: Open Model T90N: 0.7 oz. (20g) approximately.
Sealed Model T90S: 0.9 oz. (26g) approximately.

Notes

(1) Operating ambient temperature must consider "Must Operate Voltage Change Over Temperature," Contact Temperature Rise, Coil Temperature Rise (If coil is not allowed to cool) and Maximum Coil Temperature. Specification ambient considers nominal coil voltage, 20A load with coil cooled to ambient.
(2) Sealed relay terminals should not be bent.
(3) Knock-off nib should be removed after cleaning process for optimum life of sealed relays.
(4) Maximum soldering temperature is 500°F for 4 seconds.
(5) Class F coils are UL systems approved for maximum coil temperature of 155°C by change of resistance method.
(6) See application note 13C265 for proper relay mounting, termination, cleaning and PC board conductor width. Coil rise test performed with 30A PC board to maintain 20°C maximum rise @ 30A.

Ordering Information

Typical Part Number ▶	T90	S	5	D	1	2	-24

1. Basic Series:
T90 = Printed circuit board power relay.

2. Enclosure:
N = Open, no cover (snap-on dust cover available as an option).
S = Immersion cleanable, sealed plastic case with knock-off nib for ventilation.

3. Contact Arrangement:
1 = 1 Form A (SPST-NO). 5 = 1 Form C (SPDT).

4. Coil Input:
D = DC Voltage.

5. Terminals:
1 = Printed circuit terminals.
4 = Printed circuit terminals, no common terminal between coil terminals (see wiring diagram).
Note: Terminal code 4 recommended for UL 873 applications. Consult factory for use of terminal code 1 for UL 873 applications.

6. Contact Material:
2 = Silver-cadmium oxide.

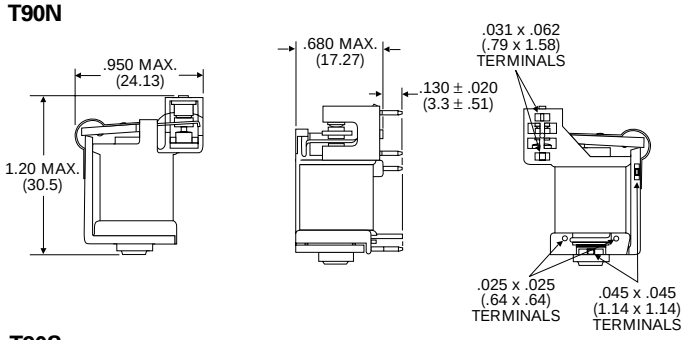
7. Coil Voltage:
5 = 5V DC 6 = 6V DC 9 = 9V DC 12 = 12V DC 15 = 15V DC 18 = 18V DC 24 = 24V DC 48 = 48V DC 110 = 110V DC

Our authorized distributors are more likely to maintain the following items in stock for immediate delivery.

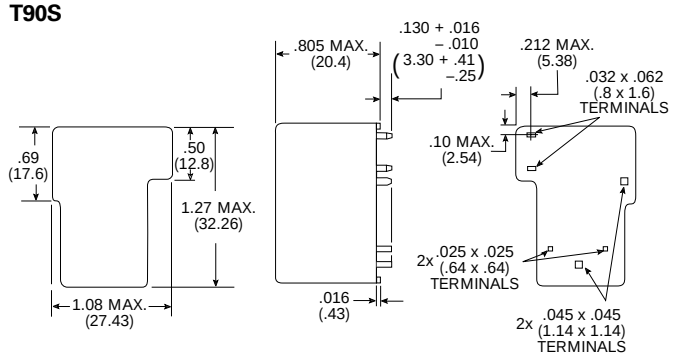
T90N1D12-12	T90N1D42-24	T90N5D42-24	T90S1D42-24	T90S5D42-24
T90N1D12-18	T90N5D12-12	T90S1D12-12	T90S5D12-12	
T90N1D12-24	T90N5D12-24	T90S1D12-24	T90S5D12-24	

Outline Dimensions

T90N



T90S

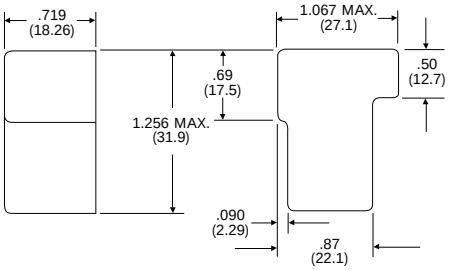


Optional Dust Cover For Use With Open-Style Relays

Optional plastic dust cover is a snap-on unit, open on the PC board side of the relay. The cover, when ordered with the relay, is shipped separately. It is designed to be snapped into place by the customer after the relay has been assembled to the PC board.

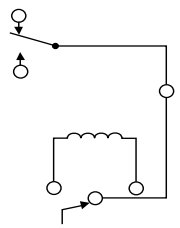
Cover Ordering Information – Boldface items are stocked.

Part No.	Description
35C620A	Black dust cover for use on open-style, T90N relay.

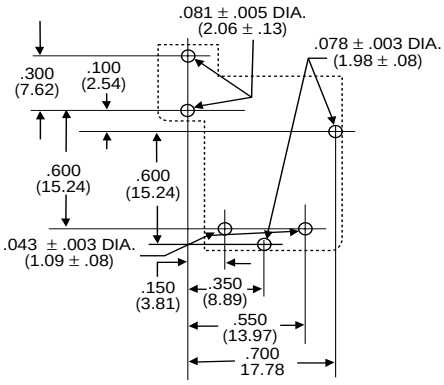


Wiring Diagram & PC Board Layout (Bottom Views)

1 Form C
(Unused terminals are not present)



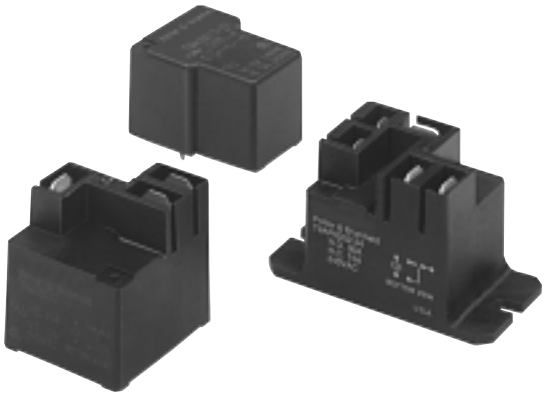
Note: This terminal not present with terminal code 4.



UL & CSA Contact Ratings

Voltage	Load Type	N.O. Contact	N. C. Contact
Silver Contacts			
240VAC	General Purpose	10A	5A
240VAC	Resistive	10A	5A
28VDC	Resistive	10A	5A
Silver-Cadmium Oxide Contacts			
240VAC	General Purpose†	30A	15A
240VAC	UL Resistive†	20A	15A
120VAC	Motor	1 HP	1/4 HP
240VAC	Motor	2 HP	1/2 HP
240VAC	LRA/FLA†	80/30	30/10
240VAC	Tungsten	TV5	TV3
277VAC	Ballast	6A	3A
28VDC	Resistive	20A	10A

† For Form C application, derate current to 67%.



T9A series

DC Coil 30 Amp PC Board or Panel Mount Relay

File E22575
File LR15734

Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- Up to 30 amp switching in SPST and 20 amp in SPDT arrangements.
- Immersion cleanable(6), plastic sealed case available.
- Meets UL 873 and UL 508 spacing – 1/8" through air, 1/4" over surface.
- Load connections made via 1/4" Q. C. terminals and safety wells accept insulated female Q. C. terminals (mounting codes 2 & 5).
- UL Class F insulation system standard.
- Well suited for various industrial, commercial and residential applications.

Contact Ratings @ 25°C

Arrangements: 1 Form A (SPST-NO), and 1 Form C (SPDT).
Material: Silver-cadmium oxide.
Mechanical Life: 10 million operations, typical.
Minimum Contact Load: 1A @ 5VDC or 12VAC.
Initial Contact Resistance: 75 milliohms, max., @ min. rated current (switched).

Contact Ratings @ 25°C (unless otherwise noted) with relay properly vented. Remove vent nib after soldering and cleaning.

Typical Electrical Load & Life - 1 Watt Coil

Contact Arrangement	Contact Load	Type of Load	Operations
1	30A @ 240VAC	UL General Purpose	100,000
	25A @ 240VAC	Resistive Heater	100,000
5	20A/10A @ 240VAC	UL General Purpose	100,000
	20A/10A @ 240VAC	UL Resistive	100,000
	20A/10A @ 28VDC	Resistive	100,000

UL 508/873 & CSA Contact Ratings - 900mW Coil

Voltage	Load Type	N.O. Contact	N.C. Contact	Operations
240VAC	General Purpose	30A	–	100,000
240VAC	Resistive	18A	–	100,000 @ 105°C
240VAC	Resistive	–	15A	6,000
240VAC	LRA/FLA	30A/15A	–	100,000
120VAC	LRA/FLA	50A/16A	–	100,000
120VAC	LRA/FLA	30A/11A	–	200,000

Note: Consult factory for other 900mW version contact ratings.

UL 508/873 & CSA Contact Ratings - 1 Watt Coil

Voltage	Load Type	N.O. Contact	N.C. Contact
277VAC	Tungsten *	5.4A	–
277VAC	Ballast	10A	3A
240VAC	Motor	2 HP	1/2 HP
240VAC	Resistive *†	25A	20A
240VAC	General Purpose†	30A	15A
240VAC	LRA/FLA **††	80A/30A	30A/12A
240VAC	Pilot Duty *	470VA	275VA
125VAC	Motor	1 HP	1/4 HP
120VAC	LRA/FLA	98A/22A	–
120VAC	Tungsten *	8.3A	–
120VAC	Pilot Duty	470VA	–
28VDC	Resistive	20A	10A

* Rated 6,000 operations.
** Higher UL & CSA ratings available.
† For Form C application, derate current to 20A (N.O.), 10A (N.C.).
†† For Form C application, derate current to 67%.

Note: Consult factory for other 900mW version contact ratings.

Initial Dielectric Strength

Between Open Contacts: 1,500V rms.
Between Contacts and Coil: 2,500V rms.
6 kV surge using 1.2µs/50µs Impulse Wave or .5µs – 100kHz Ring Wave

Initial Insulation Resistance

Between Mutually Insulated Elements: 10^9 ohms, min., @ 500VDC, 25°C and 50% R.H.

Coil Data @ 25°C

Voltage: 5 to 110VDC.
Nominal Coil Power: 1.0W, (approx.) and 900mW (approx.) versions.
Maximum Coil Power: 2.8 Watt.
Maximum Coil Temperature(5): Class F: 155°C.
Duty Cycle: Continuous.

Coil Data - 1 Watt

Nominal Voltage	DC Resistance ± 10% (Ohms)	Nominal Current (mA)
5	25	200
9	81	111
12	144	83
18	324	56
24	576	42
48	2,304	21
110	12,100	9

Coil Data - 900mW

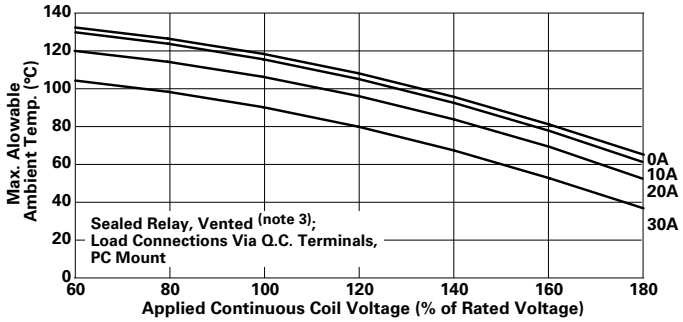
Nominal Voltage	DC Resistance ± 10% (Ohms)	Nominal Current (mA)
5	27	185
9	97	93
12	155	77
18	380	47
24	660	36
48	2,560	19
110	13,450	8

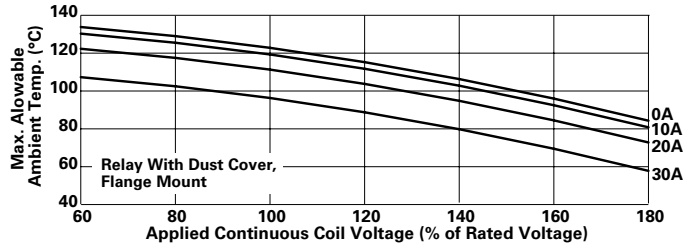
Operate Data @ 25°C

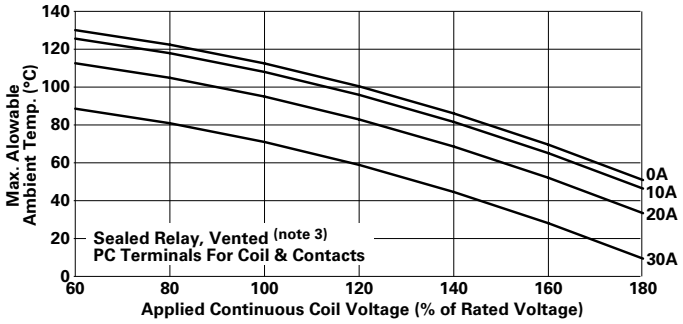
Must Operate Voltage: 75% of nominal voltage or less.
Must Release Voltage: 10% of nominal voltage or more.
Operate Time (Including Bounce)§: 15 ms, max.
Release Time (Including Bounce)§: 15 ms, max.
§ At or From Nominal Coil Voltage

Ambient Temperature vs. Coil Voltage - 1 Watt Coil

Data below are average values and should be verified in application. Tests were conducted within a 2' (.6 m) cube (still air); at nominal coil power @ 25°C; with normally open contact loaded; and with 4' (1.22 m) long, #10 AWG load wires. P.C. board relays were mounted to a 30A, single side P.C. board (6).







Environmental Data

Storage Temperature Range: -55°C to 130°C.
Operating Temperature Range(1): -55°C to +85°C.
Vibration, Operational: 0.065" (1.65mm) max. excursions from 10-55 Hz. with no contact opening >100µs.
Shock, Operational: 10g for 11 ms with no contact opening >100µs.
Shock, Mechanical: 100g.

Mechanical Data

Termination: Printed circuit and quick connect terminals (4).
Enclosures (all have 94V-0 flammability rating):
T9AP: Unsealed, plastic dust cover.
T9AS: Immersion cleanable, sealed plastic case (2 & 3).
T9AV: Vented, flux-tight, plastic cover.
Weight: Q.C. version: 1.2 oz. (33g) approx. (mounting code 2 & 5).
Sealed Model T9AS: 0.9 oz. (26g) approx. (mounting code 1).

Notes

(1) Operating ambient temperature must consider "Must Operate Voltage Change Over Temperature," Contact Temperature Rise, Coil Temperature Rise (If coil is not allowed to cool) and Maximum Coil Temperature. Specification ambient considers 20A load with coil cooled to ambient.
(2) Sealed relay terminals should not be bent.
(3) Remove knock-off nib after cleaning process for optimum life of sealed relays.
(4) Maximum soldering temperature is 500°F for 4 seconds.
(5) Class F coils are UL systems approved for maximum coil temperature of 140°C, by change of resistance method.
(6) See application note 13C265 for proper relay mounting, termination, cleaning and PC board conductor width. Coil rise test performed with 30A PC board to maintain 20°C maximum rise @ 30A.

Ordering Information

Typical Part Number ▶	T9A	S	5	D	2	2	-12

1. Basic Series:
T9A = Low cost, printed circuit board/panel power relay.

2. Enclosure:
P = Unsealed, plastic dust cover (mounting code 5).
S = Immersion cleanable, knock off nib, sealed plastic case (mounting codes 1 & 2).
V = Vented, flux-tight (mounting code 1).

3. Contact Arrangement:
1 = 1 Form A (SPST-NO). 5 = 1 Form C (SPDT).

4. Coil Input:
D = DC voltage (1 Watt) L = DC voltage (900mW)

5. Mounting & Termination:
1 = Printed circuit board mounting; PC terminals for coil & contacts (a).
2 = Printed circuit board mounting; PC terminals for coil & contacts, and .250" (6.35mm) quick connects for contacts (b).
5 = Flanged mounting; .187" (4.75mm) quick connects for coil and .250" (6.35mm) quick connects for contacts (c).

6. Contact Material:
2 = Silver-cadmium oxide.

7. Coil Voltage:
5 = 5VDC 12 = 12VDC 24 = 24VDC 110 = 110VDC
9 = 9VDC 18 = 18VDC 48 = 48VDC

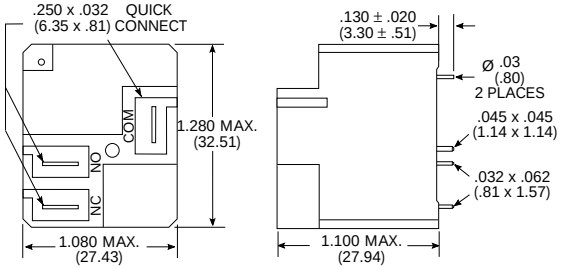
a) Only available with enclosure code "S" & "V". b) Only available with enclosure code "S". c) Only available with enclosure code "P".

Our authorized distributors are more likely to maintain the following items in stock for immediate delivery.

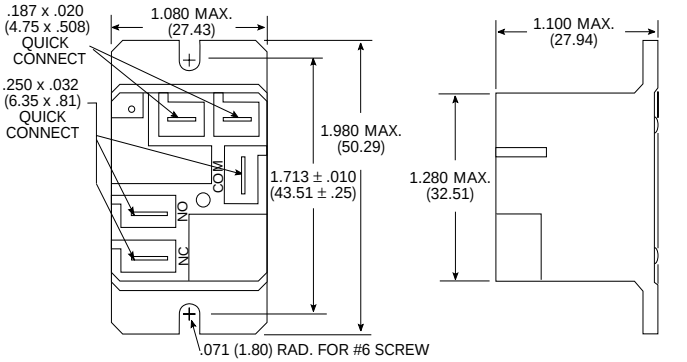
T9AP1D52-9	T9AS1D12-24	T9AS5D22-12
T9AP1D52-12	T9AS1D12-48	T9AS5D22-24
T9AP5D52-12	T9AS1D22-12	T9AV1L22-24
T9AP5D52-24	T9AS1D22-24	
T9AS1D12-12	T9AS5D12-12	
T9AS1D12-18	T9AS5D12-24	

Outline Dimensions

T9AS – Mounting & Termination Code 2

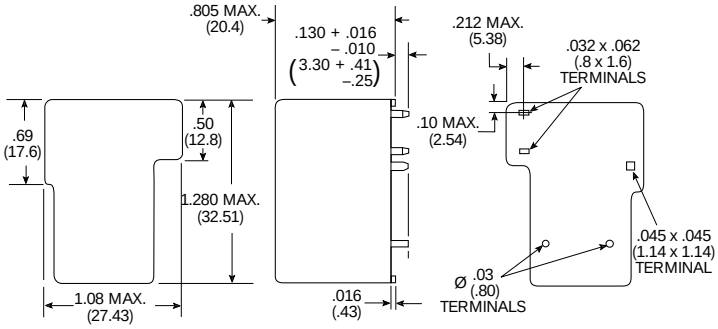


T9AP – Mounting & Termination Code 5



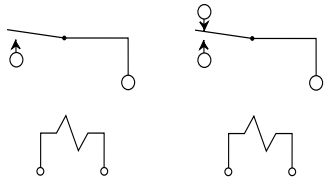
Note: Recommended mounting screw torque is 4.0-5.0 lbs.in when #6 screw is used.

T9AS/V – Mounting & Termination Code 1



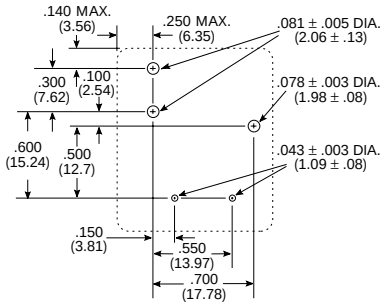
Wiring Diagrams (Bottom Views)

1 Form A **1 Form C**

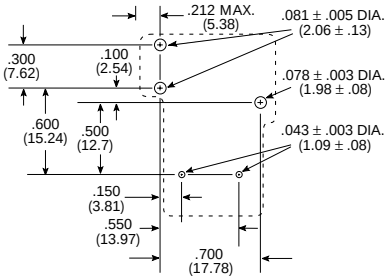


PC Board Layouts (Bottom Views)

T9AP/S – Mounting & Termination Code 2



T9AS/V – Mounting & Termination Code 1





491 series

AC Coil 20 Amp PC Board or Panel Mount Relay

File E38802
File LR75282

Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- Up to 20 amp switching in SPST-NO and 13.3 amp in SPDT arrangements.
- Washable, plastic sealed case available.
- Meets UL 873 and UL 508 spacing – 1/8" through air, 1/4" over surface.
- Load connections made via 1/4" Q. C. terminals.
- Choice of UL Class B or F insulation system.
- Well suited for various industrial, commercial and residential applications.

Contact Ratings @ 23°C

Arrangements: 1 Form A (SPST-NO), 1 Form B (SPST-NC) and 1 Form C (SPDT).
Material: Silver-cadmium oxide.
Mechanical Life: 10 million operations, at 300 ops/minute.
Electrical Life: 100,000 operations at factory rated load, 6 ops/minute.
Minimum Contact Load: 1A @ 5VDC or 12VAC.
Initial Contact Resistance: 50 milliohms @ 100mA, 6VDC).

Contact Ratings @ 23°C with relay properly vented. Remove tape from vent hole after soldering and cleaning.

Factory Contact Ratings

Voltage	1 Form A	1 Form B	1 Form C	
			(NO)	(NC)
240VAC	20A	10A	13.3A	6.7A
28VDC	20A	6.7A	13.3A	6.7A

UL/CSA Contact Ratings

Voltage	Load Type	1 Form A	1 Form B	1 Form C	
				(NO)	(NC)
240VAC	General Purpose	30A	15A	20A	10A
240VAC	Resistive *	30A	15A	20A	10A
240VAC	Motor	2 HP	1/2 HP	2 HP	1/2 HP
120VAC	Motor	1 HP	1/4 HP	1 HP	1/4 HP
240VAC	LRA/FLA **	80/30	30/10	50/20	20/7
120VAC	LRA/FLA	98/22	–	–	–
120VAC	Tungsten *	TV5	TV3	TV5	TV3
277VAC	Ballast	10A	3A	10A	3A
28VDC	Resistive	20A	10A	20A	10A

Initial Dielectric Strength

Between Open Contacts: 1,500V rms, 1 minute.
Between Contacts and Coil: 1,500V rms, 1 minute.

Initial Insulation Resistance

Between Mutually Insulated Elements: 10^9 ohms, min., @ 500VDC, 23°C and 50% R.H.

Coil Data @ 23°C

Voltage: 12 to 220VAC.
Nominal Coil Power: 2.0VA, (approx.).
Maximum Coil Temperature(4): **Class B:** 130°C. **Class F:** 155°C.
Duty Cycle: Continuous.

Coil Data

Nominal Voltage	DC Resistance ±10% (Ohms)	Must Operate Voltage (Max.)	Must Release Voltage (Min.)
12	26	10.2	1.8
24	106	20.4	3.6
110	2,750	93.5	16
220	11,000	187	33

Operate Data @ 25°C

Must Operate Voltage: 85% of nominal voltage or less.
Must Release Voltage: 15% of nominal voltage or more.
Operate Time (Including Bounce)§: 20 ms, max.
Release Time (Including Bounce)§: 15 ms, max.
§ At or From Nominal Coil Voltage

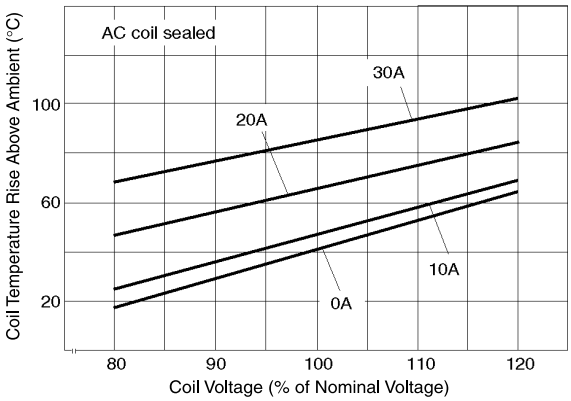
Environmental Data

Storage Temperature Range: -40°C to 130°C.
Operating Temperature Range(1): -55°C to +85°C.
Vibration, Operational: 0.065" (1.5mm) max. excursions from 10-55 Hz.
Shock, Operational: 10g for 11 ms.
Shock, Mechanical: 100g.

Mechanical Data

Termination: Printed circuit and quick connect terminals (4).
Enclosures (all have 94V-0 flammability rating):
Open, unsealed dust cover or sealed case.
Weight: 1.2 oz. (33g) approx.

Coil Temperature Rise



Notes

(1) Operating ambient temperature must consider must operate voltage change over temperature, contact temperature rise, coil temperature rise (If coil is not allowed to cool) and maximum coil temperature.
(2) Sealed relay terminals should not be bent.
(3) Remove tape after cleaning process for optimum life of sealed relays.
(4) Class B coils are UL systems approved for maximum coil temperature of 130°C, by change of resistance method. Class F coils are UL systems approved for maximum coil temperature of 155°C, by change of resistance method.

Ordering Information

Typical Part Number ▶	491	-1	1	G	2	00

1. Basic Series:
491 = AC coil, printed circuit board/panel power relay.

2. Enclosure & Terminals:
1 = Dust Cover, PC terminal.
2 = Sealed Case, PC terminal.
6 = Sealed Case, Panel Mount, .110 Coil Terminal.
7 = Sealed Case, Panel Mount, .187 Coil Terminal.
8 = Open Unit

3. Contact Arrangement:
1 = 1 Form C (SPDT)
4 = 1 Form B (SPST-NC)
5 = 1 Form A (SPST-NO)

4. Coil Input:
P = 12VAC
Q = 24VAC
T = 120VAC
U = 220VAC

5. Contacts:
2 = Silver-cadmium oxide

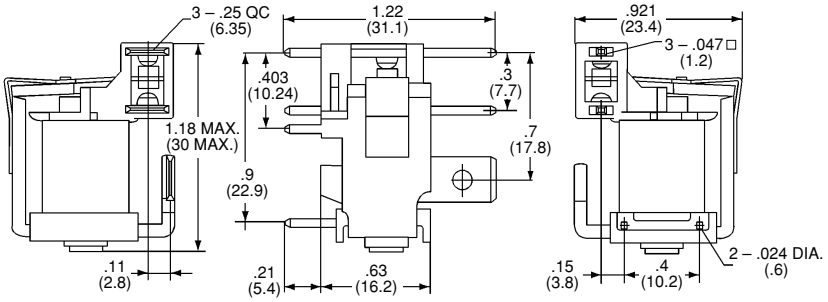
6. Coil Insulation and Special Features:
00 = Standard, UL Class B Coil Insulation System
F0 = Special, UL Class F Coil Insulation System
M0 = Magnetic Blowout (with enclosure 1 or 2 only, not UL or CSA)
A1 - E9 = Special - Customer Specific Features

Our authorized distributors are more likely to maintain the following items in stock for immediate delivery.

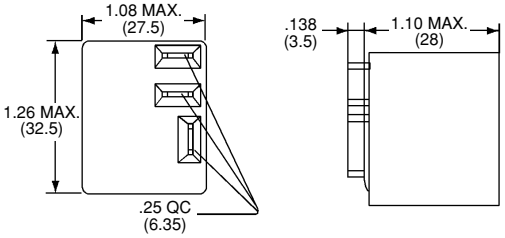
491-21T200	491-24T200	491-61T200	491-64T200
491-21Q200	491-24Q200	491-61Q200	491-64Q200

Outline Dimensions

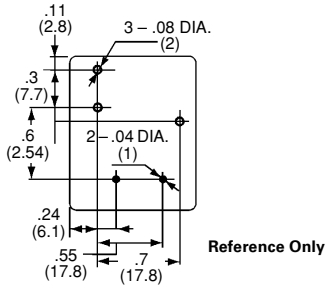
Open Style



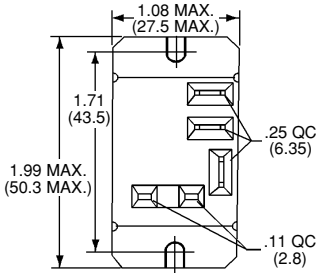
Sealed Case for PC Board Mounting



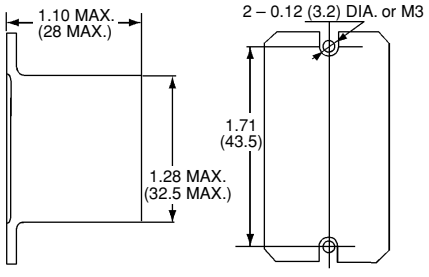
PC Board Layout (Bottom View)



Sealed Case for Panel Mounting

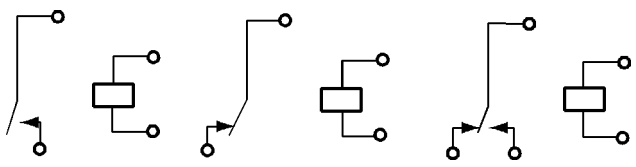


Mounting Hole Pattern



Wiring Diagrams (Bottom Views)

1 Form A **1 Form B** **1 Form C**

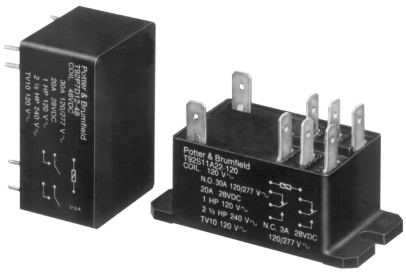


Dimensions are shown for reference purposes only.

Dimensions are in inches over (millimeters) unless otherwise specified.

Specifications and availability subject to change.

www.tycoelectronics.com
Technical support:
Refer to inside back cover.



T92 series

Two-Pole, 30 Amp PC Board or Panel Mount Relay

File E22575 (type 2,3,4,5)
File LR15734 File No. 5386 (type 1,2,3,4)

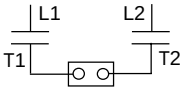
Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

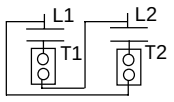
- 30A DPST-NO and DPDT switching capabilities.
- Designed to control compressor loads to 3.5 tons, 25.3 FLA, 110 LRA.
- Extended life – >300,000 operations at 30A, 240VAC (DC coil).
  >100,000 operations at 30A, 240VAC (AC coil).
- Meets requirements of UL873 and UL508 spacings.
  – .315" (8mm) through air, .375" (9.5mm) over surface.
- Meets requirements of VDE 8mm spacing, 4kV dielectric coil-to-contacts.
- Meets requirements of UL Class F construction.
- UL approved for 600VAC switching (1.5HP).
- Conforms to VDE 0435, 0631, and 0700.
- New screw terminal version (consult factory for availability, ratings).

Contact Ratings @ 25°C with relay properly vented. Remove tape over vent hole after soldering and cleaning.

Arrangements: 2 Form A (DPST-NO) and 2 Form C (DPDT).
Materials: Silver cadmium oxide.
Max. Load Rating:
Normally Open Contacts:
30A @ 120/277VAC, resistive;
10A @ 600VAC, resistive;
1 HP @ 120VAC, 2.5 HP @ 240VAC;1.5 HP @ 480VAC, 1.5 HP @ 600VAC
110 LRA, 25.3 FLA, @ 240VAC with DC coil(1);
60 LRA, 14 FLA @ 240VAC with AC coil·
3A @ 240VAC pilot duty;
20A @ 28VDC;
TV10 @ 120VAC.
VDE Rating (Flange Mount): 25A @ 400VAC, 100K Ops. (30K Ops. for Form C Models).
VDE Rating (PC Mount): 30A @ 400VAC, 100K Ops. (30K Ops. for Form C Models).
Normally Closed Contacts:
3A @ 28VDC or 277VAC, 2A @ 480VAC, 1A @ 600VAC.
VDE Rating (Flange or PC Mount): 3A @ 400VAC, 30K Ops.
Min. Load Rating:
Normally Open Contacts: 500mA @ 12VAC/VDC.
Normally Closed Contacts: 100mA @ 6VAC/VDC.
Expected Mechanical Life: 5 million operations.
Expected Electrical Life: 100,000 operations at rated load.
ARI 780-86 Endurance Test (section 6.6):
HVAC Definite Purpose Contactor Standard
Normally Open Contacts
Single Phase/Two Pole (Both poles together switching a single load)
110 LRA, 25.3 FLA, 200K operations (DC Coil).



Single Phase Per Pole (Single load per pole)
110 LRA, 18 FLA, 200K operations (DC Coil).
60 LRA, 14 FLA, 200K operations (AC Coil).



Notes: Vent hole tape must be removed to achieve all listed ratings.
Consult factory regarding ratings for screw terminal versions.

Initial Dielectric Strength

Between Contacts and Coil: 4,000V rms, 50/60 Hz.
Between Open Contacts: 1,500V rms, 50/60 Hz.
Between Poles: 2,000V rms, 50/60 Hz.

Initial Insulation Resistance

Between Mutually Insulated Elements: 10^9 ohms, min. @ 500VDC.

Coil Data

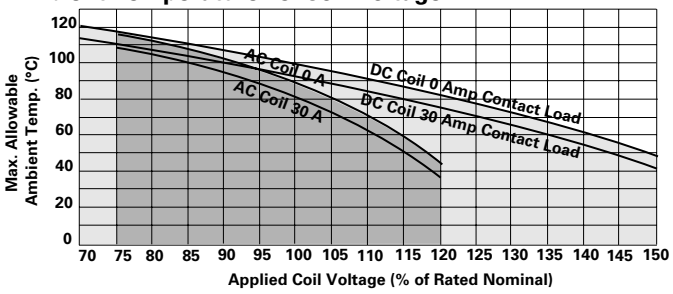
Voltage: 12 through 110VDC and 12 through 277VAC.
Resistance: See Coil Data table.
Nom. Power: AC Coil: 4.0VA; **DC Coil:** 1.7W.
Coil Temp. Rise: 35°C/W.
Max. Coil Temp.: 155°C.
Duty Cycle: Continuous.

Coil Data (@ 25°C Coil Temperature)

DC Coils (1.7W)			
Nom. Voltage (VDC)	DC Resist. ±10% (Ohms)	Nom. Voltage (VDC)	DC Resist. ±10% (Ohms)
12	86	48	1,390
24	350	110	7,255

AC Coils (4.0VA)					
Nom. Voltage (VAC)	Freq.	DC Resist. ±10% (Ohms)	Nom. Voltage (VAC)	Freq.	DC Resist. ±10% (Ohms)
12	60	9.1	110/120	50/60	950
24	60	36.6	220/240	50/60	3800
			250/277	50/60	5485

Ambient Temperature vs. Coil Voltage



Assumptions:
1. Thermal resistance = 35°C per Watt (DC only.)
2. Still air.
3. Nominal coil resistance.
4. Max. mean coil temperature = 155°C (change of resistance method).
5. Coil temperature rise due to load = 6.3°C @ 30 amps.
6. Curves are based on 1.7W at 25°C (DC only.)

Operate Data

Must Operate Voltage: AC Coil: 80% of nominal voltage or less.
DC Coil: 75% of nominal voltage or less.
Must Release Voltage: 10% of nominal voltage or more.
Initial Operate Time(2): 15 ms typical, (25 ms max. w/bounce).
Initial Release Time(2): 10 ms typical, (25 ms max. w/bounce).
Max Operating Frequency: 14 operations per minute.

Environmental Data

Temperature Range: Storage: -55°C to +155°C.
Operating: AC Coil: -40°C to +65°C.
DC Coil: -40°C to +85°C.
Vibration: 0.065" (1.65mm) double amplitude for 10-55 Hz., functional.
Shock, Operational: 10g for 11 ms, 1/2 sine wave pulse with no contact opening > 100µs.
Shock, Mechanical: 100g for 11 ms, 1/2 sine wave pulse.
Flammability: UL 94V-0.

Mechanical Data

Termination: Printed circuit terminals; .250" (6.35mm) quick connects for coil and contacts; .187" (4.75mm) quick connects for coil and .250" (6.35mm) quick connects for contacts; or M4 screws with captive pressure plates for coil and contacts.
Enclosure: Unsealed, plastic dust cover or immersion cleanable, tape sealed plastic cover.
Weight: 3 oz. (86g) approximately.

Conditions

All parametric, environmental and life tests are performed according to EIA Standard RS-407-A at standard test conditions (25°C ambient, 20-50% RH, 29.5 ± 1" Hg.) unless otherwise noted.

Notes

(1) FLA, LRA ratings are compatible with 3.5 ton compressor applications.
(2) Nominal voltage, no coil suppression, excluding bounce.

Ordering Information

Typical Part Number ▶	T92	S	11	D	2	2	-24

1. Basic Series:
T92 = Printed circuit board / panel mount power relay.

2. Enclosure:
P = Plastic dust cover (unsealed). S = Immersion cleanable, tape sealed plastic case (code 1). Top sealed, not immersion cleanable, not tape sealed on bottom (codes 2, 3 & 4).

3. Contact Arrangement:
7 = 2 form A (DPST-NO). 11 = 2 form C (DPDT).

4. Coil Input:
A = AC voltage, 60 Hz. or 50/60 Hz. (See Coil Data Table) D = DC voltage.

5. Mounting & Termination:
1 = Printed circuit board mount; printed circuit board terminals.
2 = Panel mount via flanged cover; .250" (6.35mm) x .032" (.81mm) quick connect terminals.
3 = Panel mount via flanged cover; .187" (4.75mm) x .032" (.81mm) quick connect terminals for coil and .250" (6.35mm) for contacts.
4 = Panel mount via flanged cover, .187" (4.75mm) x .020" (.51mm) quick connect terminals for coil and .250" (6.35mm) for contacts.
5 = Panel mount via flanged cover, M4 screw terminals w/ captive pressure plates. Requires Enclosure P and Contact Arrangement 7.‡

6. Contact Material:
2 = Silver cadmium oxide.

7. Coil Voltage: (See Coil Data Table)

(DC)	12 = 12VDC	24 = 24VDC	48 = 48VDC	110 = 110VDC
(60Hz.)	12 = 12VAC	24 = 24VAC		
(50/60Hz.)	110 = 100/110VAC	120 = 110/120VAC	240 = 220/240VAC	277 = 250/277VAC

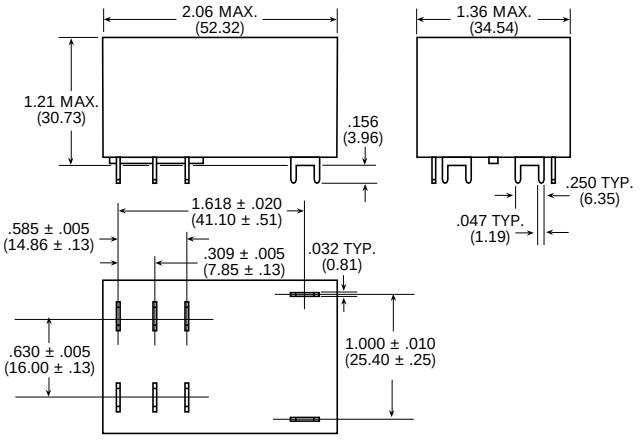
‡ New option. Consult factory for detailed ratings, specifications and availability.

Stock Items – We recommend that our authorized distributors stock the following items for immediate delivery.

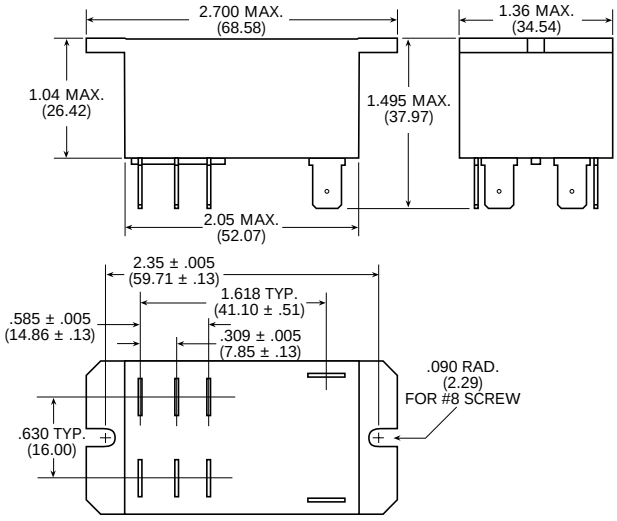
T92P7A22-24	T92P7A22-240	T92P7D12-24	T92P7D22-24	T92P11A22-120	T92P11D22-12	T92S7D12-12	T92S11D22-12
T92P7A22-120	T92P7D12-12	T92P7D22-12	T92P11A22-24	T92P11A22-240	T92P11D22-24	T92S7D12-24	T92S11D22-24

Outline Dimensions

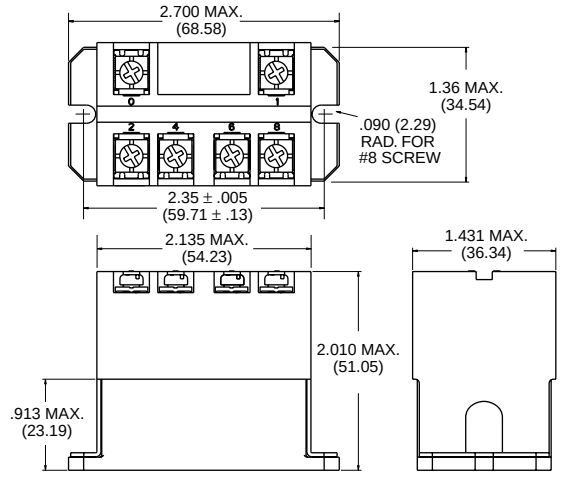
Mounting & Termination Type 1



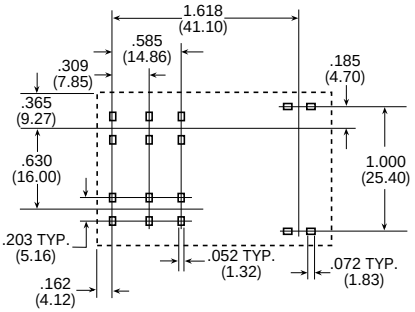
Mounting & Termination Types 2, 3 & 4



Mounting & Termination Type 5

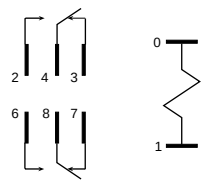


Suggested PC Board Layout (Bottom View)



Note: An alternate PC board layout utilizes .076 ± .003 (1.93 ± .076) diameter holes on the same center-to-center spacing shown above. Use of the rectangular holes is recommended for improved solderability.

Wiring Diagram



Only necessary terminals are present on single throw models.

Dimensions are shown for reference purposes only.

Dimensions are in inches over (millimeters) unless otherwise specified.

Specifications and availability subject to change.

www.tycoelectronics.com
Technical support:
Refer to inside back cover.

Alphanumeric Index

Series	Type	Page
SR2M (V23047)	2 Pole Relay	603
SR4 D/M	4 Pole Relay	606
SR6 (V23050)	6 Pole Relay	609
SR6 D/M	4 Pole Relay	607
SR6S	Sensitive 6 Pole Relay	611
SR6Z	6 Pole Relay Module	613
V23047 (SR2M)	2 Pole Relay	603
V23050 (SR6)	6 Pole Relay	609

Relays with
Forcibly Guided Contacts 601-614 **6**

Definitions – Relays with forcibly guided contacts ("safety relays")

General Information

Relays with forced guidance contacts play a decisive role in avoiding accidents on machines and in systems. Safety control circuits enable to switch into the fail safe state. Forcibly guided contacts monitor the function of the safety control circuits.

For this safety function, all the assumed faults that can occur must already have been taken into consideration and their effects examined. Standard EN 50205 "Relays with forcibly guided contacts" contains current internationally-defined design requirements. Relays with forcibly guided contacts that comply with EN 50205 are also referred as "safety" relays.

Function

Power relays with forcibly guided (linked) contacts:

Power relays with at least one break contact and at least one make contact designed that by mechanical means make and break contacts can never be simultaneously in the closed position.

Contact gaps shall never be less than 0.5 mm over the operating life, not only under normal operating conditions, but also when a fault occurs.

This requirement allows the respective exclusive-or contact to detect the fault of a contact to open. For example, the welding of a make contact is indicated by the non-closing of the break contact when the energization is switched off.

To fulfill the specifications of the standard, the assumed faults must be considered:

Assumed fault	Effect
Failure of the contact to open due to welding	The failure of any make contact to open has the effect that none of the break contacts close even when the relay is not energized. The failure of any break contact to open has the effect that none of the make contacts close when the relay is energized.
Failure of the contact to open due to failure of the drive	The drive has no effect on the forcibly guided contact operation.
Breakage of the contact spring	Simultaneous closing of the break and make contacts is not possible even as a result of breakage. Completely insulated contact chambers (SR2, SR4, SR6) or barriers (SR2M) guarantee a contact gap of 0.5 mm.

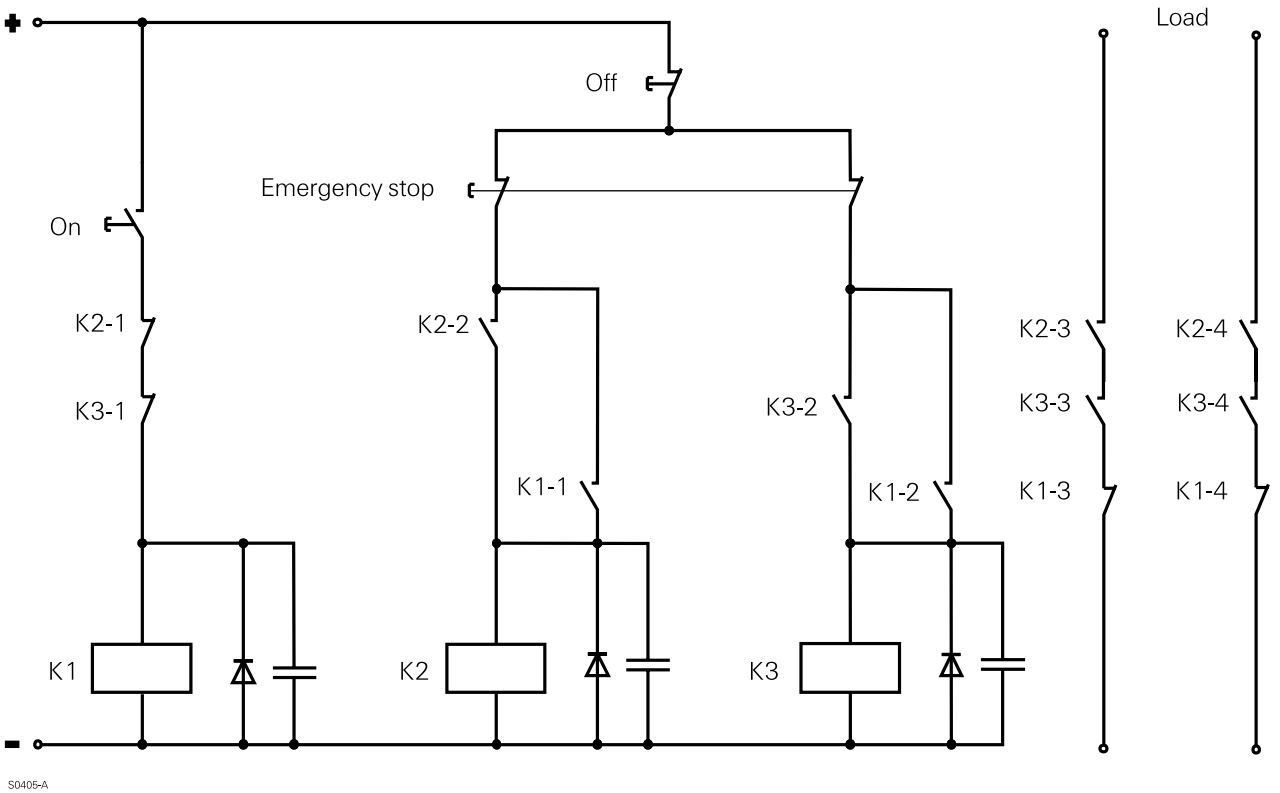
Application Example – Relays with forcibly guided contacts ("safety relays")

The configuration of safety control circuits is basically only possible with specified fault conditions. Safety relays have the characteristic that make and break contacts can never both be closed at the same time.

The following circuit diagram shows an emergency stop control circuit consisting of three 4-pole safety relays.

The first fault to occur
- does not cause the safety function to fail because more components are used than required for the circuit to function (redundancy).
- prevents an restart and can be detected as a result (self monitoring)

Operation
- Closing the "ON" switch causes the K1 relay to be pulled in
- The K2 and K3 relays are energized via the make contacts K1-1 and K1-2 and hold themselves via K2-2 or K3-2
- The break contacts K2-1 and K3-1 cause the drop-out of K1 where the load circuit is released via the break contacts of K1-3 or K1-4.



Fault analysis (examples):

Type of fault	Is there any danger arising from the fault?	Is a restart possible?
Failure of contact K2-3 to open	No, K3-3 opens when the emergency stop switch is actuated	No, K2-1 and K2-3 cannot be closed at the same time (fault excluded by forcibly guidance). "ON" button does not cause K1 to close
Failure of contact K1-3 to open	No, K2-3 and K3-3 open when the emergency stop switch is actuated	No, K1-1 and K1-2 cannot close due to closed K1-3. K2 and K3 are not energized

Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.
www.tycoelectronics.com
Technical support:
Refer to inside back cover.

V23047 series

SR2M "Safety Relay" - PCB, neutral, monostable relay with two forcibly guided contacts.



c UL us File E214024
VDE No. 116064
TUV-Rheinland, No. 945/EZ 116/99

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- 1 NO and 1 NC or 2 Form C contacts.
- High insulation spacing for the safe separation of the contact circuits.
- Sealed case.
- Ideal for emergency shut-off, machine control, elevator and escalator control, light barrier control.

Contact Data @ 23°C

Type: Single button contacts, forcibly guided.
Arrangements: 1 NO and 1 NC or 2 Form C.
Material: Silver-nickel alloy.
Max. Continuous Current at Max. Amb. Temp.: 6A, 1 contact loaded.
Max. Switched Current: See Expected Electrical Life chart.
Max. Switched Voltage: 250VDC.
Max. Switched Power: 1,500VA. (See Fig. 1, Limit Curve for DC Power Load).
Max. Switching Rate: 6 operations/min. at rated load.
300 operations/min. at minimum load.
Minimum Load: AgNi: >50mW.
Initial Contact Resistance: AgNi: ≤100 mΩ - 1A/24VDC.
Expected Mechanical Life: 10^7 operations.
Expected Electrical Life:

6A @ 250VAC, Resistive, 100,000 ops. @ 70°C amb. temp.;

10/0.5A @ 110VAC, Inductive, 2,000,000 ops. @ 23°C amb. temp.;

6A/230VAC, 100,000 ops. @ 70°C amb. temp.;

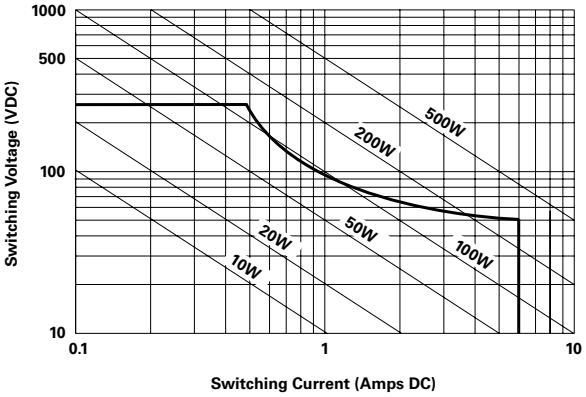
6A/24VDC, $T_{0.95}$ = 300ms, switchcycle 0.1 Hz.,
Standard IEC947-5-1 (DC-13), NO contact loaded;

Standard IEC947-5-1 (AC-15), power factor 0.3; switchcycle 0.1 Hz.,
NO contact: 3A/230VAC, inrush current 30A, 6,050 ops.,
NC contact: 1.5A/230VAC, inrush current 15A, 6,050 ops;

3A/24VDC, $T_{0.95}$ = 300ms, switchcycle 0.33 Hz., Diode (1N4007)
across the inductive load, Standard IEC947-5-1 (DC-13),
NO contact loaded, 1,000,000 ops;

1A/24VDC, $T_{0.95}$ = 144ms, switchcycle 0.33 Hz., Diode (1N4007)
across the inductive load, Standard IEC947-5-1 (DC-13),
NO contact loaded, 1,500,000 ops.

Figure 1 - Limiting Curve for DC Power Load



Initial Dielectric Strength

Between Open Contacts: 1,000V rms.
Between Adjacent Contacts: 4,000V rms.
Between Coil and Contacts: 4,000V rms.

Initial Insulation Resistance

Between Mutually Insulated Elements: 10^6 ohms.

Coil Data @ 23°C

Voltage: 5 to 110VDC.
Nominal Power: 700mW.
Max. Coil Temperature: 105°C.
Duty Cycle: Continuous.

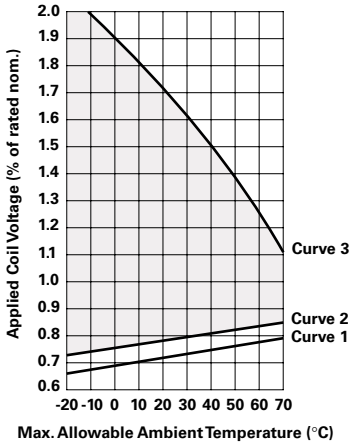
Coil Data @ 23°C

Rated Coil Voltage (VDC)	Coil Resistance (Ohms)	Must Operate Voltage (VDC)	Nominal Coil Current (mA)
5	35.7 ± 3.6	3.75	140
6	51 ± 5.1	4.5	118
9	116 ± 11.6	6.8	78
12	206 ± 20.6	9	60
21	630 ± 63.0	15.8	34
24	823 ± 82.3	18	30
36	1,851 ± 185	27	19.5
48	3,291 ± 494	36	14.6
60	5,142 ± 617	45	11.7
80	9,143 ± 1,097	60	8.8
110	17,285 ± 2,074	83	6.4

Operate Data @ 23°C

Operate Time: 10 ms (excluding bounce).
Release Time (w/o parallel diode, typ.): 4 ms (excluding bounce).
Bounce Time: 10 ms.
Must Release Voltage: 10% of nominal voltage.

Max. Allowed Ambient Temp. vs. Applied Coil Voltage



Operating

Curve 1 - Must operate voltage when the coil is not pre-energized.

Curve 2 - Operate voltage raises due to a pre-energizing with 1.1 x Vnom.

Curve 3 - Maximum allowable voltage.

Release

The must release voltage may fall to ≥ 5% of Vnom during operation life of the relay.

Denotes recommended operation area.

Environmental Data

Temperature Range: -25°C to +70°C.
Solder Bath Temp./Max. Duration: 260°C/5s.

Mechanical Data

Termination: Printed circuit terminals.
Enclosure (94V-0 Flammability Ratings): Sealed plastic case.
Weight: 0.6 oz. (18g).

Ordering Information

Typical Part Number ►	V23047	A1	012	A	5	01

1. Basic Series:
V23047 = SR2M safety relay.

2. Enclosure:
A1 = Sealed.

3. Coil Voltage:
005 = 5VDC 006 = 6VDC 009 = 9VDC 012 = 12VDC 021 = 21VDC 024 = 24VDC
036 = 36VDC 048 = 48VDC 060 = 60VDC 080 = 80VDC 110 = 110VDC

4. Contact Type:
A = Single button, forcibly guided.

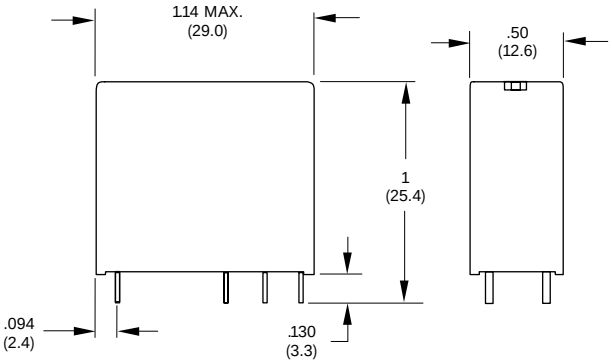
5. Contact Material:
5 = Silver nickel.

6. Contact Arrangement:
01 = 2 Form C.
11 = 1 NO and 1 NC.

Our authorized distributors are more likely to stock the following items for immediate delivery.

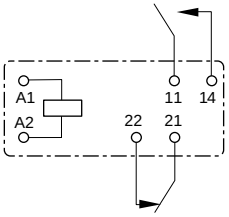
V23047A1012A501
V23047A1012A511

Outline Dimensions

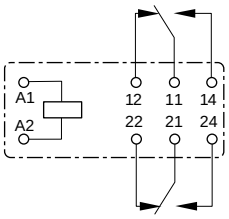


Wiring Diagrams (Bottom Views)

1 NO and 1 NC

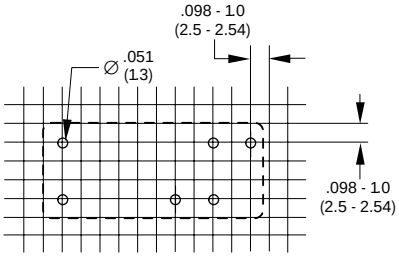


2 Form C

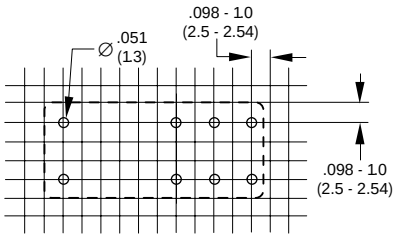


Suggested PC Board Layouts (Bottom Views)

1 NO and 1 NC



2 Form C



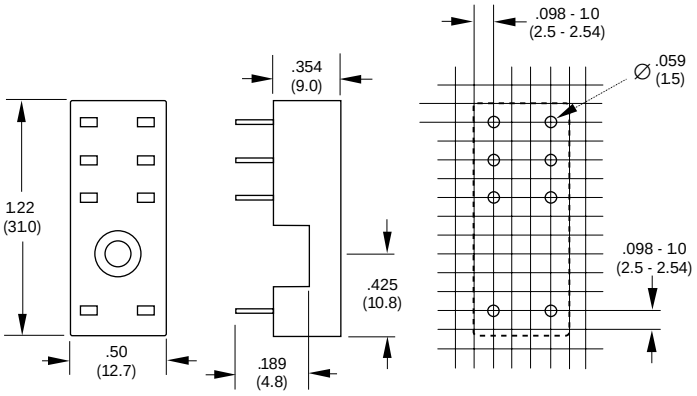
Dimensions are shown for reference purposes only.

Dimensions are in inches over (millimeters) unless otherwise specified.

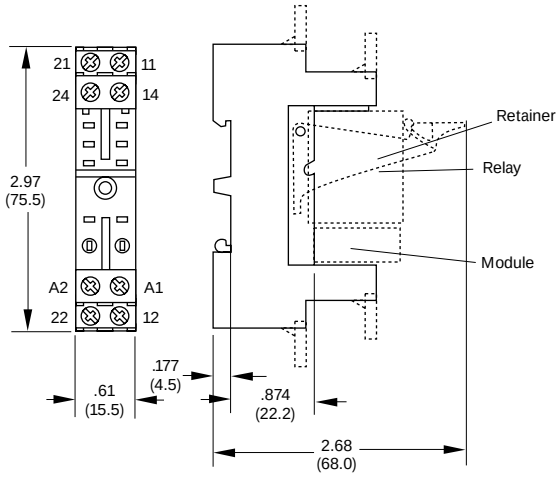
Specifications and availability subject to change.

Sockets for V23047 Series Relays

RP78602
Socket with PCB Terminals

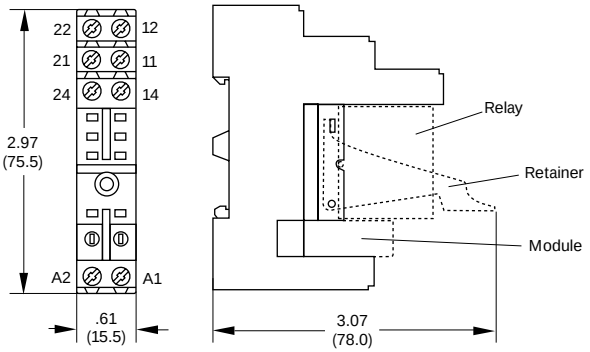


RT78625
DIN Rail Mount Socket with Screw-Type Terminals



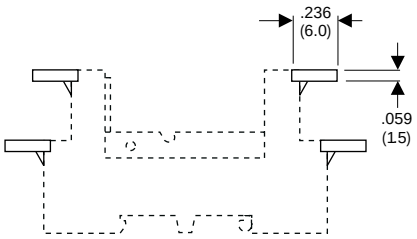
RP16104 Plastic Retaining Clip

RT78626
DIN Rail Mount Socket with Screw-Type Terminals



RP16104 Plastic Retaining Clip

RT16040 Marking Tags



- White
- Marking area .610 (15.5) x .236 (6.0).
- Snaps on socket in up to 4 positions.

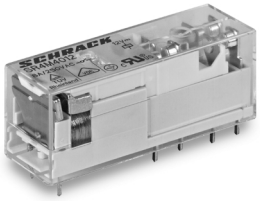
Function and Protection Modules



- Easy insertion of module into the socket.
- Wiring in parallel to the coil.

Ordering Code	Type
RT16040	Marking Tags
RPMT00A0	Protection Diode 1N4007*
RPML0024	LED 12 - 24VDC*
RPML0524	LED 12 - 48VDC
RPML0110	LED 110VDC*

* Standard Polarity: A1:+, A2:-



SR4 D/M series

"Safety Relay" with four forcibly guided contacts.

c UL us File E214024

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- 2 NO + 2NC or 3NO + 1 NC contacts.
- 4kV/10mm contact-to-coil.
- Compact package.
- Well suited for emergency shut-off, machine control, elevator and escalator control, light barrier control.

Contact Data

Type: Single button contact, forcibly guided.
Arrangements: 2 NO + 2NC or 3NO + 1 NC.
Material: Silver-tin oxide.
Expected Mechanical Life: 10 million operations.
Ratings:
Current: 8A.
Voltage: 250VAC.
Voltage (breaking): 440VAC.
Power (breaking): 2,000VA.
Minimum Contact Load: >50mW.
Initial Contact Resistance: ≤ 100 millohms/1A/24VDC; ≤ 20 millohms/10mA/5VDC.

Initial Dielectric Strength

Between Open Contacts: 1,000Vrms.
Between Coil and Contacts: 4,000Vrms.
Between Contact Sets: 2,500Vrms.
Creepage/Clearance: Contact-to-coil: 10/10mm.
Between Contact Sets: 3/3.5mm.

Initial Insulation Resistance

Between Mutually Insulated Elements: 10^6 ohms.

Operate Data

Must Operate Voltage: See Coil Data table.
Operate Time /Release Time (typical): 12 ms / 20 ms.
Switching Rate: 3,600 ops./hr. max. at rated load.

Coil Data DC @ 20°C

Nominal Coil Power: 800mW.

Nominal Voltage VDC	DC Resistance in Ohms	Must Operate Voltage VDC	Drop-out Voltage VDC	Nominal Coil Current (mA)
5	31 ± 10%	3.8	0.5	161.3
6	45 ± 10%	4.5	0.6	133.3
9	101 ± 10%	6.8	0.9	89.1
12	180 ± 10%	9.0	1.2	66.7
15	281 ± 10%	11.3	1.5	53.4
18	405 ± 10%	13.5	1.8	44.4
21	551 ± 10%	15.8	2.1	38.1
24	720 ± 10%	18.0	2.4	33.3
36	1,620 ± 10%	27.0	3.6	22.2
40	2,000 ± 10%	30.0	4.0	20.0
48	2,880 ± 10%	25.0	4.8	16.7
60	4,500 ± 10%	45.0	6.0	13.3
85	9,031 ± 10%	64.0	8.5	9.4
110	15125 ± 10%	82.5	11.0	7.3

All values are given for coil without preenergization, at 20°C ambient.
At 70°C after preenergization with 1.1 x nominal voltage, the maximum operating voltage is 85% of nominal.
At 70°C maximum coil voltage is 1.1 x nominal.

Environmental Data

Temperature Range: Operating: -20°C to +70°C.
Vibration (10-200 Hz.): NO: 8g; **NC:** 2.5g.

Mechanical Data

Termination: Printed circuit terminals.
Enclosure: Sealed (RTIII) plastic case.
Weight: 0.56 oz. (16 g) approximately.

Ordering Information

Typical Part Number ▶	SR4	D	4	012

1. Basic Series:
SR4 = 4 pole printed circuit board relay with forcibly guided contacts.

2. Contact Configuration:
D = 2 NO + 2 NC contacts M = 3 NO + 1 NC contacts

3. Contact Material:
4 = Silver-tin oxide.

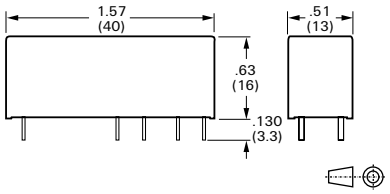
4. Coil Voltage:

005 = 5VDC	009 = 9VDC	015 = 15VDC	021 = 21VDC	036 = 36VDC	048 = 48VDC	085 = 85VDC
006 = 6VDC	012 = 12VDC	018 = 18VDC	024 = 24VDC	040 = 40VDC	060 = 60VDC	110 = 110VDC

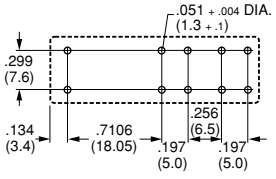
Our authorized distributors are more likely to stock the following items for immediate delivery.

None at present.

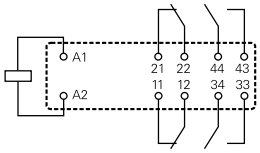
Outline Dimensions



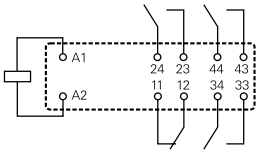
PC Board Layout (Bottom View)



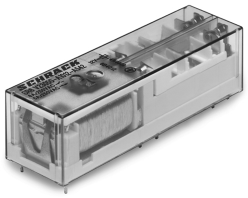
Wiring Diagrams (Bottom Views)



2 NO + 2 NC



3 NO + 1 NC



SR6 D/M series

"Safety Relay" with four forcibly guided contacts and large spacings, improved isolation

c UL us File E214024

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- 2 NO + 2NC or 3NO + 1 NC contacts.
- Large spacings for improved isolation.
- Well suited for emergency shut-off, machine control, elevator and escalator control, light barrier control

Contact Data

Type: Single button contact, forcibly guided.
Arrangements: 2 NO + 2NC or 3NO + 1 NC.
Material: Silver-tin oxide.
Expected Mechanical Life: 10 million operations.
Ratings:
Current: 8A.
Voltage: 250VAC.
Voltage (breaking): 440VAC.
Power (breaking): 2,000VA.
Minimum Contact Load: >50mW.
Initial Contact Resistance: ≤ 100 millohms/1A/24VDC;
≤ 20 millohms/10mA/5VDC.

Initial Dielectric Strength

Between Open Contacts: 1,000Vrms.
Between Coil and Contacts: 3,000Vrms.
Between Contact Sets: 3,000Vrms; 4,000Vrms, in longitudinal direction.
Creepage/Clearance: Contact-to-coil: 5.5/5.5mm.
Between Contact Sets: 5.5/5.5mm; 12/12mm, in longitudinal direction.

Coil Data DC @ 20°C

Nominal Coil Power: 800mW.

Nominal Voltage VDC	DC Resistance in Ohms	Must Operate Voltage VDC	Drop-out Voltage VDC	Nominal Coil Current (mA)
5	21 ± 10%	3.8	0.5	238.1
6	30 ± 10%	4.5	0.6	200.0
9	68 ± 10%	6.8	0.9	132.4
12	120 ± 10%	9.0	1.2	100.0
18	270 ± 10%	13.5	1.8	66.7
21	368 ± 10%	15.8	2.1	57.1
24	480 ± 10%	18.0	2.4	50.0
36	1,080 ± 10%	27.0	3.6	33.3
40	1,333 ± 10%	30.0	4.0	30.0
48	1,920 ± 10%	25.0	4.8	25.0
60	3,000 ± 12%	45.0	6.0	20.0
85	6,021 ± 12%	64.0	8.5	14.1
110	10,080 ± 12%	82.5	11.0	10.9

All values are given for coil without preenergization, at 20°C ambient.
At 70°C after preenergization with 1.1 x nominal voltage, the maximum operating voltage is 85% of nominal.
At 70°C maximum coil voltage is 1.1 x nominal.

Initial Insulation Resistance

Between Mutually Insulated Elements: 10^6 ohms.

Operate Data

Must Operate Voltage: See Coil Data table.
Operate Time /Release Time (typical): 11 ms / 3ms.
Switching Rate: 3,600 ops./hr. max. at rated load.

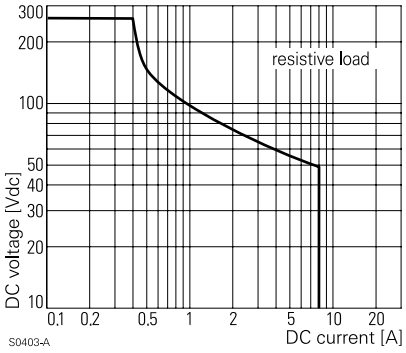
Environmental Data

Temperature Range: Operating: -20°C to +70°C.
Vibration (10-200 Hz.): NO: 8g; **NC:** 5g.
Shock (functional) 16ms, half-sine: NO: 8g; **NC:** 6g.

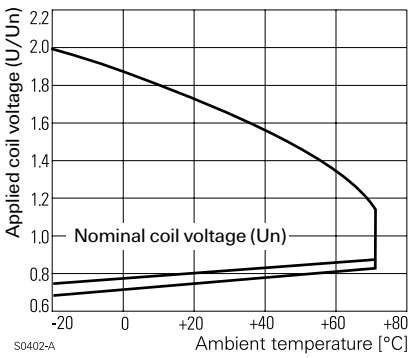
Mechanical Data

Termination: Printed circuit terminals.
Enclosure (94 V-0 rated): Sealed (RTIII) plastic case.
Weight: 1.06 oz. (30 g) approximately.

Max. DC Load Breaking Capacity



Coil Operating Range



Ordering Information

Typical Part Number ▶	**SR6**	**D**	**4**	**012**

1. Basic Series:
SR6 = 4 pole printed circuit board relay with forcibly guided contacts, increased spacing.

2. Contact Configuration:
D = 2 NO + 2 NC contacts
M = 3 NO + 1 NC contacts

3. Contact Material:
4 = Silver-tin oxide.

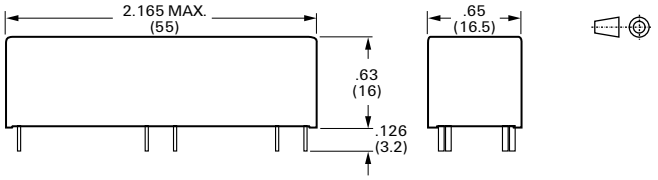
4. Coil Voltage:

005 = 5VDC	009 = 9VDC	018 = 18VDC	024 = 24VDC	040 = 40VDC	060 = 60VDC	110 = 110VDC
006 = 6VDC	012 = 12VDC	021 = 21VDC	036 = 36VDC	048 = 48VDC	085 = 85VDC	

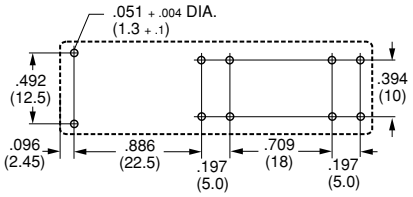
Our authorized distributors are more likely to stock the following items for immediate delivery .

None at present.

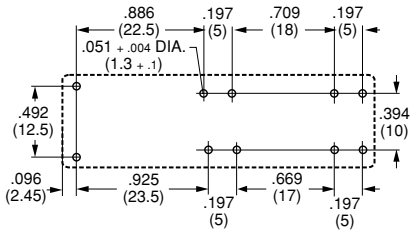
Outline Dimensions



PC Board Layouts (Bottom Views)

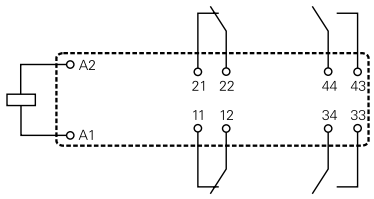


2 NO + 2 NC

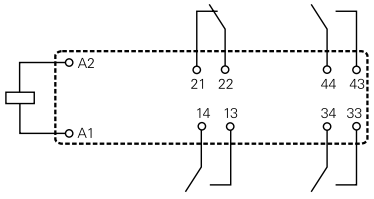


3 NO + 1 NC

Wiring Diagrams (Bottom Views)



2 NO + 2 NC



3 NO + 1 NC

Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.
www.tycoelectronics.com
Technical support:
Refer to inside back cover.



V23050 series

SR6 "Safety Relay" - PCB, neutral, monostable relay with six forcibly guided contacts.

c UL us File E214024
VDE No. 116064
TUV-Rheinland, No. 945/EZ 116/99

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- 4 NO and 2 NC or 3 NO and 3 NC or 5 NO and 1 NC contacts.
- Extremely compact.
- High insulation spacing for the safe separation of the contact circuits.
- Sealed case.
- Ideal for emergency shut-off, machine control, elevator and escalator control, light barrier control.

Contact Data @ 23°C

Type: Single button contacts, forcibly guided.
Arrangements: 3 NO and 3 NC, 4 NO and 2 NC or 5 NO and 1 NC.
Material: Silver nickel alloy.
Max. Continuous Current at Max. Amb. Temp.: 8A, 1 contact loaded.
Max. Switched Voltage: 400VAC/VDC.
Max. Switched Power: 2,000VA.
Max. Switching Rate: 6 operations/min. at rated load.
600 operations/min. at minimum load.
Minimum Load: 50mW.
Initial Contact Resistance: 100 mΩ - 1A/24VDC.
Expected Mechanical Life: 10^7 operations.
Electrical Life: 250VAC, 70°C ambient, 1 NO loaded with 8A and 1 NC loaded with 5A: 75,000 operations.

Initial Dielectric Strength

Between Open Contacts: 1,000VAC rms.
Between Adjacent Contacts: 3,000VAC rms.
Between Coil and Contacts: 3,000VAC rms.

Coil Data @ 23°C

Voltage: 5 to 110VDC.
Nominal Power: 1.2W.
Max. Coil Temperature: 130°C.
Duty Cycle: Continuous.

Coil Data @ 23°C

Rated Coil Voltage (VDC)	Coil Resistance (Ohms)	Must Operate Voltage (VDC)	Nominal Coil Current (mA)
5	21 ± 2	3.75	240
6	30 ± 3	4.5	200
9	68 ± 7	6.8	130
12	120 ± 12	9.0	100
18	270 ± 27	13.5	70
21	370 ± 40	15.8	60
24	480 ± 50	18.0	50
40	1,330 ± 130	30.0	30
60	3,000 ± 300	45.0	20
85	6,020 ± 600	64.0	14
110	10,000 ± 1,000	82.5	11

Operate Data @ 23°C

Minimum Release Voltage: 10% of nominal voltage.
Minimum Operating Voltage @ 70°C: 85% of nominal voltage.

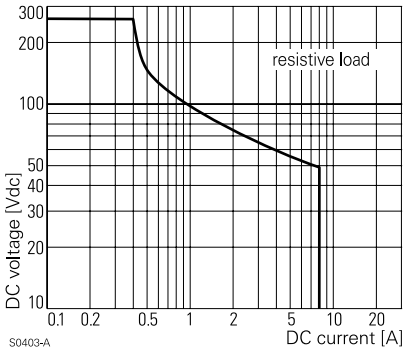
Environmental Data

Temperature Range: -25°C to +70°C.
Solder Bath Temp./Max. Duration: 260°C/5s.

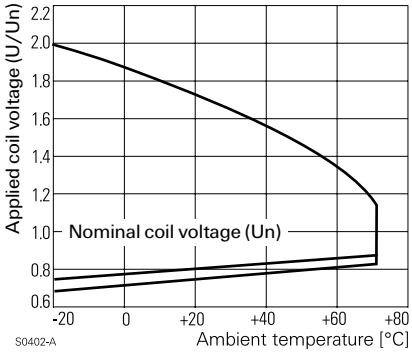
Mechanical Data

Termination: Printed circuit terminals.
Enclosure (UL94V-2 Flammability Ratings): Sealed (RTIII) plastic case.
Weight: 1.01 oz. (30g).

Max. DC Load Breaking Capacity



Coil Operating Range



Ordering Information

Typical Part Number ▶	**V23050**	**A1**	**012**	**A**	**5**	**33**

1. Basic Series:
V23050 = SR6 safety relay.

2. Enclosure:
A1 = Sealed.

3. Coil Voltage:
005 = 5VDC 006 = 6VDC 009= 9VDC 012 = 12VDC 021= 21VDC
024= 24VDC 040 = 40VDC 060= 60VDC 085 = 85VDC 110 = 110VDC

4. Contact Type:
A = Single contact.

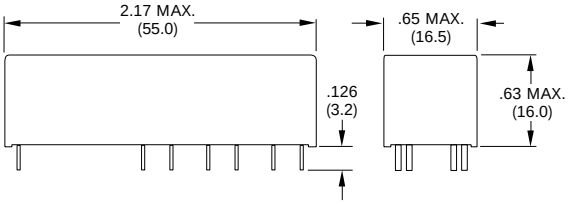
5. Contact Material:
5 = Silver nickel.

6. Contact Arrangement:
33 = 3 NO and 3 NC.
42 = 4 NO and 2 NC.
51 = 5 NO and 1 NC.

Our authorized distributors are more likely to stock the following items for immediate delivery.

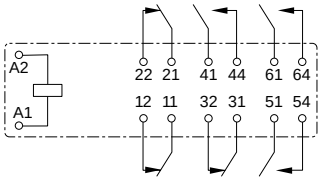
None at present.

Outline Dimensions

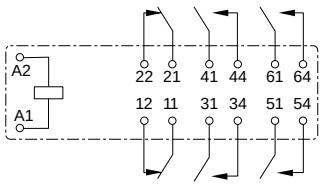


Wiring Diagrams (Bottom Views)

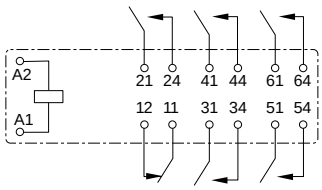
3 NO and 3 NC



4 NO and 2 NC

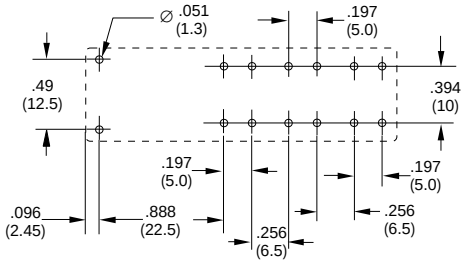


5 NO and 1 NC

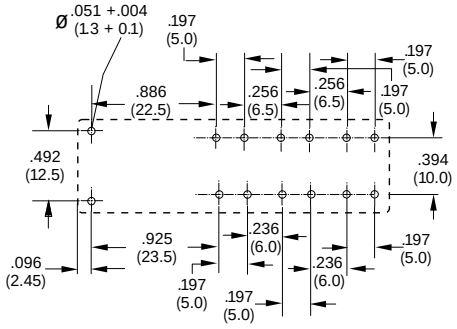


Suggested PC Board Layouts (Bottom Views)

3 NO and 3 NC, 4 NO and 2 NC



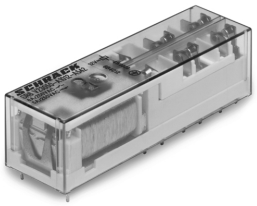
5 NO and 1 NC



Dimensions are shown for reference purposes only.

Dimensions are in inches over (millimeters) unless otherwise specified.

Specifications and availability subject to change.



SR6 Sensitive series

Sensitive "Safety Relay" with six forcibly guided contacts.

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- 4 NO + 2NC, 3 NO + 3 NC or 5 NO + 1 NC contacts.
- Polarized, 800mW coil.
- 6 kV surge resistance between poles.
- Well suited for emergency shut-off, machine control, elevator and escalator control, light barrier control

Contact Data

Type: Single button contact, forcibly guided.
Arrangements: 4 NO + 2NC, 3 NO + 3 NC or 5 NO + 1 NC.
Material: Silver-tin oxide.
Expected Mechanical Life: 10 million operations.
Ratings:
Current: 8A.
Voltage: 250VAC.
Voltage (breaking): 440VAC.
Power (breaking): 2,000VA.
Minimum Contact Load: >50mW.
Initial Contact Resistance: ≤ 100 millohms/1A/24VDC;
≤ 20 millohms/10mA/5VDC.

Initial Dielectric Strength

Between Open Contacts: 1,000Vrms.
Between Coil and Contacts: 3,000Vrms.
Between Contact Sets: 3,000Vrms.
Creepage/Clearance: **Contact-to-coil:** 5.5/5.5mm.
Between Contact Sets: 5.5/5.5mm.

Coil Data DC @ 20°C

Nominal Coil Power: 800mW.

Nominal Voltage VDC	DC Resistance in Ohms	Must Operate Voltage VDC	Drop-out Voltage VDC	Nominal Coil Current (mA)
5	31 ± 10%	3.8	0.5	161.3
6	45 ± 10%	4.5	0.6	133.3
9	101 ± 10%	6.8	0.9	89.1
12	180 ± 10%	9.0	1.2	66.7
15	281 ± 10%	11.3	1.5	53.4
18	405 ± 10%	13.5	1.8	44.4
21	551 ± 10%	15.8	2.1	38.1
24	720 ± 10%	18.0	2.4	33.3
36	1,620 ± 10%	27.0	3.6	22.2
40	2,000 ± 10%	30.0	4.0	20.0
48	2,880 ± 10%	25.0	4.8	16.7

All values are given for coil without preenergization, at 20°C ambient.
At 70°C after preenergization with 1.1 x nominal voltage, the maximum operating voltage is 85% of nominal.
At 70°C maximum coil voltage is 1.1 x nominal.

Initial Insulation Resistance

Between Mutually Insulated Elements: 10^6 ohms.

Operate Data

Must Operate Voltage: See Coil Data table.
Operate Time /Release Time (typical): 11 ms / 3ms.
Switching Rate: 3,600 ops./hr. max. at rated load.

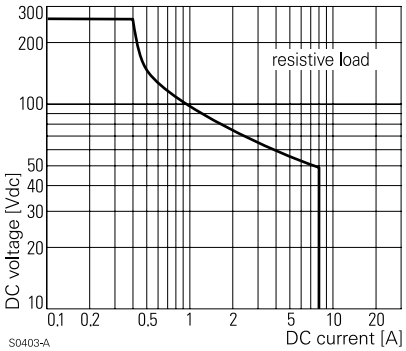
Environmental Data

Temperature Range: Operating: -20°C to +70°C.
Vibration (10-200 Hz.): NO: 8g; **NC:** 5g.
Shock (functional) 16ms, half-sine: NO: 8g; **NC:** 6g.

Mechanical Data

Termination: Printed circuit terminals.
Enclosure (94 V-0 rated): Sealed (RTIII) plastic case.
Weight: 1.06 oz. (30 g) approximately.

Max. DC Load Breaking Capacity



Ordering Information

Typical Part Number ▶	**SR6**	**A**	**4**	**S**	**012**	

1. Basic Series:
SR6 = 6 pole printed circuit board relay with forcibly guided contacts.

2. Contact Configuration:
A = 3 NO + 3 NC contacts B = 4 NO + 2 NC contacts C = 5 NO + 1 NC contacts

3. Contact Material:
4 = Silver-tin oxide.

3. Coil Type:
S = Sensitive coil.

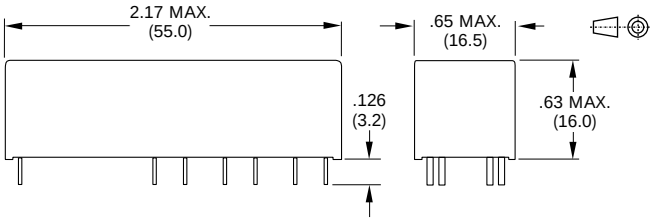
5. Coil Voltage:

005 = 5VDC	009 = 9VDC	018 = 18VDC	024 = 24VDC	040 = 40VDC	060 = 60VDC	110 = 110VDC
006 = 6VDC	012 = 12VDC	021 = 21VDC	036 = 36VDC	048 = 48VDC	085 = 85VDC	

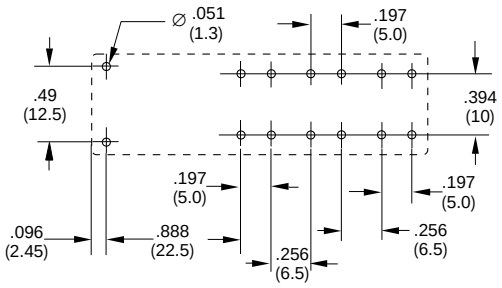
Our authorized distributors are more likely to stock the following items for immediate delivery.

None at present.

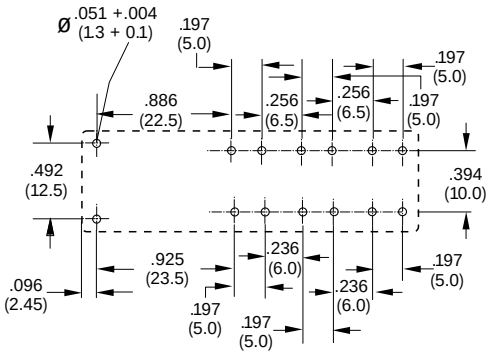
Outline Dimensions



PC Board Layouts (Bottom Views)

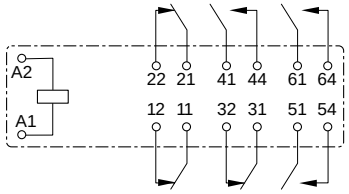


3 NO + 3 NC and 4 NO + 2 NC

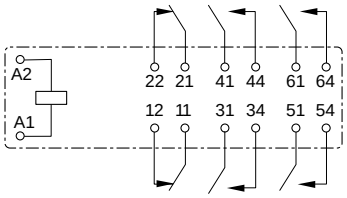


5 NO + 1 NC

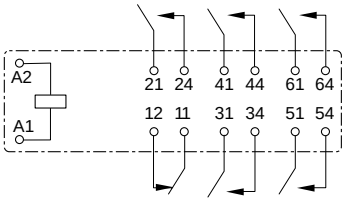
Wiring Diagrams (Bottom Views)



3 NO + 3 NC

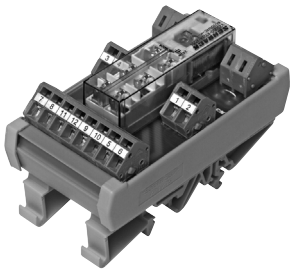


4 NO + 2 NC



5 NO + 1 NC

Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.
www.tycoelectronics.com
Technical support:
Refer to inside back cover.



SR6 Z series

6-pole "Safety Relay" on DIN-rail module.

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- 6-pole SR6 relay mounted to PC board on DIN-rail module.
- AC/DC input.
- Spring connectors.
- Module is 1.81 in (46mm) wide.
- Well suited for emergency shut-off, machine control, elevator and escalator control, light barrier control

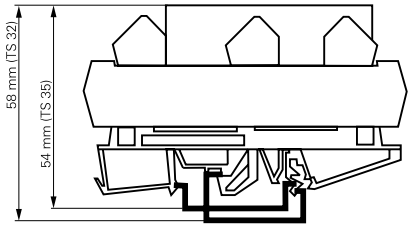
Contact Data

Type: Single button contact, forcibly guided.
Arrangements: 4 NO + 2NC, 3 NO + 3 NC or 5 NO + 1 NC.
Material: Silver-tin oxide.
Expected Mechanical Life: 10 million operations.
Ratings:
Current: 8A.
Voltage: 250VAC.
Voltage (breaking): 440VAC.
Power (breaking): 2,000VA.
Minimum Contact Load: >50mW.
Initial Contact Resistance: ≤ 100 millohms/1A/24VDC;
≤ 20 millohms/10mA/5VDC.

Initial Dielectric Strength

Between Open Contacts: 1,000Vrms.
Between Coil and Contacts: 3,000Vrms.
Between Contact Sets: 2,000Vrms.
Creepage/Clearance: **Contact-to-coil:** 5.5/5.5mm.
Between Contact Sets: 3/3mm.

Outline Dimensions



Module width: 1.81 in (46 mm).
Module length: 3.42 in (87 mm).
Mounted height: 2.12 - 2.28 in. (54 - 58 mm) depending upon DIN rail.

Module fits mounting rails per DIN EN 50022 or DIN EN 50035.

Coil Data DC @ 20°C

Nominal DC Voltage: 24VDC.
Nominal AC/DC Voltage: 24, 115VAC/VDC.
Nominal AC Voltage: 230VAC.
Minimum Operating Voltage: 90% of nominal.
Minimum Release Voltage: ≤10% of nominal.
Maximum Operating Voltage: 110% of nominal.
Input Circuit: Bridge rectifier, series resistor.

Operate Data

Switching Rate: 3,600 ops./hr. max. at rated load.

Environmental Data

Temperature Range: Operating: -20°C to +50°C.

Mechanical Data

Termination: Spring clamp connections.
Acceptable Wire Sizes: 14 - 18 AWG..
Weight: 3.17 oz. (90 g) approximately.

Ordering Information

Typical Part Number ▶	SR6Z	A	024

1. Basic Series:
SR6Z = 6 pole relay with forcibly guided contacts on DIN-rail module.

2. Contact Configuration:
A = 3 NO + 3 NC contacts
B = 4 NO + 2 NC contacts
C = 5 NO + 1 NC contacts

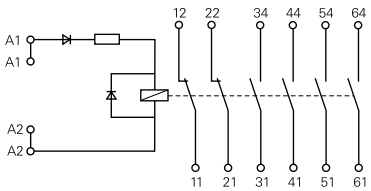
5. Coil Voltage:

024 = 24VDC	524 = 24VAC/VDC
615 = 115VAC/VDC	730 = 230VAC

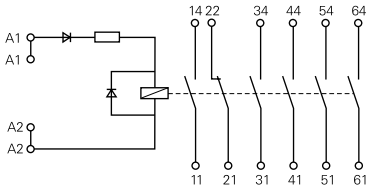
Distributors are more likely to stock the following items.

None at present.

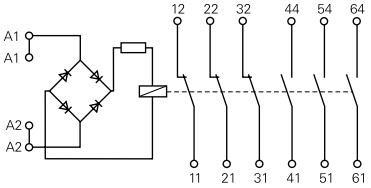
Wiring Diagrams (Bottom Views)



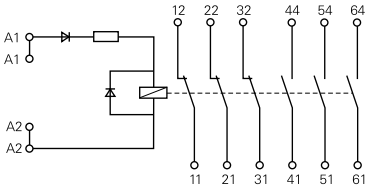
DC Module, 4 NO + 2 NC



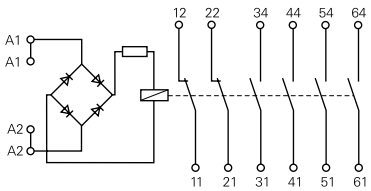
DC Module, 5 NO + 1 NC



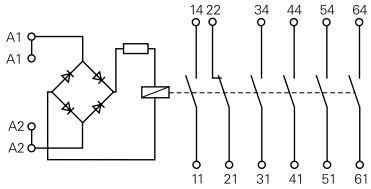
AC/DC Module, 3 NO + 3 NC



DC Module, 3 NO + 3 NC



AC/DC Module, 4 NO + 2 NC



AC/DC Module, 5 NO + 1 NC

Engineering Notes

Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.

Alphanumeric Index

Series	Type	Page
0419	Relay w/Dust Cover	745
K10	Relay w/Dust Cover	720
KA	Open Relay	737
KH/KHA	Relay w/Dust Cover	709
KHS	Hermetically Sealed Relay	709
KRP–3–H	Relay w/Dust Cover	739
KR–E	Hermetically Sealed Relay	737
KRP/KRPA	Relay w/Dust Cover	737
KU/KUP	Open Relay or Relay w/Dust Cover	723
KUE/KUEP	Open Relay or Relay w/Dust Cover	723
KUGP	Relay w/Dust Cover	723
KUIP	Relay w/Dust Cover	723
KUM/KUMP	Open Relay or Relay w/Dust Cover	723
KUP93	Relay w/Dust Cover	731
MT	Relay w/Dust Cover	742
PCL/PCLH	Relay w/Dust Cover	713
PT	Relay w/Dust Cover	717
R10-R	Immersion-Cleanable Relay	703
R10	Relay w/Dust Cover	703
RM	Relay w/Dust Cover	733
Socket Usage Guide		749
Track Mount System		747

NOTE: A question tree that may help you in selecting an appropriate relay for your application can be found on the next page.

Plug-in/Panel Mount General Purpose Relays 701-752 **7**

Mature Products

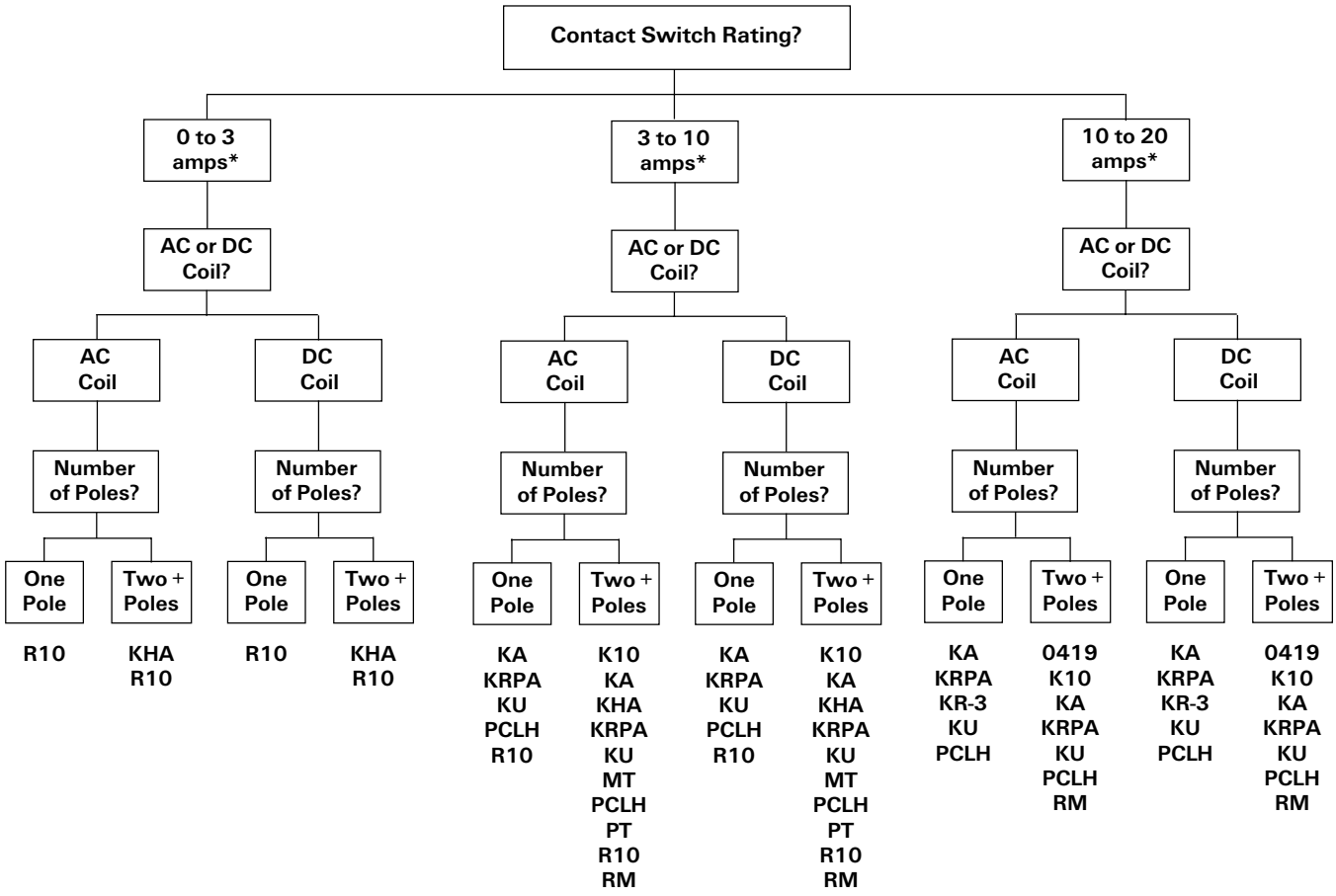
Some mature product series are no longer described in the technical databook, as they no longer represent the most effective solution for many new design requirements. However, certain models within these series are currently available, in varying quantities, for retrofit applications. Some of these products are scheduled for obsolescence or discontinuance in the near future. Contact technical support (see inside back cover) for suggestions regarding alternate products which may be appropriate for your application.

NOTE: Many of the relay products described in this section are also available with printed circuit board terminals as an option.

Plug-in / Panel Mount General Purpose (≤20A) Relay Question Tree

This guide helps the user select one or more relay series which may be appropriate for a given application. The user should then refer to detailed specifications elsewhere in this catalog to determine the actual part number to be specified. Of course, the user must assume ultimate responsibility for determining the suitability of a relay for a particular application.

Several relay product families are quite broad (i.e., R10, KU), and only the basic family designator, not the actual product series designator (i.e., R10S, KUIP) is listed in this guide.



***** Typical loads at 28VDC or 120VAC, resistive, for comparison purposes. See catalog pages for a given series for detailed rating specifications.

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Specifications and availability subject to change.
www.tycoelectronics.com
Technical support:
Refer to inside back cover.

R10 series

General Purpose Dry Circuit to 7.5 Amp Multicontact AC or DC Relay

- R10-E – Clear Dust Cover Version
- R10-R – Sealed, Immersion Cleanable Type
- R10S – Super Sensitive, Logic Compatible


R10


R10-R


R10S

File E29244

File LR15734

Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- Broad range of coil options provide sensitivity ranging from 25 to 750mW.
- Various contacts switch from dry circuit to 7.5 amps.
- Many mounting and termination options.

Contact Data @ 25°C

Arrangements: 1 Form C (SPDT) through 8 Form C (8PDT) See Ordering Information tables for more details regarding availability.

Contact Materials, Styles & Ratings @ +25°C

Contact Code	Contact Material	Contact Style	Coil Codes Available	Contact Ratings Min.	Typ.	Max.
W	Silver-Cadmium Oxide	Single Button	V, Q, S, J	500mA	-	7.5A‡
X	Silver-Cadmium Oxide	Single Button	V, Q, S, J	500mA	-	5A§
Y	Fine Silver	Single Button	All	100mA	2A	3A
Z	Fine Silver	Bifurcated	All	1mA	100mA	2A
P	Gold overlay on Silver	Bifurcated Crossbar	All	Dry Circuit	1mA	3A

Ratings are at 28VDC or 155VAC unless otherwise specified. Total load must not exceed 30A per relay.

‡ Use ungrounded frame for AC loads of 5A or greater. Max.ratings are 7.5A at 115VAC and 4A at 28VDC for coil codes S and J.

§ Use ungrounded frame for AC loads of 5A or greater. Max.ratings are 5A at 115VAC and 3A at 28VDC for coil codes S and J.

UL Horsepower Contact Ratings (Coil Code V Only)

Contact Code	No. of Poles	At 110-120VAC	At 220-240VAC
W	1, 2, 4	1/8 HP (3.8A)	1/6 HP (2.2A)
X	1, 2, 4, 6	1/20 HP (1.5A)	1/10 HP (1.5A)

Expected Mechanical Life: 100 million operations, typical. (Except contact Code W: 1,000,000 operations, typical.)

Typical Expected Life For Resistive Loads @ 25°C

Type	Current	Voltage	Contact Style	Coil Code	Operations††
R10	7.5A	120VAC, 60 Hz.	W	V,S,J	$7.5 \cdot 10^4$
R10	7.5A	28VDC	W	V	$7.5 \cdot 10^4$
R10	5.0A	120VAC, 60 Hz.	X	V,S,J	$5 \cdot 10^4$
R10	5.0A	28VDC	X	V	$5 \cdot 10^4$
R10	4.0A	28VDC	W	S,J	$2 \cdot 10^4$
R10	3.0A	28VDC	X	S,J	$2 \cdot 10^4$
R10	3.0A	28VDC or 120VAC	P	V,S,J	$3 \cdot 10^4$
R10	2.0A	28VDC	P,Y,Z	V	$1.5 \cdot 10^6$
R10	2.0A	28VDC	P,Y,Z	S,J	$6 \cdot 10^5$
R10S	2.0A	28VDC	P,Y,Z	J	$5 \cdot 10^5$
R10	1.0A	28VDC	P,Y,Z	V,S,J	$12 \cdot 10^6$
R10	1.0A	28VDC	P,Y,Z	SS,JJ	$5 \cdot 10^5$
R10S	1.0A	28VDC	P,Y,Z	J	$1 \cdot 10^6$
R10	500mA	28VDC	P,Y,Z	SS,JJ	$5 \cdot 10^6$
R10	100mA	28VDC or 120VAC	P,Y,Z	V,S,J	$1 \cdot 10^8$
R10	100mA	48VDC	P,Z	SS,JJ	$5 \cdot 10^6$
R10	100mA	6VDC	P	SS,JJ	$5 \cdot 10^7$
R10S	100mA	28VDC or 120VAC	P,Y,Z	J	$1 \cdot 10^6$
R10	50mA	6VDC	P,Z	V,S,J	$5 \cdot 10^7$
R10S	30mA	6VDC	P,Z	J	$5 \cdot 10^6$
R10	1mA	6VDC	P	SS,JJ	$5 \cdot 10^7$

†† Relay operated at rated coil voltage or 133% of pick-up current or higher.

Initial Dielectric Strength

Between Open Contacts: 500V rms, for contact codes P and Z. 1,000V rms for contact codes W, X and Y with coil code V.

Between All Other Conductors: 1,000V rms.

Capacitance

Between Contacts: 2 pf, typ.
Between Contacts and Coil: 2 pf, typ.
Between Coil and Frame: 30 pf, typ.

Initial Insulation Resistance

Between Mutually Insulated Elements: 10^{10} ohms @ 25°C, 50% RH. Consult factory for optional acetal resin material rated 10^{12} ohms.

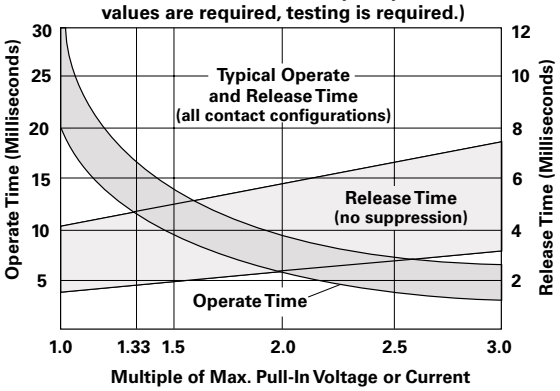
Coil Data @ 25°C (also see Coil Data tables)

Voltage: 3 to 115VDC and 6 to 115VAC.
Maximum Coil Power: 2.2 Watts.
Coil Temperature Rise: 30°C per Watt.
Maximum Coil Temperature: 105°C.

Operate Data @ 25°C

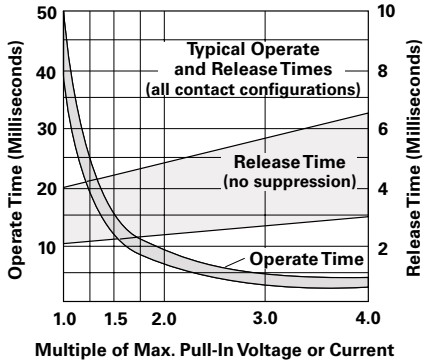
R10 Relays (DC Only) Typical Ranges of Operations

(Curves for reference only. If specific values are required, testing is required.)



R10 Ultra-Sensitive "SS" and "JJ" Typical Ranges of Operation

(Curves for reference only. If specific values are required, testing is required.)



Environmental Data

Storage Temperature Range: -55°C to +105°C.
Operating Temperature Range: -55°C to +75°C.

Mechanical Data

Terminal Finish: Tin plating standard.
Weight: 0.8 to 1.4 oz. (23 to 40g) approximately.

Coil Data Tables @ 25°C

One of the **boldface** resistance or voltage values from a table below is to be inserted in step 6 of the ordering chart on the next page.

V — Standard DC Voltage Adjustment

2.2 Watts Maximum Continuous Coil Dissipation @ 25°C

VDC at 25°C		Coil Resistance at 25°C ± 10% (ohms)		
Nominal	Pick-up (Max.)	1, 2 & 4 Form A, B, C or D Pick-up 500mW	6 Form A, B or C Pick-up 850mW	8 Form A, B or C Pick-up 1000mW
3.0	2.25	**10**	**6**	**5**
5.0	3.75	**28**	**16**	**14**
6.0	4.5	**52**	**25**	**20**
12.0	9.0	**185**	**90**	**72**
24.0	18.0	**700**	**430**	**350**
48.0	36.0	**2.5K**	**1.5K**	**1.25K**
72.0	54.0	**5.8K**	**3.5K**	**2.8K**
115.0	86.0	**15.0K**	**9.0K**	**8.0K**

Q — Special DC Voltage Adjustment

1 & 2 Form A, B, C or D			3 & 4 Form A, B, C or D			
Coil Res. @ 25°C ± 10% (ohms)	Pick-up (Max.) @ 25°C (VDC)	Pick-up @ 25°C (mW)	Coil Res. @ 25°C ± 10% (ohms)	Pick-Up (Max.) @ 25°C (VDC)	Pick-Up @ 25°C (mW)	Nominal Voltage @ 25°C (VDC)
52	3.1	180	**32**	3.8	450	5
110	4.5	185	**52**	4.2	340	6
450	9.2	190	**185**	8.4	380	12
1.8K	17.4	170	**1.0K**	17.2	295	24
7.5K	36.2	175	**3.2K**	31.1	300	48
15.0K	49.5	165	**7.5K**	49.3	325	72
30.0K	67.5	160	**15.0K**	67.5	300	115

S — Sensitive DC Voltage Adjustment

2.2 Watts Maximum Continuous Coil Dissipation @ 25°C

VDC at 25°C		Coil Resistance at 25°C ± 10% (ohms)			
Nominal	Pick-up (Max.)	1 & 2 Form A, B, C or D Pick-up 100mW	3 & 4 Form A, B, C or D Pick-up 175mW	6 Form A, B or C Pick-up 250mW	8 Form A, B or C Pick-up 400mW
3.0	2.25	**50**	**30**	**20**	**12**
5.0	3.75	**140**	**80**	**56**	**35**
6.0	4.5	**200**	**110**	**80**	**52**
12.0	9.0	**800**	**450**	**320**	**200**
24.0	18.0	**3.2K**	**1.8K**	**1.2K**	**800**
48.0	36.0	**13.0K**	**7.5K**	**5.2K**	**3.2K**
72.0	54.0	**28.0K**	**16.0**	**13.0K**	**7.5K**
115.0	86.0	**50.0K**	**40.0K**	**30.0K**	**16.0K**

SS — Ultra-Sensitive Voltage Adjustment (1-4 Pole Only)

2.2 Watts Maximum Continuous Coil Dissipation @ 25°C

VDC at 25°C		Coil Resistance at 25°C ± 10% (ohms)		
Nominal	Pick-up (Max.)	1 Form C Pick-up Power 20mW	2 Form C Pick-up Power 40mW	3 & 4 Form C, Pick-up Power 80mW
3.0	2.25	**220**	**110**	**52**
5.0	3.75	**700**	**350**	**175**
6.0	4.5	**1.0K**	**500**	**250**
12.0	9.0	**4.0K**	**2.0K**	**1.0K**
18.0	13.5	**9.0K**	**4.5K**	**2.2K**
24.0	18.0	**15.0K**	**7.5K**	**3.7K**
36.0	27.0	**30.0K**	**15.0K**	**7.5K**
48.0	36.0	—	**30.0K**	**15.0K**

J — Sensitive DC Current Adjustment

Must Operate Current (mA)

All Applicable Types Except R10S

Coil Resistance ±10% (ohms)	2 Form A, B, C or D Pick-up 85mW	4 Form A, B, C or D Pick-up 175mW	6 Form A, B, C or D Pick-up 250mW	8 Form A, B or C Pick-up 400mW	Max. Coil Current (mA)
1.0K	8.5	13.0	16.0	20.0	45.0
2.5K	5.8	8.4	10.0	13.0	28.0
5.0K	4.1	6.2	7.2	9.0	20.0
10.0K	3.1	4.5	5.0	6.4	14.0
15.0K	2.6	3.5	4.2	5.3	11.5
30.0K	1.7	2.5	2.9	3.7	8.3

R10S Types Only

Coil Resistance ±10% (ohms)	1 Form C Pick-up 10mW	2 Form C Pick-up 20mW	4 Form C Pick-up 40mW
500	4.5 (A)	6.3 (A)	9.0
1.0K	3.2 (A)	4.5	6.5
2.5K	2.0	2.9 (B)	4.1 (B)
5.0K	1.4 (B)	2.0	2.9 (C)
10.0K	1.0	1.4 (C)	2.0
16.0K	0.8	1.2	1.4
30.0K	0.6 (C)	0.8	1.2

(A) Suggested for 5VDC operation.
(B) Suggested for 12VDC operation.
(C) Suggested for 24VDC operation.

JJ — Ultra-Sensitive Current Adjustment (1-4 Pole Only)

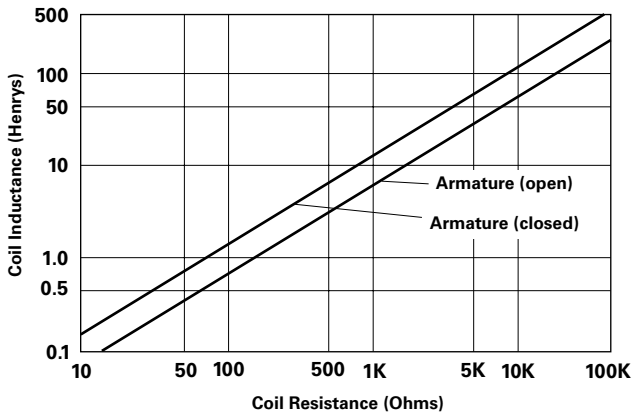
	Maximum Pick-Up Current (mA)			
Coil Resistance at 25°C ±10%	1 Form C Pick-Up Power 20mW	2 Form C Pick-Up Power 40mW	3 & 4 Form C Pick-Up Power 80mW	Maximum Continuous Coil Current (mA)
1.0K	4.5	6.5	**9.0**	45.0
2.5K	2.9	4.1	**5.8**	28.0
5.0K	2.1	2.9	**4.1**	20.0
10.0K	1.5	2.0	**3.0**	14.0
15.0K	1.2	1.7	**2.4**	11.5
30.0K	0.85	1.2	**1.7**	8.3

Standard AC Operated Relays

Coil Resistance @ 25°C ± 20% (ohms)		Volts AC @ 25°C		
2 & 4 Form C	6 & 8 Form C	Pick-Up (max.)	Nominal	Maximum Continuous
25	15	5.0	**6**	7.2
120	90	9.0	**12**	14.5
500	350	18.0	**24**	30.0
2.0K	1.4K	36.0	**48**	60.0
9.0K	7.5K	86.0	**115**	130.0

Note: Dual coil diode rectified construction.

Typical Coil Inductance



Dimensions are shown for reference purposes only.

Dimensions are in inches over (millimeters) unless otherwise specified.

Specifications and availability subject to change.

www.tycoelectronics.com
Technical support:
Refer to inside back cover.

Ordering Information

Typical Part Number ▶	R10	-E	1	Y	4	-V700

1. Basic Series:
R10 = Relay with Form C contacts.
R10S = Super sensitive R10 (case and terminals E1 & E2 only, J coil adj. only).

2. Case Style:
E = Non-sealed polycarbonate cover.
R = Immersion cleanable, tape sealed plastic case (R10 only [Form C], terminal code 2 & 9 only [std. PCB]). No ground or stud included. Not available on R10S.

3. Terminals & Mounting:
1 = Solder/plug-in terminals with #3-48 mounting stud.
2 = Printed circuit terminals (std.) .064" (1.62mm) clearance, 1.25" (31.75mm) seated ht.
6 = Side mounting plate with #6-32 stud, solder/plug-in terminals (#3-48 stud not included).
7 = Narrow (.04" [1.02mm] wide) printed circuit terminals .013" (.33mm) clearance, 1.2" (30.48mm) seated ht.
9 = Non-shouldered, narrow (.04" [1.02mm] wide) printed circuit terminals in a staggered arrangement (1 to 6 poles only).

4. Contact Style & Rating:

	W	X	Y	Z	P
	Single Contact	Single Contact	Single Contact	Bifurcated, Low	Bifurcated Crossbar,
	V, Q, S & J Coil Adjustment Only			Level Contacts	Dry Circuit Contacts
	Max. 7.5A† Min. 500mA	Max. 5A‡ Min. 500mA	Typ. 2A Max. 3A Min. 100mA	Typ. 100mA Max. 2A Min. 1mA	Typ. 1mA Max. 3A Min. Dry Circuit
R10	X	X	X	X	X
R10S			X	X	X

Ratings are at 28VDC or 115VAC. Total load must not exceed 30A per relay.
† Use ungrounded frame for AC loads of 5A or greater. Max. ratings are 7.5A at 115VAC and 4A at 28VDC for coil codes S & J.
‡ Use ungrounded frame for AC loads of 5A or greater. Max. ratings are 5A at 115VAC and 3A at 28VDC for coil codes S & J.

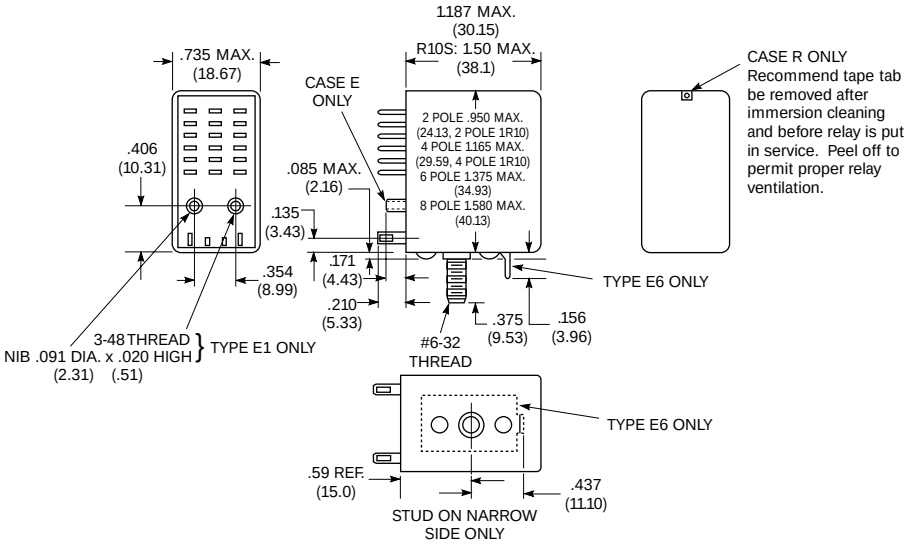
5. Number of Poles:
1 = 1 pole.
2 = 2 pole.
3 = 3 pole.
4 = 4 pole
6 = 6 pole (not available with W contacts).
8 = 8 pole (available on case style E only; not available with W contacts).

6. Coil (Refer to Coil Data Tables):
AC Voltage (available on R10 only)
Specify nominal coil voltage followed by V (example: 24V).
DC Voltage
Specify coil adjustment code letter followed by coil resistance (example: V700).

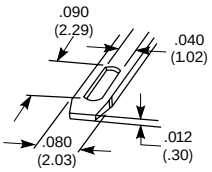
Our authorized distributors are more likely to stock the following items for immediate delivery.

R10-E1P2-115V
R10-E1P2-V700
R10-E1P4-115V
R10-E1P4-V700
R10-E1W2-V185
R10-E1W2-V700
R10-E1W4-V185
R10-E1W4-V700
R10-E1X2-115V
R10-E1X2-24V
R10-E1X2-S800
R10-E1X2-V185
R10-E1X2-V700
R10-E1X4-115V
R10-E1X4-V185
R10-E1X4-V2.5K
R10-E1X4-V700
R10-E1X6-V430
R10-E1Y2-J1.0K
R10-E1Y2-J2.5K
R10-E1Y2-V15.0K
R10-E1Y2-V185
R10-E1Y2-V2.5K
R10-E1Y2-V700
R10-E1Y4-J10.0K
R10-E1Y4-V2.5K
R10-E1Y4-V52
R10-E1Y4-V700
R10-E1Y6-V1.5K
R10-E1Z2-V185
R10-E1Z2-V700
R10-E1Z4-V185
R10-E1Z4-V2.5K
R10-E1Z4-V700
R10-E1Z6-V1.5K
R10-E1Z6-V430
R10-E2P4-V185
R10-E2P4-V700
R10-E2W2-V185
R10-E2X2-V185
R10-E2X2-V700
R10-E2X4-V185
R10-E2X4-V700
R10-E2Y2-V185
R10-E2Y2-V700
R10-E2Y4-V185
R10-E2Y4-V700
R10S-E1Y2-J5.0K
R10S-E2Y1-J1.0K

Outline Dimensions

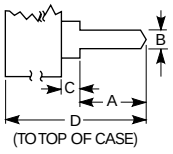


Solder Terminal Dimensions



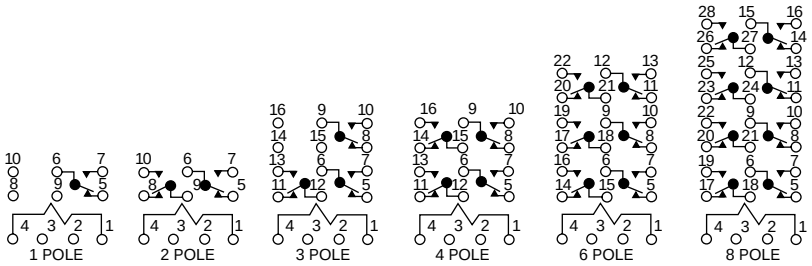
PC Terminal Dimensions

	A	B	C	D	Arrang.
Type 2	.131	.050	.064	1.251	Inline
Type 7	.131	.040	.013	1.20	Inline
Type 9	.170	.040	.000	1.187	Staggered
Thickness	.012	012	.012	.013	—

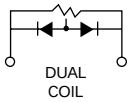


Wiring Diagrams (Bottom Views)

R10 Wiring Diagrams

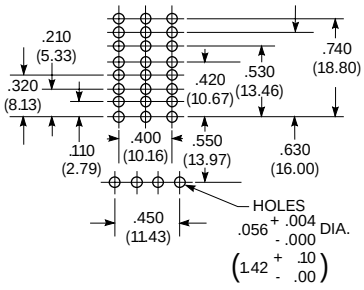


R10-AC Wiring Diagram

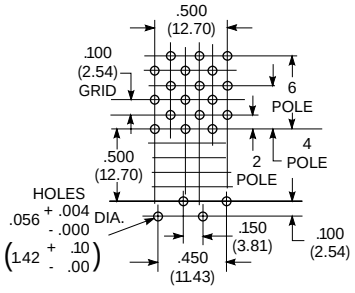


Suggested PC Board Layouts (Component Side of Boards)

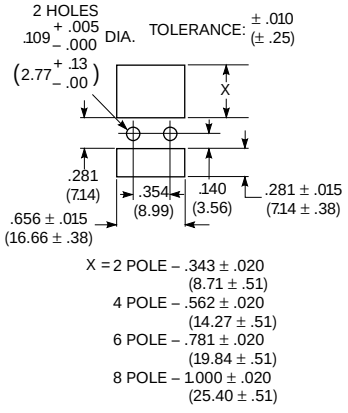
Terminal Types E2 & R2



Terminal Types E9 & R9

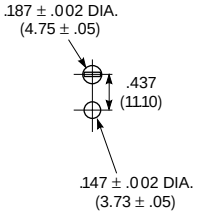


Suggested Panel Cutout For Relay or Socket



X = 2 POLE – .343 ± .020
(8.71 ± .51)
4 POLE – .562 ± .020
(14.27 ± .51)
6 POLE – .781 ± .020
(19.84 ± .51)
8 POLE – 1.000 ± .020
(25.40 ± .51)

Mounting Hole Layout For Terminal & Mounting Style 6



Dimensions are shown for reference purposes only.

Dimensions are in inches over (millimeters) unless otherwise specified.

Specifications and availability subject to change.

www.tycoelectronics.com
Technical support:
Refer to inside back cover.

R10 Socket & Accessory Information



Socket Specifications

Contact Material:
Spring brass, tin-plated.
Body Material: 2 and 4 pole: polyester.
6 and 8 pole: phenolic.
Voltage Drop: 30mV max. @ 10A.
Dielectric Strength: 1,000V rms.
Insulation Resistance: 10^9 megohms.
Max. Current: 10A.

Solder or PC Terminal Sockets

Rugged, molded socket body retains floating terminals of either solder or printed circuit pin configuration. PC terminal sockets are offered with pins in either 0.1" (2.54mm) grid or in-line arrangement.

Grounding Provisions

Pre-installed on sockets
Not for use at 5A AC and above.
Grounding Strip: Mounting stud of relay contacts grounding strip. Grounding strip is grounded with screw or rivet through round hole in socket.
Grounding Terminal (PC sockets only):
Mounting stud of relay contacts ground terminal through square hole in socket.

Strip



Terminal



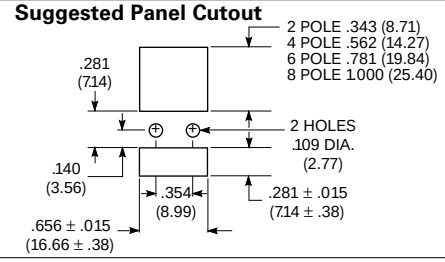
Caution:
Printed circuit sockets are manufactured with "floating" (loose) terminals. This permits them to align with holes in the circuit board and with the relay terminals. During the mounting and soldering of the socket, vertical float should be eliminated and the terminals seated on the board. (This may be accomplished by inserting a dummy relay in the socket.) Failure to eliminate float may cause fracture of the solder joint or separation of the copper conductor from the printed circuit board when a relay is inserted in the socket after soldering.

Ordering Data – Stock items are boldfaced.

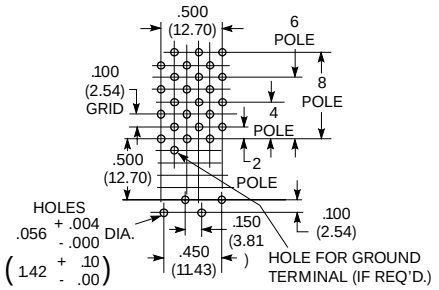
Socket Part No.	No. of Poles	Type of Terminal	Grounding Provision
27E125	2	Solder	Strip
27E126	4		Strip
27E127	6		Strip
27E162	2		None
27E163	4		None
27E164	6		None
27E128	2	PC Stag. .180" long (4.57mm)	Strip
27E129	4		Strip
27E130	6		Strip
27E254	8		Strip
27E212	2		None
27E213	4		None
27E271	6		None
27E258	8		None
27E193	2		Terminal
27E194	4		Terminal
27E636	2	PC Stag. .210" long (5.33mm)	Strip
27E637	4		Strip
27E631	2	PC In-line .180" long (4.57mm)	Strip
27E632	4		Strip
27E340	6		Strip
27E342	2		None
27E629	4		None
27E630	6		None
27E338	4		Terminal
27E633	2	PC In-line .210" long (5.33mm)	Strip
27E634	4		Strip
27E635	6		Strip

All tolerances ±.010 (±.25) unless otherwise noted.

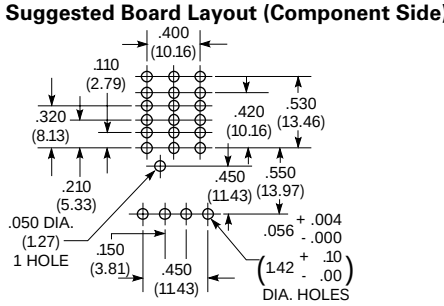
Suggested Panel Cutout



Suggested Board Layout (Component Side)



Suggested Board Layout (Component Side)



Hold Downs For Use With R10 Sockets

Part No.	No. of Poles	Description
20C249	2	Wire Hold Down Spring
20C250	4	Wire Hold Down Spring
20C251	6	Wire Hold Down Spring
20C266	8	Wire Hold Down Spring
20C259	All	Wire Hold Down Strap (PC only)
20C300	2 (R10S)	Hold Down Spring
20C301	4 (R10S)	Hold Down Spring

Hold Down Spring

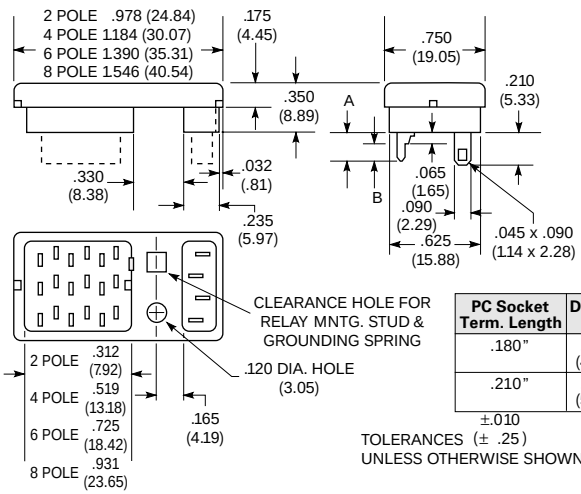


Hold Down Strap (PC Sockets Only)



See following page for additional sockets & accessories.

Solder & PC Terminal Socket Outline Dimensions



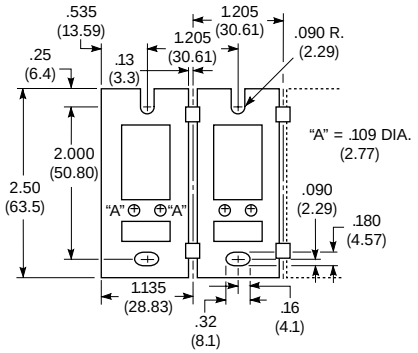
PC Socket Term. Length	Dim. A	Dim. B
.180"	.180 (4.57)	.115 (2.92)
.210"	.210 (5.33)	.156 (3.96)

±.010
TOLERANCES (± .25)
UNLESS OTHERWISE SHOWN

37D645 – Mounting Strip

Strip of .060" (1.52mm) aluminum contains ten pre-punched, breakaway mounting plates. Each plate accomodates a 2, 4, 6 or 8 pole solder terminal R10 relay or socket to facilitate chassis- or rack mounting.





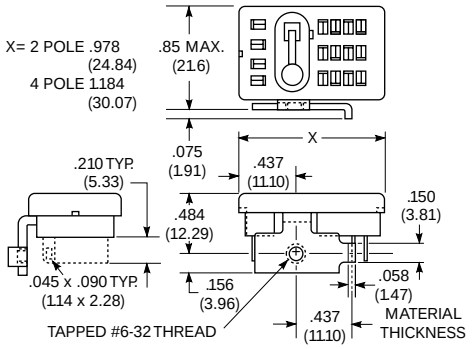
R10 Socket & Accessory Information (Continued)

Ordering Data – Stock items are boldfaced.

Socket Part No.	No. of Poles	Type of Terminal	Grounding Provision
27E317	2	Solder/	Strip
27E152	4	Bracket	Strip



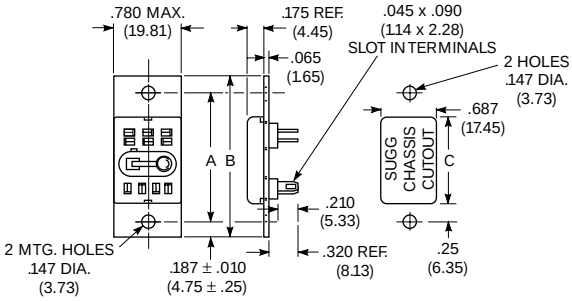
Bracket Mount Socket
Allows solder terminal relay to mount flat on a chassis.



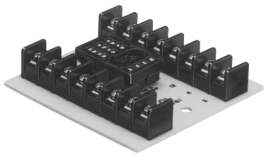
Socket Part No.	No. of Poles	Dim. A Nom.	Dim. B Max.	Dim. C Min.
27E446	2	1.437 (36.50)	1.822 (46.27)	.937 (23.80)
27E447	4	1.687 (42.85)	2.072 (52.63)	1.125 (28.58)
27E448	6	1.875 (47.63)	2.260 (57.40)	1.343 (34.11)



Flange Mount Socket
Solder terminal socket with tin-plated terminals and grounding strip pre-assembled on .065" (1.65mm) steel mounting plate. Requires only one chassis cutout.



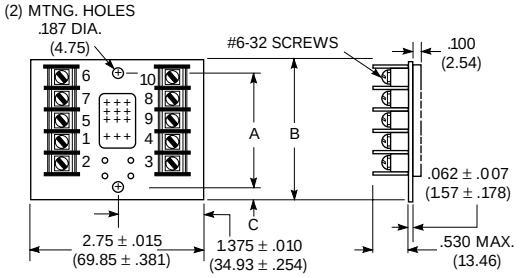
Part No.	No. of Poles	Dim. A Nom.	Dim. B Max.	Dim. C Nom.
27E460	2	1.800 (45.72)	2.230 (56.64)	.200 (5.08)
27E461	4	2.125 (53.98)	2.830 (71.88)	.337 (8.56)
27E462	6	2.812 (71.42)	3.830 (97.28)	.494 (12.55)



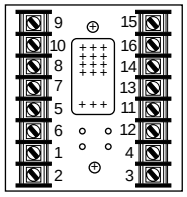
Track Mount Socket
Provides front wiring, screw terminal connections for R10 family relays. No grounding provision.

See preceding page for hold down springs.

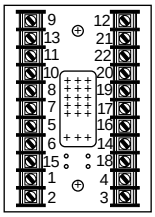
2 Pole Terminal Wiring Code



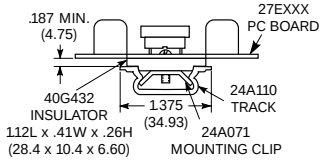
4 Pole Terminal Wiring Code



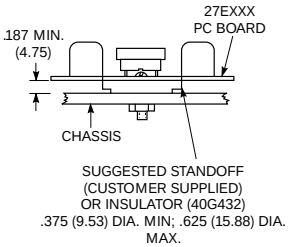
6 Pole Terminal Wiring Code



Suggested Track Mounting



Suggested Chassis Mounting





KHS



KHAU

KHA series

General Purpose Dry Circuit to 5A Multicontact AC or DC Relay

File E22575
File LR15734

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- Miniature size from 2 pole to 4 pole.
- KHAU is produced on an automated line, while KHU is produced manually. Form, fit and function of the two versions are identical.
- KHS hermetically sealed version UL Approved for Class 1 Division 2 hazardous locations.
- Various applications include process control, photocopier, and data processing.
- Push-to-test and indicator options available.
- Various contact materials available for specific load requirements.

Contact Data @ 25°C

Arrangements: 2 Form C (DPDT), 4 Form C (4PDT).
Expected Life: 10 million operations, mechanical; 100,000 operations min. at rated loads. Ratings are based on tests of relays with ungrounded frames.
Initial Breakdown Voltage: 500V rms, 60 Hz., between open contacts. 1240V rms, 60 Hz., between all other elements.

Contact Ratings

Contact Code	Material	Resistive Rating	
		Minimum	Maximum
1	Silver	100mA @ 12VAC/12VDC	3A @ 120VAC/28VDC
2*	Silver-cadmium oxide	500mA @ 12VAC/12VDC	5A @ 120VAC/28VDC
3	Gold-silver-nickel	10mA @ 12VAC/12VDC	2A @ 120VAC/28VDC
6	Bifurcated cross bar, gold overlay silver	Dry circuit	1A @ 120VAC/28VDC
8	Gold diffused silver	50mA @ 12VAC/12VDC	3A @ 120VAC/28VDC

Note: Relays should only carry a maximum of 15 amps continuously for all poles combined.

KHS Contact Ratings
Class I Division II Hazardous Location:
5A@28VDC/120VAC
UL 508 (Industrial Control):
3A@28VDC/120VAC; 1/10 HP @ 120VAC.

Coil Data @ 25°C

Voltage: From 6 to 120VDC, and 6 to 240VAC, 50/60 Hz.
Nom. Power: DC coils - 0.9 watt; 0.5 watt minimum operate @ 25°C.
AC coils - 1.2 VA; 0.55 VA minimum operate @ 25°C.
Max. Power: DC coils - 2.0 watts @ 25°C.
Duty Cycle: Continuous.
Initial Breakdown Voltage: 500V rms, 60 Hz.

Coil Data

DC Coils			AC Coils	
Nominal Voltage	Resistance in Ohms ±10% @ 25°C	Nominal Inductance in Henrys	Resistance in Ohms ±15%	Nominal AC Current in mA
5	32	.072	—	—
6	40	.08	10.5	200
12	160	.28	43	100
24	650	1.0	160	52
48	2,600	4.5	668	25
110 *	11,000	17.0	—	—
120 *	—	—	3,900	11.0
240	—	—	12,000	6.0

*Note: For 220 and 240VDC, use series dropping 5W resistor of 11,000Ω.

Operate Data @ 25°C

Must-Operate Voltage: DC: 75% of nominal voltage.
AC: 85% of nominal voltage.
Operate Time: 13 milliseconds typical @ nominal voltage (excluding bounce).
Release Time: 6 milliseconds typical @ nominal voltage (excluding bounce).

Environmental Data

Temperature Range: -45°C to +70°C operate.
-60°C to +130°C storage.

Mechanical Data

Mountings: #3-48 stud, sockets with printed circuit or solder terminals, or bracket plate with #6-32 threaded stud.
Termination: Printed circuit or solder/socket terminals.
Printed circuit terminals are available for KHS on a special order basis.
Enclosures: See Ordering Information table.
Weight: 1.6 oz. approx. (45g).

Ordering Information

Typical Part No. ▶	KHA	U	-17	A	1	1	B	-24

1. Basic Series: (See Note 1)

2. Type:
E = Printed circuit terminals, nylon dust cover, contacts rated opposite polarity (UL & CSA).
S = Solder terminals, hermetically sealed steel case (UL & CSA). Note: Do not ground KHS frame without consulting factory for load levels. (Order as KHS, not KHAS.)
U = Solder terminals, clear polycarbonate dust cover, contacts rated same polarity (UL & CSA).

3. Contact Arrangement:
11 = 2 Form C (DPDT)
17 = 4 Form C (4PDT)

4. Operating Coil:
A = AC D = DC

5. Mounting and Termination:

1 = Socket mount, solder terminals on S, U types; printed circuit terminals on E types.

6. Contact Material:

Relay Type	E	S	U
Available Codes	1, 2, 3, 6, 8	1*, 2*, 3	1, 2, 6, 8

*UL Rated 1/10 HP, 3A, 120VAC when used with mounting & termination 1.

1 = Silver.
2 = Silver-cadmium oxide.
3 = Gold-silver-nickel.
6 = Bifurcated crossbar, gold overlay silver.
8 = Gold diffused silver.

7. Options Available:

Relay Type	E	S	U
Available Codes	B (DPDT only)	None	N B H L M

B = Push to test button.
N = Neon indicator. Only available with 120VAC or 110VDC coils. Not available with mounting & termination 4 or 8.
H = Neon indicator and push to test button. Only available with 120VAC or DC coils. Not available with mounting & termination 4 or 8.
L = LED indicator. Only available with 6-48VAC or DC coils.
M = LED indicator and push-to-test button. Only available with 6-48VAC or DC coils.

8. Coil Voltage:
6, 12, 24, 48, 120, 240**VAC
6, 12, 24, 48, 110VDC
**240VAC coil is not available on KHS type relays.

Note 1: Some KHA models available in KH construction. Specify KH instead of KHA.

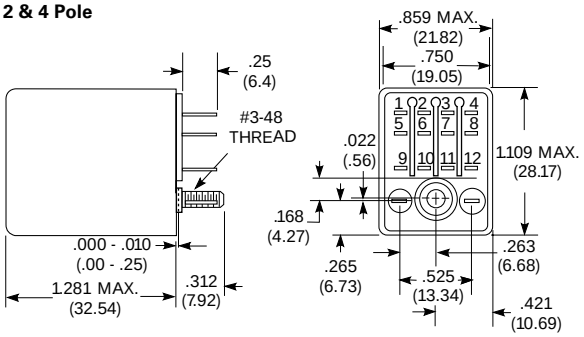
Stock Items – Our authorized distributors are likely to stock the following items.

KHAE-17D12-24
KHAU-11A11-120
KHAU-11D11-24
KHAU-17A11-12
KHAU-17A11-24
KHAU-17A11-120
KHAU-17A11N-120
KHAU-17A12-120
KHAU-17A13-120
KHAU-17A16-24
KHAU-17A16-120
KHAU-17A18-120
KHAU-17D11-6
KHAU-17D11-12
KHAU-17D11-24
KHAU-17D11-48
KHAU-17D11-110
KHAU-17D12-12
KHAU-17D12-24
KHAU-17D12-48
KHAU-17D12-110
KHAU-17D16-12
KHAU-17D16-24
KHS-17A11-24
KHS-17A11-120
KHS-17A12-120
KHS-17D11-12
KHS-17D11-24
KHS-17D11-48
KHS-17D11-110
KHS-17D12-12
KHS-17D12-24

Outline Dimensions

Mounting Code 1 - KHAU only.

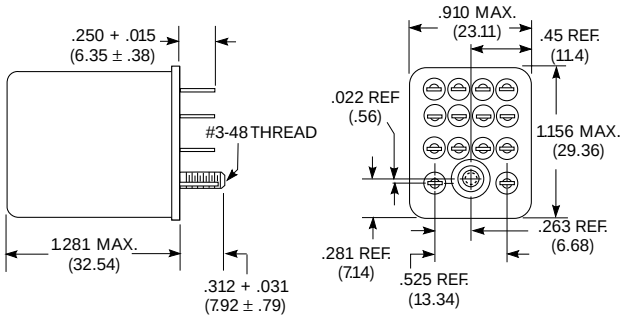
2 & 4 Pole



PC terminal models have rivet, not stud.
Max. seated height in 27E006 socket is 1.37" (34.8mm).

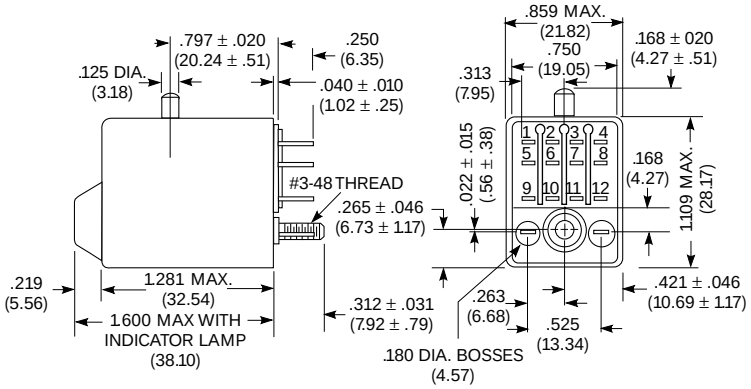
Mounting Code 1 - KHS only.

2 & 4 Pole

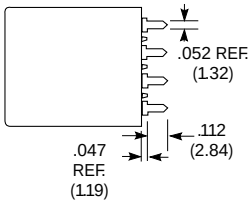


Class 1 Div. 2 Group A, B, C & D Hazards

Mounting Code 1 - Neon Indicator, Push-To-Test.



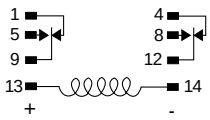
Printed Circuit Terminals



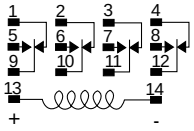
Printed circuit terminal thickness .022 (.558)

Wiring Diagrams (Bottom Views)

2 Pole

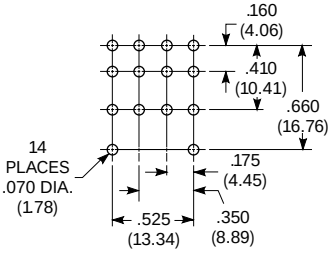


4 Pole



+ = Polarity for LED indicator.

PC Board Layout (Bottom View)



For KHAE Relays with PC terminals and sockets with PC terminals

Sockets For KHA And KHS Series

Boldface sockets are normally maintained in stock for immediate delivery.

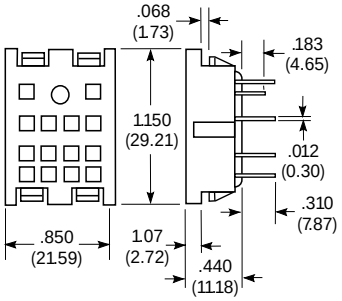
For KHAU, KHAX, KHS, KHU Relays.
Relays with solder terminals are required for use with sockets.

Socket Description

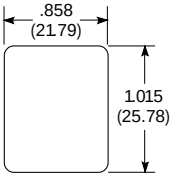
Industrial Part No.	No. of Poles	Terminal and Length	Grounding Provision	Socket Material
27E006*	4	Solder .375" (9.53mm)	Yes	Nylon
27E007*	4	P.C. .218" (5.54mm)	Yes	Nylon
27E023*	4	P.C. .218" (5.54mm)	No	Nylon
27E220*	2			
27E166**	4	Screw	Yes	Glass-filled Polyester
27E894**	4	Screw	No	Glass-filled Polyester
20C217		Relay Hold Down Spring		
20C297		Relay Hold Down Spring - use with 27E166		
20C426		Relay Hold Down Spring - use with 27E894		

* UL Recognized, file E22575
** UL Recognized, file E59244

4-Pole Socket



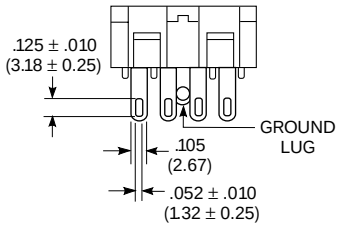
Recommended Chassis Cutouts For Mounting Sockets



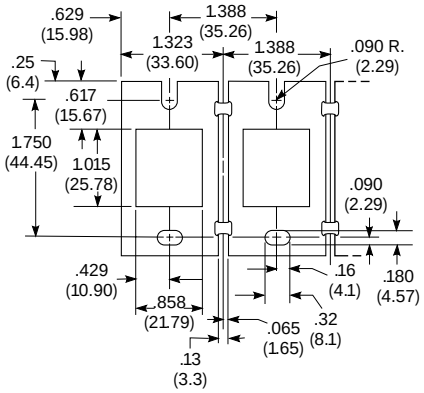
Recommended Chassis Thickness
.031 (.79) to .062 (1.57)

Socket punch Greenlee part 5015115.0, Type 731R available from Greenlee Tool Co., Rockford, Illinois. (4-pole)

Pierced Solder Terminals



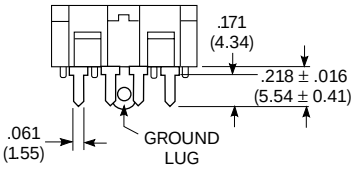
Mounting Strip 37D633



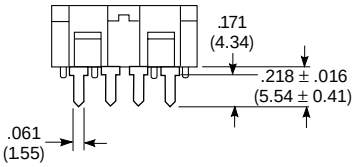
37D633 will mount eight solder terminal sockets in one length of aluminum strip measuring 10.97" x 2.25" x .062 (278.6 x 57.15 x 1.57)

Printed Circuit Terminals

With Grounding Lug

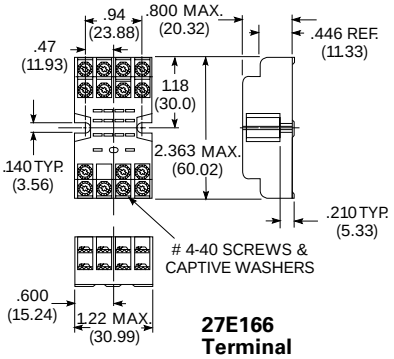


Without Grounding Lug



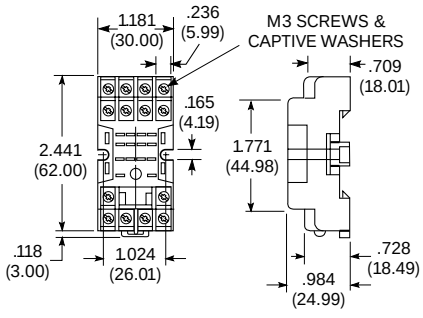
Screw Terminal Socket 27E166

Relays with solder terminals are required for use with screw terminal sockets.



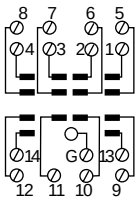
Screw Terminal DIN Rail, Snap-Mount Socket 27E894

(Use with mounting track 24A110)



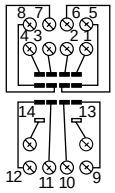
Caution: Printed circuit sockets are manufactured with "floating" (Loose) terminals. This permits them to align with holes in the circuit board and with the relay terminals. During the mounting and soldering of the socket, vertical float should be eliminated and the terminals seated on the board. (This may be accomplished by inserting a dummy relay in the socket.) Failure to eliminate float may cause fracture of the solder joint or separation of the copper conductor from the printed circuit board when a relay is inserted in the socket after soldering.

27E166 Terminal Location



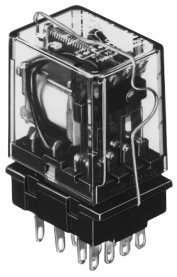
Top View

27E894 Terminal Location



Top View

Hold Down Spring 20C217



Dimensions are shown for reference purposes only.

Dimensions are in inches over (millimeters) unless otherwise specified.

Specifications and availability subject to change.

www.tycoelectronics.com
Technical support:
Refer to inside back cover.



PCL/PCLH series

3A, 5A, 10A, 15A General Purpose Miniature Relay

Factory Automation, Process Controls, Electrical Panels, etc.

UL File No. E58304
CSA File No. LR48471

Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- Small size, 3A, 5A, 10A and 15A switching capacity.
- Meets UL and CSA requirements.
- 1 pole, 2 poles and 4 poles contact arrangements.
- AC and DC coils with UL Class F (155°C) coil insulation system standard.
- Optional flange mount case.
- Plug-in terminals or PCB terminals.

Contact Data @ 20°C

Arrangements: 1 Form A (SPST-NO), 1 Form C (SPDT),
2 Form A (DPST-NO), 2 Form C (DPDT),
4 Form A (4PST-NO), 4 Form C (4PDT).
Material: Ag, Ag Alloy.
Max.Switching Rate: 300ops./min.(Mechanical).
30ops./min.(Electrical).
Expected Mechanical Life: 100 million operations (no load).
Expected Electrical Life: 100,000 operations (rated load).
Minimum Load: 100mA @ 5VDC.
Initial Contact Resistance: 50milliohms @ DC6V,1A.

Contact Ratings

Ratings:
PCL-4 3A @ AC250V/DC24V resistive.
PCL-2 5A @ AC250V/DC24V resistive.
PCLH-2 15A @ AC120V resistive.
10A @ AC250V/DC24V resistive.
PCLH-1 15A @ AC250V/DC24V resistive.

Max. Switched Current:
PCL-4 3A.
PCL-2 5A.
PCLH-2 15A.
PCLH-1 15A.

Max. Switched Power:
PCL-4 660VA, 72W.
PCL-2 1,100VA, 120W.
PCLH-2 3,168VA, 240W.
PCLH-1 3,300VA, 360W.

Initial Dielectric Strength

Between Open Contacts: 1,000VAC 1minute.
Between Adjacent Contact Terminals: 1,500VAC 1minute.
Between Contacts and Coil: 2,000VAC 1minute.
Surge Voltage (Coil-Contact): 3,000V(1.2/50µs).

Initial Insulation Resistance

Between Open Contacts: 1,000Mohms @ 500VDC.
Between Adjacent Contact Terminals: 1,000Mohms @ 500VDC.
Between Contacts and Coil: 1,000Mohms @ 500VDC.

Coil Data

Voltage: AC 6 - 240V.
DC 6 - 110V.
Nominal Power: AC abt. 1.4VA/1.2VA (50Hz/60Hz).
DC abt. 0.9W.
Coil Temperature Rise: AC 60°C max.
DC 50°C max.
Max. Coil Power: 110% of nominal voltage.

Coil Data@ 20°C

PCL AC Coil				
Rated Coil Voltage (VAC)	**Coil Resistance (ohms)±10%**	**Must Operate Voltage (VAC)**	**Must Release Voltage (VAC)**	**Nominal Coil Power (VA)**
6	10	80% max.	30% min.	abt. 1.4
12	40			
24	160			
48	600			
100	2,800			
110/120	3,400			
200	11,000			
220/240	13,600			

PCL DC Coil				
Rated Coil Voltage (VDC)	**Coil Resistance (ohms)±10%**	**Must Operate Voltage (VDC)**	**Must Release Voltage (VDC)**	**Nominal Coil Power (W)**
6	40	80% max.	10% min.	abt. 0.9
12	160			
24	650			
48	2,600			
100/110	11,000			abt. 1.1

Operate Data @ 20°C

Must Operate Voltage: AC 80% of nominal voltage or less.
DC 80% of nominal voltage or less.
Must Release Voltage: AC 30% of nominal voltage or more.
DC 10% of nominal voltage or more.
Operate Time: AC 20ms max.
DC 15ms max.
Release Time: AC 20ms max.
DC 8ms max.

Environmental Data

Temperature Range:
Operating: -10°C to +55°C.
Humidity: 45 to 85%. (Non-condensing).
Vibration, Operational: 10 to 55Hz 1.0mm double amplitude.
Mechanical: 10 to 55Hz 1.0mm double amplitude.
Shock, Operational: 100m/s^2 (abt. 10G).
Mechanical: 1,000m/s^2 (abt. 100G).

Mechanical Data

Termination: Plug-in, PCB.
Enclosure: Snap-on cover.
Weight: 1.26 oz (32g) approximately.

Ordering Information

Typical Part Number	PCL	-2	02A	1		S		,000

1. Basic Series:
PCL = 3A, 5A type PCLH = 10A,15A type

2. Number of Poles:
1 = 1 pole (PCLH only) 2 = 2 pole 4 = 4 pole (PCL only)

3. Coil Voltage:

01A=6VAC	02A=12VAC	03A=24VAC	04A=48VAC	
05A=100VAC	06A=110/120VAC	07A=200VAC	08A=220/240VAC	
01D=6VDC	02D=12VDC	03D=24VDC	04D=48VDC	05D=100/110VDC

4. Contact Material:
Blank = Ag (only available on 4 pole model) 1 = Ag Alloy (available with all versions)

5. Contact Arrangement:
Blank = Form C M = Form A

6. Case Type:
S = Standard (Smoke color) F = Flange mount (Smoke color)

7. Terminal Type:
Blank = Plug-in P = PCB

8. Indicator Lamp:
Blank = None L = Indicator Lamp

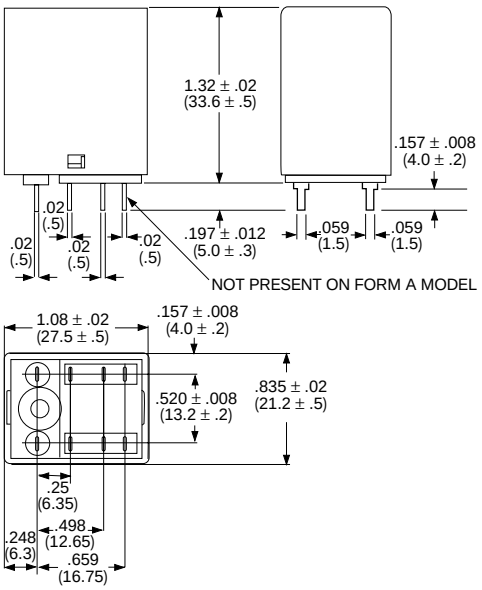
9. Option:
,000 = Standard model Other suffix = Custom model.

Our authorized distributors are more likely to stock the following items for immediate delivery.

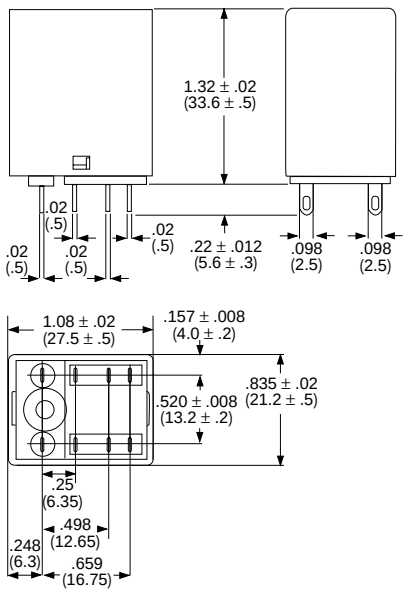
PCLH-202A1S,000
PCLH-203A1S,000
PCLH-206A1S,000
PCLH-208A1S,000
PCLH-202D1S,000
PCLH-203D1S,000
PCLH-204D1S,000
PCLH-205D1S,000
PCLH-206A1SP,000
PCLH-202D1SP,000
PCLH-203D1SP,000
PCLH-205D1SP,000

Outline Dimsisions

PCL 2c, 2a type (PCB Terminal)



PCL 2c, 2a type (Plug-in Terminal)



Dimensions are shown for reference purposes only.

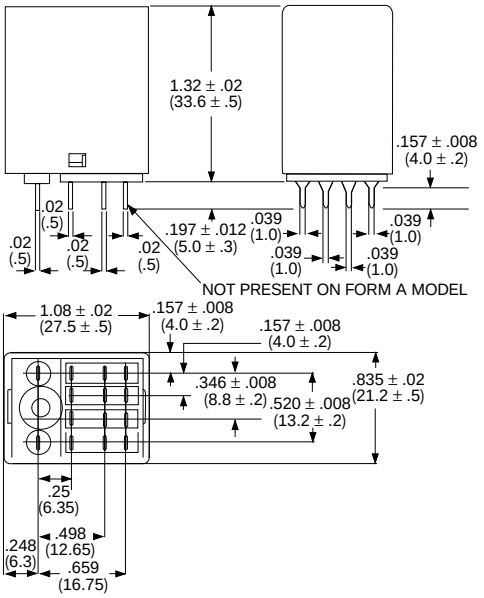
Dimensions are in inches over (millimeters) unless otherwise specified.

Specifications and availability subject to change.

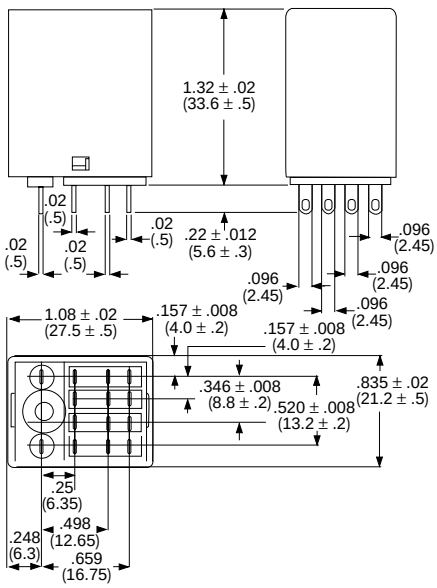
www.tycoelectronics.com
Technical support:
Refer to inside back cover.

Outline Dimensions (continued)

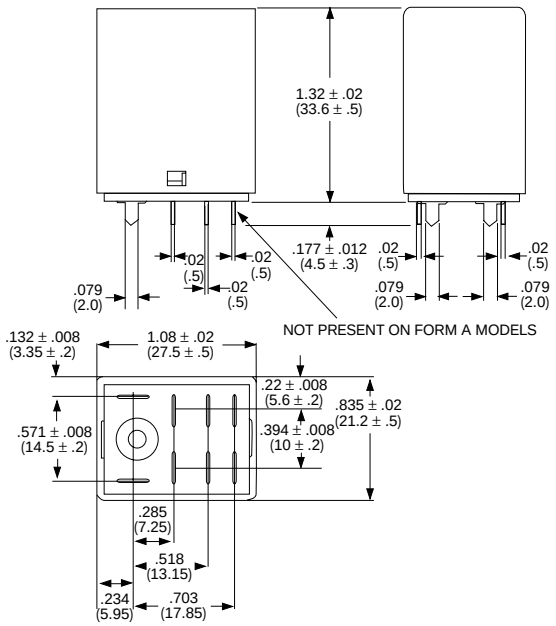
PCL 4c, 4a type (PCB Terminal)



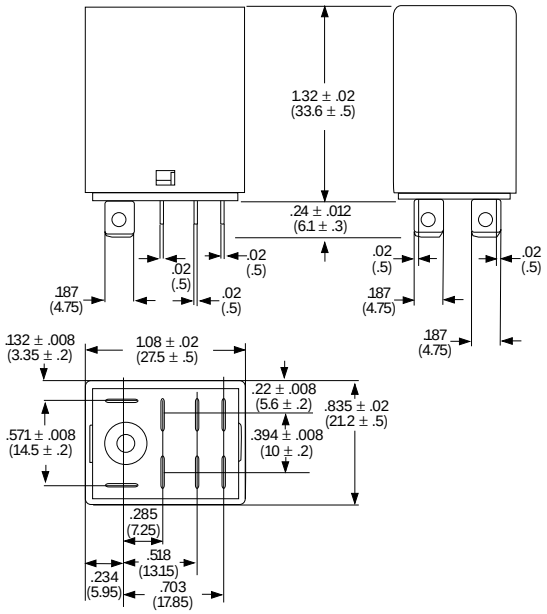
PCL 4c, 4a type (Plug-in Terminal)



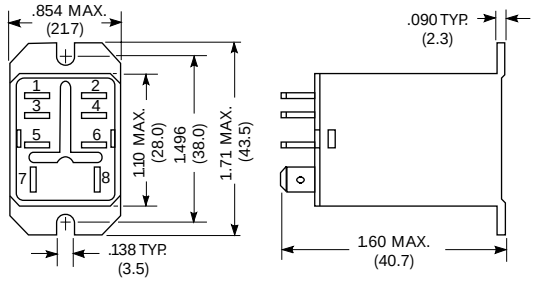
PCLH type (PCB Terminal)



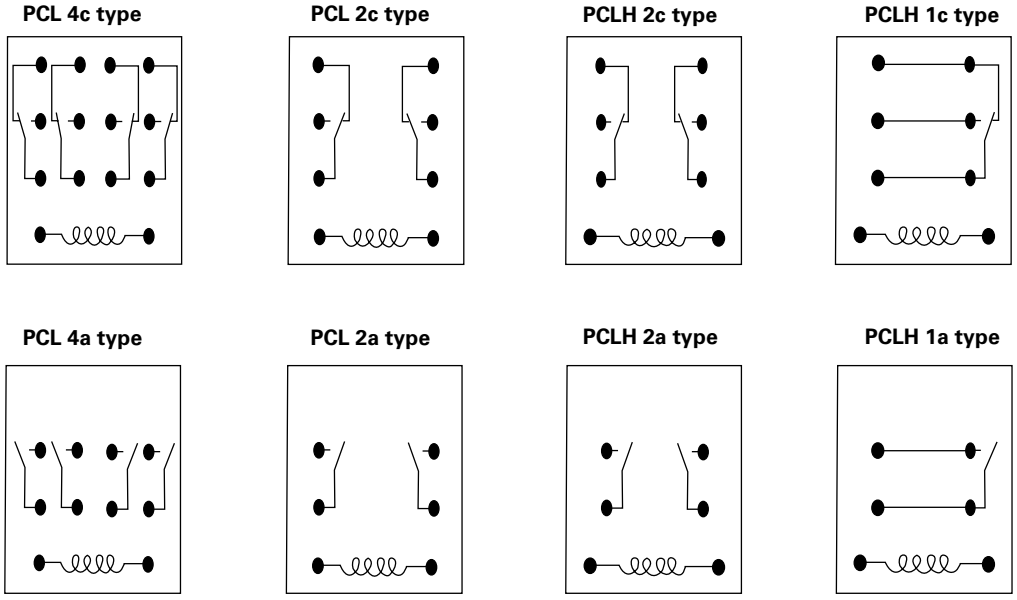
PCLH type (Plug-in Terminal)



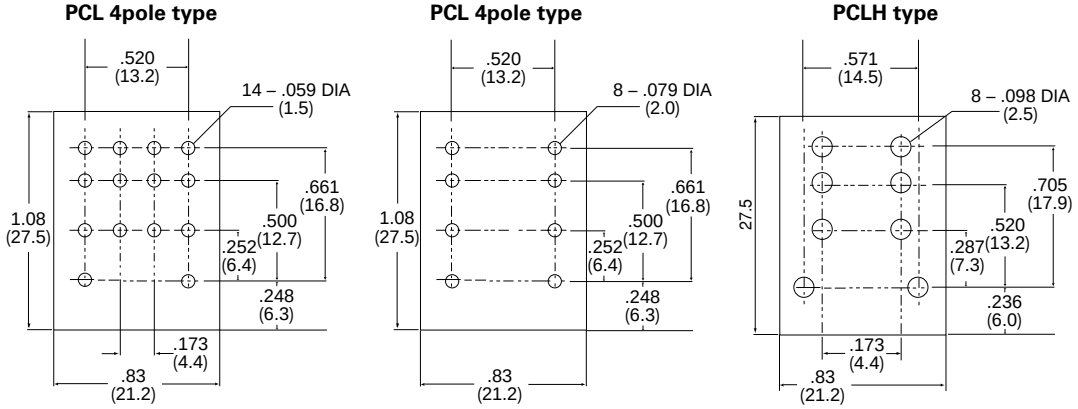
PCLH type (Flange Mount Case)



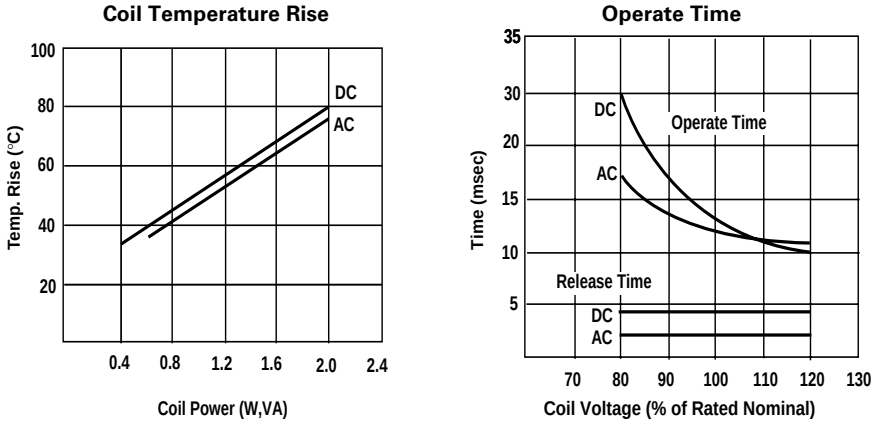
Wiring Diagrams (Bottom Views)



PC Board Layouts (Bottom Views)



Reference Data



Sockets

For PCL socket information refer to KH series sockets (page 712).
For PCLH socket information refer to K10 series sockets (page 722).

Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.
www.tycoelectronics.com
Technical support:
Refer to inside back cover.



PT series

6 to 12 Amp Miniature Relay
2, 3 or 4 Pole, PCB or Plug-in

c UL us UL File E79990

VDE NR 5353

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- Low profile height of 29mm.
- DPDT, 3PDT or 4PDT contact arrangements.
- Greater switching performance – up to 3,000VA.
- AC and DC coils.
- Mechanical indicator.
- Manual test tab with locking option available.

Contact Data @ 20°C

Arrangements: 2 Form C (DPDT), 3 Form C (3PDT) and 4 Form C (4PDT).
Material: Silver-nickel 90/10 with optional gold plating.
Minimum Load: Silver-nickel 90/10: 10mA @ 12V.
Silver-nickel 90/10 with gold plating: 1mA @ 20mV.
Expected Mechanical Life: DC coil 30 million operations minimum.
AC coil 20 million operations minimum.

Ratings:

Arrangement	2 Form C	3 Form C	4 Form C
Rated Current	12A	10A	6A
Rated Voltage	250VAC	250VAC	250VAC
Maximum Switching Voltage	440VAC	440VAC	440VAC
Rated Breaking Capacity	3,000VA	2,500VA	1,500VA
Maximum Make Current	24A	20A	12A

Initial Dielectric Strength

Between Open Contacts: 1,500VAC.
Between Coil and Contacts: 2,500VAC; 5,000V surge (1.2 / 50µs).
Between Poles: 2 and 3 Pole:2,500VAC, 4 Pole: 2,000VAC.

DC Coil Data @ 20°C

Nominal Coil Power: 750mW

Nominal Voltage VDC	DC Resistance in Ohms ±10%	Must Operate Voltage VDC	Drop-out Voltage VDC	Nominal Coil Current (mA)
06	48	4.5	0.6	125.0
12	192	9.0	1.2	62.5
24	777	18.0	2.4	30.8
48	3,072	36.0	4.8	15.6
60	4,845	45.0	6.0	12.4
110	16,133	82.5	11.0	6.8
220	64,533	165.0	22.0	3.4

AC Coil Data @ 20°C

Nominal Coil Power: 1.0VA @ 50 Hz. / 0.86VA @ 60 Hz.

Nominal Voltage VAC	DC Resistance in Ohms ±10%	Must Operate Voltage (VAC) 50 Hz / 60 Hz	Drop-out Voltage VAC	Nominal Coil Current (mA) 50 Hz. / 60 Hz.
06	11	4.8 / 5.4	1.8	166.5 / 141
12	48	9.6 / 10.8	3.6	83.3 / 70.5
24	192	19.2 / 21.6	7.2	41.6 / 33.0
48	777	38.4 / 43.2	14.4	21.3 / 18.2
60	1,306	48.0 / 54.0	18.0	16.7 / 14.5
115	4,845	92.0 / 103.5	34.5	8.8 / 7.5
230	19,465	184.0 / 207.0	69.0	4.3 / 3.9

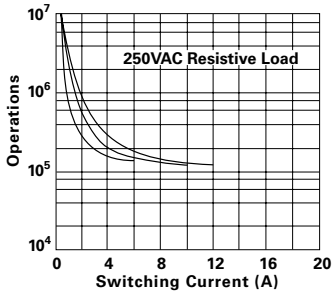
Operate Data

Must Operate Voltage: See Coil Data table.
Operate Time : 15 ms typical, at nom. voltage.
Release Time : 10 ms typical, at nom. voltage.
Bounce Time: 5 ms typical, at nom. voltage.
Switching Rate: 6 ops./minute max. at rated load.

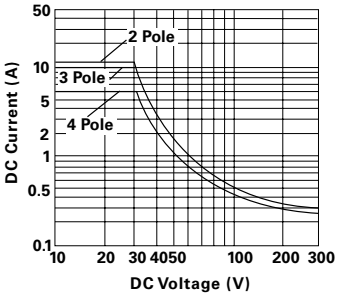
Environmental Data

Temperature Range:
Storage: -45°C to +80°C.
Operating: -45°C to +70°C.
Vibration: 55 to 150 Hz. at 7g N/O, 4g N/C.
Operational Shock: 20g N/O, 5g N/C.
Mechanical Shock: 50g.

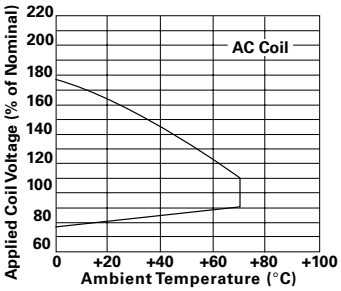
Electrical Life

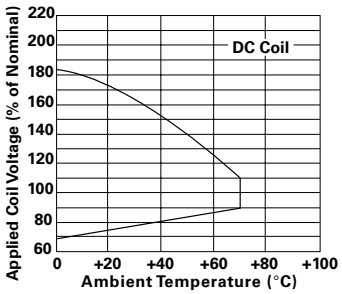


Max. DC Load Breaking Capacity (resistive load)



Coil Operating Range





Ordering Information

Typical Part Number ▶	PT	2	7	0	024

1. Basic Series:
PT = General purpose relay.

2. Contact Arrangement:
2 = 2 Form C (DPDT) 3 = 3 Form C (3PDT) 5 = 4 Form C (4PDT)

3. Contact Material and Test Button Option:
2 = Silver-Nickel 90/10, no test button.
3 = Silver-Nickel 90/10, with gold plating, no test button.
7 = Silver-Nickel 90/10 with locking test button.
8 = Silver-Nickel 90/10, with gold plating, and locking test button.

4. Termination:
0 = Socket mount, solder terminals. 1 = Printed circuit board terminal.

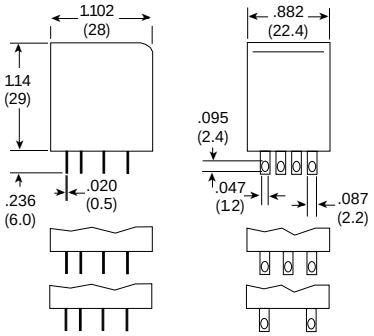
5. Coil Voltage:
006 = 6VDC 012 = 12VDC 024 = 24VDC 048 = 48VDC 060 = 60VDC 110 = 110VDC 220 = 220VDC
506 = 6VAC 512 = 12VAC 524 = 24VAC 548 = 48VAC 560 = 60VAC 615 = 115VAC 730 = 230VAC

Our authorized distributors are more likely to stock the following items for immediate delivery.

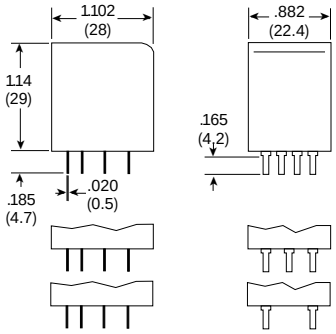
PT220024	PT221024	PT270024	PT320024	PT321024	PT370024	PT520024	PT521024	PT570024	PT580024
PT220524	PT221524	PT270524	PT320524	PT321524	PT370524	PT520524	PT521524	PT570524	PT580524
PT220615	PT221615	PT270615	PT320615	PT321615	PT370615	PT520615	PT521615	PT570615	PT580615

Outline Dimensions

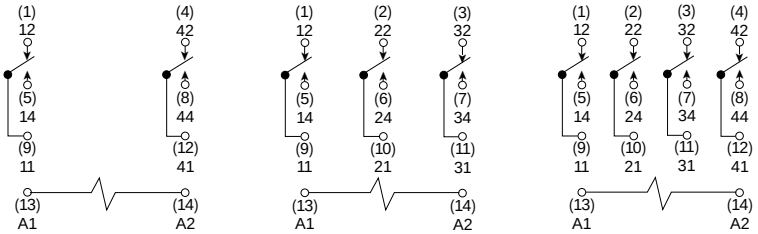
Socket Mount, Solder Terminals



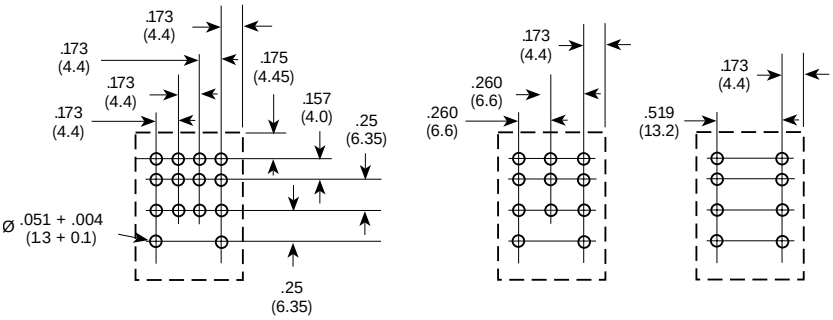
Printed Circuit Board Terminals



Wiring Diagrams (Bottom Views)

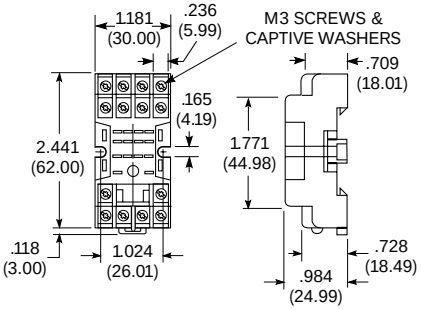


PC Board Layout (Bottom Views)

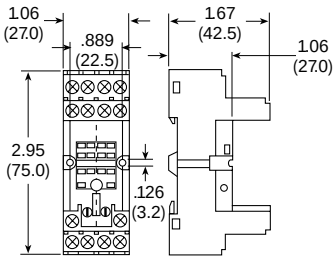


Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.
www.tycoelectronics.com
Technical support:
Refer to inside back cover.

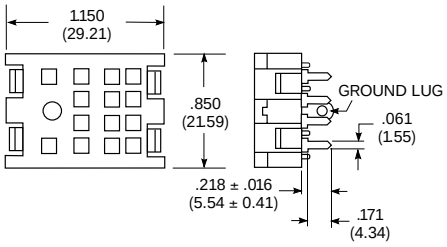
27E894
DIN Rail Socket with Screw Terminals, 4 pole



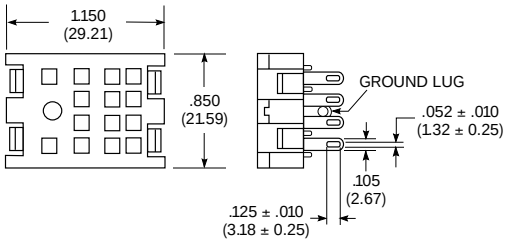
PT78702, PT78703, PT78704 (2, 3 and 4 Pole)
DIN Rail Socket with Screw Terminals



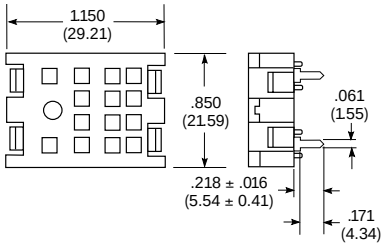
27E023
4 Pole Socket with PCB Terminals



27E006
4 Pole Socket with Solder Terminals



27E220
2 Pole Socket with PCB Terminals



Socket Selection Table
Stock items are boldfaced.

Socket Part No.	Socket Termination	Mounting Style	No. of Poles	Accepts Modules?
27E894	Screw Terminals	DIN-rail	4	No
PT78702	Screw Terminals	DIN-rail	2	Yes
PT78703	Screw Terminals	DIN-rail	3	Yes
PT78704	Screw Terminals	DIN-rail	4	Yes
27E006	.375 (9.53) Solder Terminals	Panel Cutout	4	No
27E220	.218 (5.54) Solder Terminals	PC Board	2	No
27E023	.218 (5.54) PCB Terminals	PC Board	4	No

LED and Protection Module Selection Table
Stock items are boldfaced.

Module Part No.	Type
RPM T0 0A0	Protection diode 1N4007 (Note 1)
RPM U0 548	RC network 24-48VAC
RPM U0 730	RC network 110-230VAC
RPM L0 024	LED 12-24VDC (Note 1)
RPM L0 524	LED 12-48VAC/VDC
RPM L0 110	LED 110VDC (Note 1)
RPM L0 730	LED 110-230VAC

Note 1: Standard polarity: A1: +, A2: –



K10 series

15 Amp General Purpose Miniature Relay

File E22575
File LR15734

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- K10 - DPDT contact arrangement standard.
- AC and DC coils.
- Mounting options include socket, PCB, top flange.
- UL Class B coil insulation system.

Coil Data

	DC Coils		AC Coils	
Nominal Voltage	**Resistance in Ohms ± 10%**	**Nominal Current in Milliamps**	**Resistance in Ohms ± 15%**	**Nominal Current in Milliamps**
6	40	150	10.5	200
12	160	75	43	100
24	650	37	160	52
48	2,600	18.5	668	26
110	11,000	10	___	___
120*	___	___	3,900	11
240*	___	___	12,000	6

*For 220/240VDC operation, use 11,000 Ohm, 5 Watt dropping resistor in series with the 110VDC coil.

Contact Data @ 25°C

Materials: Silver-cadmium oxide.
Expected Life: 10 million operations, mechanical; 100,000 operations minimum at rated loads.

Contact Ratings

Contact Code	Material	UL/CSA Ratings	Type
5	Silver-cadmium oxide	15A @ 30VDC 15A @ 120VAC 10A @ 277VAC 1/3HP @ 120VAC 1/2HP @ 250VAC	Resistive Resistive Resistive

Operate Data @ 25°C

Must Operate Voltage:
DC Coils: 75% of nominal voltage.
AC Coils: 85% of nominal voltage.
Operate Time (Excluding Bounce): 13 milliseconds, typical, at nominal voltage.
Release Time (Excluding Bounce): 6 milliseconds, typical, at nominal voltage.

Initial Dielectric Strength

Between Open Contacts: 1,000V rms.
Between Adjacent Contacts: 1,500V rms.
Between Contacts and Coil: 1,500V rms.

Environmental Data

Temperature Range:
Storage: -60°C to +105°C.
Operating: -45°C to +70°C.

Coil Data @ 25°C

Nominal Power:
DC Coils: .9 Watts.
AC Coils: 1.2VA.
Maximum Power: 2.0 Watts.
Duty Cycle: Continuous.
Insulation: Class B: (130°C).

Mechanical Data

Mounting: Socket mount, printed circuit board, top flange.
Termination: .187" (4.75mm) quick connect/solder terminals, or printed circuit terminals.
Enclosure: Smoke-color polycarbonate dust cover.
Weight: 1.8 oz. (51g) approximately.

Ordering Information

	Typical Part No. ▶	K10	P	-11	D	1	5	-6

1. Basic Series:
K10 = 15 amp miniature relay.

2. Cover:
P = Polycarbonate (smoke color).

3. Contact Arrangement:
11 = 2 Form C (DPDT)

4. Coil Input:
A = 50/60 Hz. AC D = DC

5. Mounting & Termination:
1 = Socket mount; .187" (4.75mm) quick connect/solder terminals.
5 = Printed circuit terminals; .160" length.
T = Mounting bracket on end of cover; .187" (4.75mm) quick connect/solder terminals.

6. Contact Type:
5 = 15 amp silver-cadmium oxide

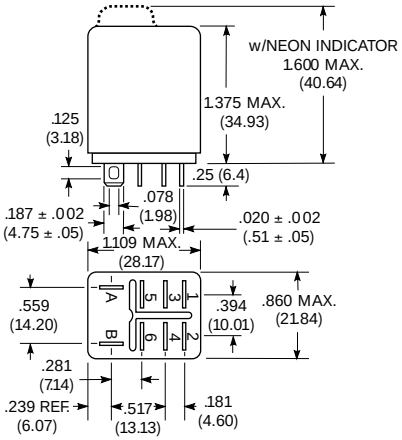
7. Coil Voltage:
To 240VAC or 110VDC, see coil data table.

Our authorized distributors are more likely to stock the following items for immediate delivery.

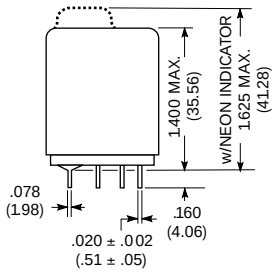
K10P-11A15-6	K10P-11D15-6	K10P-11D55-24
K10P-11A15-12	K10P-11D15-12	K10P-11D55-110
K10P-11A15-24	K10P-11D15-24	K10P-11DT5-12
K10P-11A15-120	K10P-11D15-110	K10P-11DT5-24
K10P-11AT5-120	K10P-11D55-12	

Outline Dimensions

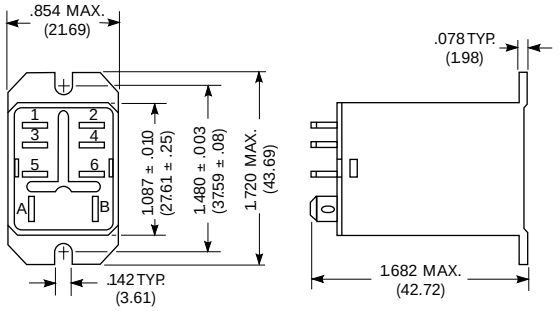
Mounting Code 1
Socket Mount



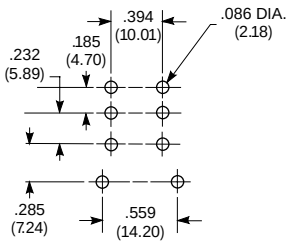
Mounting Code 5
Printed Circuit Terminals



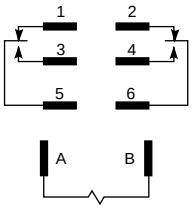
Mounting Code T



PC Board Layout



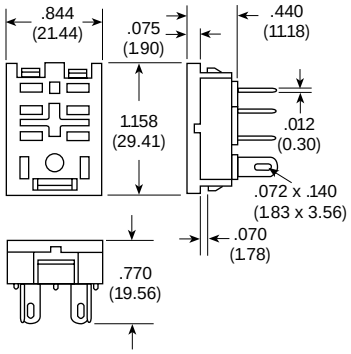
Wiring Diagram



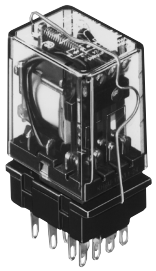
Sockets and Accessories for K10 Relays

Sockets for K10 series relays are rated 10 amps, and are UL recongnized, File E59244, and CSA certified, File LR15734.

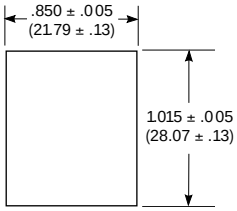
27E488
Pierced Solder Terminals



20C217
Hold Down Spring For 27E488 & 27E489



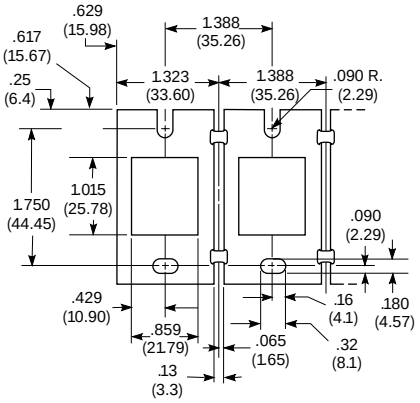
Chassis Cutout For Mounting 27E488 Socket



Recommended chassis thickness .039" (.99mm) to .079" (2.01mm).

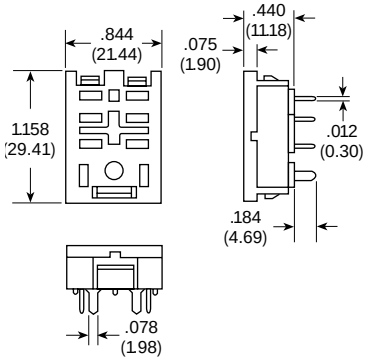
Socket punch Greenlee part 5015115.0, Type 731R available from Greenlee Tool Co., Rockford, Illinois.

37D633
Mounting Strip

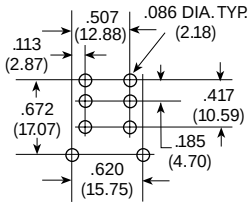


37D633 will mount eight 27E488 sockets in one length of aluminum strip measuring 10.97" x 2.25" x .062". (278.64 x 57.15 x 1.57)

27E489
Printed Circuit Terminals



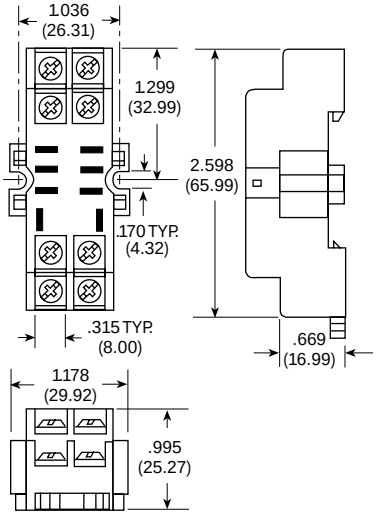
P.C. Board Layout For Socket



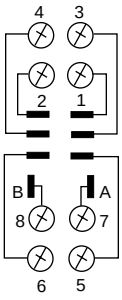
Note: P.C. terminal socket will also fit P.C. board layout for relay. However, in order to accomplish this, terminals must be formed accordingly.

Caution: Printed circuit sockets are manufactured with "floating" (loose) terminals. This permits them to align with holes in the circuit board and with the relay terminals. During the mounting and soldering of the socket, vertical float should be eliminated and the terminals seated on the board. (This may be accomplished by inserting a dummy relay in the socket.) Failure to eliminate float may cause fracture of the solder joint or separation of the copper conductor from the printed circuit board when a relay is inserted in the socket after soldering.

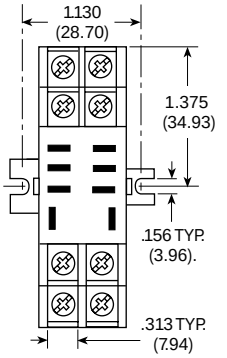
27E895
Screw Terminals, DIN Rail Snap-Mount
(Use with mounting track 24A110)

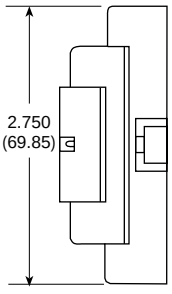


Terminal Location

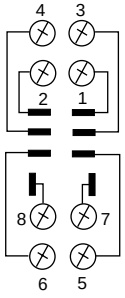


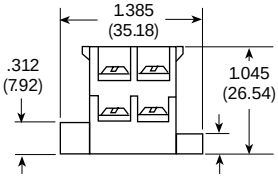
27E487
Screw Terminals



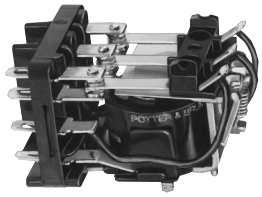


Terminal Location





20C426
Hold Down Spring
For 27E487 & 27E895





KU series

KUP Enclosed Relay
KUIP VDE 8mm Coil to Contacts
KUGP VDE 8mm 3mm Gap Coil to Contacts
KUEP 10 Amp 150VDC Load Switching
KUMP 15 Amp 277VAC

File E22575
File LR15734
0435 Registration 1792 (KUIP)
0435 Registration 1792 (KUGP)
License 81.12102.01

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- AC coils: 6-240VAC, 50/60 Hz. DC: 6-110VDC.
- Contact arrangement up to 4PDT.
- Wide selection of termination and mounting styles.
- PC terminals available.
- Push to test button and indicator lamps.
- KUEP incorporates a blow out magnet for high voltage DC switching.
- KUIP/KUGP are VDE approved.
- Complete line of sockets and DIN rail.
- Class B coil insulation.

Contact Data @ 25°C

Arrangements: See respective ordering information table.
Materials: Fine silver (5 amp) silver-cadmium oxide (10 amp).
Gold flash available as standard.
Gold diffused and gold alloy on special order.
Expected Mechanical Life:

Contact Ratings

Material	Arrangement	UL/CSA Ratings	Expected Life
Fine Silver	All	5 amps @ 28VDC or 240VAC 80% PF, 2.5 amp tungsten @120VAC, 1/2 amp @ 120VDC.	100,000
		1/6 HP @120VAC, 1/3 HP @ 240VAC, 5 FLA, 15 LRA @ 250VAC (FLA covered by 30,000 operations).	
Silver-Cadmium Oxide	1-2 Pole KUP KUIP KUGP	10 amps @ 28VDC or 240VAC, 80% PF, 5 amp tungsten @ 120VAC, 3A 600VAC, 1/2 amp @ 120VDC.	100,000
	KUEP All KUMP	1/3 HP @ 120VAC, 1/2 HP @ 240, 480, and 600VAC, 10 FLA 30 LRA @ 120VAC, 5 FLA, 15 LRA @ 250VAC.(FLA ratings covered by 30,000 operations)	
	KUMP	15 amp @ 277VAC, 80% PF KUM KUMP	100,000
	3 Pole KUP KUIP	10 amp @ 28VDC or 120VAC, 80% PF, 6 2/3 amp @ 240VAC, 80% PF	100,000
	4 Pole	10 amp per pole not to exceed 30 amp total @ 28VDC, 120VAC, 80% PF, 6 2/3 amp @ 240VAC, 80% PF	100,000
	KUEP SPST-NO	10 amp @ 150VDC	
	KUEP 2PST-NO	5 amp @ 150VDC	
	KUEP 2PDT	3 amp @ 150VDC	100,000

(All other AC ratings apply KUEP.)

Initial Dielectric Strength

Between Open Contacts: 1,200V rms; KUGP, 3,500V rms.
Between Adjacent Contacts: 2,200V rms.
Between Contacts and Coil: 2,200V rms; KUGP, KUIP, 3,750V rms.

Coil Data @ 25°C

Voltage: 6 to 110VDC and 6 to 240VAC.
Nominal Coil Power:
DC Coils: 1.2 Watts - KUP, KUIP, KUMP, 1 - 3 pole; KUEP, 1 pole.
DC Coils: 1.8 Watts - KUP, 4 pole; KUEP, 2 pole; KUGP.
AC Coils: 2.0VA - KUP, KUIP, 1 - 2 pole; KUEP, 1 pole.
AC Coils: 2.7VA - KUP, KUIP, 3 pole; KUEP, 2 pole; KUGP, KUMP.

Coil Data

DC Volts	1.2 Watt		1.8 Watt	
Nominal	DC Ohms ± 10%	Nom. I ma	DC Ohms ± 10%	Nom. I ma
5	21	238	14	360
6	32.1	187	20	300
12	120	100	80	150
24	472	51	320	75
48	1,800	26.7	1,260	38
110	10,000	11	6,720	16
AC Volts	**2VA**		**2.7VA**	
Nominal	**DC Ohms ± 15%**	**Nom. I ma**	**DC Ohms ± 15%**	**Nom. I ma**
6	6	335	4.2	460
12	24	168	18	230
24	85	84	72	115
120	2,250	17.5	1,700	24
240	9,110	8.75	7,200	12

Operate Data @ 25°C

Must Operate Voltage:
DC Coils: 75% of nominal voltage or less.
AC Coils: 85% of nominal voltage or less.
Operating Time (Excluding Bounce):
15 milliseconds, typical, at nominal voltage.
Release Time (Excluding Bounce):
10 milliseconds, typical, at nominal voltage.

Environmental Data

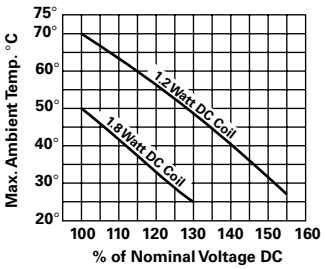
Temperature Range:
Operating: **Enclosed Relays:** -45°C to maximum listed in table below.
Open Relays: Add 15°C to maximum listed.

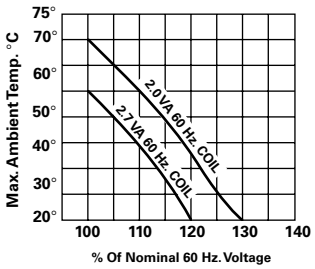
Max C°	+45°C	+50°C	+55°C	+70°C	+75°C	+80°C	+95°C
KUP	AC 3-4 pole	DC 4 pole	AC 1-2 pole	DC 1-3 pole			
KUIP				AC 3 pole		AC 1-2 pole	DC 1-3 pole
KUGP				AC 2 pole	DC 2 pole		
KUEP	AC 2 pole	DC 2 pole	AC 1 pole	DC 1 pole			
KUMP	AC 3 pole		AC 1-2 pole	DC 1-3 pole			

Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.
www.tycoelectronics.com
Technical support:
Refer to inside back cover.

Environmental Data (Continued)

Maximum Allowable Ambient Temperature vs. Voltage (KUP enclosed)





Mechanical Data

Termination: Quick connect, solder and PC board.
Enclosure: Clear polycarbonate dust cover.
Weight: 3.0 oz. (85g) approximately.

Ordering Information

Typical Part No. ▶	KU KUP	-14	A	1	5	F	-120

1. Basic Series & Type:
KU = Basic open relay.
KUP = Basic enclosed relay.

2. Contact Arrangement:
1 = 1A (SPST-NO)
5 = 1C (SPDT)
11 = 2C (DPDT)
14 = 3C (3PDT)
17 = 4C (4PDT)

3. Coil Input:
A = AC 50/60 Hz.
D = DC

4. Mountings:

Type	KU	KUP (through 3 poles)	KUP (4 pole models)
Codes Available	1,3,4	1,2,3,4,5, A,E,T	1,3,5,A,E

KU:
OPEN STYLE
1 = #6-32 stud, .218" (5.54mm) locating tab.
3 = #6-32 tapped core, .125" (3.18mm) locating tab.
4 = #6-32 tapped core, .218" (5.54mm) locating tab.

KUP (through 3 poles):
1 = PLAIN CASE;
2 = with test button.
3 = with indicator lamp.*
4 = with test button & indicator lamp.*
5 = BRACKET MOUNT CASE.
A = PLAIN CASE, #6-32 stud, locating tab.
E = PLAIN CASE, tapped core, locating tab.
T = TOP FLANGE CASE.

* Indicator lamps are available on models with the following coils: 6-24VAC and DC, 110VDC and 120-240VAC. Only models with 120-240VAC coils are UL recognized.

5. Terminal & Contact Material:

Type	1 & 2 Pole Models	3 Pole Models	4 Pole Models
Codes Available	1, 5, 7, K	1, 5, 7	1**, 5**,7, 9

**4 pole KUP with .187" (4.75mm) quick connect/solder terminals will not plug into sockets. Must use .110" (2.79 mm) quick connect solder terminals for socket mounting.

1 = .187" (4.75mm) quick-connect/solder; silver, 5 amps.
5 = .187" (4.75mm) quick connect/solder; silver-cadmium oxide, 10 amps.
7 = .047" (1.19mm) printed circuit; silver-cadmium oxide, 10 amps.
9 = 4 pole KU, KUP: .110" (2.79mm) quick connect/solder; silver-cadmium oxide, 10 amps.
K = .250" (6.35mm) quick connect; silver-cadmium oxide, 10 amps.

5A. Gold Flashed Contact Option:
F = Optional gold flashing for silver and silver-cadmium oxide contacts.

6. Coil Voltage:
To 240VAC, 50/60 Hz. or 110VDC.

Our authorized distributors are more likely to stock

KUP-5A15-24	KUP-11A15-12	KUP-11D15-5	KUP-11D55-110	KUP-14A55-24	KUP-14D25-24
KUP-5A15-120	KUP-11A15-24	KUP-11D15-12	KUP-14A11-120	KUP-14A55-120	KUP-14D35-24
KUP-5A15-240	KUP-11A15-120	KUP-11D15-24	KUP-14A15-12	KUP-14A55-240	KUP-14D55-12
KUP-5A55-120	KUP-11A15-240	KUP-11D15-110	KUP-14A15-24	KUP-14D11-24	KUP-14D55-24
KUP-5D15-12	KUP-11A35-120	KUP-11D35-24	KUP-14A15-120	KUP-14D15-6	KUP-17A19-120
KUP-5D15-24	KUP-11A55-24	KUP-11D55-6	KUP-14A15-240	KUP-14D15-12	KUP-17A55-24
KUP-5D55-12	KUP-11A55-120	KUP-11D55-12	KUP-14A25-120	KUP-14D15-24	KUP-17D19-24
KUP-5D55-24	KUP-11AT5-120	KUP-11D55-24	KUP-14A35-120	KUP-14D15-48	KUP-17D55-24
KUP-11A11-120	KUP-11D11-24	KUP-11D55-48	KUP-14A45-120	KUP-14D15-110	

Ordering Information

VDE Approved Design

Typical Part No. ▶	KUIP KUGP	-5	A	5	5	-120

1. Basic Series & Type:
KUIP = Enclosed relay designed for General VDE 0435.*
KUGP = Enclosed relay with 3mm open contact spacing. (Form A and Form X arrangements only)*

2. Contact Arrangement:
5 = 1 Form C (SPDT)*
7 = 2 Form A (DPST-NO)
11 = 2 Form C (DPDT)*
14 = 3 Form C (3PDT)*

3. Coil Input:
A = AC, 50/60 Hz.*
D = DC*

4. Mountings:
1 = PLAIN CASE, SOCKET MOUNT.*
5 = BRACKET MOUNT CASE.*
T = TOP FLANGE CASE.*

5. Terminal & Contact Material:
3 = .047" (119mm) printed circuit board; silver.
5 = .187" (4.75mm) quick connect/solder; silver-cadmium oxide.*

6. Coil Voltage:
To 240VAC, 50/60 Hz. or 110VDC. (For 277VAC, consult factory.)*
See coil data tables.

* Options included in VDE file.

Our authorized distributors are more likely to stock the following items for immediate delivery.

KUGP-7D55-24
KUIP-5A55-120
KUIP-11D55-12
KUIP-11D55-24
KUIP-14A15-120
KUIP-14D15-12
KUIP-14D15-24

Ordering Information

High Voltage DC Switching

Typical Part No. ▶	KUEP	-3	A	1	5	-120

1. Basic Series & Type:
KUEP = Enclosed relay with magnetic blow-outs.

2. Contact Arrangement:
3 = 1X (SPST-NO-DM)
7 = 2A (DPST-NO)
11 = 2C (DPDT)

3. Coil Input:
A = AC 50/60 Hz.
D = DC

4. Mountings:
1 = PLAIN CASE;
3 = with indicator lamp.*
5 = BRACKET MOUNT CASE
T = TOP FLANGE CASE.

*Indicator lamps are available on models with the following coils: 6-24VAC and DC, 110VDC and 120-240VAC. Only models with 120-240VAC coils are UL recognized.

5. Terminal & Contact Material:
5 = .187" (4.75mm) quick connect/solder; silver-cadmium-oxide.
7 = .047' (119mm) printed circuit; silver-cadmium-oxide.

6. Coil Voltage:
To 240VAC, 50/60 Hz. or 110VDC. (For 277VAC, consult factory.)

Our authorized distributors are more likely to stock the following items for immediate delivery.

KUEP-3A15-120
KUEP-3D15-12
KUEP-3D15-24
KUEP-3D15-110
KUEP-7D15-24
KUEP-11A15-120
KUEP-11D15-12
KUEP-11D15-24

Ordering Information

15 Amp Switching

Typical Part No. ▶	KUM KUMP	-14	A	1	8	-120

1. Basic Series & Type:
KUM = 15 amp open relay
KUMP = 15 amp enclosed relay

2. Contact Arrangement:
1 = 1A (SPST-NO)
2 = 1B (SPST-NC)
3 = 1X (SPST-NO-DM)
4 = 1Y (SPST-NC-DB)
5 = 1C (SPDT)
6 = 1Z (SPDT-NC-NO [DB-DM])
7 = 2A (DPST-NO)
8 = 2B (DPST-NC)
11 = 2C (DPDT)
12 = 3A (3PST-NO)
13 = 3B (3PST-NC)
14 = 3C (3PDT)

3. Coil Input:
A = AC, 50/60 Hz. D = DC

4. Mountings:

Type KUM	KUMP	
OPEN STYLE 1 = #6-32 stud, .218" (5.54mm) locating tab. 2 = 2-hole bracket, #6-32 tapped. 3 = #6-32 tapped core, .125" (3.18mm) locating tab. 4 = #6-32 tapped core, .218" (5.54mm) locating tab. 5 = #6-32 tapped core, no locating tab.	1 = PLAIN CASE; 2 = with test button. 3 = with indicator lamp.* 4 = with test button & indicator lamp.* 5 = BRACKET MOUNT CASE; 6 = with test button. 7 = with indicator lamp.* 8 = with test button & indicator lamp.* 9 = STUD ON END OF PLAIN CASE.	A = PLAIN CASE, #6-32 STUD LOCATING TAB; B = with test button. C = with indicator lamp.* D = with test button & indicator lamp.* E = PLAIN CASE, TAPPED CORE, LOCATING TAB; F = with test button. G = with indicator lamp.* H = with test button & indicator lamp.* T = TOP FLANGE CASE.
	*Indicator lamps are available on models with the following coils: 6-24VAC and DC, 110VDC and 120-240VAC. Only models with 120-240VAC coils are UL recognized.	

5. Terminal & Contact Material:

Type	1 & 2 Pole Models	3 Pole Models
Codes Available	6,8,9,G	6,8,9

6 = .205" (5.21mm) quick connect/solder; silver-cadmium-oxide.
8 = .187" (4.75mm) quick connect/solder; silver-cadmium-oxide.
9 = .047" (1.19mm) printed circuit; silver-cadmium-oxide.
G = .250" (6.35mm) quick connect; silver-cadmium-oxide. (Not available on 3 pole models.)

6. Coil Voltage:
To 240VAC, 50/60 Hz. or 110VDC (For 277VAC, consult factory.)

Our authorized distributors are more likely to stock the following items for immediate delivery.

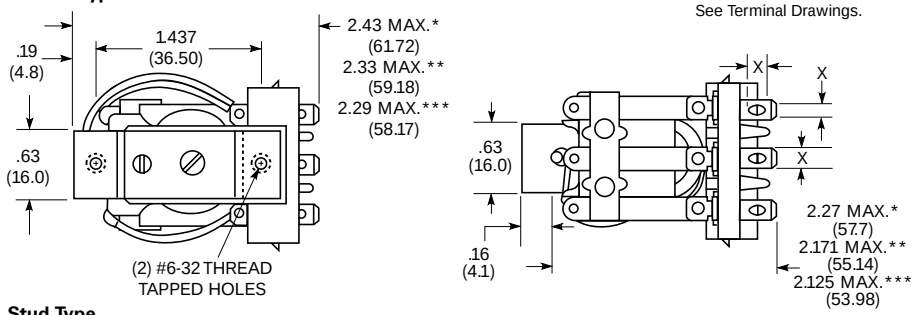
KUMP-11A18-24	KUMP-11D18-12	KUMP-14A18-24	KUMP-14D18-24
KUMP-11A18-120	KUMP-11D18-24	KUMP-14A18-120	
KUMP-11A18-240	KUMP-11D18-110	KUMP-14D18-12	

Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.

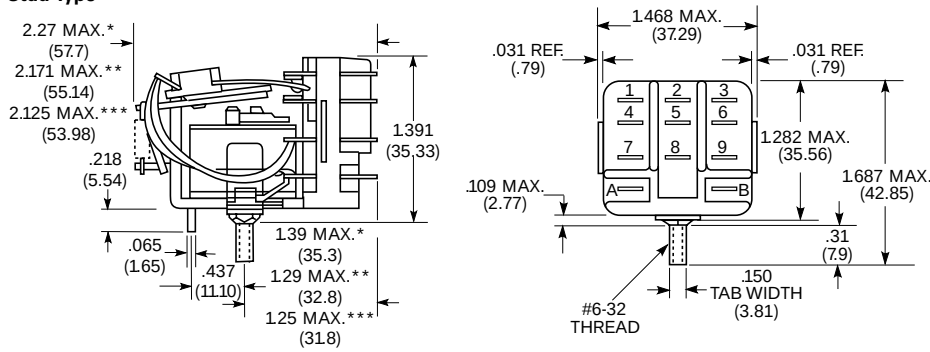
Outline Dimensions

Open Relays

Bracket Type



Stud Type



Seated Heights For Open Relays

1.391" (35.33mm) for #6-32 stud with .218" (5.54mm) locating tab.

1.52" (38.6mm) for bracket with 2-#6 32 tapped holes.

1.282" (32.56mm) for #6-32 tapped core with .125" (3.18mm) or .218" (5.54mm) locating tab.

2.046" (51.97mm) for relay with printed circuit terminals.

STUD TYPE also available with .125" (3.18mm) tab, as well as without stud and locating tab. Models without stud have core tapped #6-32 THREAD, .25" (6.4mm) minimum depth.

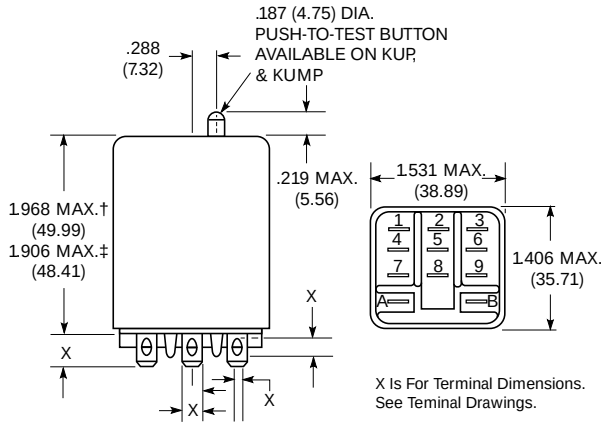
*Dimensions with .250" (6.35mm) terminals.

**Dimensions with .110" (2.79mm) or .205"(5.21mm) terminals.

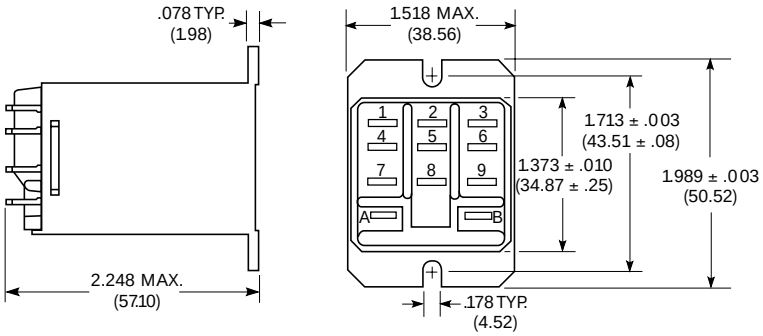
***Dimensions with .187" (4.75mm) terminals.

Enclosed Relays

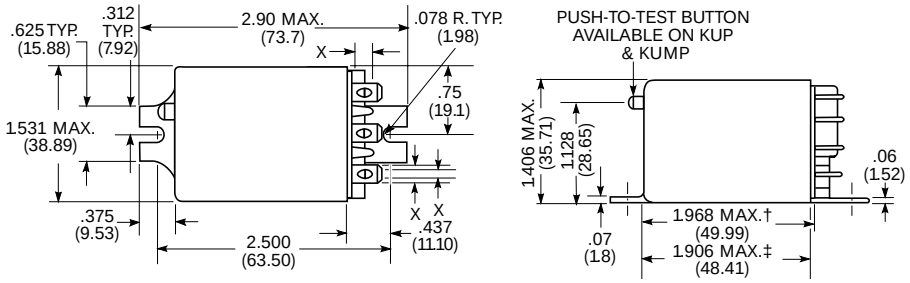
Plain Case



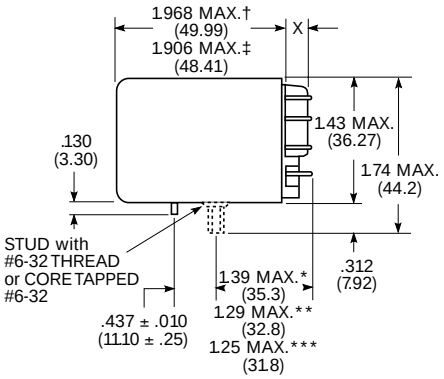
Top Flange Case



Bracket Mount Case



Core and Stud Mount Cases



†Dimensions with .250" (6.35mm) terminals.

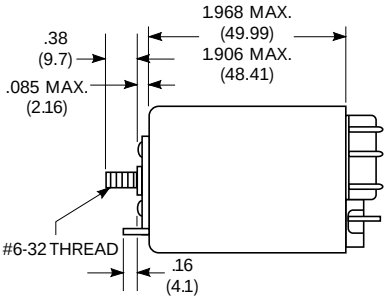
‡Dimensions with .110" (2.79mm), .187" (4.75mm and .205" 5.21mm) terminals.

*Dimensions with .250" (6.35mm) terminals.

**Dimensions with .110" (2.79mm) or .205" (5.21mm) terminals

***Dimensions with .187" (4.75mm) terminals.

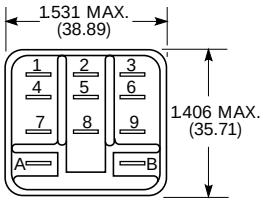
Stud on End Case



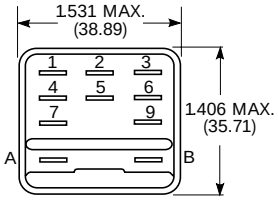
Outline Dimensions (Continued)

Relay Front Diagrams

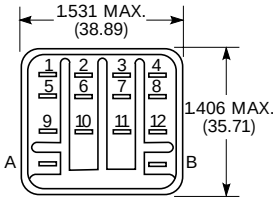
1-3 Pole Relays



Relays With .250" (6.35mm) Terminals

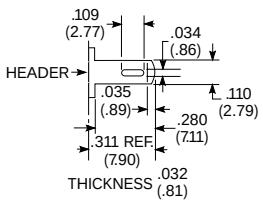


4 Pole Relays

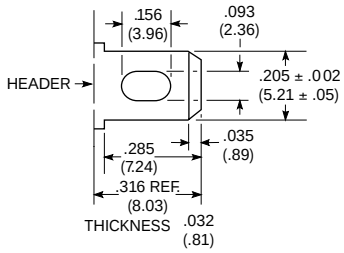


Terminal Dimensions

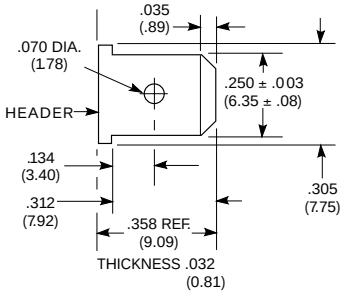
.110" (2.79mm) Quick ConnectQuick Connect



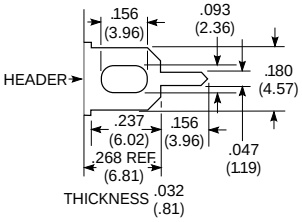
.205" (5.21mm) Quick Connect



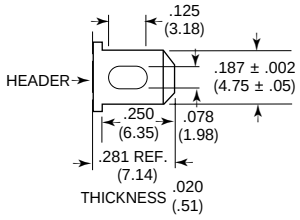
.250" (6.35mm)



Printed Circuit



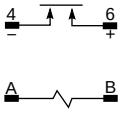
.187" (4.75mm) Quick Connect



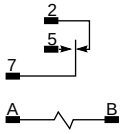
Note: All drawings shown oversize.

Wiring Diagrams

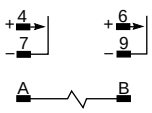
***1 Form X**



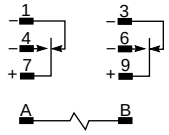
1 Form C



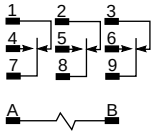
***2 Form A**



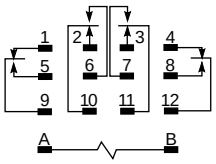
***2 Form C**



3 Form C



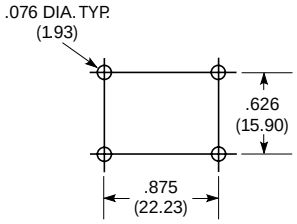
4 Form C



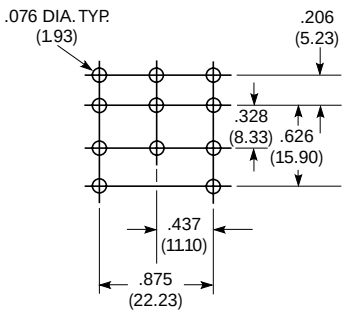
*Recommended Load Polarity for Optimum Arc Suppression.

PC Board Layouts (Bottom Views)

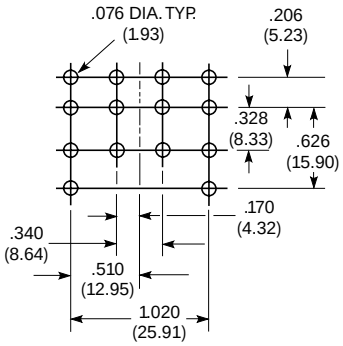
1 Form X



3 Pole Models



4 Pole Models



Dimensions are shown for reference purposes only.

Dimensions are in inches over (millimeters) unless otherwise specified.

Specifications and availability subject to change.

www.tycoelectronics.com
Technical support:
Refer to inside back cover.

Sockets For KU Series Relays Through 3 Poles

Socket Selection Table

Stock items are boldfaced.

For KUP, KUEP, KUGP, KUIP, and KUMP relays, through 3 poles, with .187" (4.75mm) quick connect termination.

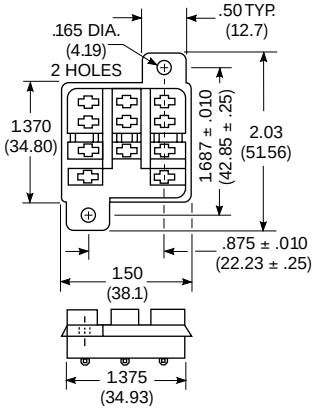
Socket	Socket Termination	Hold-Down Spring
27E043	Solder eyelet	20C228 or 20C254*
27E046	PC board, .144" (3.66mm) terminals	20C228 or 20C254
27E067	.187" (4.75mm) quick connect	20C228 or 20C254
27E121	Screw terminals	20C314 (2 per socket required)
27E305	PC board, .184" (4.67mm) terminals	20C228 or 20C254
27E396	.187" (4.75mm) quick connect*	20C254
27E893	Screw terminals†	20C318

* 20C228 held in place by socket hold-down screw where as 20C254 snaps onto socket.
** Snap-in mounting.
† DIN rail mounting.

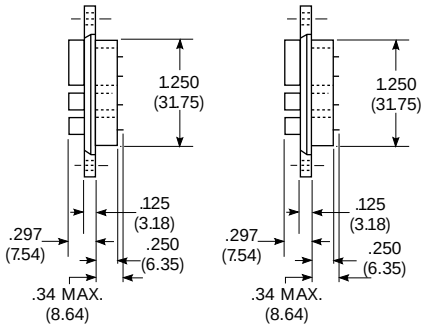
Hard Mount Sockets For Relays Through 3 Poles

Nylon sockets with .187" (4.75mm) quick connect, solder or printed circuit terminals are available for KUEP, KUGP, KUIP, KUMP, and KUP relays, through 3 poles, with .187" (4.75mm) quick connect terminals. All are rated 15 amps and UL recognized, File E59244 and CSA certified File LR15734

27E043–with solder eyelet terminals.
27E067–with .187" (4.75mm) quick connect terminals.

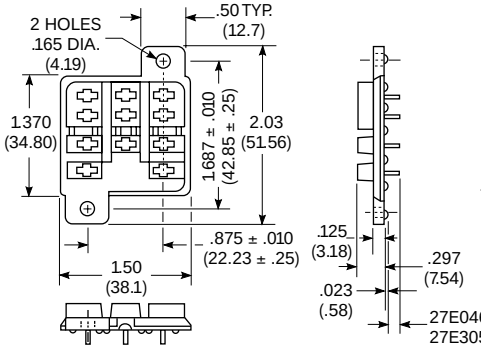


27E043 **27E067**



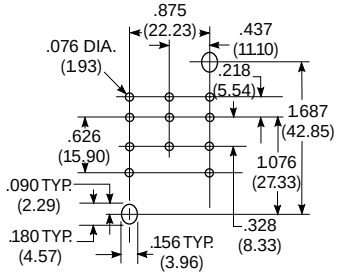
The 27E043 and 27E067 use chassis cutout shown on this page.

27E046, 27E305 Socket With Printed Circuit Terminals



27E046 HAS TERMINALS .144" (3.66 mm) LONG.
27E305 HAS TERMINALS .184" (4.67 mm) LONG.

Suggested Socket PC Board Layout

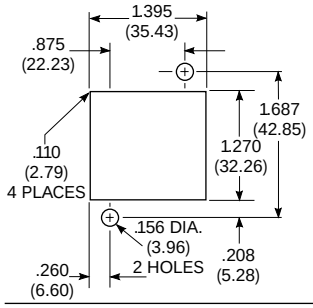


27E396 Snap-In Socket For Relays Through 3 Poles

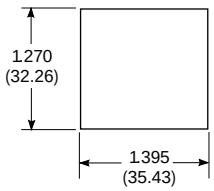
Nylon snap-in socket with .187" (4.75mm) quick connect terminals is available for KUEP, KUGP, KUIP, KUMP, and KUP relays, through 3 poles, with .187" (4.75mm) quick connect terminals. Snap-in sockets reduce labor by eliminating time consuming screw or rivet mounting. Preassembled wiring harnesses may also be used as the sockets are designed to snap into the chassis from either front or back. All are rated 15 amps and UL recognized, File E59244. The 27E396 uses chassis cutout shown on this page.

27E396–with .187" (4.75mm) quick connect terminals.

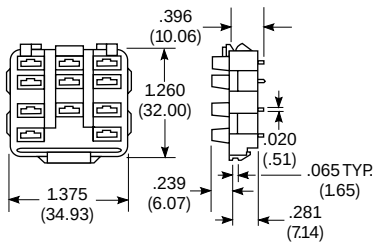
Recommended Chassis Cutout For Hard Mount Sockets



Recommeded Chassis Cutout For Snap-In Sockets



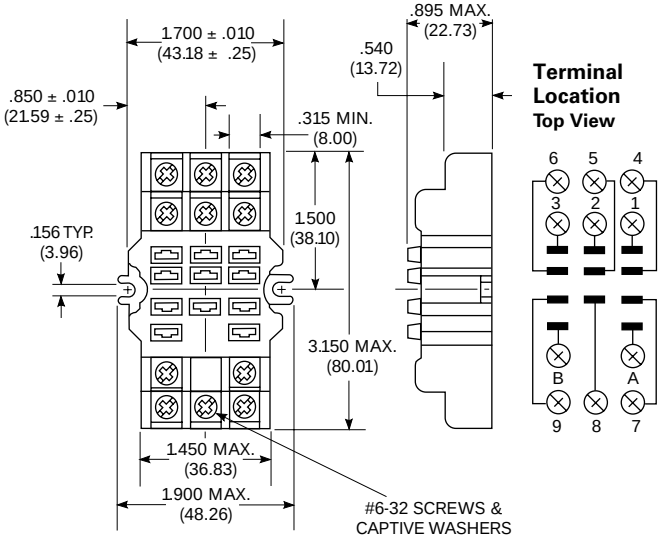
Recommended chassis thickness .031" (.79mm) to .062" (1.57mm).



Sockets For KU Series Relays Through 3 Poles (continued)

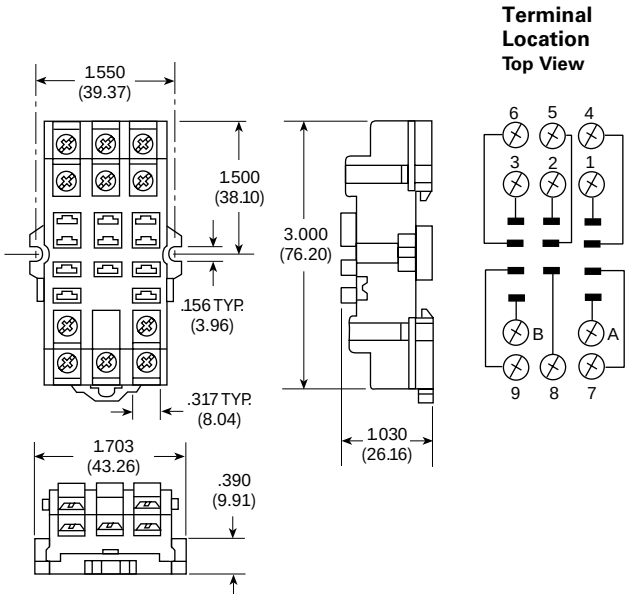
27E121
Screw Terminal Socket

The 27E121 socket offers screw termination for KUEP, KUGP, KUIP, KUL, KUMP and KUP relays, through 3 poles, with .187" (4.75mm) quick connect terminals. This socket stacks on 1.700" (43.18mm) centers. When surface mounting, two #6-32 screws of suitable length are required. When track mounting, two 24A071 retainer clips (not shown) are required. The 27E121 is rated 15 amps and is UL recognized, File E59244, CSA certified, File LR15734.



27E893
Screw Terminal, Din Rail Snap-Mount Socket
(use with mounting track 24A110)

The 27E893 DIN rail, snap-mount socket offers screw termination for KUEP, KUGP, KUIP, KUL, KUMP and KUP relays, through 3 poles, with .187" (4.75mm) quick connect terminals. This socket is constructed with a spring-loaded latch which allows it to be quickly snapped onto or removed from a "top hat" style mounting track. No special tools or extra hardware is required for installation. The 27E893 is UL rated 15 amps, 94V-0, File E59244 and CSA rated 10 amps, File LR15734.



Sockets For KU Series 4 Pole Relays

Socket Selection Table
Stock items are boldfaced.

For 4 pole KUP relays with .110" (2.79mm) quick connect termination.

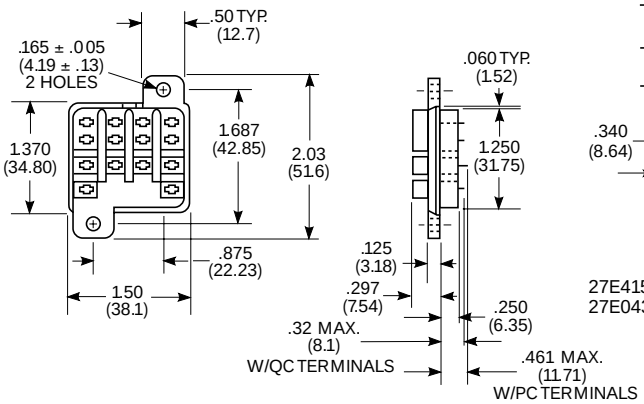
Socket	Socket Termianation	Hold-Down Spring
27E415	.187" (4.75mm) quick connect	20C228 or 20C254
27E419	PC board	20C228 or 20C254
27E867*	Screw terminals	20C254

* Use 40G432 insulator pad or customer supplied alternative.

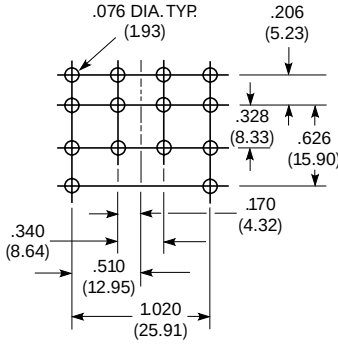
Hard Mount Sockets For 4 Pole Relays

27E415–with .187" (4.75mm) quick connect/solder terminals.
27E419–with printed circuit terminals. See PC board layout at right.

Note: Only 4 pole KUP relays with .110" (2.79mm) quick connect terminals can be used with 4 pole hard mount sockets.



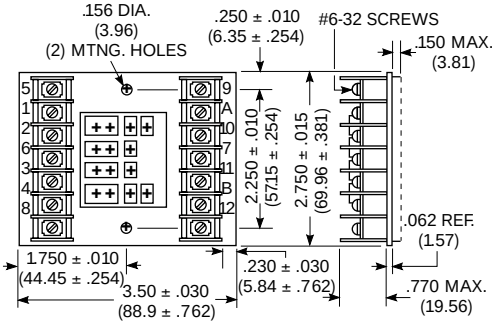
Suggested Socket PC Board Layout



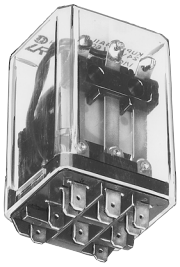
27E415 uses same chassis cutout as 27E043.

Screw Terminal Socket For 4 Pole Relays

27E867 offers screw termination for 4 pole KUP relays with .110" (2.79mm) quick connect/socket mount terminals. Rated 10 amps and is UL recognized, File E59244.



Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.
www.tycoelectronics.com
Technical support:
Refer to inside back cover.



KUP93 series

General Purpose
3 to 10 Amp, Multicontact
AC or DC Relay

File E22575
File LR15734

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- AC coils 24, 120 & 240V 50/60 Hz.; DC 12 & 24VDC.
- Contact arrangement to 3PDT.
- Sockets available for all models.
- Accepted pin pattern for HVAC industry.
- Primarily designed for the HVAC industry.

Coil Data

	Nominal Voltage	DC Resistance in Ohms ± 10%*	Must Operate Voltage	Nominal Coil Current (mA)
DC Coils	12 24	120 472	9.0 18.0	100 51
AC Coils	24 120 240	72 1,700 7,200	20.4 102.0 204.0	115 24 12

*AC coils, ± 15%

Contact Data @ 25°C

Material: Fine silver or silver-cadmium oxide.

Contact Ratings

Material	UL/CSA Ratings	Life Expected
Fine silver	5A @ 28VDC or 240VAC, 80% PF, 1/10 HP @ 120VAC, 1/4 HP @ 240VAC	100,000
Silver-cadmium oxide	10A @ 28VDC or 240VAC, 80% PF, 1/4 HP @ 120VAC,1/3 HP @ 240VAC	100,000
	10 FLA, 30 LRA @ 120VAC, 5 FLA,15 LRA @ 240VAC	30,000

Operate Data @ 25°C

Must Operate Voltage:
DC Coils: 75% of nominal voltage or less.
AC Coils: 85% of nominal voltage or less.
Operate Time (Excluding Bounce): 15 milliseconds, typical, at nominal voltage.
Release Time (Excluding Bounce):
DC Coils: 10 milliseconds, typical, at nominal voltage.
AC Coils: 10 milliseconds, typical, at nominal voltage.

Initial Dielectric Strength

Between Open Contacts: 500V rms.
Between Adjacent Contacts: 1,500V rms.
Between Contacts and Coil: 1,500V rms.

Environmental Data

Temperature Range:
Storage:
All Coils: -45°C to +105°C.
Operating:
DC Coils: -45°C to +70°C.
AC Coils: -45°C to +45°C.

Coil Data @ 25°C

Nominal Power:
DC Coils: 1.2 Watts.
AC Coils: 2.7VA.
Initial Insulation Resistance: 100 megohms, min., at 25°C.

Mechanical Data

Termination: .187" x .020" quick connect.
Enclosures: Clear polycarbonate dust cover.
Weight: 3.0 oz. (86g) approximately.

Ordering Information

	Typical Part No. ▶	KUP93	11	A	2	1	-24

1. Type:
KUP93 = Enclosed general purpose relay.

2. Contact Arrangement:
14 = 3 Form C (3PDT)

3. Coil Input:
A = AC D = DC

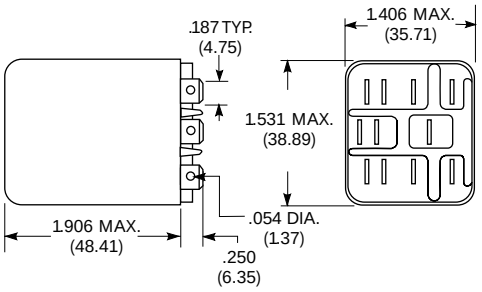
4. Mounting:
1 = PLAIN CASE;

5. Terminals, Contact Material & Rating:
1 = .187" (4.75mm) quick connect, silver, 5 amps.
3 = .187" (4.75mm) quick connect, silver-cadmium oxide, 10 amps.

6. Coil Voltage:
To 240VAC, 50/60 Hz. or 110VDC.

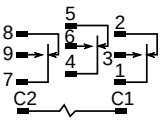
Our authorized distributors are more likely to stock the following items for immediate delivery.
No items in this series typically are stocked.

Outline Dimensions

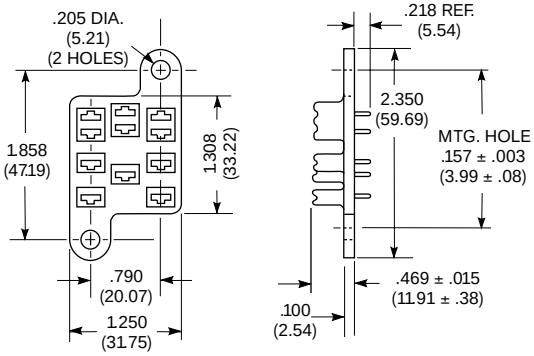


Wiring Diagrams

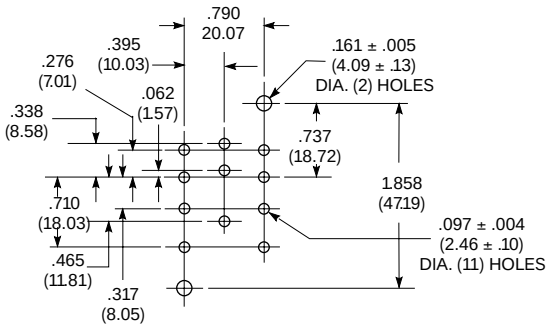
3 Form C



KUP93 Sockets



Socket PC Board Layout (Component Side of Board)



KUP93 Socket Number

Socket Color	P C Socket With Terminals
Natural Nylon	27E168**

**UL Recognized, file E22575

Socket: Rated 10 amperes. Will accept .187" (4.75mm) quick-connect terminals of all KUP93 relays.

Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.
www.tycoelectronics.com
Technical support:
Refer to inside back cover.



RM series

RM2/3/7 2/3 Pole 10/16 Amp
RM5/6 VDE 3mm Contact Gap
RM8 25 Amp

c UL us File E214025
VDE NR 5330, NR 5365, NR 5333
CE

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- Contact arrangements to 3PDT.
- Plug-in or PC terminals.
- Push to test button and mechanical indicator.
- RM 5/6 VDE approved with 3mm contact gap.

Contact Data @ 25°C

Arrangements:
RM 2/3/7: 2 Form C (DPDT) and 3 Form C (3PDT).
RM 5/6: 2 Form A (DPST-NO) and 3 Form A (3PST-NO).
RM 8: 2 Form C (DPDT).
Material: Silver-cadmium oxide.
Expected Mechanical Life: 20 million operations minimum.
Contact Ratings:
UL/CSA @ 25°C
RM 2/5: 16A, 250VAC G.P., 30,000 Ops.
16A, 28VDC G.P., 30,000 Ops.
1 HP, 120VAC G.P., 30,000 Ops.
1HP, 240VAC G.P., 30,000 Ops.
RM 3/6: 10A, 250VAC G.P., 30,000 Ops.
10A, 28VDC G.P., 30,000 Ops.
RM 3/6/7: 1 HP, 120VAC, 30,000 Ops.
1/2 HP, 240VAC, 480VAC, 600VAC, 30,000 Ops.
1.5 HP, 240VAC, 3 Phase, 30,000 Ops.
RM 7: 16A, 250VAC G.P., 30,000 Ops.
16A, 10VDC G.P., 30,000 Ops.
RM 8: 25A,. 240VAC, G.P., 30,000 Ops.
1.5 HP, 120VAC, G.P., 30,000 Ops.
2 HP, 240, G.P., 30,000 Ops.

VDE @ 35°C
RM 2: 16A, 400VAC, 100,000 Ops.
RM 3/6: 10A, 400VAC, 100,000 Ops.
RM 5/7: 16A, 400VAC, 100,000 Ops.
RM 8: 25A, 250VAC, 10,000 Ops.

Initial Dielectric Strength

Between Open Contacts: 1,500VAC (RM 5/6 2,500VAC).
Between Coil and Contacts: 2,500VAC.
Creepage/Clearance coil-contact: 6/3.5mm (RM 8 4/2.8).

DC Coil Data @ 25°C

Nominal Voltage VDC	Operate Voltage VDC	Drop-out Voltage VDC	DC Resistance in Ohms ±10% RM 2 RM 3 RM 8	DC Resistance in Ohms ±10% RM 5 RM 6 RM 7	Nominal Coil Current (mA) RM 2 RM 3 RM 8	Nominal Coil Current (mA) RM 5 RM 6 RM 7
06	4.5	0.9	32	24	187.5	250.0
12	9.0	1.8	110	86	109.1	139.5
24	18.0	3.6	475	345	50.5	69.6
48	36	7.2	2,000	1,340	24.0	35.8
60	45	9.0	2,850	2,200	21.1	27.3
110	82.5	16.5	10,000	7,300	11.0	15.1
221	165	33	40,000	30,000	5.5	7.3

AC Coil Data @ 25°C

Nominal Voltage VAC	Operate Voltage VAC	Drop-out Voltage VAC	DC Resistance in Ohms ±10% RM 2 RM 3	DC Resistance in Ohms ±10% RM 5 RM 6 RM 7 RM 8	Nominal Coil Current (mA) RM 2 RM 3	Nominal Coil Current (mA) RM 5 RM 6 RM 7 RM 8
06	4.8	2.4	5.3	4.7	381.7	476.7
12	9.6	4.8	24.0	19.5	182.5	225.8
24	19.2	9.6	86.0	80.0	94.2	109.2
48	38.4	19.2	345.0	320.0	47.5	54.2
60	48.0	24.0	544.0	500.0	37.8	43.7
115	92.0	46.0	2,000.0	1,850.0	20.6	23.0
230	184.0	92.0	8,300.0	7,500.0	10.1	11.7
400	320.0	160.0	27,500.0	23,500.0	5.8	6.5

Operate Data

Must Operate Voltage: see coil data.
Operate Time : Approximate ms

	RM 2/3/7	RM 5/6	RM 8
Pull-in	15	15	15
Drop Out	10	10	15
Bounce	3	4	3

Switching Rate: 1000 ops/hr max. at rated load.

Environmental Data

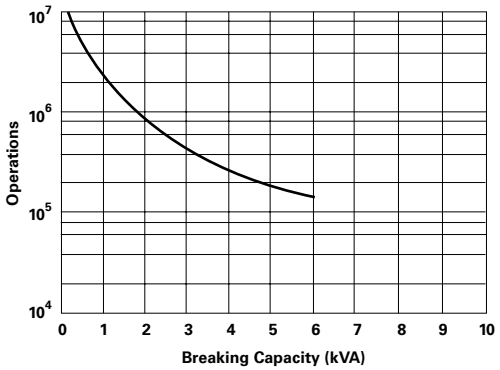
Temperature Range:
Operating: -45°C to maximum °C listed below.

	RM2	RM3	RM5	RM6	RM7	RM8
DC Coil	+70°C	+60°C	+60°C	+60°C	+60°C	+65°C
AC Coil	+55°C	+55°C	+50°C	+50°C	+50°C	+40°C

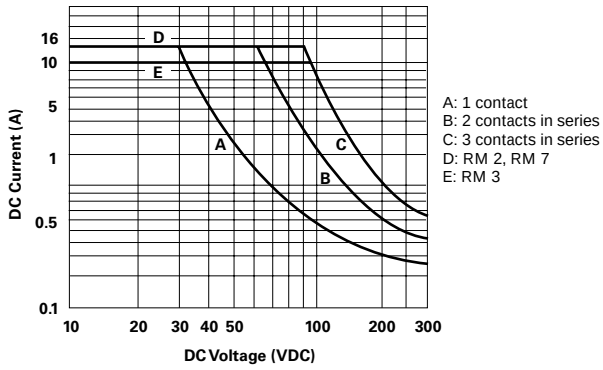
Vibration:
RM2/3/7: 30 to 150 Hz at 5g N/O, 2g N/C
RM5/6: 30 to 150 Hz at 12g N/O.
RM8: 30 to 150 Hz at 10g N/O, 5g N/C

RM2/3/7
2/3 POLE 10/16A

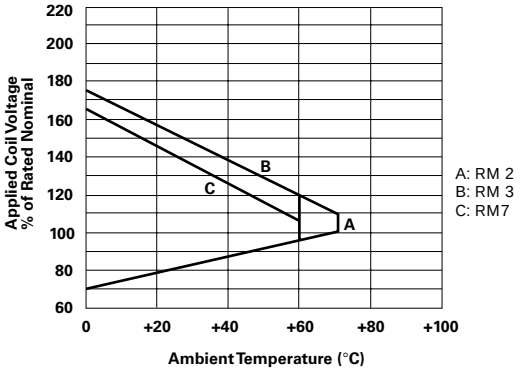
Contact Life



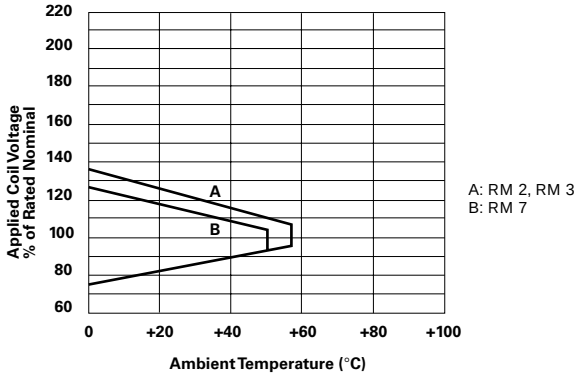
Max. DC Load Breaking Capacity



DC Coil Operating Range

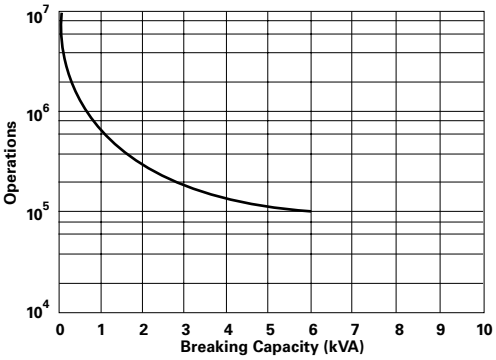


AC Coil Operating Range

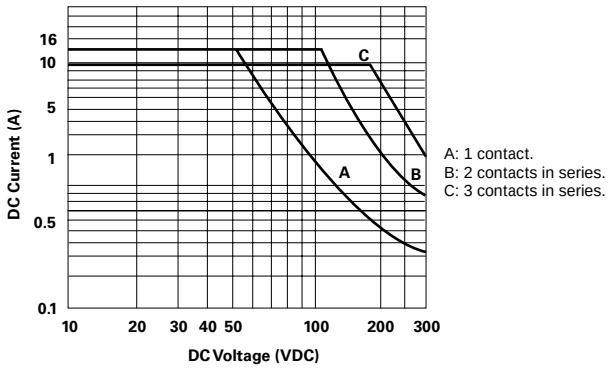


RM5/6
2/3 POLE 10/16A
(Contact gap 3 mm)

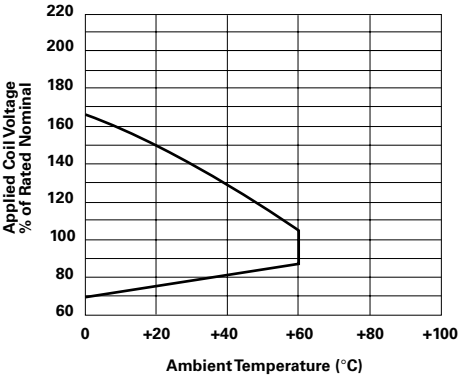
Contact Life



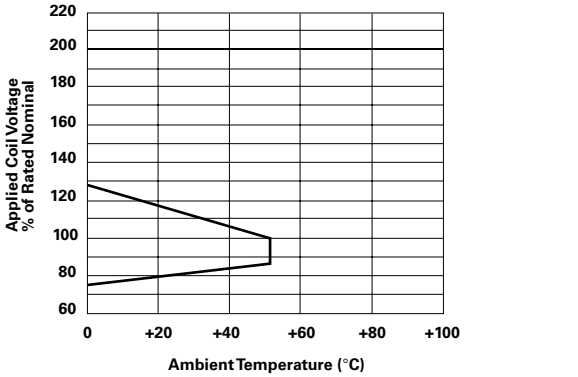
Max. DC Load Breaking Capacity



DC Coil Operating Range



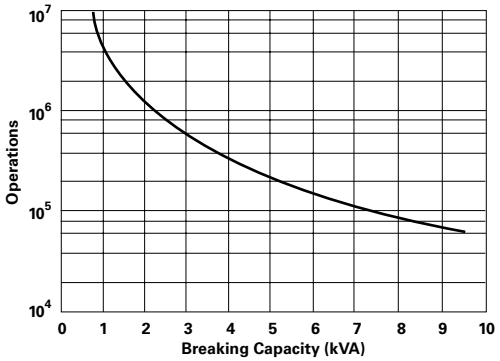
AC Coil Operating Range



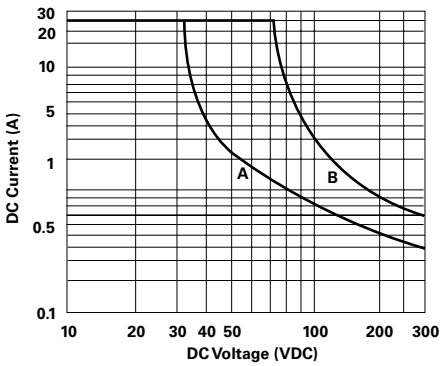
Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.
www.tycoelectronics.com
Technical support:
Refer to inside back cover.

RM8
2 POLE 25A

Contact Life

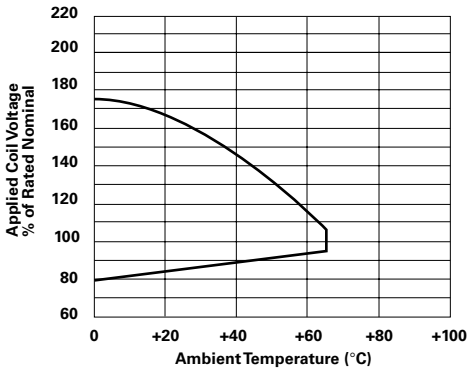


Max. DC Load Breaking Capacity



A: 1 contact.
B: 2 contacts in series.

DC Coil Operating Range



Ordering Information

Typical Part Number ▸	RM	2	3	2	024

1. Basic Series:
RM = General purpose relay.

2. Contact Arrangement and Rating:
2 = 2 Form C (DPDT) 16 Amp
3 = 3 Form C (3PDT) 10 Amp
5 = 2 Form A (DPST-NO) 16 Amp 3mm Contact Gap
6 = 3 Form A (3PST-NO) 10 Amp 3mm Contact Gap
7 = 3 Form C (3PDT) 16 Amp
8 = 2 Form C (DPDT) 25 Amp (Available only with enclosure 5,8, and 9.)

3. Test:
0 = without push-to-test-button.
3 = with push-to-test-button.

4. Enclosure:
2 = Plain Case .187 (4.75mm) quick-connect (Not available with RM 8).
3 = Bracket Mount Case 0.187 (4.75mm) quick connect. (Not available with RM 8)
5 = Bracket Mount Case 0.250 (6.35mm) quick connect.
7 = Plain Case printed circuit (not available with RM8).
8 = Case with snap-on attachment on top 0.250 (6.35mm) quick-connect.
9 = Case with snap-on attachment on side 0.250 (6.35mm) quick-connect.

5. Coil Voltage:

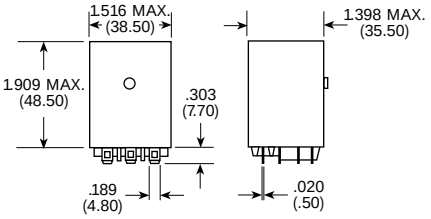
Standard	with LED	with protection diode	with LED and protection diode		Standard	with LED	with protection diode	with LED and protection diode	
006	006	OA6	LA6	=6VDC	506	R06	—	—	=6VAC
012	L12	0B2	LB2	=12VDC	512	R12	—	—	=12VAC
024	L24	0C4	LC4	=24VDC	524	R24	—	—	=24VAC
048	L48	0E8	LE8	=48VDC	548	R48	—	—	=48VA
060	L60	0G0	LG0	=60VDC	560	R60	—	—	=60VAC
110	M10	1B0	MB0	=110VDC	615	S15	—	—	=115VAC
220	N21	2C1	NC1	=220VDC	730	T30	—	—	=230VAC
					900	V00	—	—	=400VAC

Our authorized distributors are more likely to stock the following items for immediate delivery.

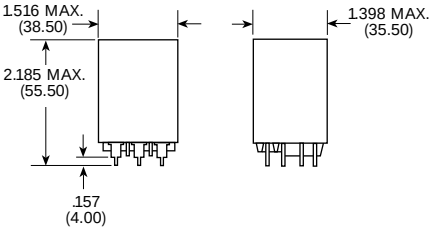
RM202012	RM203012	RM205024	RM302024	RM502524	RM602615	RM702615	RM703615	RM805615
RM202024	RM203024	RM205524	RM302524	RM502615	RM702012	RM703012	RM805012	
RM202524	RM203524	RM205615	RM302615	RM602024	RM702024	RM703024	RM805024	
RM202615	RM203615	RM302012	RM502024	RM602524	RM702524	RM703524	RM805524	

Outline Dimensions

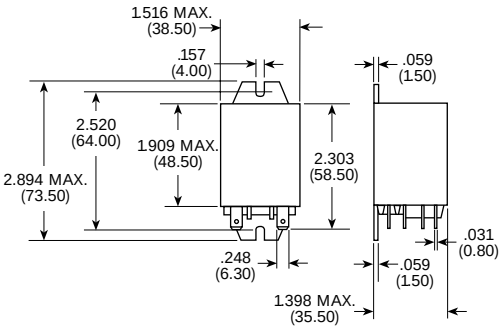
RM .187 quick connect terminals



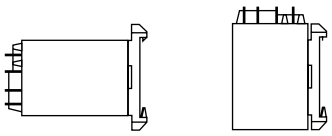
RM with PCB terminals



RM .250 quick connect terminals, with brackets

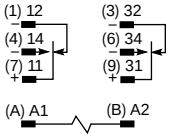


RM with snap-on attachment

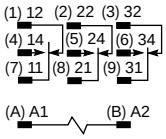


Wiring Diagrams (Bottom Views)

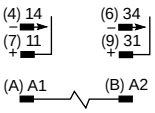
RM2/8 2 Pole



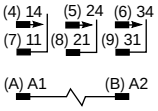
RM3/7 3 Pole



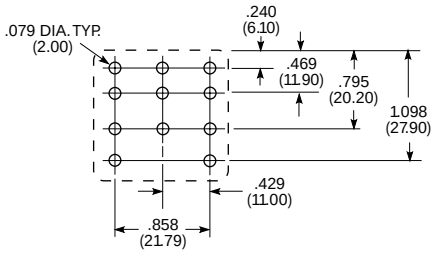
RM5 2 Pole



RM6 3 Pole



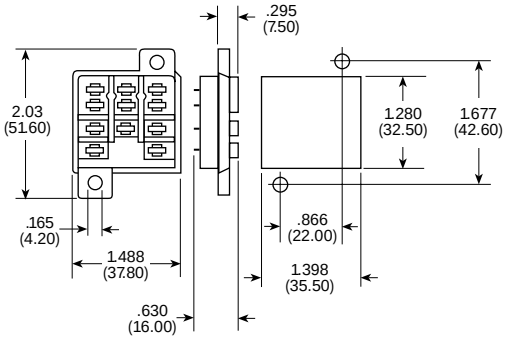
PC Board Layout (Bottom View)



RM Sockets and Accessories

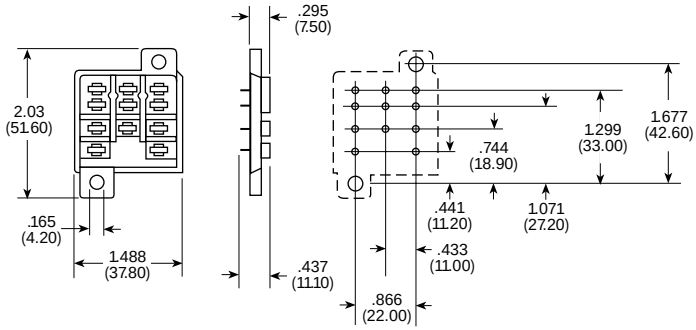
RM78700/701

RM78700 has QC Terminals
RM78701 has Solder Terminals



Hold-Down Spring RM28802

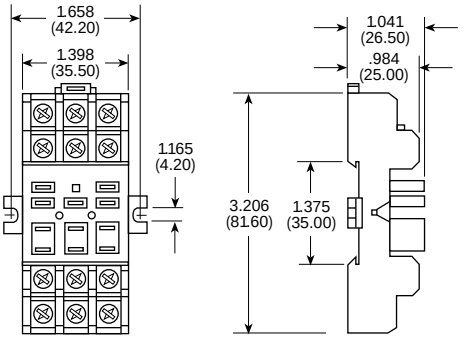
RM78702



Hold-Down Spring RM28802

RM78705

16A, 250VAC, Socket with Screw Terminals



Socket Selection Table

Stock items are boldfaced.

Socket	Socket Termination	Hold-Down Spring
RM78700	.187(4.75)QC Terminals	**RM28802**
RM78701	Solder Terminals	**RM28802**
RM78702	.142(3.61)PCB Terminals	**RM28802**
RM78705	Screw Terminals	

Dimensions are shown for reference purposes only.

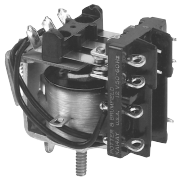
Dimensions are in inches over (millimeters) unless otherwise specified.

Specifications and availability subject to change.

www.tycoelectronics.com
Technical support:
Refer to inside back cover.


KRPA


KRP


KA

KRPA, KRP, KA, KR series

5 to 10 Amp General Purpose Relay

File E29244, E22575, E81558 (KR Hermetic)
File LR15734

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- Industry standard octal-type termination for quick installation.
- Contact arrangements from 1 Form C (SPDT) to 3 Form C (3PDT).
- Indicator lamp and push-to-test options available on certain models.
- The KRPA is the automated manufactured version of the KRP.
- Hermetically sealed option available with KR UL recognized for Class I Div. 2 Hazardous locations, Groups A, B, C, D.

Contact Data @ 25°C

Arrangements: See Ordering Information Table.
Materials: Silver or silver-cadmium oxide, with or without gold flashing.
Expected Life: 10 million operations min., mechanical; 100,000 operations min. @ rated loads.

KA, KRP, KRPA UL/CSA Contact Ratings @ 25°C (Except KR)

Contact Code	Arrangement	Contact Rating
Y (Silver)	1, 2, 3 Poles	5A @ 120VAC 3A @ 240VAC 1/10HP @ 120VAC 1/6HP @ 240VAC
G&N (Silver-Cad. Oxide)	1, 2, 3 Poles	10A @ 240VAC 1/2 HP @ 240VAC 1/3HP @ 120VAC

KR–E (Herm. Sealed) UL Contact Ratings @ 25°C Class I, Div. 2, Hazardous Loc.

Contact Code	Arrangement	Contact Rating
Y (Silver)	1, 2, 3 Poles	5A @ 120VAC 3A @ 240VAC 1/10HP @ 120VAC 1/6HP @ 240VAC
G&N (Silver-Cad. Oxide)	1, 2, 3 Poles	10A @ 240VAC 1/6 HP @ 120VAC

KR–E (Herm. Sealed) UL Contact Ratings @ 25°C UL 508 Industrial Control

Contact Code	Arrangement	Contact Rating
Y , G (Silver)	1, 2, 3 Poles	3A @ 120VAC 3A @ 28VDC 1/10HP @ 120VAC

KRP, KRPA Factory Ratings

Contact Code	Arrangement	Contact Rating
Y	1, 2, 3 Poles	5A @ 28VDC, 120VAC, 80% PF
G&N	1, 2, 3 Poles	10A @ 28VDC, 120VAC, 80% PF 6A @ 250VAC

KA UL Contact Ratings

Contact Code	Series	Contact Ratings
Y	KA[1]	5A @ 120VAC, 3A @ 240VAC, 1/10 HP @ 120VAC, 1/6 HP @ 240VAC
G	KA[2]	10A @ 120VAC, 6A @ 240VAC 1/6 HP @ 120VAC, 1/3 HP @ 240VAC

[1]Listed by C.S.A. for 5A @ 120VAC 80% PF
[2]Listed by C.S.A. for 10A @ 120VAC 80% PF

Note: See KRPA, KRP, KA, KR-E Ordering Information table.

Initial Dielectric Strength

Between Open Contacts: 500V rms.
Between All Elements: 1,500V rms.

Coil Data @ 25°C

		Nominal Power	Maximum Power
KRP	AC	2VA	Enclosed Models - 4VA
KRPA	DC	1.2W	Enclosed Models - 3W
KA	AC	2VA	Open Models - 4VA
	DC	125mW per movable arm	Open Models - 4W

Duty Cycle: Continuous.
Initial Insulation Resistance: KRP, KRPA - 1000 Megohms, min.
KA - 100 Megohms, min.

Coil Data @ 25°C

	Nominal Voltage	DC Resistance (Ω) ±10%	Nominal Coil Current (mA)
DC Coils	6	32	188
	12	120	100
	24	472	51
	48	1,800	26.6
	110	10,000	11.5
	220	Use 110V relay with 10,000 Ω 5W Resistor in series	
AC Coils	6	6	335
	12	24	168
	24	85	84
	120	2,250	17.5
	240	9,110	8.75

Operate Data @ 25°C

Must-Operate Voltage:
DC: 75% or less of nominal voltage.
AC: 85% or less of nominal voltage.
Operate Time (Excluding Bounce):
15 milliseconds typical @ nominal voltage.
Release Time (Excluding Bounce):
10 milliseconds typical @ nominal voltage.

Environmental Data

Temperature Range:
Open Models: AC: -45°C to +70°C.
DC: -45°C to +85°C.
Enclosed Models: AC: -45°C to +55°C.
DC: -45°C to +70°C.

Mechanical Data

Open Models: Solder terminals.
Enclosed Models: Octal-type plug.
Enclosures: Transparent polycarbonate (except KR).
Hermetically sealed metal case available with KR only.
Weight: KA: 1.7 oz. (48.2g) approximately.
KRPA, KRP: 3.0 oz. (85g) approximately.

Ordering Information

Typical Part No. ▶	KRPA	-5	A	Y		-120

1. Series:
KRPA (Newer version, enclosed)
KRP (Older version, enclosed)
KR (Hermetically sealed option 'E'only)
KA (Open style)

2. Contact Arrangement:
5 = 1 Form C (SPDT)
11 = 2 Form C (DPDT)
14 = 3 Form C (3PDT)

3. Coil Input:
A = AC, 50/60 Hz.
D = DC

4. Contact Rating and Indicator Lamp Option:

TYPE	KRPA	KRP	KR	KA
Codes Available	Y, G, N,	Y, G, N,	Y, G,	Y, G,

Leave Blank = Silver, no indicator lamp for hermetically sealed KR (option E below).
Y = Silver, no indicator lamp
G = Silver-cadmium oxide, no indicator lamp
N = Silver-cadmium oxide, with indicator lamp*

5. Options:
Leave Blank = No options (except KR).
E = Hermetically Sealed Option (KR only).

6. Coil Voltage:
Up to 240VAC
Up to 125VDC

*Indicator Lamp not available on 25-90V coils. Only 120-240VAC and 110VDC models are UL recognized and CSA certified.

Our authorized distributors are more likely to stock the following items for immediate delivery.

KA-5AG-120
KA-5AY-120
KA-5DG-6
KA-5DG-12
KA-5DG-110
KA-11AG-120
KA-11AY-6
KA-11AY-24
KA-11AY-120
KA-11DG-12
KA-11DG-24
KA-11DG-110
KA-14AG-120
KA-14AY-120
KA-14DG-24
KA-14DG-110
KR-11AE-120
KR-11AGE-120
KR-11DE-24
KR-11DGE-12
KR-11DGE-24
KR-14AGE-120
KR-14DGE-24
KRP-5AG-120
KRP-11AG-24
KRP-11AG-120
KRP-11AG-240
KRP-11AN-24
KRP-11AN-120
KRP-11AY-120
KRP-11DG-12
KRP-11DG-24
KRP-11DG-48
KRP-11DG-110
KRP-11DG-125
KRP-11DN-12
KRP-11DN-24
KRP-11DY-24
KRP-14AG-120
KRP-14AG-240
KRP-14AN-120
KRP-14AY-120
KRP-14DG-12
KRP-14DG-24
KRP-14DG-110
KRP-14DN-24
KRPA-5AG-24
KRPA-5AG-120
KRPA-5AY-120
KRPA-5DG-6
KRPA-5DG-12
KRPA-5DG-24
KRPA-5DY-12
KRPA-5DY-24
KRPA-11AG-6
KRPA-11AG-12
KRPA-11AG-24
KRPA-11AG-120
KRPA-11AG-240
KRPA-11AN-12
KRPA-11AN-24
KRPA-11AN-120
KRPA-11AN-240
KRPA-11AY-6
KRPA-11AY-12
KRPA-11AY-24
KRPA-11AY-120
KRPA-11AY-240
KRPA-11DG-6
KRPA-11DG-12
KRPA-11DG-24
KRPA-11DG-48
KRPA-11DG-110
KRPA-11DN-12
KRPA-11DN-24
KRPA-11DN-110
KRPA-11DY-12
KRPA-11DY-24
KRPA-14AG-12
KRPA-14AG-24
KRPA-14AG-120
KRPA-14AG-240
KRPA-14AN-24
KRPA-14AN-120
KRPA-14AN-240
KRPA-14AY-24
KRPA-14AY-120
KRPA-14AY-240
KRPA-14DG-12
KRPA-14DG-24
KRPA-14DG-48
KRPA-14DG-110
KRPA-14DN-24
KRPA-14DY-24



KRP-3-H

KRP-3-H series

20 Amp
Small AC or DC Relays

File E22575

Features

- 1 Form X (SPST - NO - DM) contact rating of 20A.
- Heavy copper alloy movable contact arms.
- Twin silver-cadmium oxide contacts.
- Many uses in automation controls and other applications requiring high current switching.

Contact Data @ 25°C

Arrangement: 1 Form X (SPST - NO - DM).
Ratings: UL Rating: 20A @ 120VAC, 3/4 HP @ 120VAC.
Factory Rating: 20A @ 120VAC, 80% PF; 1 HP @ 120/240VAC.
Material: Twin, silver-cadmium oxide.
Expected Life: 2.5 million operations min., mechanical. 100,000 operations at rated contact load.

Initial Dielectric Strength

Between Open Contacts: 500V rms, 60 Hz. between all elements.

Coil Data @ 25°C

See chart on page 105.
Nominal Power: **DC Coils:** 1.2W
AC Coils: 2.0VA
Initial Insulation Resistance: 1,000 megohms.

Operate Data @ 25°C

Must-Operate Voltage: **DC:** 75% of nominal voltage.
AC: 85% of nominal voltage.
Operate Time: 15 milliseconds approximate (Excluding Bounce).
Release Time: 10 milliseconds approximate (Excluding Bounce).

Environmental Data

Temperature Range: **Enclosed Models:** **AC:** -45°C to +55°C.
DC: -45°C to +70°C.

Mechanical Data

Mounting: Socket mounting.
Termination: Octal-type plug.
Enclosure: Polycarbonate enclosure with octal-type mounting.
Weight: 2 oz. (57g) approximately.

Ordering Information

Typical Part No. ▶	KR	P	-3	D	H	-12

1. Basic Series: KR

2. Type:
P = Enclosed
(20 amp models available only with Contact Arrangement 3 and Material H.)

3. Contact Arrangement:
3 = 1 Form X (SPST - NO - DM)

4. Coil Input:
A = AC
D = DC

5. Contact Material & Rating:
H = Silver-cadmium oxide, 1/4" (6.35mm) dia., 20 amps.

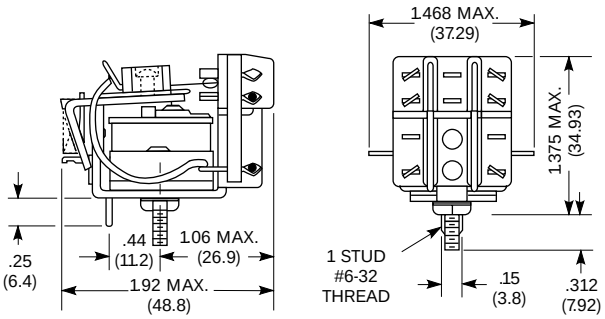
6. Coil Voltage:
To 240VAC, 50/60 Hz. or 110VDC.

Our authorized distributors are more likely to stock the following items for immediate delivery.

KRP-3AH-120
KRP-3DH-24
KRP-5AG-120

Outline Dimensions

KA Series

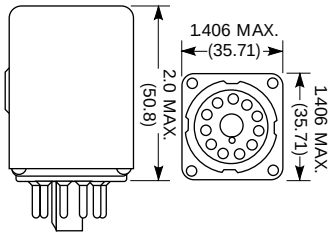


Tolerances on .XX Decimals ± .02 (± .5) Unless Otherwise Specified
Tolerances on .XXX Decimals ± .005 (± .13) Unless Otherwise Specified

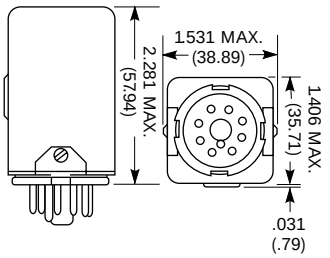
KR Series Enclosures

Type "P" Clear Dust Cover

For KRPA and KRP



For KRP3-H

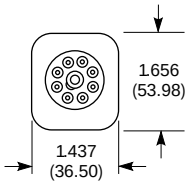


Hermetically Sealed Enclosure

(KR only)



Octal Plug



Height: 2.125" (53.98mm) max.

Hold-Down Spring

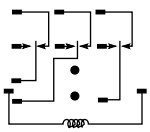
20C176 KRPA & KRP
20C206 KAP and KRP3



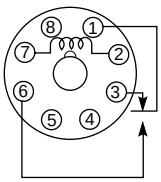
Durable stainless steel spring can be moved aside for relay removal or installation. Mounts with same machine screws or rivets that secure socket to chassis. Two .156" (3.96mm) dia. holes required.

Wiring Diagrams (Bottom Views)

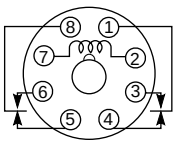
KA



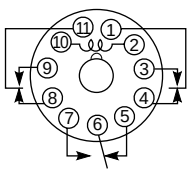
KR5
KAP5
KRP5
KRPA5



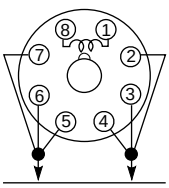
KR11
KAP11
KRP11
KRPA11



KR14*
KAP14
KRP14
KRPA14



KRP3AH



* The hermetically sealed KR14 has pins 5 and 6 reversed.

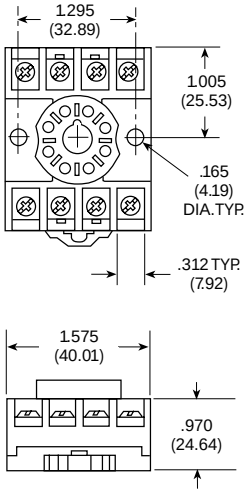
Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.
www.tycoelectronics.com
Technical support:
Refer to inside back cover.

Sockets For KRP, KRPA Series Relays

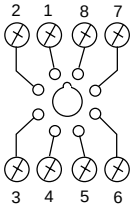
The following sockets are normally maintained in stock for immediate delivery.

Screw Terminal, DIN Rail Snap-Mount Sockets
(Use with mounting track 24A110)

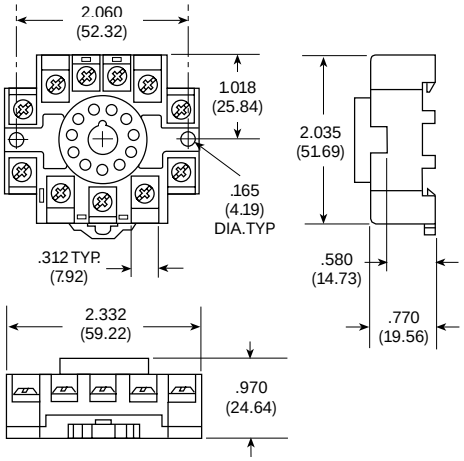
27E891
10A, 300VAC



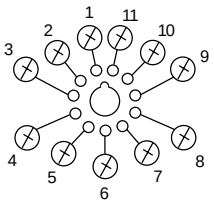
Terminal Location
Top View



27E892
10A, 300VAC



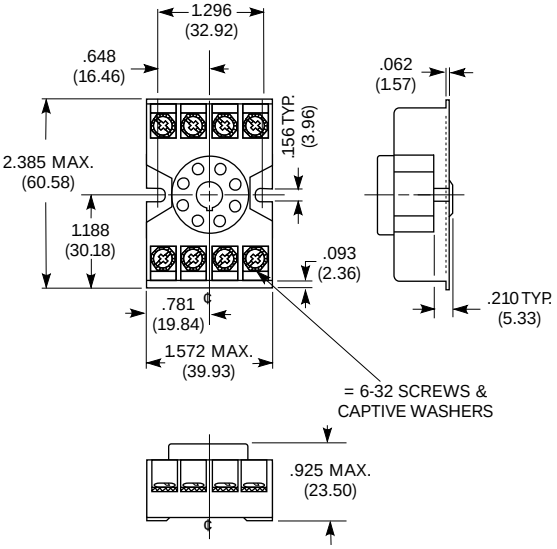
Terminal Location
Top View



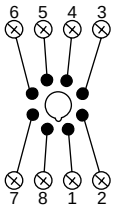
Sockets have M3.5 screw terminals which accept up to two #12 AWG wires. Rated 10 amps @ 300VAC and meets UL 94V-0.

Screw Terminal Sockets

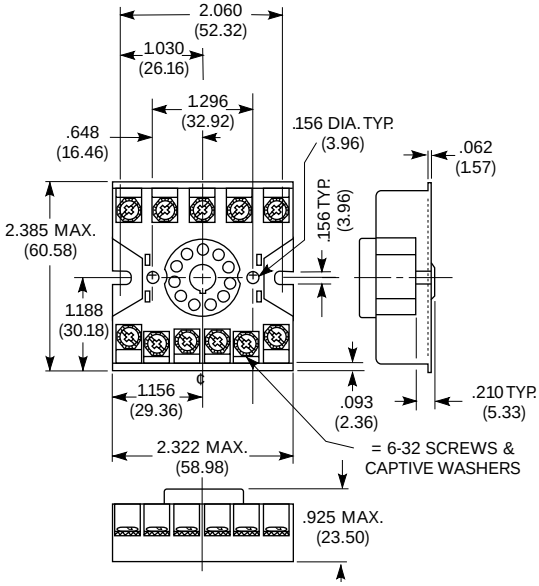
27E122
10A, 300VAC
8-pin



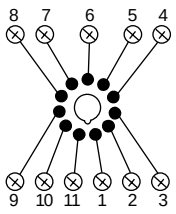
Terminal Location



27E123
10A, 300VAC
11-pin



Terminal Location





MT series

10 Amp General Purpose Relay

c UL us File E214025
VDE NR 6182
CE

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- DPDT or 3PDT contact arrangements.
- 4 amp bifurcated contact available.
- AC and DC coils.
- Protection Diode available (DC coils).
- Mechanical indicator - all models.
- Electrical indicator available.
- Test actuator with front operated finger protected push to test button and integral locking test tab.

Contact Data @ 25°C

Arrangements: 2 Form C (DPDT).
3 Form C (3PDT.
Material: 10 amp; Silver-nickel 90/10 with or without gold plating.
4 amp; Silver-nickel 90/10 with gold plating.
Expected Mechanical Life: 20 million operations minimum.
Ratings:
UL/CSA NO/NC @ 25°C:
4 amp (Bifurcated) 250VAC Resistive 30,000 ops.
10 amp 240VAC Resistive 30,000 ops.
1/2 HP 240VAC 30,000 ops.
1/4 HP 120VAC 30,000 ops.
B300 Pilot duty 30,000 ops.

VDE @ 35°C:
10 amp 250VAC Resistive 100,000 ops., DC Coil, AC Coil N/O.
20,000 ops., AC Coil N/C.

Initial Dielectric Strength

Between Open Contacts: 1,500VAC.
Between Coil and Contacts: 2,500VAC.
Between Poles: 2,500VAC.
Creepage/Clearance Coil-Contact: 4/2.8mm.

Coil Data @ 25°C

Nominal Coil Power: 1.2W, 2.3VA.

DC Data

Nominal Voltage VDC	DC Resistance in Ohms ±10%	Must Operate Voltage VDC	Must Release Voltage VDC	Nominal Coil Current (mA)
06	32	4.5	0.6	187.5
12	110	9	1.2	109.1
24	475	18	2.4	50.5
48	2,000	36	4.8	24.0
60	2,850	45	6.0	21.1
110	10,000	82.5	11.5	11.0
220	40,000	165	22.0	5.5

AC Data

Nominal Voltage VAC	DC Resistance in Ohms ±10%	Must Operate Voltage VAC	Must Release Voltage VAC	Nominal Coil Current (mA)
06	5.3	4.8	2.4	381.7
12	24	9.6	4.8	182.5
24	86	19.2	9.6	94.2
48	345	38.4	19.2	47.5
60	544	48	24	37.8
115	2,000	92	46	20.6
230	8,300	184	92	10.1

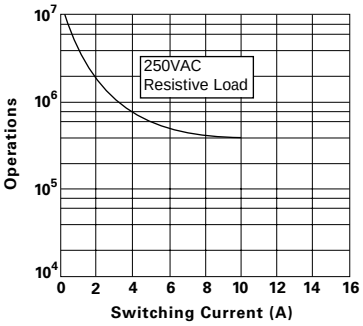
Operate Data

Must Operate Voltage: See Coil Data table.
Operate Time: 12 ms typical, at nom. voltage.
Release Time: 5 ms typical, at nom. voltage.
Bounce Time: 4 ms typical, at nom. voltage.
Switching Rate: 1,200 ops./hr. max. at rated load.

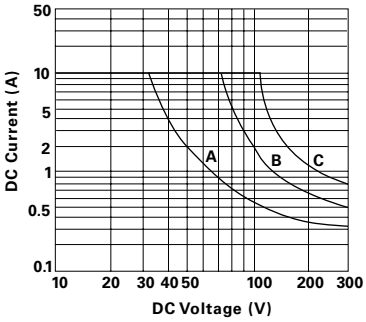
Environmental Data

Temperature Range:
Operating: -45°C to +60°C DC coil.
-45°C to +50°C AC coil.
Vibration: 30 to 1,500 Hz. at 5g N/O, 2g N/C.
Shock: 50g N/O, 10g N/C.

Electrical Life

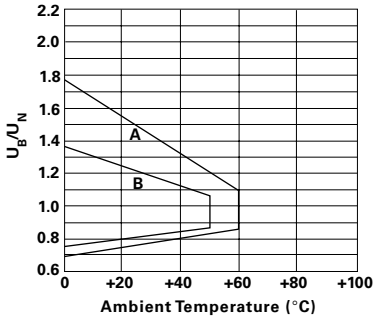


Max. DC Load Breaking Capacity



A: 1 contact.
B: 2 contacts in series.
C: 3 contacts in series.

Coil Operating Range



A: DC coil.
B: AC coil.

Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.
www.tycoelectronics.com
Technical support:
Refer to inside back cover.

Ordering Information

Typical Part Number ▶	MT	3	2	1	012

1. Basic Series:
MT = General purpose relay.

2. Contact Arrangement:
2 = 2 Form C (DPDT) 8 pin
3 = 3 Form C (3PDT) 11 pin

3. Contact Material:
2 = Silver Nickel 90/10 with mechanical actuator.
3 = Silver Nickel 90/10, gold plated, with mechanical actuator.
B = 4 amp Silver Nickel 90/10 bifurcated contact with gold plating.

4. Test:
1 = DC coil with test-button.
3 = DC coil with test-button and LED.
6 = AC coil with test-button.
8 = AC coil with test-button and LED.

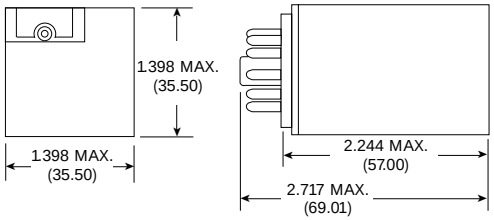
5. Coil Voltage:

Standard	With protection diode	Standard	With protection diode
006 = 6VDC	0A6 = 6VDC	006 = 6VAC	N/A
012 = 12VDC	0B2 = 12VDC	012 = 12VAC	N/A
024 = 24VDC	0C4 = 24VDC	024 = 24VAC	N/A
048 = 48VDC	0E8 = 48VDC	048 = 48VAC	N/A
060 = 60VDC	0G0 = 60VDC	060 = 60VAC	N/A
110 = 110VDC	1B0 = 110VDC	115 = 115VAC	N/A
220 = 220VDC	2C0 = 220VDC	230 = 230VAC	N/A

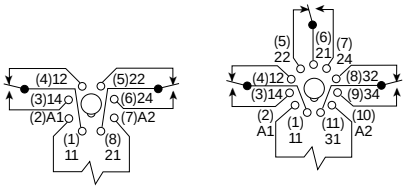
Our authorized distributors are more likely to stock the following items for immediate delivery.

MT221012	MT226024	MT226230	MT321024	MT326115
MT221024	MT226115	MT321012	MT326024	MT326230

Outline Dimensions

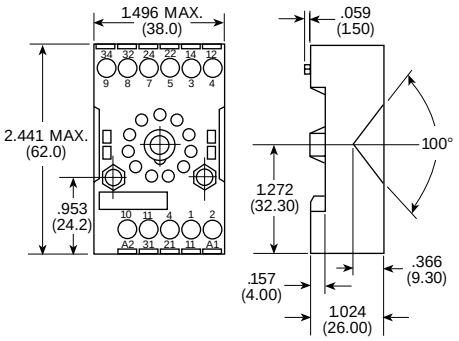


Wiring Diagrams (Bottom Views)

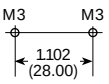


MT Sockets and Accessories

MT78750
10A, 400VAC
11 Pin Socket

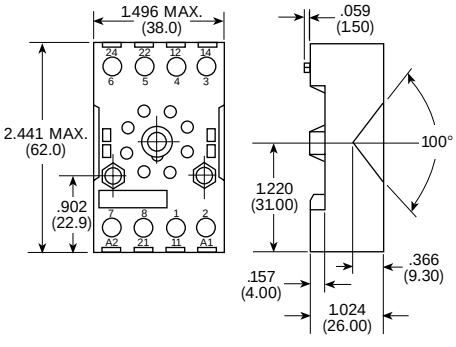


Mounting Hole Centers

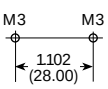


Hold-Down Spring MT28800

MT78755
10A, 400VAC
8 Pin Socket



Mounting Hole Centers



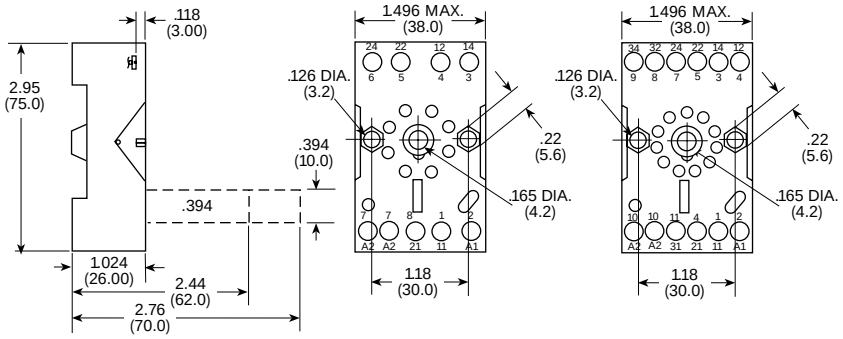
Hold-Down Spring MT28800

MT Sockets and Accessories (continued)

Module-capable Sockets

MT78745
10A, 400VAC
8 Pin Socket

MT78740
10A, 400VAC
11 Pin Socket



Socket Selection Table

Stock items are boldfaced.

Socket	Socket Type and Termination	Hold-Down Spring
MT78750	11-pin, DIN Rail w/ Screw Terminals	**MT28800**
MT78755	8-pin, DIN Rail w/ Screw Terminals	**MT28800**
MT78740	11-pin, module-capable, DIN Rail w/ Screw Terminals	**MT28800**
MT78745	8-pin, module-capable, DIN Rail w/ Screw Terminals	**MT28800**

Timing Module Selection Table

Stock items are boldfaced.

Module	Type
MTMZ0W00	Delay ON timing module
MTMF0W00	Multifunction timing module

LED and Protection Module Selection Table

Stock items are boldfaced.

Module	Type
MTMT00A0	Protection diode 1N4007
MTMU0524	RC-network 24 – 115 VAC
MTMU0730	RC-network 230 VAC
MTML0024	LED 24 VAC / VDC
MTML0615	LED 115 VAC

Timing Module Functional Data

Nominal Voltage: 24 – 240 VAC / VDC
Frequency: 48 – 63 Hz.
Precision of Time Setting: ± 0.5%.
Readiness for Repetition: ≤ 0.5% or 5 ms.
Influence of Temperature: ≤ 0.1% /°C.
Time Range Switchable: 0.05 s – 240 h in 8 ranges.
Ambient Temperature: –25°C to +55°C.

Timing Function Diagrams

Delay ON



Delay OFF



Single shot leading edge



Single shot trailing edge



Single shot



Delay ON triggered by signal contact

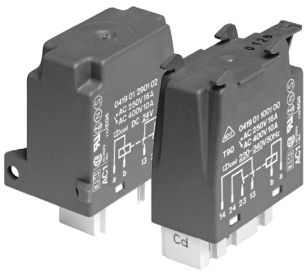


Flasher starting with pause



Flasher starting with pulse





0419 series

16 Amp RAST 5 Relay

File E214025

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- 2 Form A (DPST-NO).
- 16 amp rated current.
- Compatible with RAST 5 connector.
- Contact gap exceeds 3 mm; 4kV/8mm contact-to-coil spacing.
- Designed for European domestic appliances.
- Snap-in or screw mounting.
- Dust cover.

Contact Data

Arrangements: 2 Form A (DPST-NO).
Material: Silver-cadmium oxide or silver-nickel.
Expected Mechanical Life: 2 million operations.
Ratings:
Current: 16A.
Voltage: 250VAC.
Power (breaking): 4,000 VA.
Voltage (breaking): 400VAC.
Current (making, max. 4s at 10% duty cycle): 25A.
AC Coil Models
16 amp resistive, 250VAC, 100,000 ops.
12 amp resistive, 250VAC, 100,000 ops.
DC Coil Models
16 amp resistive, 250VAC, 250,000 ops.
12 amp resistive, 250VAC, 250,000 ops.

Initial Dielectric Strength

Between Open Contacts: 2,000Vrms.
Between Coil and Contacts: 4,000Vrms.
Creepage/Clearance: 8/8mm.

Coil Data DC @ 20°C

Nominal Coil Power: AC Coils: 2.0-2.5 VA; **DC Coils:** 1.3W.

Nominal Voltage VDC	DC Resistance in Ohms ±10%	Must Operate Voltage VDC	Drop-out Voltage VDC	Maximum Voltage VDC	Nominal Coil Current (mA)
DC Coils					
12	118	7.7	0.9	19.5	102.0
24	470	15.5	1.8	39.0	51.0
AC Coils (50 Hz)					
110-120	1,650	93.0	18.0	132.0	20.0
220-240	6,600	187.0	36.0	264.0	10.0
380-400	20,000	323.0	60.0	440.0	6.0

Operate Data

Must Operate Voltage: See Coil Data table.
Operate Time (typical): 15 ms.
Release Time (typical): 15 ms.
Bounce Time (typical): 4 ms.
Switching Rate: 9,000 ops./hr. max. at rated load.

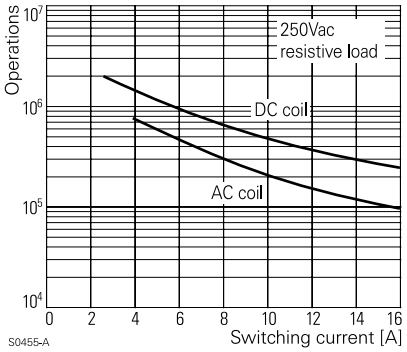
Environmental Data

Temperature Range:
Operating: -20°C to +90°C.
Vibration: (5 to 500 Hz.) 2g.
Shock (destruction): 80g.

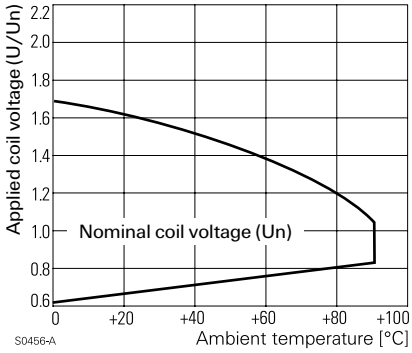
Mechanical Data

Termination: Rast 5.
Enclosure: Plastic dust cover.
Weight: 3.2 oz. (90 g) approximately.

Contact Life



Coil Operating Range



Ordering Information

	Typical Part Number ▶	0419 01	14	01	00

1. Basic Series:
0419 01= Power relay with RAST 5 connection.

2. Coil Voltage:
31 = 12VDC 29 = 24VDC 14 = 110-120VAC 10 = 220-240VAC 09 = 380-400VAC

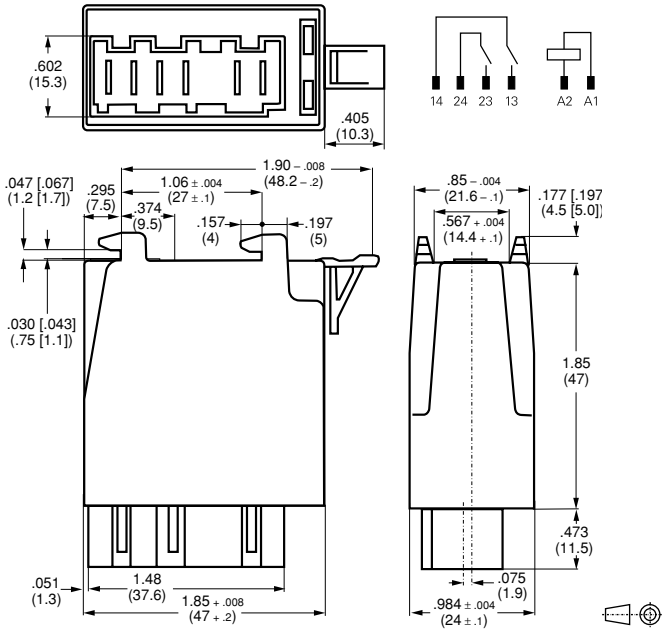
3. Contact Material:
01 = Silver-cadmium oxide. 03 = Silver-nickel 90/10

4. Mounting:
00 = Snap mounting, 10 mm panel
01 = Snap mounting, 15 mm panel
02 = Screw mounting

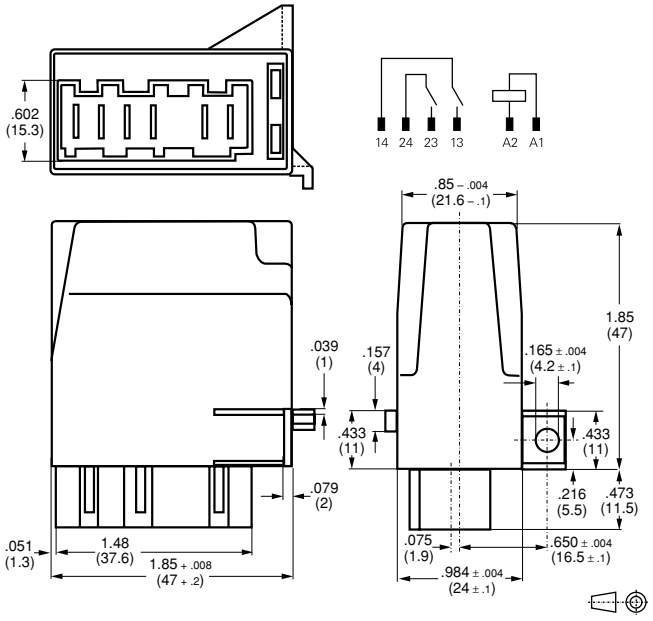
Our authorized distributors are more likely to stock the following items for immediate delivery.

None at present.

Outline Dimensions and Wiring Diagrams



Snap Mount Version

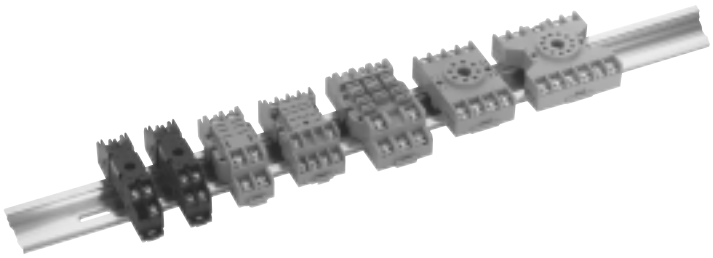


Screw Mount Version

Dimensions are shown for reference purposes only.

Dimensions are in inches over (millimeters) unless otherwise specified.

Specifications and availability subject to change.



DIN Rail Mount Screw Terminal Socket Track Mounting System

File E59244
File LR35144

Features

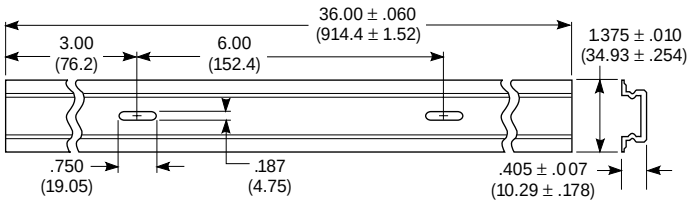
- Sockets mount on standard 35mm DIN track & P&B "top hat" track.
- Spring loaded integral clip holds sockets securely to the track.
- Small screwdriver can be used to release sockets from track.
- Any available hold-down springs must be ordered separately. See Relay & Socket Usage Chart beginning on page 747.
- End clips can be used to further stabilize sockets on track.

Location of Socket Dimensions

Typical Relay	Base	Socket Part Number	Page
KRPA (DPDT)	8-pin octal-type	27E891	741
KRPA (3PDT)	11-pin octal-type	27E892	741
KUP	11-blade square	27E893	730
KH, PCL	14-blade square	27E894	712
K10, PCLH	8-blade square	27E895	722
RT (code 1)	5-blade square	RT78624	452
RT (codes 3 & 5)	8-blade square	RT87625	452
MT (DPDT)	8-pin octal-type	MT78755	743
MT (3PDT)	11-pin octal-type	MT78750	743
RM	11-blade square	RM78705	736
PT (DPDT)	8-blade square	PT78702	719
PT (3PDT)	11-blade square	PT78703	719
PT (4PDT)	14-blade square	PT78704	719

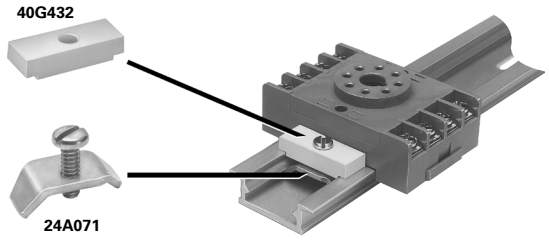
24A110 – DIN Rail Style Mounting Track

24A110 mounting track is designed to accept snap-mount sockets, as well as all other P&B screw terminal sockets. Track is made of lightweight, sturdy extruded aluminum and is shipped in three-foot (914cm) lengths with mounting holes on six-inch (152mm) centers. Track can be cut to shorter lengths or used end-to-end.



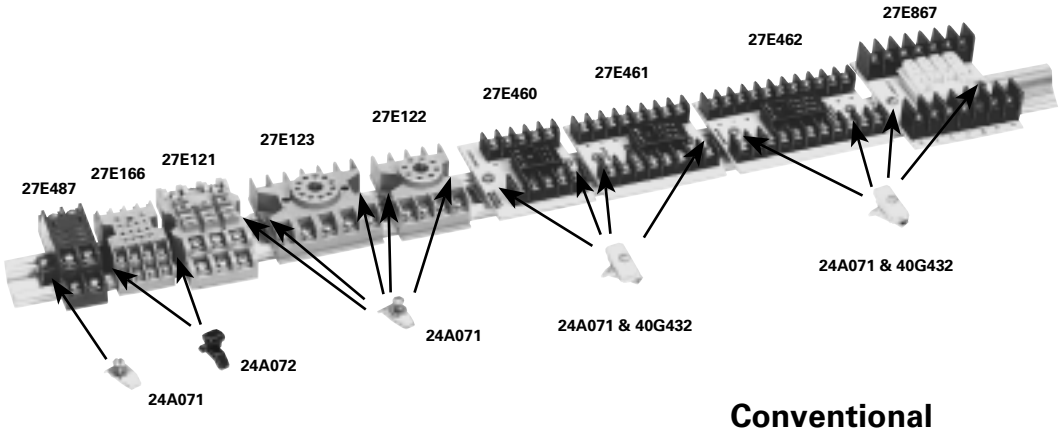
24A071 & 40G432 – End Clip

24A071 steel mounting clip with one #6-32 screw 7/16" (11.1mm) long is used with a 40G432 insulator to prevent sockets from moving sideways or sliding off the end of the track.



Our authorized distributors are more like to stock the items listed below in boldface.

Part Number	Description
24A110	DIN rail style extruded aluminum mounting track for DIN or standard sockets.
24A071	Steel mounting clip with one #6-32 screw 7/16" (11.1mm) long. Use with 40G432 below to make end clip.
40G432	Plastic insulator. Use with 24A071 above to make end clip.



Conventional Screw Terminal Socket Track Mounting Sytem

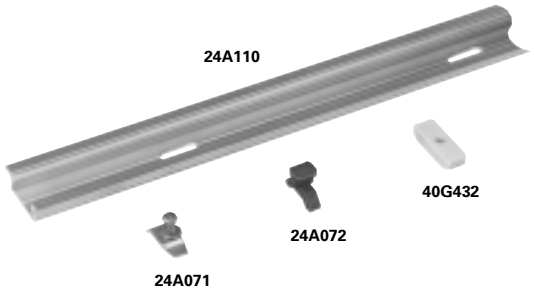
Features

- P&B DIN rail track accommodates a variety of sockets and relays. See Relay & Socket Usage Chart beginning on page 747.
- Various clips are available to secure components to track.

Location of Socket Dimensions

Typical Relay	Base	Socket Part Number	Page
K10	8-blade square	27E487	722
KH	14-blade square	27E166	712
KUP (3PDT)	11-blade square	27E121	730
KRPA (3PDT)	11-pin octal-type	27E123	741
KRPA (DPDT)	8-pin octal-type	27E122	741
R10 (DPDT)	10-blade square	27E460	708
R10 (4PDT)	16-blade square	27E461	708
R10 (6PDT)	22-blade square	27E462	708
KUP (4PDT)	14-blade square	27E867	730

Track & Mounting Accessories



Our authorized distributors are more like to stock the items listed below in boldface.

Part Number	Description
24A110	DIN rail style extruded aluminum mounting track 36" (914mm) long with holes on 6.0" (152.4mm) centers. Holes accept #8 screws.
24A071	Steel mounting clip with one #6-32 screw 7/16" (11.1mm) long.
24A072	Plastic twist mounting clip for 27E166, 27E122 and 27E123 sockets. Twist clip into track to hold socket in place, except when used on end of track. Use 24A071 on ends of track to lock first and last socket in place.
40G432	Plastic insulator for track or surface mounting. Use with 27E460, 27E461, 27E462 and 27E867 sockets.

Track Mounting System – Chart below lists typical applications. See Relay & Socket Usage Chart on following pages for more detail.

Socket	Typ. Relay	Component Hold Down Spring		24A110 Track Mounting Hardware		Chassis Mounting
27E121	KUP	20C314	Hooks into slots below mounting ears. Two hold downs required per socket.	24A071	36" (914cm) strip will mount 19 sockets.	Two suitable screws on 1.7" (43.2mm) centers.
27E122	KRPA		See Socket Usage Chart.	24A071 24A072	36" (914cm) strip will mount 22 sockets.	Two suitable screws on 1.296" (32.92mm) centers.
27E123	KRPA		See Socket Usage Chart.	24A071 24A072	36" (914cm) strip will mount 15 sockets.	Two suitable screw on 1.296" (32.92mm) or 2.06" (52.3mm) centers.
27E166	KHAU	20C297	Hooks into slots on side of socket body. One hold down required per socket.	24A071	36" (914cm) strip will mount 30 sockets.	Two suitable screws on .94" (23.9mm) centers.
27E460 27E461 27E462	R10	20C249 20C250 20C251	Hooks into slots on side of socket body. One hold down required per socket.	24A071 40G432	36" (914cm) strip will mount 16 27E460, 12 27E461 or 9 27E462 sockets.	Two 40G432 insulators and two suitable screws on 1.8" (45.7mm), 2.125" (53.98mm) or 2.812" (71.42mm) centers.
27E487	K10	20C297	Hooks into slots on side of socket body. One hold down required per socket.	24A071 24A072	36" (914cm) strip will mount 31 sockets. 24A072 can be used on small ear only.	Two suitable screws on 1.143" (29.03mm) centers.
27E867	KUP (4PDT)	20C254	Hooks into slots on side of socket body. One hold down.	24A071 40G432	36" (914cm) strip will mount 13 sockets.	Two 40G432 insulators and two suitable screws on 2.25" (57.15mm) centers.

Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.
www.tycoelectronics.com
Technical support:
Refer to inside back cover.

Relay and Socket Usage Chart

Relay	Socket	Terminal Type	Hold-Down Spring	Notes	Socket Page	Comments
48K (8-pin octal)	27E122	Screw	—	—	741	
	27E891	Screw		5	741	
48K (11-pin octal)	27E123	Screw	—	—	741	
	27E892	Screw		5	741	
CB (8-pin octal)	27E122	Screw	—	—	741	
	27E891	Screw		5	741	
CB (11-pin octal)	27E123	Screw	—	—	741	
	27E892	Screw		5	741	
CD (8-pin octal)	27E122	Screw	—	—	741	
	27E891	Screw		5	741	
CD (11-pin octal)	27E123	Screw	—	—	741	
	27E892	Screw		5	741	
CG (8-pin octal)	27E122	Screw	—	—	741	
	27E891	Screw		5	741	
CG (11-pin octal)	27E123	Screw	—	—	741	
	27E892	Screw		5	741	
CH (8-pin octal)	27E122	Screw	—	—	741	
	27E891	Screw		5	741	
CH (11-pin octal)	27E123	Screw	—	—	741	
	27E892	Screw		5	741	
CK (8-pin octal)	27E122	Screw	—	—	741	
	27E891	Screw		5	741	
CK (11-pin octal)	27E123	Screw	—	—	741	
	27E892	Screw		5	741	
CL-41 & CL-44	27E043	Screw	20C228 or 20C254	—	729	20C228 held in place by socket hold down screw whereas 20C254 snaps onto socket.
	27E046	PC	20C228 or 20C254	—	729	20C228 held in place by socket hold down screw whereas 20C254 snaps onto socket.
	27E067	QC & Solder	20C228 or 20C254	—	729	20C228 held in place by socket hold down screw whereas 20C254 snaps onto socket.
	27E121	Screw	20C314	—	730	Use 2 pieces 20C314 per socket.
	27E396	QC & Solder	20C254	—	729	
	27E893	Screw	20C318	5	730	
CL-51	27E043	Solder	20C247	—	729	20C247 held in place by socket hold down screw.
	27E046	PC	20C247	—	729	20C247 held in place by socket hold down screw.
	27E067	QC & Solder	20C247	—	729	20C247 held in place by socket hold down screw.
	27E121	Screw	20C314	—	730	Use 2 pieces 20C314 per socket.
	27E396	QC & Solder		—	729	
	27E893	Screw	20C318	5	730	
CN1 (8-pin octal)	27E122	Screw	—	—	741	
	27E891	Screw		5	741	
CNM5 (11-pin octal)	27E123	Screw	—	—	741	
	27E892	Screw		5	741	
CNS (8-pin octal)	27E122	Screw	—	—	741	
	27E891	Screw		5	741	
CNS (11-pin octal)	27E123	Screw	—	—	741	
	27E892	Screw		5	741	
CNT (11-pin octal)	27E123	Screw	—	—	741	
	27E892	Screw		5	741	
CR (8-pin octal)	27E122	Screw	—	—	741	
	27E891	Screw		5	741	
CS (8-pin octal)	27E122	Screw	—	—	741	
	27E891	Screw		5	741	

Note 1: Flange mount sockets pre-assembled on steel mounting plates. Grounding is not recommended for currents of 5 amps AC & above.

Note 2: Listed hold-down springs cannot be used for R10S.

Note 3: On R10L series hold down spring fits to the side of light emitting diode.

Note 4: Use 40G432 insulator or suitable insulator (2 per socket).

Note 5: Snap-mount relay sockets snap onto 24A110 mounting rail without extra hardware.

Note 6: 27E893 cannot be used with KUIP and KUGP series relays.

Relay and Socket Usage Chart continued on next page.

Relay and Socket Usage Chart

Relay	Socket	Terminal Type	Hold-Down Spring	Notes	Socket Page	Comments
CU-41 & CU-44	27E043	Solder	20C228 or 20C254	—	729	20C228 held in place by socket hold down screw whereas 20C254 snaps onto socket.
	27E046	PC	20C228 or 20C254	—	729	20C228 held in place by socket hold down screw whereas 20C254 snaps onto socket.
	27E067	QC & Solder	20C228 or 20C254	—	729	20C228 held in place by socket hold down screw whereas 20C254 snaps onto socket.
	27E396	QC & Solder	20C254	—	729	
	27E400	Solder	20C254	—	729	
	27E121	Screw	20C314	—	730	Use 2 pieces 20C314 per socket.
	27E893	Screw	20C318	5	730	
CU-51	27E043	Solder	20C247	—	729	20C247 held in place by socket hold down screw.
	27E046	PC	20C247	—	729	20C247 held in place by socket hold down screw.
	27E067	QC & Solder	20C247	—	729	20C247 held in place by socket hold down screw.
	27E121	Screw	20C314	—	730	Use 2 pieces 20C314 per socket.
	27E396	QC & Solder		—	729	
	27E893	Screw	20C318	5	730	
GP	CR0001	Screw	CR0111 or CR0133	—	920	
	CR0002	Screw	CR0111 or CR0133	—	920	
	CR0067	Screw	CR0069	—	920	
	CR0095	Screw	CR0070 or CR0155	—	920	
IAC & IDC	—	—	—	—	—	Refer to page 1114 for I/O modules mounting board details.
IACM & IDCM	—	—	—	—	—	Refer to page 1122 for Slim Line I/O modules mounting board details.
K10	27E487	Screw	20C426	—	722	
	27E488	Solder	20C217	—	722	
	27E489	PC	20C217	—	722	
	27E895	Screw	20C426	5	722	
KBP (11-pin octal)	27E123	Screw	—	—	741	
	27E892	Screw		5	741	
KH & KHA (type-P,S,U,X)	27E006	Solder	20C217	—	712	
	27E007	PC	20C217	—	712	
	27E023	PC	20C217	—	712	
	27E166	Screw	20C297	—	712	
	27E894	Screw	20C426	5	712	
KR Sealed (8-pin octal)	27E122	Screw	—	—	741	
	27E891	Screw	—	5	741	
KR Sealed (11-pin octal)	27E123	Screw	—	—	741	
	27E892	Screw	—	5	741	
KRP3-H (8-pin octal)	27E122	Screw	—	—	741	
	27E891	Screw	—	5	741	
KRP & KRPA (8-pin octal)	27E122	Screw	—	—	741	
	27E891	Screw	—	5	741	
KRP & KRPA (11-pin octal)	27E123	Screw	—	—	741	
	27E892	Screw	—	5	741	
KUEP, KUGP, KUIP, KUMP & KUP [1-3 poles with .187" (4.75mm) QC]	27E043	Solder	20C228 or 20C254	—	729	20C228 held in place by socket hold down screw whereas 20C254 snaps onto socket.
	27E046	PC	20C228 or 20C254	—	729	20C228 held in place by socket hold down screw whereas 20C254 snaps onto socket.
	27E067	QC & Solder	20C228 or 20C254	—	729	20C228 held in place by socket hold down screw whereas 20C254 snaps onto socket.
	27E121	Screw	20C314	—	730	Use 2 pieces 20C314 per socket.
	27E396	QC & Solder	20C254	—	729	
	27E400	Solder	20C254	—	729	
	27E893	Screw	20C318	5, 6	730	
KUL with .187" (4.75mm) QC]	27E043	Solder	20C247	—	729	20C247 held in place by socket hold down screw.
	27E046	PC	20C247	—	729	20C247 held in place by socket hold down screw.
	27E067	QC & Solder	20C247	—	729	20C247 held in place by socket hold down screw.
	27E121	Screw	20C314	—	730	Use 2 pieces 20C314 per socket.
	27E396	QC & Solder		—	729	
	27E893	Screw	20C318	5	730	

Note 1: Flange mount sockets pre-assembled on steel mounting plates. Grounding is not recommended for currents of 5 amps AC & above.

Note 2: Listed hold-down springs cannot be used for R10S.

Note 3: On R10L series hold down spring fits to the side of light emitting diode.

Note 4: Use 40G432 insulator or suitable insulator (2 per socket).

Note 5: Snap-mount relay sockets snap onto 24A110 mounting rail without extra hardware.

Note 6: 27E893 cannot be used with KUIP and KUGP series relays.

Relay and Socket Usage Chart continued on next page.

Relay and Socket Usage Chart

Relay	Socket	Terminal Type	Hold-Down Spring	Notes	Socket Page	Comments
KUP [4 pole with .110" (2.79mm) QC]	27E415	QC & Solder	20C228 or 20C254	—	101	20C228 held in place by socket hold down screw whereas 20C254 snaps onto socket.
	27E419	PC	20C228 or 20C254	—	101	20C228 held in place by socket hold down screw whereas 20C254 snaps onto socket.
	27E867	Screw	20C254	4	101	
MD0	27E006	Solder	—	—	712	
	27E007	PC	—	—	712	
	27E023	PC	—	—	712	
	27E166	Screw	—	—	712	
	27E894	Screw	—	5	712	
MT	MT78750	Screw	MT28800	—	743	For relays with 11-pin bases.
	MT78755	Screw	MT28800	—	743	For relays with 8-pin bases.
	MT78740	Screw	MT28800	—	744	For relays with 11-pin bases. Will accommodate function modules.
	MT78745	Screw	MT28800	—	744	For relays with 8-pin bases. Will accommodate function modules.
ML	CR0001	Screw	CR0111 or CR0133	—	920	
	CR0002	Screw	CR0111 or CR0133	—	920	
	CR0067	Screw	CR0069	—	920	
	CR0095	Screw	CR0070 or CR0155	—	920	
OAC & ODC	—	—	—	—	—	Refer to page 1114 for I/O module mounting board details.
OACM & ODCM	—	—	—	—	—	Refer to page 1122 for Slim Line I/O modules mounting board details.
ORWH	27E1064	PC	—	—	439	
PCE	27E1064	PC	—	—	437	
PT	27E006	Solder	—	—	719	Will accommodate 2- or 4-pole models.
	27E220	PC	—	—	719	For use with 2-pole models.
	27E023	PC	—	—	719	For use with 4-pole models.
	27E894	Screw	—	5	719	Will accommodate 2- or 4-pole models.
	PT78700	Screw	—	5	719	Will accommodate 2- or 4-pole models.
	PT78702	Screw	—	5	719	For 2-pole relays. Will accommodate function modules.
	PT78703	Screw	—	5	719	For 3-pole relays. Will accommodate function modules.
	PT78704	Screw	—	5	719	For 4-pole relays. Will accommodate function modules.
R10, R10L & R10S (2 pole)	27E125	Solder	20C249	2, 3	707	Tin plated terminals with grounding strip.
	27E162	Solder	20C249	2, 3	707	Tin plated terminals no grounding provision.
	27E128	PC Stag.	20C249 or 20C259	2, 3	707	Tin plated terminals with grounding strip.
	27E446	Solder	20C249	1, 2, 3	707	Tin plated terminals with grounding strip.
	27E193	PC Stag.	20C249 or 20C259	2, 3	707	Tin plated terminals with grounding terminals.
	27E212	PC Stag.	20C249 or 20C259	2, 3	707	Tin plated terminals no grounding provision.
	27E342	PC In-Line	20C249 or 20C259	2, 3	707	Tin plated terminals no grounding provision.
	27E317	Solder/Bkt. Mt.	20C249	2, 3	708	Tin plated terminals with grounding strip.
	27E460	Screw	20C249 or 20C259	2, 3, 4	708	Tin plated terminals no grounding provision.
R10, R10L & R10S (4 pole)	27E126	Solder	20C250	2, 3	707	Tin plated terminals with grounding strip.
	27E163	Solder	20C250	2, 3	707	Tin plated terminals no grounding provision.
	27E129	PC Stag.	20C250	2, 3	707	Tin plated terminals with grounding strip.
	27E194	PC Stag.	20C250 or 20C259	2, 3	707	Tin plated terminals with grounding terminal.
	27E213	PC Stag.	20C250 or 20C259	2, 3	707	Tin plated terminals no grounding provision.
	27E629	PC In-Line	20C250 or 20C259	2, 3	707	Tin plated terminals no grounding provision.
	27E461	Screw	20C250 or 20C259	2, 3, 4	708	Tin plated terminals no grounding provision.
R10 & R10L (6 pole)	27E127	Solder	20C251	3	707	Tin plated terminals with grounding strip.
	27E130	PC Stag.	20C251 or 20C259	3	707	Tin plated terminals with grounding strip.
	27E630	PC In-Line	20C251 or 20C259	3	707	Tin plated terminals no ground provision.
	27E462	Screw	20C251 or 20C259	3, 4	708	Tin plated terminals no grounding provision.
RM	RM78700	QC	RM28802	—	736	
	RM78701	Solder	RM28802	—	736	
	RM78702	PC	RM28802	—	736	
	RM78705	Screw	—	5	736	
RT	RP78601	PC	RP16041	—	450	Use with Code 1.
	RP78602	PC	RP16041	—	450	Use with Codes 3 & 5.
	RT78624	Screw	RT16016	5	450	Use with Code 1.
	RT78625	Screw	RT16016	5	450	Use with Codes 3 & 5.
	RT78626	Screw	RT16016	5	450	Use with Codes 3 & 5.

Note 1: Flange mount sockets pre-assembled on steel mounting plates. Grounding is not recommended for currents of 5 amps AC & above.

Note 2: Listed hold-down springs cannot be used for R10S.

Note 3: On R10L series hold down spring fits to the side of light emitting diode.

Note 4: Use 40G432 insulator or suitable insulator (2 per socket).

Note 5: Snap-mount relay sockets snap onto 24A110 mounting rail without extra hardware.

Note 6: 27E893 cannot be used with KUIP and KUGP series relays.

Relay and Socket Usage Chart continued on next page.

Relay and Socket Usage Chart

Relay	Socket	Terminal Type	Hold-Down Spring	Notes	Socket Page	Comments
S89R11APP & S89R11DPP (8-pin octal)	27E122	Screw	—	—	741	
	27E891	Screw		5	741	
SCB, SCC, SCE (8-pin octal)	27E122	Screw	—	—	741	
	27E891	Screw		5	741	
SCB, SCC, SCE (11-pin octal)	27E123	Screw	—	—	741	
	27E892	Screw		5	741	
SCF	BCSF11SC	Screw	—	—	1218	
SDAS-01	27E043	Solder	—	—	729	
	27E046	PC	—	—	729	
	27E067	QC & Solder	—	—	729	
	27E121	Screw	20C314	—	730	Use 2 pieces 20C314 per socket.
	27E396	QC & Solder	—	—	729	
	27E893	Screw	—	5	730	
SRC	27E122	Screw	—	—	741	
	27E891	Screw		5	741	
SRUDH	27E1064	PC	20C430	—	443	
SRUUH	27E1064	PC	20C430	—	445	
SSC, SST (8-pin octal)	27E122	Screw	—	—	741	
	27E891	Screw		5	741	
SSC, SST (11-pin octal)	27E123	Screw	—	—	741	
	27E892	Screw		5	741	
STA	27E043	Solder	—	—	729	
	27E046	PC	—	—	729	
	27E067	QC & Solder	—	—	729	
	27E121	Screw	—	—	730	
	27E396	QC & Solder		—	729	
	27E893	Screw	—	5	730	
T7C	27E1064	PC	20C430	—	441	
T7N	27E1064	PC	—	—	435	
TR	CR0001	Screw	CR0111 or CR0133	—	920	
	CR0002	Screw	CR0111 or CR0133	—	920	
	CR0067	Screw	CR0069	—	920	
	CR0095	Screw	CR0070 or CR0155	—	920	
V23047	RP78602	PC	—	—	605	
	RT78625	Screw	RP16104	5	605	Accommodates function modules.
	RT78626	Screw	RP16104	5	605	Accommodates function modules.

Note 1: Flange mount sockets pre-assembled on steel mounting plates. Grounding is not recommended for currents of 5 amps AC & above.
Note 2: Listed hold-down springs cannot be used for R10S.
Note 3: On R10L series hold down spring fits to the side of light emitting diode.
Note 4: Use 40G432 insulator or suitable insulator (2 per socket).
Note 5: Snap-mount relay sockets snap onto 24A110 mounting rail without extra hardware.
Note 6: 27E893 cannot be used with KUIP and KUGP series relays.

Alphanumeric Index

Series	Type	Page
38	Power Relay	818
9100	Power Relay	816
9400	Power Relay	814
KUHP	Power Relay	803
Model 2000	Definite Purpose Contactor	828
Model 93-3100	Definite Purpose Contactor	834
Model 96-3100	Definite Purpose Contactor	830
Model 96-3186	Definite Purpose Contactor	838
Model 98-3100	Definite Purpose Contactor	832
Model A-3100	Definite Purpose Contactor	840
P25	Definite Purpose Contactor	820
P30/P40	Definite Purpose Contactor	823
P31/P41	Definite Purpose Contactor	826
PM	Power Relay	809
PRD	Power Relay	811
RM C/D	Power Relay	805
S86R/S87R	Power Relay	807

NOTE: A question tree that may help you in selecting an appropriate power relay or definite purpose contactor for your application can be found on the next page.

NOTE: In addition to the products described in this section of the databook, more power relays and contactors are also described in other sections. Following is a list.

Power PC Board Relays

491	509
PCF	502
T9A	506
T90	504
T92	511

Plug-in/Panel Mount Relays

KRP-3-H	739
RM8	733

Latching, Impulse Rotary & Special Application Relays

136	916
S89R/S90R	912

Solid State Relays & I/O Modules

SSR	1104
SSRD	1102
SSRQ	1108
SSRD	1106

Automotive Relays

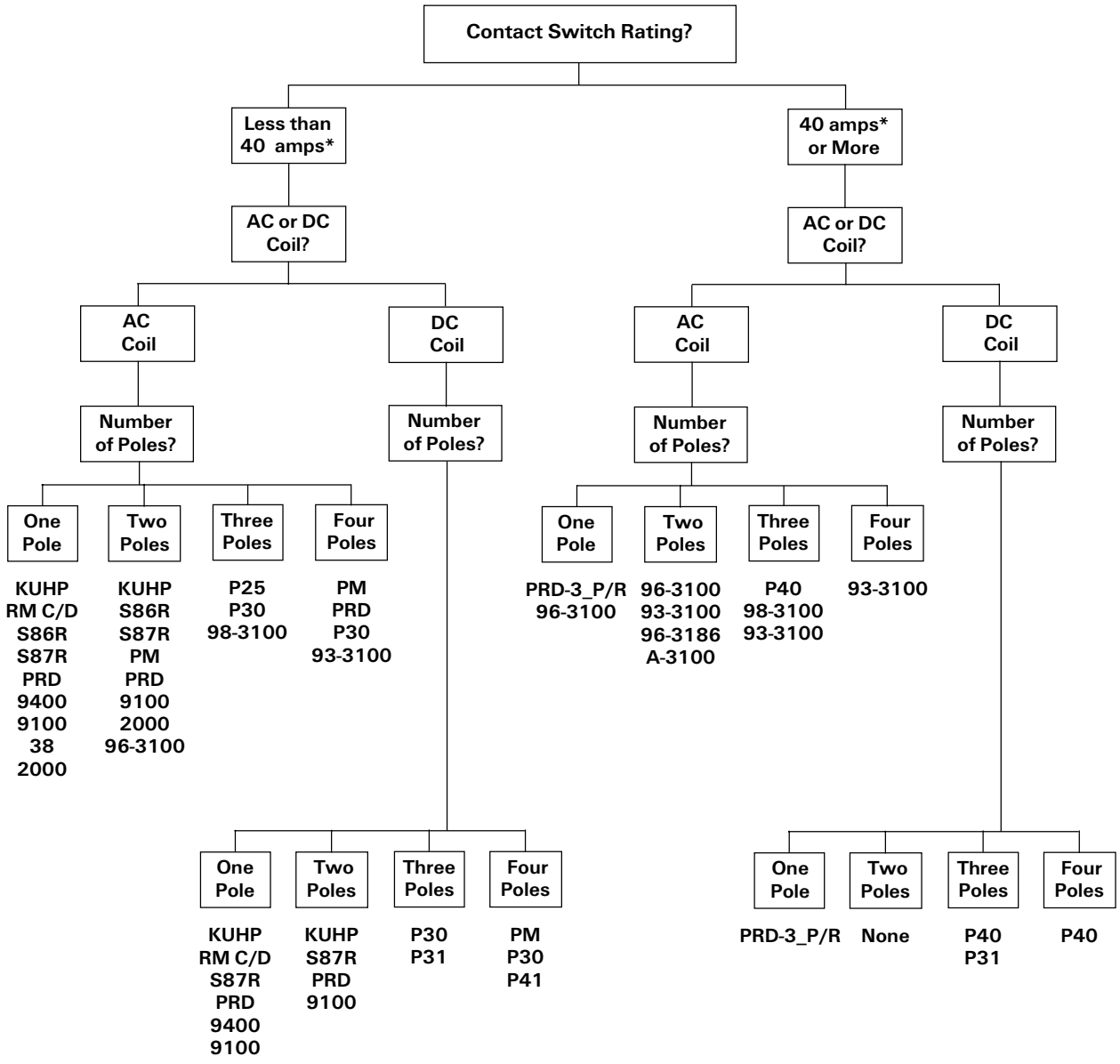
T72M	1005
V23086	1002
V2R	1012
VF4	1017
VF7	1021
VFM	1014
VKP	1007

Power relays and contactors are also included in our line of high performance products (see overview of product line in section 14 of this databook).

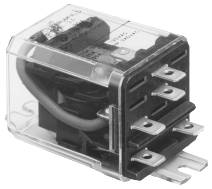
Power Relays & Definite Purpose Contactors 801-842 **8**

Power Relay & Definite Purpose Contactor Question Tree

This guide helps the user select one or more product series which may be appropriate for a given application. The user should then refer to detailed specifications elsewhere in this catalog to determine the actual part number to be specified. Of course, the user must assume ultimate responsibility for determining the suitability of a product for a particular application.



* Typical loads for comparison purposes. See catalog pages for a given series for detailed rating specifications.



KUHP series

30 Amp Power Relays

File E22575
File LR15734-123

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- AC coils 6-277VAC 50/60 Hz., DC 6-110VDC.
- Contact arrangement up to DPDT.
- .250" combination push-on/solder terminals or PC terminals.
- Side flange and top flange mounting.
- Designed to meet VDE space requirements.
- Class B coil insulation.

Contact Data @ 25°C

Arrangements: 1 Form C (SPDT) and 2 Form C (DPDT).
Material: Silver or silver-cadmium oxide.
Expected Mechanical Life: 10 million operations.

Contact Ratings

Contact Arrangement	UL/CSA Ratings	Expected Life
1 Form C Single Pole Double Throw	30A 120/240VAC 1 HP @ 120VAC, 1 1/2 HP @ 240VAC 25A @ 28VDC	100,000 ops.
2 Form C Double Pole Double Throw	20A @ 120/240VAC 3/4 HP @ 120VAC 1 1/2 HP @ 240VAC 20A @ 28VDC 7A @ 120VAC (Tungsten)*	100,000 ops.

*NO contacts only.

Initial Dielectric Strength

Between Open Contacts: 1,200V rms.
Between Adjacent Contacts: 3,750V rms.
Between Contacts and Coil: 3,750V rms.
Between Coil and Frame: 2,000V rms.

Coil Data @ 25°C

Voltage: 6-110VDC and 6-277VAC.
Nominal Power:
DC Coils: 1.2 Watts.
AC Coils: 2.7VA.
Duty Cycle: Continuous.
Initial Insulation Resistance: 100 megohms, min.
Insulation: Class B, 130°C.

Coil Data

	Nominal Voltage	DC Resistance in Ohms ± 10%*	Must Operate Voltage	Nominal Coil Current (mA)
DC Coils	6	32.1	4.5	187
	12	120	9.0	100
	24	472	18.0	51
	48	1,800	36.0	26.7
	110	10,000	82.5	11
AC Coils	6	4.2	5.1	460
	12	18	10.2	230
	24	72	20.4	115
	120	1,700	102.0	24
	240	7,200	204.0	12
	277	10,250	235.5	9

*±15% for AC coils.

Operate Data @ 25°C

Must Operate Voltage:
DC Coils: 75% of nominal.
AC Coils: 85% of nominal.
Operate Time (Excluding Bounce): 20 milliseconds, typical, at nominal voltage.
Release Time (Excluding Bounce): 20 milliseconds, typical, at nominal voltage.

Environmental Data

Temperature Range: (Operating)
DC Coils: -45°C to +70°C.
AC Coils: -45°C to +45°C.
Shock: 15g's, 11 ms (non-operating).
Vibration: .065" double amplitude, 10-55 Hz.

Mechanical Data

Termination: .250" quick connect/solder; and PC board.
Enclosure: Polycarbonate dust cover.
Weight: 3.2 oz. (92g) approximately.

Ordering Information

Typical Part No. ▶	KUHP-	11	A	5	1	-120

1. Basic Series and Type:
KUHP = Enclosed 20/30 amp relay.

2. Contact Arrangement and Rating:
5 = 1C (SPDT); 30 amps. 11 = 2C (DPDT); 20 amps.

3. Coil Input:
A = AC, 50/60 Hz. D = DC

4. Mountings:
1 = PLAIN CASE 5 = BRACKET MOUNT CASE T = TOP FLANGE CASE

5. Terminals and Contact Materials:
1 = .250" (6.35mm) quick connect/solder; silver-cadmium oxide. 7 = .047" (1.19mm) printed circuit; silver-cadmium oxide.

6. Coil Voltage:
AC coils to 277VAC, 50/60 Hz. DC coils to 110VDC.

NOTE: No sockets are available for this relay.

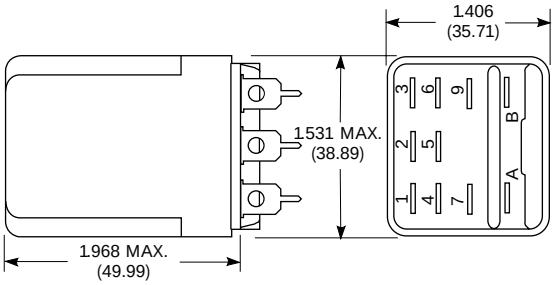
Our authorized distributors are more likely to maintain the following items in stock for immediate delivery.

KUHP-5A51-24	KUHP-5AT1-120	KUHP-5D51-24	KUHP-5DT1-24	KUHP-11A51-120	KUHP-11D51-12	KUHP-11DT1-12
KUHP-5A51-120	KUHP-5D51-12	KUHP-5DT1-12	KUHP-11A51-24	KUHP-11AT1-120	KUHP-11D51-24	KUHP-11DT1-24

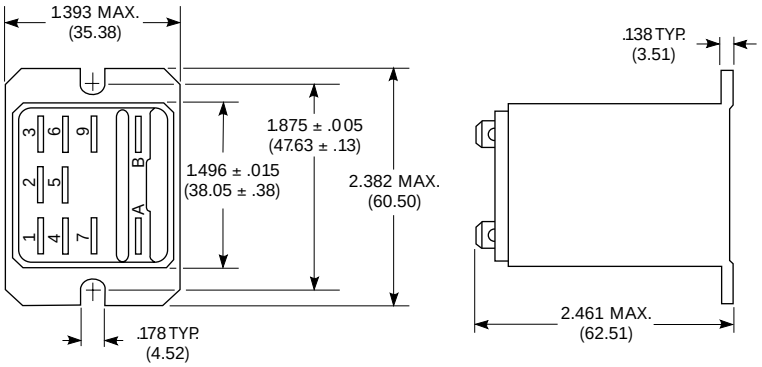
Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.
www.tycoelectronics.com
Technical support:
Refer to inside back cover.

Outline Dimensions

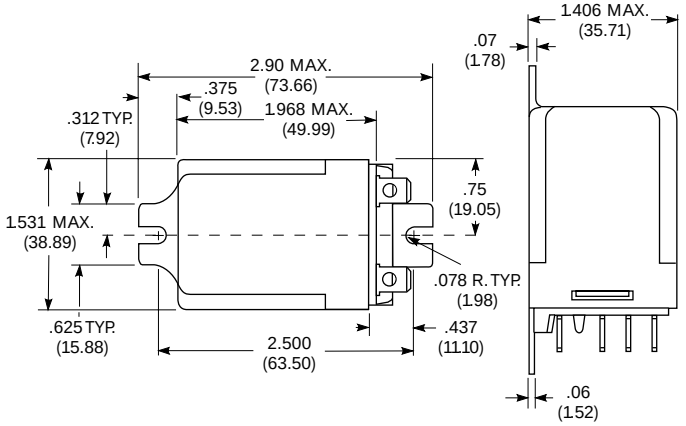
Plain Case



Top Flange Enclosure

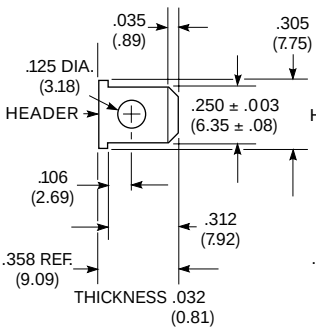


Bracket Mount Case

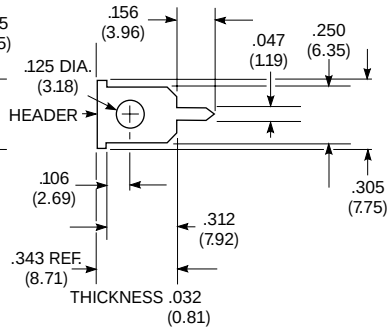


Terminal Dimensions

.250" (6.35mm) Quick Connect/Solder

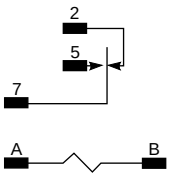


Printed Circuit

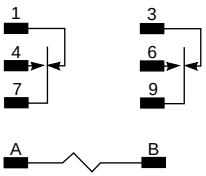


Wiring Diagrams

1 Form C
1 Form A (Delete 2)
1 Form B (Delete 5)

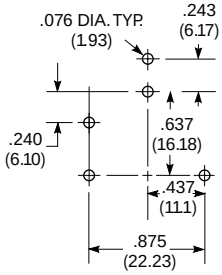


2 Form C
2 Form A (Delete 1 & 3)
2 Form B (Delete 4 & 6)

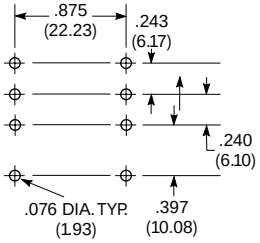


PC Board Layouts (Bottom Views)

1 Pole Model



2 Pole Model



Dimensions are shown for reference purposes only.

Dimensions are in inches over (millimeters) unless otherwise specified.

Specifications and availability subject to change.

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Technical support:
Refer to inside back cover.



RM C/D series

30 Amp Power Relays

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- SPST-NO-DM or SPDT-DB-DM arrangements.
- Flange-mount case.
- Optional push to test button.
- Available with LED indicator and protection diode.

Contact Data @ 20°C

Arrangements: 1 Form X (SPST-NO-DM) and 1 Form Z (SPDT-DB-DM).
Material: Silver-cadmium oxide.
Expected Mechanical Life: 10 million operations minimum.
Rated Current: 30A.
Rated Voltage: 250VAC.
Maximum Breaking Capacity (AC): 7,500VA.
Maximum Make Current (max. 4s at 10% duty cycle: 60A.

Initial Dielectric Strength

Between Open Contacts: 1,500VAC (RM 5/6 2,500VAC).
Between Coil and Contacts: 2,500VAC.
Creepage/Clearance: 2.8/4mm.

Coil Data @ 20°C

Voltage: 6-220VDC and 24-400VAC.
Nominal Power: DC Coils: 1.2W; **AC Coils:** 2.8VA.

Coil Data @ 20°C

Nominal Voltage VDC	Operate Voltage VDC	Drop-out Voltage VDC	DC Resistance in Ohms	Nominal Coil Current (mA)
DC Coils				
6	4.5	0.6	32 ± 10%	187.5
12	9.0	1.2	110 ± 10%	109.1
24	18.0	2.4	475 ± 10%	50.0
48	36.0	4.8	2,000 ± 10%	24.0
60	45.0	6.0	2,850 ± 10%	21.1
110	82.5	11.0	10,000 ± 12%	11.0
220	165.0	22.0	40,000 ± 15%	5.5
AC Coils				
24	19.2	9.6	80 ± 10%	109.2
48	38.4	19.2	320 ± 10%	54.2
60	48.0	24.0	500 ± 10%	43.7
115	92.0	46.0	1,850 ± 10%	23.0
230	184.0	92.0	7,500 ± 10%	11.7
400	320.0	160.0	23,500 ± 15%	6.5

Operate Data

Must Operate Voltage: See Coil Data table.
Operate Time /Release Time (typical): 17 ms / 18 ms.
Bounce Time (typical): 4 ms.
Switching Rate: 9,600 ops./hr. max. at rated load.

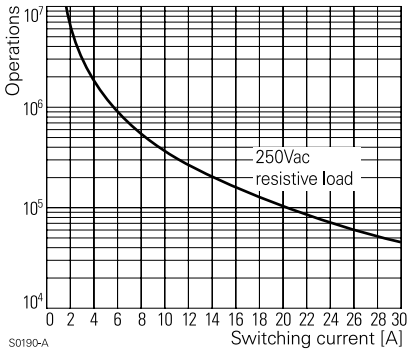
Environmental Data

Temperature Range (Operating):
DC Coil: -45°C to +60°C.
AC Coil: -45°C to +40°C.
Vibration: 30 to 150 Hz at 10g N/O, 5g N/C

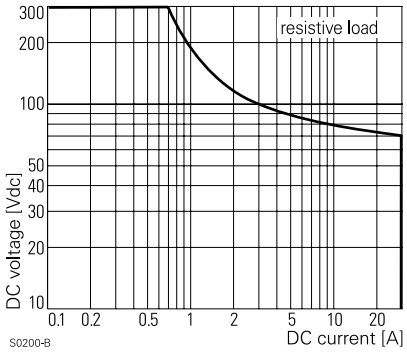
Mechanical Data

Termination: .250" quick connects.
Enclosure: Plastic dust cover.
Weight: 2.86 oz. (81 g) approximately.

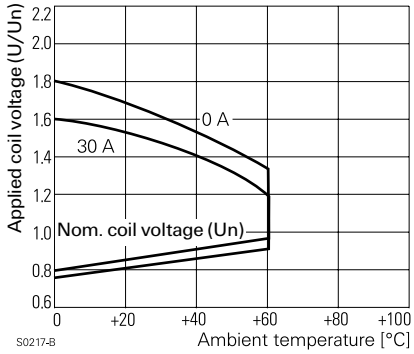
Contact Life



Maximum DC Load Breaking Capacity



DC Coil Operating Range



Ordering Information

Typical Part Number ▸	RM	C	0	5	024

1. Basic Series:
RM = General purpose relay.

2. Contact Arrangement and Rating:
C = 1 Form Z (SPDT-DB-DM) 30 Amp
D = 1 Form X (SPST-NO-DM) 30 Amp

3. Test:
0 = without push-to-test-button.
3 = with push-to-test-button.

4. Enclosure:
5 = Bracket Mount Case 0.250 (6.35mm) quick connect.

5. Coil Voltage:

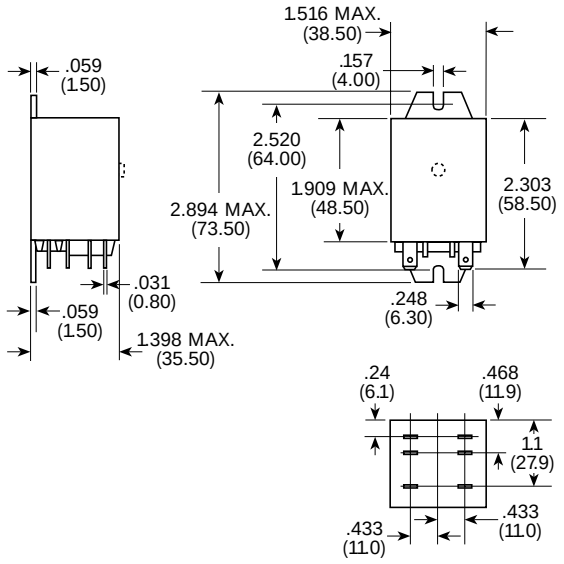
Standard Coil	with LED (bipolar)	with protection diode*	with LED and protection diode		Standard Coil	with LED	with protection diode	with LED and protection diode	
006	L06	0A6	LA6	=6VDC	524	R24	—	—	=24VAC
012	L12	0B2	LB2	=12VDC	548	R48	—	—	=48VAC
024	L24	0C4	LC4	=24VDC	560	R60	—	—	=60VAC
048	L48	0E8	LE8	=48VDC	615	S15	—	—	=115VAC
060	L60	0G0	LG0	=60VDC	730	T30	—	—	=230VAC
110	M10	1B0	MB0	=110VDC	900	V00	—	—	=400VAC
220	N21	2C1	NC1	=220VDC					

* For models with protection diode, standard polarity is: terminal A1 is positive, terminal A2 is negative.

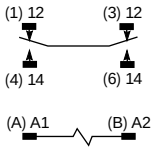
Our authorized distributors are more likely to maintain the following items in stock for immediate delivery.

None at present.

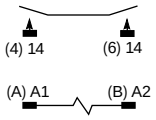
Outline Dimensions



Wiring Diagrams (Bottom Views)



RMC
1 Form Z
(SPDT-DB-DM)



RMD
1 Form X
(SPST-NO-DM)

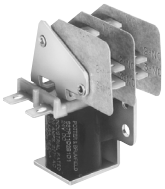
Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.
www.tycoelectronics.com
Technical support:
Refer to inside back cover.

S86R/S87R series

Low Cost 20 Amp Industrial Relays



S86R Mounting Style 1



S87R Mounting Style 2

File E22575
File LR15734

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- Low cost.
- Contact forms to 2 Form C.
- Applications include spa controls, vending machines, HVAC, and machine tool controls.
- Variety of mounting styles.

Contact Data @ 25°C

S86R and S87R: 20 amps @ 277VAC; 60 LRA, 12 FLA, 1 HP @ 125VAC;
48 LRA, 8 FLA @ 240VAC; 2 HP @ 250VAC; Pilot Duty,
360VA @ 125/250VAC.
Materials: Silver and silver-cadmium oxide.
Expected Life: 1 million operations, mechanical; 50,000 operations at rated loads.

Initial Dielectric Strength

Initial Breakdown Voltage: 1,560V rms, 60 Hz.

Coil Data @ 25°C

Nominal Power:
S86R: 4.0VA for AC models.
S87R: 2.9 Watts for single pole DC models.
4.5 Watts for double pole DC models.
4.0VA for AC models.
Insulation: Class B (130°C).

Coil Data

Nominal Coil Voltage	Coil Resistance (Ohms) AC, ± 15% DC, ± 10%		Nominal Coil Current (mA) @ 25°C*	
S86R & S87R (AC)	**All Models**		**All Models**	
12VAC	8.0		330	
24VAC	32		165	
120VAC	800		33.0	
240VAC	3,200		16.5	
S87R (DC)	**Single Pole Models**	**Double Pole Models**	**Single Pole Models**	**Double Pole Models**
6VDC	12.5	8	480	750
12VDC	50	32	240	375
24VDC	200	128	120	188
36VDC	450	288	80	125
48VDC	800	512	60	94
72VDC	1,800	1,150	40	63
125VDC	5,425	3,470	23	36

*Increase AC current values by 25% for mounting style 2 with single switch.

Operate Data

Must Operate Voltage:
DC Coils: 75% of nominal voltage @ +25°C.
AC Coils: 85% of nominal voltage @ +25°C.
Operating Position: Relay is designed for operation with plunger either vertical or horizontal; however, the relay is not designed for operation in an upside-down position.

Environmental Data

Temperature Range: -10°C to +65°C.

Ordering Information

Typical Part No. ▶	S86R	5	A	1	B	1	D	1	-120

1. Basic Series:
S86R = Standard relay with AC coil, 20 Amp contacts.
S87R = Standard relay with AC or DC coil, 20 Amp contacts.

2. Contact Arrangement:
5 = SPDT 7 = DPST-NO 11 = DPDT

3. Coil Input:
A = AC (available on S86R and S87R)
D = DC (available on S87R only)

4. Mounting Style:
S86: 1 = Style 1
S87: 2 = Style 2
(See outline dimensions)

5. Coil Terminal Style:
B = .250" (6.35mm) Quick-connect/solder.

6. Coil Terminal Location (S86):
1 = Same side as switch terminals.

Coil Terminal Location (S87):
1 = Located perpendicular to switch terminals.

7. Switch Terminal Style:
D = .250" (6.35mm) Quick-connect/solder.

8. Switch Terminal Configuration:
1 = Style 1

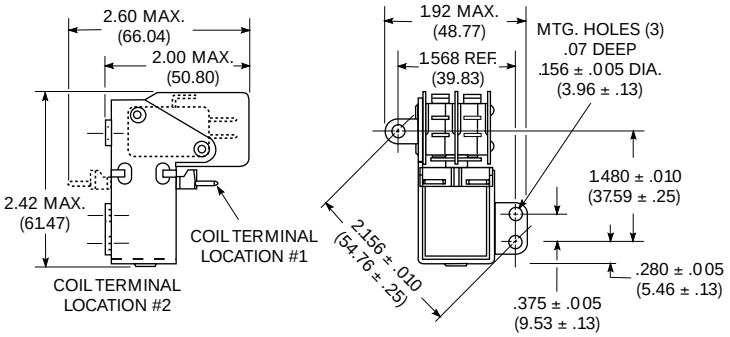
9. Coil Voltage:
AC coils to 240VAC, 50/60 Hz.
DC coils to 125VDC.

Our authorized distributors are more likely to maintain the following items in stock for immediate delivery.

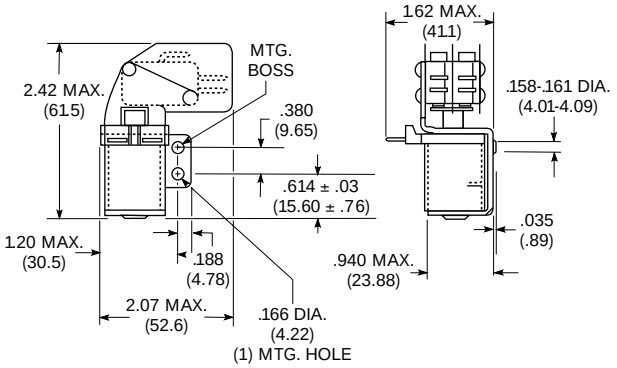
S86R5A1B1D1-120	S86R11D1B1D1-12	S87R5A2B1D1-240	S87R11A2B1D1-24	S87R11A2B1D1240
S86R11A1B1D1120	S87R5A2B1D1-120	S87R5D2B1D1-24	S87R11A2B1D1120	S87R11D2B1D1-110

Outline Dimensions

S86R (2 pole shown) Style 1

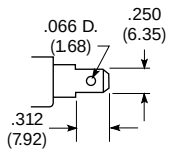


S87R (2 pole shown) Style 2



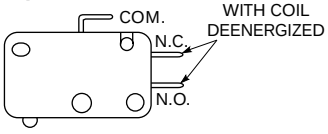
Switch Terminal Style

.250" (6.35mm) Quick Connect



Switch Terminal Configuration

Style 1



Dimensions are shown for reference purposes only.

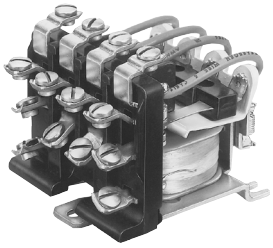
Dimensions are in inches over (millimeters) unless otherwise specified.

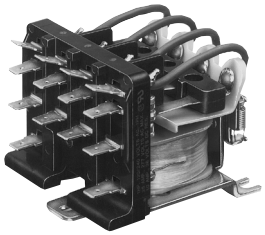
Specifications and availability subject to change.

www.tycoelectronics.com
Technical support:
Refer to inside back cover.

PM series

Heavy Duty
25 Amp Multicontact
AC or DC Power Relay





- File E22575 (PM)
- File E22575 (PMT)
- File 15734

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- Contact ratings to 25 amps.
- 8-32 screw or .250 Q.C. termination.
- AC and DC coils available.
- 4PDT contact arrangement.
- Plastic and metal covers available.

Contact Data @ 25°C

Arrangements: 4 Form C (4PDT).
Ratings: **PM & PMT:** 25 amps @ 277VAC, max.; 10 amps @ 28VDC; 1 HP @ 120/240VAC, Single Phase.
Minimum Ratings: 1 amp @ 12 VAC/VDC.
Material: Silver-cadmium oxide.
Expected Life: 10 million operations, mechanical; 100,000 operations at rated loads @ 25°C.

Initial Dielectric Strength

Initial Breakdown Voltage: 2,000V rms minimum between all elements and ground.

Coil Data @ 25°C

Voltage: From 6 to 125VDC and 12 to 240VAC, 50/60 Hz.
Nom. Power: **DC:** 4.4 Watts @ 25°C.
AC: 14VA @ 25°C.
Duty Cycle: Continuous.
Initial Insulation Resistance: 100 megohms, minimum.

DC Coils			AC Coils (50/60 Hz.)		
Nominal Voltage	DC Resis. In Ohms ±10% @ +25°C	Nominal Current In Milliamps	Nominal Voltage	DC Resis. In Ohms ±15% @ +25°C	Nominal Current In Milliamps
6	8.2	732			
12	33	364	12	1.4	1070
24	132	182	24	5.0	540
48	526	91	120	120	128
110	2760	40	240	587	61
125	3570	35			
220	Use a 110 volt relay with 2700 to 3300 ohm 5 watt wire wound resistor in series.				

Operate Data @ 25°C

Must-Operate Voltage: **DC:** 75% of nominal voltage @ +25°C.
AC: 85% of nominal voltage @ +25°C.

Environmental Data

Temperature Range: **AC:** -55°C to +45°C @ nominal coil power.
DC: -55°C to +55°C @ nominal coil power (+75°C available on special order).

Mechanical Data

Mounting: Three holes; one front key-hole and two rear channel slots for #8-32 screws.
Termination: **PM:** Heavy-duty screw type with #8-32 BH screw.
PMT: .250" (6.35mm) quick connect terminals.
Insulating Material: Molded polyester alkyd.
Enclosure: **PM & PMT:** Plastic dust cover or metal enclosure available. Order separately. See following page.
Weight: 14 oz. (397g) approximately.

Ordering Information

Typical Part No. ▶	PM		-17	A	Y	-120

1. Basic Series: PM

2. Type:
Leave blank = Open relay with screw terminals.
T = Open relay with .250" (6.35mm) quick connect terminals.

3. Contact Arrangement:
17 = 4 Form C (4PDT)

4. Coil Input:
A = AC D = DC

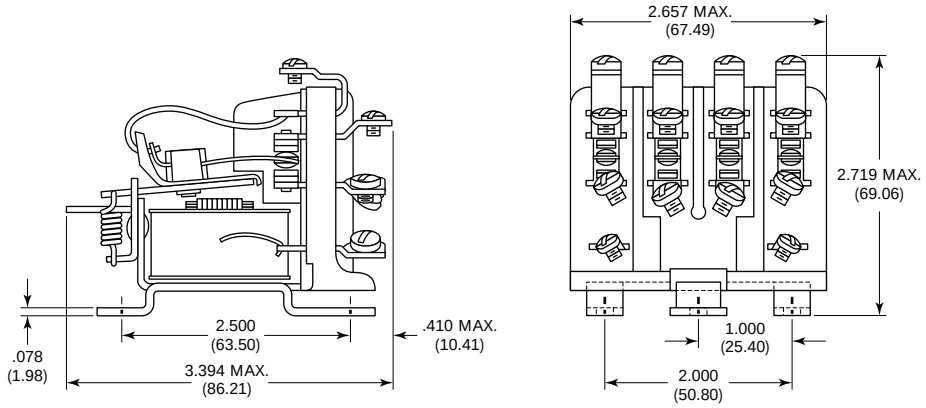
5. Contact Material:
Y = Silver-cadmium oxide.

6. Coil Voltage:
To 240VAC or 125VDC (to 220V with resistor).

Our authorized distributors are more likely to maintain the following items in stock for immediate delivery.

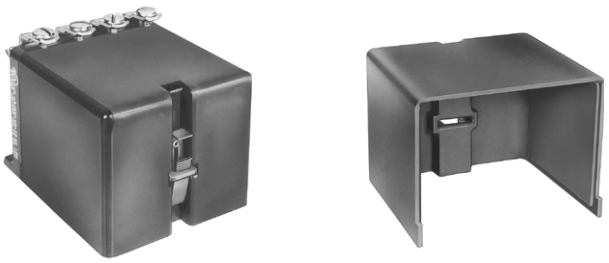
PM-17AY-24	PM-17DY-12	PMT-17DY-24
PM-17AY-120	PM-17DY-24	
PM-17AY-240	PM-17DY-110	

Outline Dimensions



Tolerance: ± .010 (± .25)

PM Plastic Dust Cover 35D203



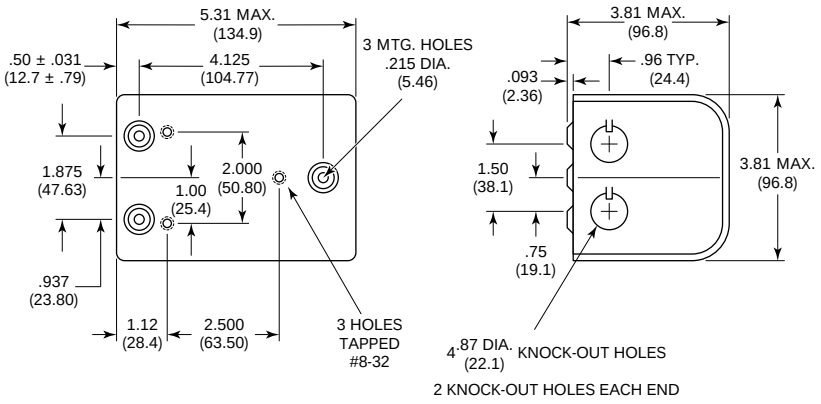
Overall Dimensions In Inches (mm)

Part No.	Length	Width	Height
35D203	3.394* (86.21)	2.657* (67.49)	2.719* (69.06)
35D227	5.313 (134.95)	3.813 (96.85)	3.813 (96.85)

*When Mounted On Relay

PM Metal Cover 35D227



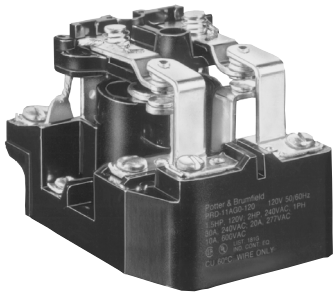


Dimensions are shown for reference purposes only.

Dimensions are in inches over (millimeters) unless otherwise specified.

Specifications and availability subject to change.

www.tycoelectronics.com
Technical support:
Refer to inside back cover.



PRD series

10 to 50 Amp Heavy Duty AC or DC Power Relay

- File E22575 (Models With All Screw Terminals)
- File E22575 (All Others)
- File 15734
- File 1949 (Q. C. Terminal models only)

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- Contact ratings to 50 amps.
- Magnetic blowouts available for switching DC loads.
- Arrangements to DPDT.
- SPDT auxiliary switch available.
- Replaces PR series.

Contact Data @ 25°C

Arrangements: Available to 2 Form C (DPDT). See ordering information.
Ratings: See UL contact rating table.
Minimum Rating: 1A @ 12 VAC/VDC.
Material: Silver and silver-cadmium oxide standard. Other materials available for special applications.
Expected Life: 100,000 operations at rated loads @25°C. Life increases at reduced loads or with appropriate arc suppression.

UL/CSA Contact Ratings

Type	Supply		Contact Ratings
	AC	DC	
PRD 1, 3 or 5	AY	DY	25 amps @ 277VAC 1 HP at 120VAC 2 HP at 250VAC 10 amps at 600VAC 7 amps at 50VDC Res.
PRD 1, 3 or 5	AG	DG	30 amps at 277VAC Res. 1.5 HP at 120VAC 2HP at 250VAC 10 amp at 600VAC
PRD 7 or 11	AY	DY	25 amps at 240VAC 20 amps at 277VAC 1HP at 120VAC 2HP at 250VAC 7 amps at 50VDC Res. 10 amps at 600VAC
PRD 7 or 11	AG	DG	30 amps at 240VAC 20 amps at 277VAC 1.5 HP at 120VAC 2 HP at 250VAC 10 amps at 600VAC
PRD 3,7 or 11	AH AJ	DH DJ	20 amp at 125VDC 1/3 HP at 125VDC

UL Recognized Load/Life Parameters for 50 Amp PRD

Type	Contact Ratings	Minimum Life
	50 Amps, 277VAC max., General Purpose	100,000 Cycles
PRD3AP4	30 Amps, 277VAC max., Ballast	6,000 Cycles
PRD3DP4	15 Amps, 277VAC max., Tungsten	6,000 Cycles
	102 LRA, 17 FLA, 240VAC	30,000 Cycles
	120 LRA, 20 FLA, 120VAC	30,000 Cycles
	1.5 HP at 120VAC	30,000 Cycles
	3 HP at 240VAC	30,000 Cycles

Note: Any PRD relay deviating electrically or physically from the standard models in the table is not UL or CSA listed. All horsepower ratings are for single phase motors.

DC Factory Contact Ratings

Type	Contact Ratings
PRD3AR4	60 Amps, 28VDC Res.
PRD3DR4	30 Amps, 125VDC Res.

Auxiliary Snap-Action Switch

Arrangements: 1 Form C (SPDT).
Rating: 5 amps at 120VAC, 60 Hz. @ 25°C.
Material: Silver.

Initial Dielectric Strength

Initial Breakdown Voltage: 2,000V rms minimum between all elements and ground. (2,200V rms on 600V ratings.)

Coil Data @ 25°C

Voltage: From 6 to 220VDC, and 6 to 480VAC.
Resistance: See coil data table.
Nom. Power: DC coils: -2.0 watts @ 25°C.
AC coils: - 9.8VA @ 25°C.
Max Power: DC coils: - 8.0 watts @ 25°C.
Duty Cycle: Continuous.
Initial Insulation Resistance: 100 megohms, minimum.

Coil Data

"DY" and "DG" DC Coils			"AY" and "AG" AC Coils (50-60Hz.)		
Nominal Volts	Resistance In Ohms ±10%@ 25°C	Nominal DC Current In Milliamps	Nominal Volts	DC Resis. In Ohms ±15%@ 25°C	Nominal AC Current In Milliamps
6	18	333	6	.86	1600
12	71	169	12	3.2	820
24	288	84	24	12.0	410
110	6050	18.2	120	290	85
220	Use 110V relay with approx. 6 ,000 ohm 5W wire-wound resistor in series.		240	1200	43
			480	4500	22

Operate Data @ +25°C

Must-Operate Voltage: **DC:** 75% of nominal voltage @ 25°C.
AC: 85% of nominal voltage @ 25°C.

Environmental Data

Temperature Range: **AC:** -55°C to +45°C.
DC: -55°C to +80°C.

Mechanical Data

Mounting: Two .187" (4.75mm) diameter holes on 1.875" (47.63mm) centers.
Termination: See ordering information tables for various options.
Enclosure: Metal dust cover, 35D013, available. Order separately.
Weight: 10 oz. (284g) approximately.

Ordering Information

Typical Part No. ▶	PRD	-7	A	Y	0	-120

1. Type:
PRD = Open relay.
PRDA = Open relay with aux. SPDT snap-action switch.

2. Main Contact Arrangement:
1 = SPST-NO
3 = SPST-NO-DM
5 = SPDT
7 = DPST-NO
7V = DPST-NO with 3mm contact gap
11=DPDT

3. Coil Input:
A = 50/60 Hz.
D = DC

4. Main Contact Material:
Y = .312" (7.92mm) dia. silver.
G = .312" (7.92mm) dia. silver cad.-oxide.
†H = Silver w/magnetic blow out.
†J = Silver cad.-oxide w/magnetic blow out.
N = Tungsten stationary & silver cad.-oxide movable. Code 1, 5, 7 & 11 only.
†Available with Code 3, 7& 11 contact arrangement only.

5. Termination:

	PRD			PRDA (With Aux. SPDT Snap-Action Switch)		
CODE	0	1	3	A	B	L
MAIN	#8-32 Screw Term.	.250" (6.35mm) QC	#8-32 Screw Term.	#8-32 Screw Term.	.250" (6.35mm) QC	Twin .250" (6.35mm) QC
COIL	6-32 Screw Term.	.250" (6.35mm) QC	.250" (6.35mm) QC	#6-32 Screw Term.	.250" (6.35mm) QC	.250" (6.35mm) QC
AUX. SWITCH				Screw Term.	.250" (6.35mm) QC	.250" (6.35mm) QC

6. Coil Voltage:
6, 12, 24, 110VDC
6, 12, 24, 120, 240, 480VAC, 50/60 Hz. Coil voltages are available to 125VDC and 600VAC.

Stock Items – The following items are normally maintained in stock for immediate delivery.

PRD-3AG0-120	PRD-5AY0-240	PRD-7DG0-24	PRD-11AY0-120	PRD-11DJ0-24
PRD-3AJ3-24	PRD-5DY0-12	PRD-7DY0-12	PRD-11AY0-240	PRD-11DY0-12
PRD-3AY0-120	PRD-5DY0-24	PRD-7DY0-24	PRD-11AY0-480	PRD-11DY0-24
PRD-3DY0-12	PRD-7AG0-120	PRD-11AG0-24	PRD-11DG0-12	PRD-11DY0-110
PRD-3DY0-24	PRD-7AY0-24	PRD-11AG0-120	PRD-11DG0-24	PRDA-11AGA-120
PRD-5AY0-24	PRD-7AY0-120	PRD-11AG0-240	PRD-11DH0-12	PRDA-11AYA-120
PRD-5AY0-120	PRD-7AY0-240	PRD-11AH0-120	PRD-11DH0-24	
PRD-5AY1-120	PRD-7AY3-120	PRD-11AY0-24	PRD-11DH0-110	

Ordering Information

Typical Part No. ▶	PRD	-3	A	P	4	-120

1. Type:
PRD = Open power relay.

2. Main Contact Arrangement:
3 = 1 Form X (SPST-NO-DM)

3. Coil Input:
A = AC, 50/60 Hz.
D = DC

4. Main Contact Material:
P = 50 amp, silver.
R = 50 amp, silver with magnetic blow out.

5. Termination:
4 = Main — boxlug terminals which accept #6-#14 wire.
Coil — #6-32 screw terminals.

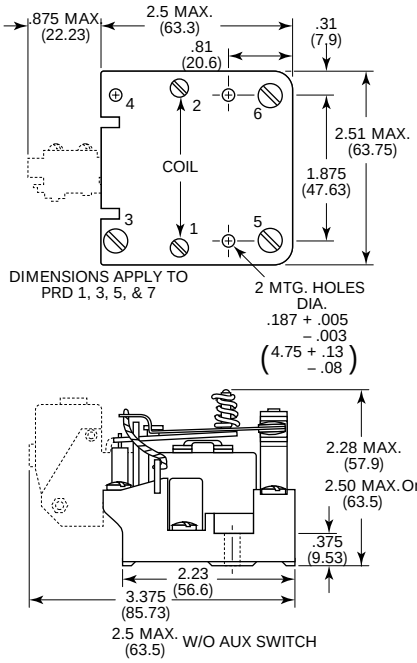
6. Coil Voltage:
12, 24, 48, 110, 125VDC
24, 120, 240, 277, 480VAC, 50/60 Hz.

Stock Items - The following items are normally maintained in stock for immediate delivery.

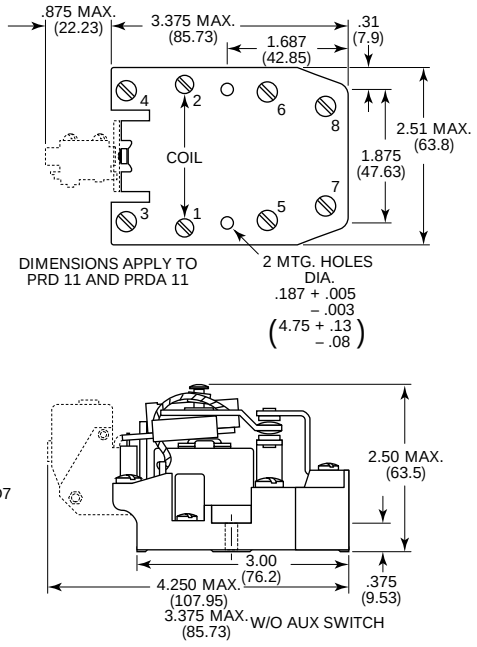
No models in the PRD-3AP series are maintained in stock.

Outline Dimensions

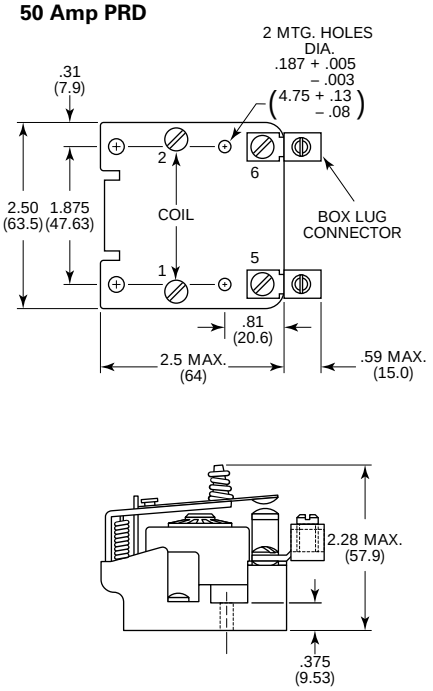
PRD/PRDA Small Base - Top View

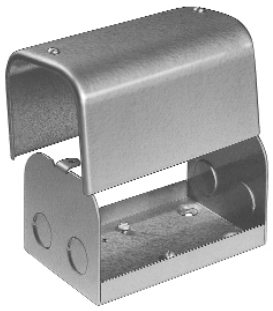


PRD/PRDA Large Base - Top View



50 Amp PRD

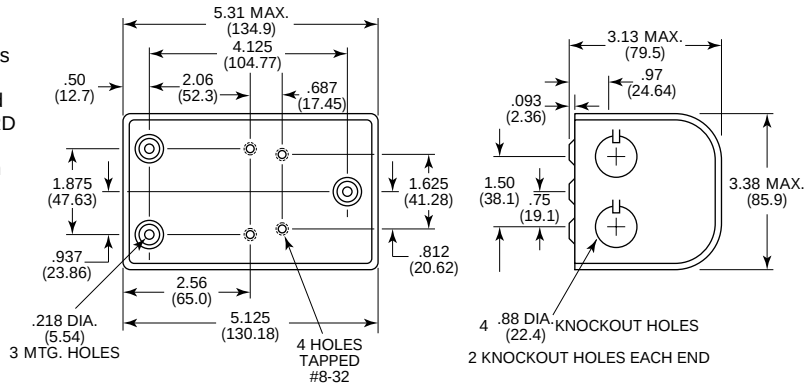




Dust Cover Open

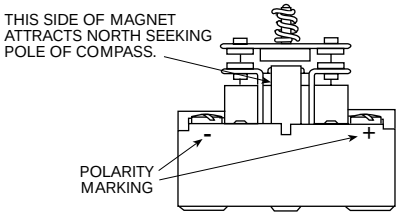
35D013 Dust Cover
PRD dust cover has a steel base with knockouts for 0.5" (12.7mm) dia. conduit and a cover fitted with two screws. Fits PRD relays, except with auxiliary contacts. Finished in gray baked enamel.

Mounting:
Three No. 10 holes on 1.875" (47.63mm) x 4.125" (104.77mm) centers.

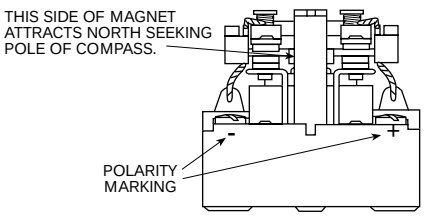


PRD Magnetic Blow-Out Drawings

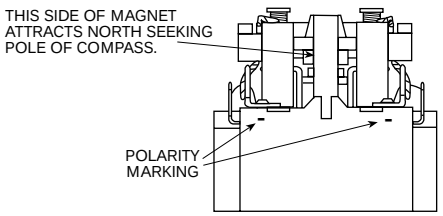
PRD3 with Magnetic Blow-Out



PRD7 with Magnetic Blow-Out



PRD11 with Magnetic Blow-Out





9400 series

Power Relay
1-pole, 8-12 FLA
AC or DC Coil

c UL us File E75492

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

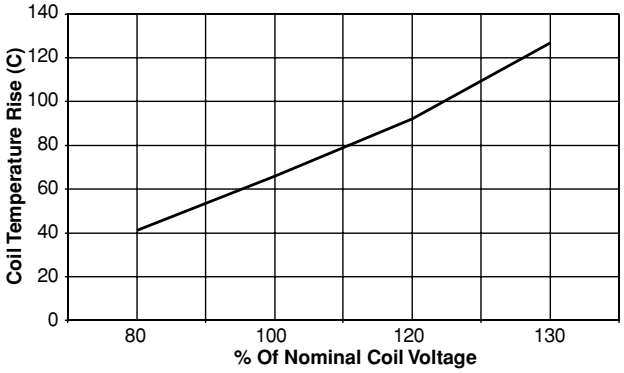
Features
- Single-pole relay used extensively in HVAC applications.
- Multi-positional mounting without affecting operation.
- Convenient 0.250" (6.35 mm) quick connect terminals.

Contact Data @ 25°C
Arrangements: 1 Form X (SPST-NO-DM), 1 Form Y (SPST-NC-DB), 1 Form Z (SPDT-DM-DB) & 1 Form Z (SPDT-DM-DB) jumpered to wire as 1 Form C (SPDT).
Materials: Silver Alloy and Fine Silver.
Maximum Ratings:
Silver Alloy (Power) Contacts
All Forms: 12 FLA, 60 LRA @ 125VAC;
18A @ 125VAC, resistive;
8 FLA, 48 LRA @ 240/277VAC;
18A @ 240/277VAC, resistive.
1 Form X only: 25A @ 240/277VAC, resistive.
Fine Silver (Pilot) Contacts
All Forms: 3A, 277VAC;
125VA @ 125VAC;
250VA @ 250VAC;
277VA @ 277VAC;
Expected Life: 1 million ops., mechanical.
250,000 ops., at rated resistive load.
100,000 ops., at rated inductive load.

Initial Dielectric Strength
Initial Breakdown Voltage: 1,554 VAC between live parts and exposed non-current carrying metal parts.

Coil Data @ 25°C
Voltage: 12 & 24 VDC; 6-277 VAC, 50/60 Hz.
Max. Sealed Power: 4 VA (AC coils.); 3 W (DC coils).
Nominal Inrush Power: 5 VA (AC coils.); 3 W (DC coils).
Insulation Class: UL Class B (130°C).
Duty Cycle: Continuous.

Coil Temperature Rise Above Ambient



Operate Data @ 25°C
Must Operate Voltage: Approximately 85% of AC nominal coil voltage.
Approximately 75% of DC nominal coil voltage.

Environmental Data
Temperature Range: Storage and Operating: -40°C – +65°C.

Mechanical Data
Termination: 0.250" (6.35 mm) quick connects, standard. Consult factory for availability of optional 0.187" (4.75 mm) quick connects.
Weight: 2.88 oz. (82 g) approximately

Ordering Information

Typical Part No. ▶	9400	-0	3	Q	1	999

1. Series:
9400 = 1- pole, 8-12 FLA relay

2. Mounting Bracket:
1 = Standard I Bracket with mounting holes on 2.625" (66.67mm) centers
4 = Standard T Bracket with mounting holes on 1.563" (39.70mm) centers
0 = Special I Bracket with mounting holes on 2.156" (54.76mm) centers

3. Pole Configuration:
1 = 1 Form X (SPST-NO-DM)
2 = 1 Form Y (SPST-NC-DB)
3 = 1 Form Z (SPDT-DM/DB)
4 = 1 Form Z (SPDT-DM/DB) jumpered to wire as 1 Form C.

4. Coil Voltage (50/60 Hz.):
B = 12VDC, C = 24VDC, Y = 6VAC, Q = 24VAC, P = 100VAC, T = 120VAC, S = 200VAC, U = 208/240VAC, V = 277VAC, QS = 24VAC, low VA

5. Contact Type:
1 = Silver alloy power contacts
2 = Fine silver pilot contacts

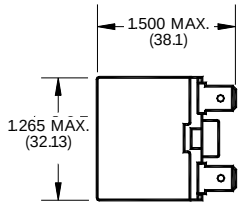
6. Customer ID Suffix:
999 = Standard Model
000-998 = Factory assigned customer ID

Standard part numbers listed below are more likely to be available from stock.

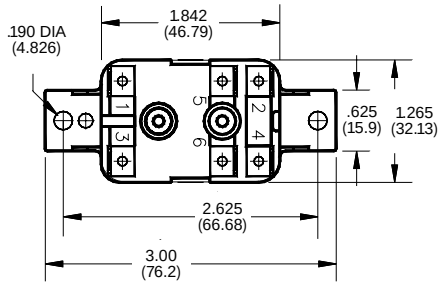
9400-03Q1999 9400-03T1999 9400-03U1999 9400-04Q1999 9400-04T1999 9400-04U1999

Outline Dimensions

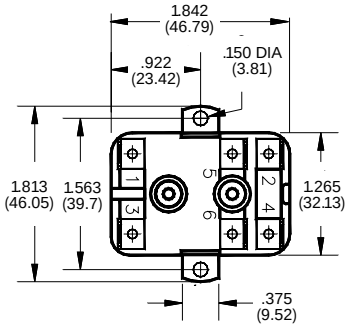
9400 Series



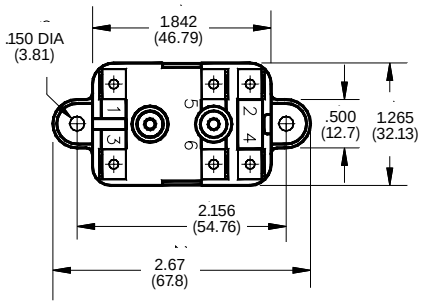
Standard I Bracket (Code 1)



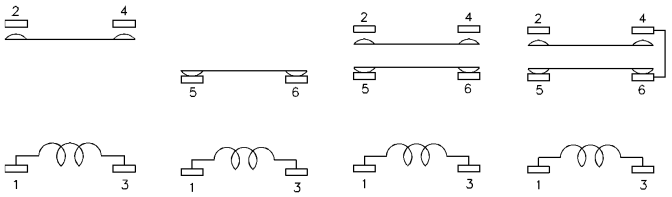
Standard T Bracket (Code 4)

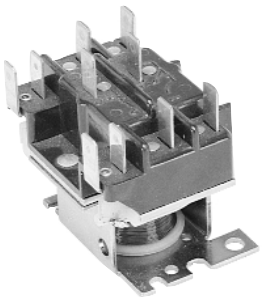


Special I Bracket (Code 0)



Contact Configurations





9100 series

Power Relay
1- and 2-pole, 3-12 FLA
AC or DC Coil

c UL us File E75492

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

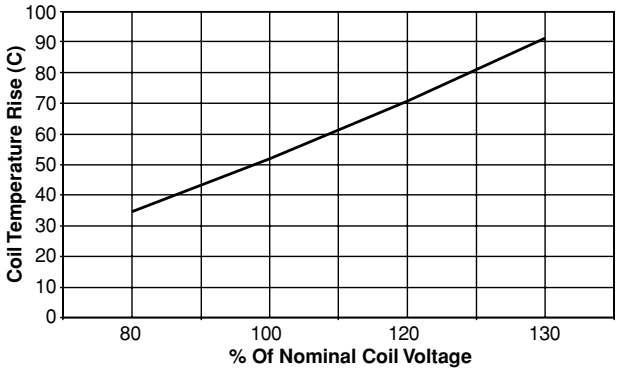
Features
- Single- or double-pole relay used extensively in HVAC applications.
- Multi-positional mounting without affecting operation.
- Convenient 0.250" (6.35 mm) quick connect terminals.

Contact Data @ 25°C
Arrangements: 1 Form A (SPST-NO), 1 Form B (SPST-NC), 1 Form C (SPDT), 2 Form A (DPST-NO), 2 Form B (DPST-NC), 2 Form C (DPDT) or 1 Form A + 1 Form B (SPST-NO+SPST-NC).
Materials: Silver, Fine Silver and Gold Alloy.
Maximum Ratings:
Silver (Power) Contacts
All Forms: 3/4 HP @ 125/250VAC;
12 FLA, 60 LRA, 15A resistive @ 125VAC;
6 FLA, 35 LRA, 15A resistive @ 250/277VAC;
3 FLA, 18 LRA, 12.5A resistive @ 480VAC;
3 FLA, 14 LRA @ 600VAC;
Form A only: 25A @ 277VAC, resistive.
Fine Silver and Gold Alloy (Pilot) Contacts
All Forms: 1/10 HP @ 125/250VAC;
3A @ 277VAC;
125VA @ 125VAC.
Expected Life: 1 million ops., mechanical.
250,000 ops., at rated resistive loads.
100,000 ops., at rated inductive loads.

Initial Dielectric Strength
Initial Breakdown Voltage: 2,200 VAC @ 60 Hz. between live parts and exposed non-current carrying metal parts.

Coil Data @ 25°C
Voltage: 12 & 24 VDC; 24-277 VAC, 50/60 Hz.
Max. Sealed Power: 9.5 VA (AC coils.); 5.75 W (DC coils).
Nominal Inrush Power: 21.5 VA (AC coils.); 5.75 W (DC coils).
Insulation Class: UL Class B (130°C).
Duty Cycle: Continuous.

Coil Temperature Rise Above Ambient



Operate Data @ 25°C
Must Operate Voltage: Approximately 85% of AC nominal coil voltage.
Approximately 75% of DC nominal coil voltage.

Environmental Data
Temperature Range: Storage and Operating: -40°C – +65°C.

Mechanical Data
Termination: 0.250" (6.35 mm) quick connects. Dual terminals on the coil are standard.
Weight: 6.08 oz. (173 g) approximately

Ordering Information

Typical Part No. ▶	9100	-2	3	3	Q	999

1. Series:
9100 = 1- or 2-pole, 3-12 FLA relay

2. Pole Configuration:
1 = Two-pole
3 = Single-pole (1,2,3 omitted)
4 = Single-pole (4,5,6 omitted)

3. Contact Configuration – Poles 4, 5, 6:
1 = 1 Form A (SPST-NO), Silver Contacts.
2 = 1 Form B (SPST-NC), Silver Contacts.
3 = 1 Form C (SPDT), Silver Contacts
4 = 1 Form A (SPST-NO), Fine Silver Contacts.
5 = 1 Form B (SPST-NC), Fine Silver Contacts.
6 = 1 Form C (SPDT), Fine Silver Contacts
7 = 1 Form A (SPST-NO), Gold Alloy Contacts.
8 = 1 Form B (SPST-NC), Gold Alloy Contacts.
9 = 1 Form C (SPDT), Gold Alloy Contacts
0 = 4, 5, 6 Omitted

4. Contact Configuration – Poles 1, 2, 3:
1 = 1 Form A (SPST-NO), Silver Contacts.
2 = 1 Form B (SPST-NC), Silver Contacts.
3 = 1 Form C (SPDT), Silver Contacts
4 = 1 Form A (SPST-NO), Fine Silver Contacts.
5 = 1 Form B (SPST-NC), Fine Silver Contacts.
6 = 1 Form C (SPDT), Fine Silver Contacts
7 = 1 Form A (SPST-NO), Gold Alloy Contacts.
8 = 1 Form B (SPST-NC), Gold Alloy Contacts.
9 = 1 Form C (SPDT), Gold Alloy Contacts

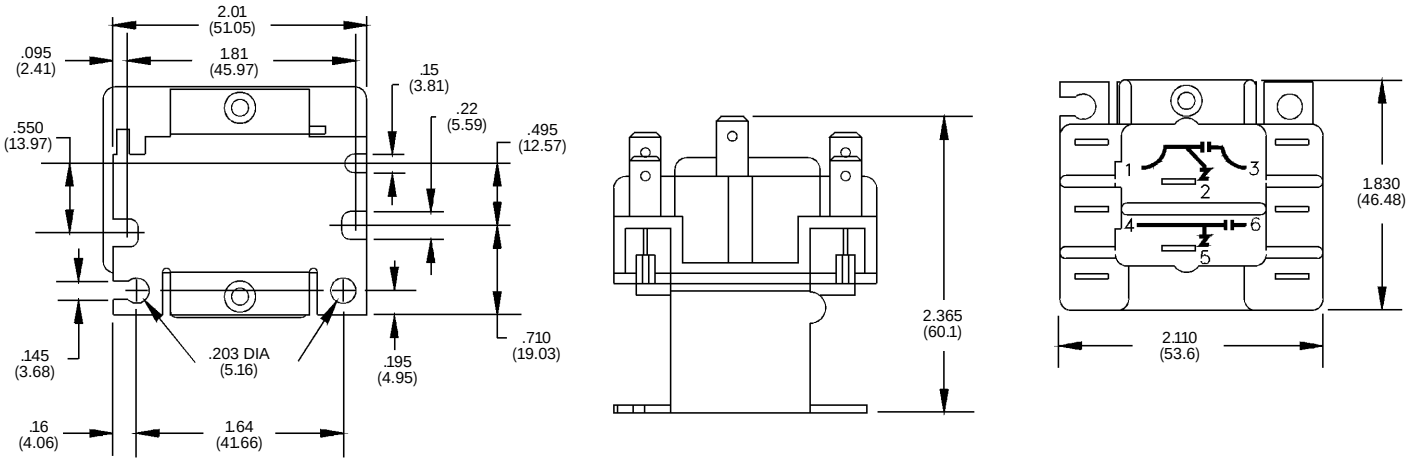
5. Coil Voltage (50/60 Hz.):
B = 12VDC
C = 24VDC
Q = 24VAC
P = 100VAC
T = 120VAC
S = 200VAC
U = 208/240VAC
N = 240VAC
V = 277VAC
QS = 24VAC, low VA

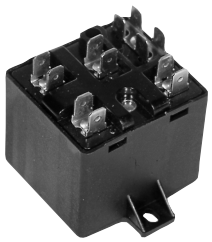
6. Customer ID Suffix:
999 = Standard Model
000-998 = Factory assigned customer ID

Standard part numbers listed below are more likely to be available from stock.

9100-233Q999 9100-233T999 9100-233U999

Outline Dimensions





38 series

Potential Motor Starting Relay 1-pole, 35A, Normally Closed AC Coil

c UL us File E83865

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features
- Single-pole, normally closed relay used extensively in HVAC applications.
- Variety of mounting positions and brackets.
- Convenient 0.250" (6.35 mm) quick connect terminals.
- Custom-built to meet customer requirements.

Contact Data @ 25°C
Arrangements: Normally-Closed.
Materials: Silver cadmium oxide.
Maximum Rating: 35A inductive @ 277VAC, 0.5 power factor (Break only.)
Expected Life: 750,000 ops, mechanical.
250,000 ops., breaking rated load.

Initial Dielectric Strength
Initial Breakdown Voltage: 1,554 VAC @ 60 Hz. between live parts and exposed non-current carrying metal parts.

Coil Data @ 25°C
Voltage: 130, 170, 214, 256, 336, 395, 420 and 495 VAC, 60 Hz.
Nominal Sealed Power: 5 VA).
Insulation Class: UL Class B (130°C).
Duty Cycle: Continuous.

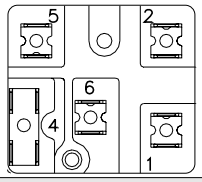
Mechanical Data
Termination: 0.250" (6.35 mm) quick connects (single or dual, model dependent). Terminals #4 & #6 are dummies for customer convenience.
Mounting Position: Each model is calibrated for its specified mounting position. Pick-up voltage may vary if relay is mounted in positions other than specified.
Weight: 5.76 oz. (163.8 g) approximately

Ordering Information

Typical Part No. ▶	38	-A	144	C	3	000

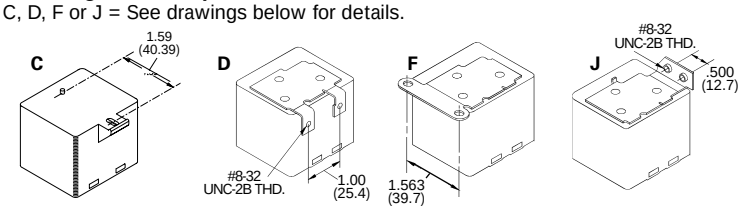
1. Series:
38 = 1-pole, normally-closed, potential motor starting relay

2. Wiring and Terminal Type (number of QCs at given base locations):
A = 2 @ loc. 1, 2 @ loc. 2, 4 @ loc. 3, 2 @ loc. 5 and 2 @ loc. 6.
D = 2 @ loc. 1, 2 @ loc. 2, 4 @ loc. 3, 2 @ loc. 5 and 0 @ loc. 6.
M = 2 @ loc. 1, 2 @ loc. 2, 2 @ loc. 3, 2 @ loc. 5 and 0 @ loc. 6.
R = 1 @ loc. 1, 2 @ loc. 2, 0 @ loc. 3, 1 @ loc. 5 and 0 @ loc. 6.
S = 1 @ loc. 1, 2 @ loc. 2, 0 @ loc. 3, 2 @ loc. 5 and 0 @ loc. 6.
T = 2 @ loc. 1, 2 @ loc. 2, 0 @ loc. 3, 2 @ loc. 5 and 0 @ loc. 6.
Y = 1 @ loc. 1, 2 @ loc. 2, 4 @ loc. 3, 2 @ loc. 5 and 0 @ loc. 6.

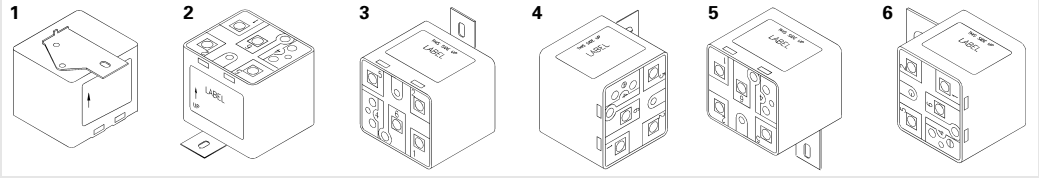


3. Coil Rating and Calibration:
000-999 = See table on following page for details.

4. Mounting Bracket Style:
C, D, F or J = See drawings below for details.



5. Mounting Position:
1, 2, 3, 4, 5 & 6 = See drawings below for details. NOTE: Devices calibrated in specified mounting position only.



6. Customer ID Suffix:
000-999 = Factory assigned customer ID

Standard part numbers listed below are more likely to be available from stock.
Custom parts only.

Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.
www.tycoelectronics.com
Technical support:
Refer to inside back cover.

Coil Rating & Calibration Table

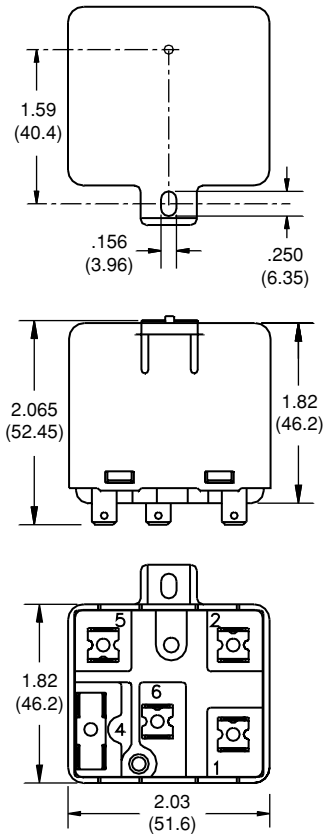
Select proper continuous coil voltage from top of appropriate column, select pick - up (PU) and drop-out (DO) voltages and insert relay calibration (RC) number in part number.

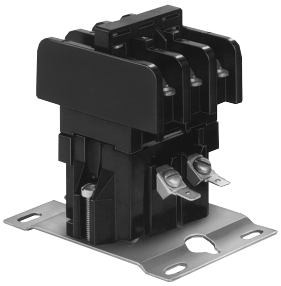
COIL #1 130 V 60 Hz 117 V 50 Hz* RES.@ 24°C 1480±10%			COIL #2 170 V 60 Hz 151 V 50 Hz* RES.@ 24°C 2040±10%			COIL #3 256 V 60 Hz 228 V 50 Hz* RES.@ 24°C 5100±10%			COIL #4 336 V 60 Hz 299 V 50 Hz* RES.@ 24°C 6800±10%		
RC#	PU	DO	RC#	PU	DO	RC#	PU	DO	RC#	PU	DO
1			2	159-172	20-77	3	240-269	45-95	4	243-271	55-125
8			9			10	259-288	45-95	11	261-290	55-125
15			16			17	278-306	45-115	18	280-309	55-125
22			23			24	296-325	45-115	25	299-327	55-125
29			30			31	315-343	45-115	32	317-345	55-125
36			37			38	323-352	45-115	39	326-354	55-125
43			44			45	333-363	45-115	46	335-364	55-125
50			51			52	285-305	MAX. 77	53	340-370	55-125
57	111-125	20-50	58	111-124	30-65	59	240-269	35-77	60	171-184	40-90
64	121-134	20-50	65	120-134	30-65	66	123-134	25-77	67	168-182	MAX. 90
71	130-143	20-55	72	130-144	30-65	73			74	180-195	40-90
78	139-153	20-55	79	140-153	30-65	80	136-150	45-90	81	219-253	40-115
85	149-163	20-55	86	149-163	30-65	87	150-163	45-90	88	152-166	55-115
92			93	159-172	30-65	94	159-172	45-90	95	162-175	55-115
99			100	168-182	30-65	101	168-182	45-95	102	171-184	55-115
106			107	178-192	30-75	108	178-192	45-95	109	180-193	55-115
113			114	139-153	MAX. 55	115	185-213	45-95	116	188-214	55-115
120			121			122	203-231	45-95	123	205-234	55-115
127			128			129	221-250	45-95	130	224-252	55-125
134			135			136	140-152	33-77	137	186-215	40-90
141	80-110	20-55	142			143	285-305	45-115	144	162-175	40-90
148	62-76	20-45	149			150	159-172	35-77	151	162-175	70-100
156			157			158	150-162	MAX. 77	159	243-271	40-90
163			164			165	136-150	MAX. 50	166	205-234	40-90
170			171			172	166-182	35-77	173	180-195	MAX.105
178			179			180			181	224-252	40-90
185			186			187			188	280-309	55-100
									194	205-234	40-90
									198	152-166	40-90

COIL #5 395 V 60 Hz 338 V 50 Hz* RES.@ 24°C 9600±10%			COIL #6 420 V 60 Hz 378 V 50 Hz* RES.@ 24°C 12700±10%			COIL #7 495 V 60 Hz 452 V 50 Hz* RES.@ 24°C 15200±10%			COIL #8 214 V 60 Hz 193 V 50 Hz* RES.@ 24°C 2840±10%		
RC#	PU	DO	RC#	PU	DO	RC#	PU	DO	RC#	PU	DO
5	245-275	60-140	6	242-272	75-150	7	239-268	75-170	193	158-171	25-57
12	262-290	60-140	13	262-290	75-150	14	258-287	75-170	196	120-134	25-56
19	280-310	60-140	20	280-310	75-160	21	277-305	75-170	197	129-142	25-57
26	305-335	60-140	27	300-328	75-160	28	295-324	75-170			
33	187-208	60-130	34	318-347	75-160	35	314-342	75-180			
40	326-354	60-140	41	328-356	75-150	42	323-352	75-180			
47	335-365	60-140	48	337-366	75-160	49	332-361	75-180			
54	340-370	60-140	55	340-370	75-160	56	258-287	60-135			
61	180-195	40-105	62	300-328	75-121	63					
68	215-225	MAX.120	69	300-328	MAX.125	70	323-352	MAX.135			
75	334-363	50-110	76	212-232	MAX.121	77	277-305	75-150			
82	298-326	50-110	83	195-224	60-121	84	295-324	60-135			
89	189-205	60-130	90	204-233	60-121	91	325-345	MAX.135			
96	162-175	50-100	97	260-290	60-121	98					
103	180-195	50-100	104	242-272	60-121	105					
110	180-195	60-130	111	180-195	60-121	112	239-268	60-135			
117	190-215	60-130	118	190-215	60-121	119	325-345	75-170			
124	208-239	60-130	125	204-233	75-150	126	277-305	60-135			
131	223-254	60-140	132	223-252	75-150	133					
138	245-275	MAX.120	139	195-224	75-150	140					
145	208-239	MAX.120	146	320-340	60-121	147					
152	260-275	MAX.120	153	295-315	MAX.195	154					
160	260-275	60-140	161	218-243	60-121	162					
167	215-225	60-130	168	205-234	40-90	169					
174	239-270	50-110	175	223-252	60-121	176					
182	208-239	50-110	183	295-315	MAX.125	184					
189	224-252	60-121	190	280-310	60-121	191					
195	190-215	40-105	192	180-195	40-105						
200	279-308	50-110									

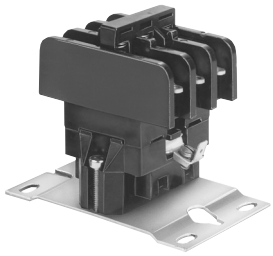
*For 50 Hz, add 300 to RC# - i.e. for 151 V 50 Hz, RC# 58 changes to 358.

Outline Dimensions





P25 with DC coil



P25 with AC coil

P25 series

Definite Purpose Magnetic Contactor
25 Ampere Full Load
30 Ampere Resistive
AC & DC Coils

File E22575
File LR15734
No. R 97069

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- AC and DC coils.
- For controlling motors, power supplies, heating elements and lighting.
- Dust cover available.
- Auxiliary switch available.

Contact Data @ 25°C

Arrangements: Up to 3 Form X (3PST-NO-DM).
Ratings: See contact rating table.
Material: Silver-cadmium oxide.
Expected Life: 500,000 operations at full load.
AC coil: 2 million operations, mechanical.
DC coil: 5 million operations, mechanical.
Minimum Contact Load: 3A @ 120VAC.

Main Contact Ratings @ +25°C, 60 Hz.

Type	Motor Rating in Amps, 3Ø3P or 1Ø2P				Resistive Rating (Electric Heat)
	Full Load	Locked Rotor			
	@ 600V	@ 240V	@ 480V	@ 600V	@ 600V
P25	25A	150A	125A	100A	30A

Motor Rating in Horsepower			
Type	@ 120V	@ 240V	@ 440-600V
1Ø2P	1.5HP	3HP	—
3Ø3P	3HP	7.5HP	10HP

Notes: Models utilizing box lug terminals are restricted to the following ratings: 25 FLA, 150 LRA @ 250VAC; 30A @ 277VAC Resistive; Horsepower ratings shown in the table are valid up to 240VAC.

Tungsten Lamp Rating: 30A, 277VAC.
Electric Discharge Lamp Rating: 30A, 277VAC.
Heavy Duty Pilot Ratings @ 120V through 600V: 720VA max. (Box lug nut units limited to 277VAC.)

Auxiliary Snap-Action Switch
Arrangements: Up to 2 Form C (DPDT).
Rating: 10 amps at 120VAC, 60 Hz. @ 25°C.
Material: Silver.

Initial Dielectric Strength

Initial Breakdown Voltage: 2,200V rms. minimum between all elements and between all elements and ground.

Coil Data @ 25°C

Voltage: From 6 to 240VDC and 24 to 600VAC, 50/60 Hz.
Power: DC, 4-8W; AC, 40VA inrush; 10VA, sealed.
Duty Cycle: Continuous.
Insulation Class: Class A, standard. Class B available.
Initial Insulation Resistance: 100 megohms, minimum.

Coil Data

Nominal VDC	Resistance (Ohms ± 10% @ 25°C)	Must Operate* Volts	Maximum Operating Volts	Nominal Coil Current (ma) @ Nominal Voltage
12	34	9	15	353
24	133	18	30	180

AC Voltage Rating	Nominal		Must Operate	
	60 Hz.	50 Hz.	60 Hz.	50 Hz.
24	24	24	20.4	20.4
120	120	110	102	94
240	208/240	208/220	177	177

Consult factory for other voltages.
*Must operate is 75% of nominal voltage for any mounting position, applicable for vertical or horizontal mounting, but not for upside-down mounting.
**Units requiring less power can be provided for some applications. Consult factory for details.
Note: Coil suppression is recommended for all DC coil units, particularly 120 and 240VDC coils.

Operate Data @ 25°C

Must-Operate Voltage: See coil data tables.

Environmental Data

Temperature Range: AC: —55°C to +65°C
DC: —55°C to +55°C
Contact sales representative for higher temperature ratings.

Mechanical Data

Mounting: No. 10 screws on 2.125" (53.98mm) centers or universal mounting bracket.
Termination:
Contacts: 8-32 screw for No. 16 to No. 8 wire, dual .250" (6.35mm) quick connect, box lug or captive pressure plate.
Coil: Combination 8-32 screw and .250" (6.35mm) or .187" (4.75mm) quick connect, combination captive pressure plate and .250" (6.35mm) quick connect, or .250" (6.35mm) quick connect.
Aux. Switch: .250" (6.35mm) quick connect, .187" (4.75mm) quick connect.
Weight: 14 oz. (397g).

Ordering Information

Typical Part No. ▶	P25	P	42	A	1	4	P	1	-240

1. Type:
P25 Definite Purpose Contactor

2. Auxiliary Switch:
P = No Aux Switch
C = 1 Form C (SPDT), silver contacts
F = 2 Form C (DPDT), silver contacts
Double pole contact forms require two switches.

3. Main Contact Arrangement:
42 = 3 Form X (3PST-NO-DM)
43 = 2 Form X (DPST-NO-DM) & 1 Form Y (SPST-NC-DB)
Other contact arrangements are available.

4. Coil Control Input:
A = Alternating Current, 50/60 Hz. D = Direct Current

5. Mounting and Installed Accessories:
1 = Without Mounting Plate*
2 = With Mounting Plate
* Order separately any mounting hardware which is to be bulk packed.

6. Main Contact Terminals:
2 = 8-32 Screw Terminals
3 = Dual .250" (6.35mm) Quick Connect
5 = 8-32 Screw with Captive Pressure Plate

7. Auxiliary Contact Terminals:
P = No Auxiliary Switch
D = .250" (6.35mm) Quick Connect

8. Coil Terminals:
1 = Combination 8-32 Screw Terminal and .250" (6.35mm) Quick Connect
6-32 Screw Terminal available on DC Coils only.

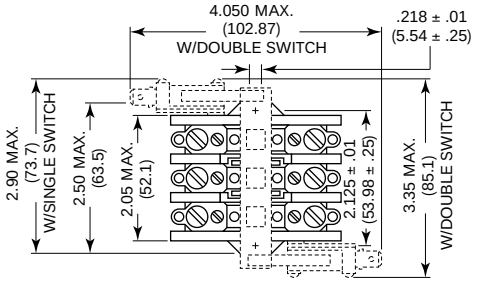
9. Coil Voltage:
24, 120 or 240VAC
12 or 24VDC
See Coil Data table.

Our authorized distributors are more likely to maintain the following items in stock for immediate delivery.

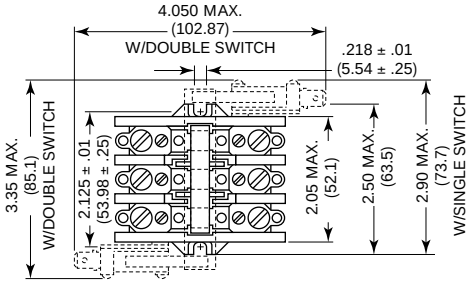
P25P42A12P1-120
P25P42A12P1-240
P25P42A22P1-120
P25P42A22P1-240
P25P42D22P1-12
P25P42D22P1-24

Outline Dimensions

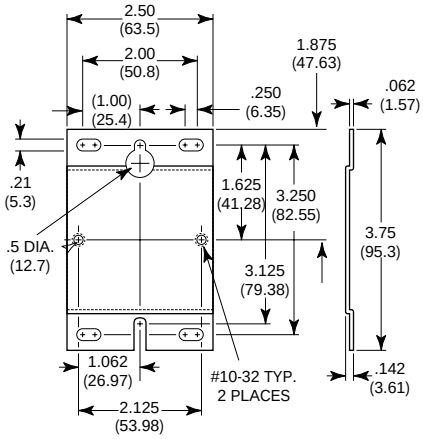
P25 With AC Coil

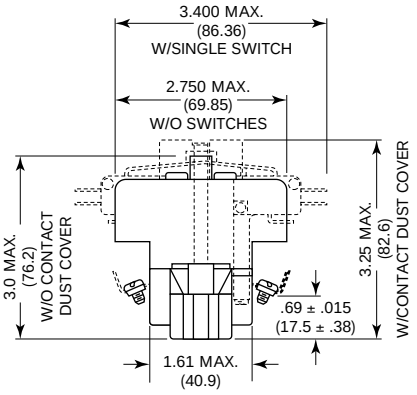


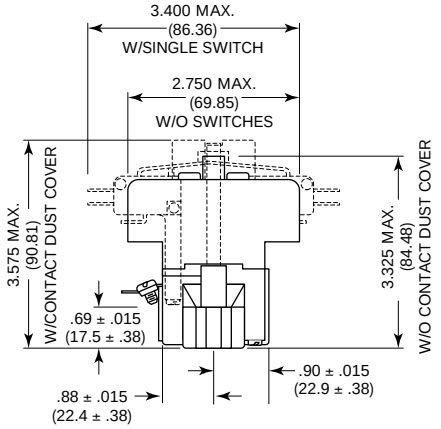
P25 With DC Coil



Mounting Plate Footprint

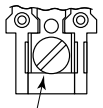






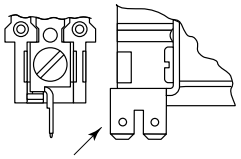
Contact Terminal Options

Code 2



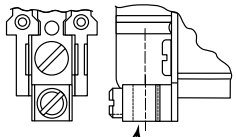
#8-32 UNF-2A X .375" (9.525mm)
Binder Terminal Screw 15S334

Code 3



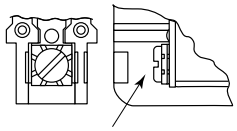
Duak .250" (6.35mm)
Quick Connect 26A902

Code 4



Box Lug Connector 26A866

Code 5



#8-32 UNF-2A X .500" (12.7mm)
Screw With Captive
Pressure Plate 15S354

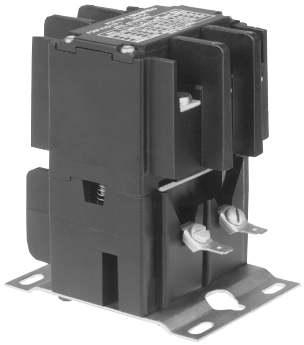
Replacement Parts and Accessories

Contact Replacement Kit - 9P25X1
Contact replacement kit includes 3 contact pressure springs, 3 movable contact assemblies and 6 stationary contact assemblies. Contact replacement kits are for use only on those models with form X contact arrangements.

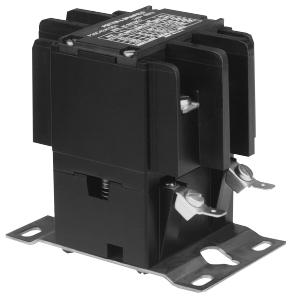
Mounting Plate Kit - 9P25X2
Mounting plate kit includes one mounting plate (37B918) and two mounting screws (15J011).

Auxiliary Switch Kit for P25 AC Coil Units - 9P25X3
This auxiliary switch kit includes one plastic actuator and one auxiliary switch assembly. It contains no screw. One assembly screw must be removed from the P25 contactor and used to mount the auxiliary switch.

Auxiliary Switch Kit for P25 DC Coil Units - 9P25X4
This auxiliary switch kit includes one plastic actuator, one auxiliary switch assembly and one thread cutting screw.



DC Coil



AC Coil

P30/P40 series

Definite Purpose Magnetic Contactor
30/40 Ampere Full Load
40/50 Ampere Resistive
AC & DC Coils

File E22575
File LR15734
P30 No. R 97070
P40 No. R 97071

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- AC and DC coils.
- Available with auxiliary switch.
- Variety of main contact terminals.
- For control of motors, power supplies, heating elements and lighting.

Contact Data @ 25°C

Arrangements: Up to 4 Form X (4PST-NO-DM)
Ratings: See contact rating table.
Material: Silver-cadmium oxide.
Expected Life: 200,000 operations at full load.
AC coil: 2 million operations, mechanical.
DC coil: 10 million operations, mechanical.
Minimum Contact Data: 3A @ 120VAC.

Main Contact Ratings

Type	Motor Rating in Amps, 3Ø3P or 1Ø2P				Resistive Rating	Tungsten Rating
	Full Load	Locked Rotor				
	@ 600V	@ 240V	@480V	@ 600V	@ 600V	@277V
P30	30A	180A	150A	120A	40A	40A
P40	40A	240A	200A	160A	50A	50A

P30 Electrical Discharge Lamp Control: 40A @ 240V (Delta), 40A @ 600V (Wye).
P40 Electrical Discharge Lamp Control: 50A @ 600V (Wye).

Type	Motor Rating in Horsepower			
		@ 120V	@ 240V	@ 440-600V
P30	1Ø2P	1.5HP	3HP	—
	3Ø3P	3HP	7.5HP	7.5HP
P40	1Ø2P	2HP	5HP	—
	3Ø3P	5HP	10HP	15HP

Auxiliary Snap-Action Switch
Arrangements: Up to 2 Form C (DPDT).
Rating: 10 amps at 120-250VAC @ 25°C.
Material: Silver.

Initial Dielectric Strength

Initial Breakdown Voltage: 2,200V rms minimum between all elements and between all elements to ground.

Coil Data @ 25°C

Voltage: From 12 to 120VDC, and 24 to 277VAC, 50/60 Hz.
Power: DC, 7.5 W; AC, 92VA, In rush; 12 VA Sealed.
Duty Cycle: Continuous.
Insulation Class: Class A, standard, Class B available.
Initial Insulation Resistance: 100 megohms, minimum.

Coil Data

Nominal VDC	Resistance (Ohms ± 10% @ 25° C)	Must Operate* Volts	Maximum Operating Volts	Nominal Coil Current (ma) @ Nominal Voltage
12	20.8	9	15	577
24	84	18	30	286
48	334	36	57	144
120	2,110	90	144	57

AC Voltage Rating	Nominal 50/60 Hz.	Must Operate* 50/60 Hz.
24	24	20.4
120	110/120	94
240	208/240	177
277	277	236

*Applicable for vertical mounting, but not for upside-down mounting.

Note: Coil suppression is recommended for all DC coil units, particulary 120 and 240VDC coils.

Operate Data

Must-Operate Voltage: See coil data tables.

Environmental Data

Temperature Range: –55°C to +65°C.

Mechanical Data

Mounting: Universal mounting bracket. See outline drawings.
Termination:
Contacts: Binder screw, box lug, captive pressure plate, combination screw and dual .250" (6.35mm) quick connect, or combination box lug and dual .250" (6.35mm) quick connect. See Main Contact Terminal Options photo.
Coil: Combination 8-32 screw and .250" (6.35mm) quick connect.
Aux. Switch: .250" (6.35mm) quick connect, .187" (4.75mm) quick connect.
Weight: 3 Pole Models: 25 oz. (709g) approximately.
4 Pole Models: 28 oz. (794g) approximately.

Ordering Information

Typical Part No. ▶	P30	P	42	A	1	4	P	1	-240

1. Type:
P30 = Definite Purpose Contactor, 30 amp.
P40 = Definite Purpose Contactor, 40 amp.

2. Auxiliary Switch:
P = No Aux. Switch
C = 1 Form C (SPDT) F = 2 Form C (DPDT)

3. Main Contact Arrangement:
42 = 3 Form X (3PST-NO-DM)
43 = 2 Form X (DPST-NO-DM) & 1 Form Y (SPST-NC-DB)
45 = 1 Form X (SPST-NO-DB) & 2 Form Y (DPST-NC-DB)
47 = 4 Form X (4PST-NO-DM)
48 = 2 Form X (DPST-NO-DM) & 2 Form Y (DPST-NC-DB)
49 = 4 Form Y (4PST-NC-DB)
Other contact arrangements are available.

4. Coil Control Input:
A = Alternating Current, 50/60 Hz. D = Direct Current

5. Mounting and Installed Accessories:
1 = Standard Mounting

6. Main Contact Terminals:
2 = Screw Terminals
3 = Screw Terminals & Dual .250" (6.35mm) Quick Connect
4 = Box Lug
5 = Captive Pressure Plate
6 = Box Lug & Dual .250" (6.35mm) Quick Connect

7. Auxiliary Contact Terminals:
P = No Auxiliary Switch
C = .187" (4.75mm) Quick Connect
D = .250" (6.35mm) Quick Connect

8. Coil Terminals:
1 = Combination 8-32* Screw Terminal and .250" (6.35mm) Quick Connect

9. Coil Voltage:
24, 120, 240 or 277VAC
12, 24 or 120VDC

Our authorized distritburos are more likely to maintain the following items in stock for immediate delivery.

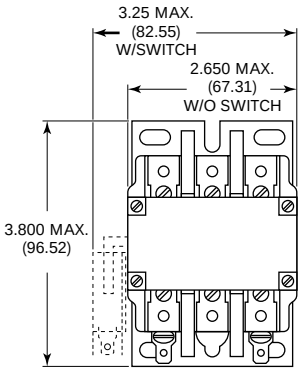
P30P42A12P1-120
P30P42D12P1-24
P30P47A12P1-120
P30P47D12P1-24
P40C42A12D1-120
P40P42A12P1-24
P40P42A12P1-120
P40P42A12P1-240
P40P42D12P1-24

Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.

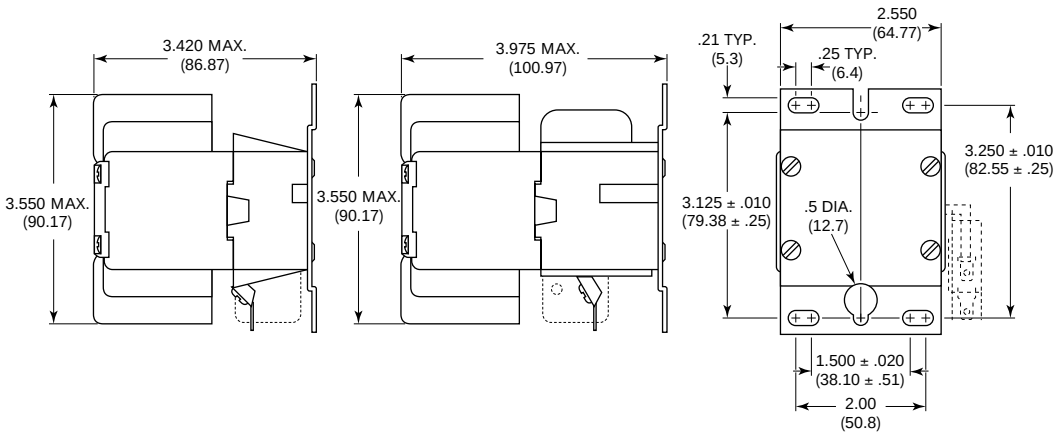
Outline Dimensions

3 Pole Models

AC Coil

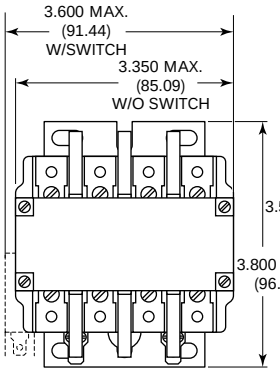


DC Coil

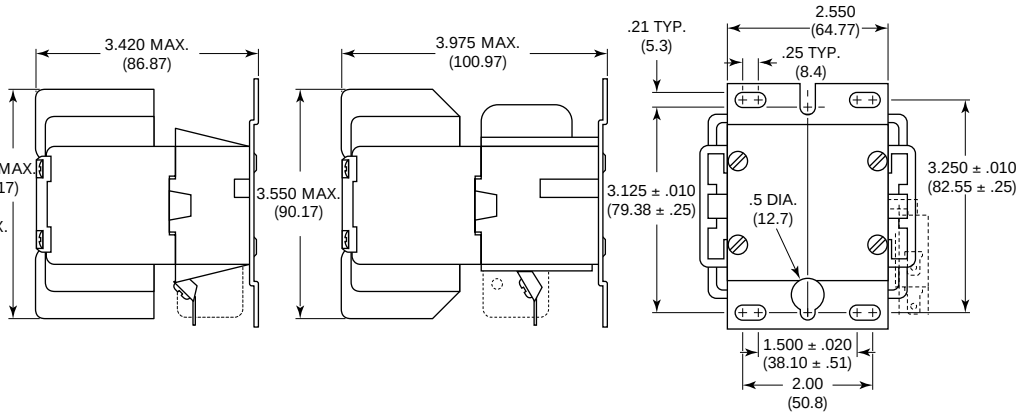


4 Pole Models

AC Coil

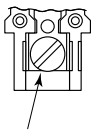


DC Coil



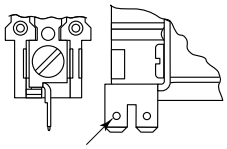
Contact Terminal Options

Code 2



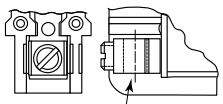
#10-32 UNF-2A X .375" (9.525mm)
Binder Terminal Screw 15S365
accepts the following
wire size: Solid, Single — 8 AWG

Code 3



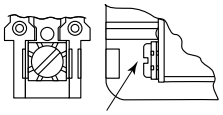
Dual .250" (6.35mm)
Quick Connect 26A945
#10-32 UNF-2A X .375" (9.525mm)
Binder Terminal Screw 15S365
accepts the following
wire size: Solid, Single — 8 AWG

Code 4



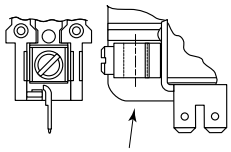
Box Lug (Keyed) 24C540 with
15S361 & 15S364 Screws
Accepts the following wire sizes:
Solid, Single —14-4 AWG

Code 5



#10-32 UNF-2A X .500" (12.7mm)
Screw with Captive
Pressure Plate 15S362
Accepts the following wire sizes:
Solid, Single —22-8 AWG
Solid, Double —22-14 AWG
Stranded, Single —22-8 AWG
Stranded, Double —22-16 AWG

Code 6



Dual .250" (6.35mm)
Quick Connect 26A945
Box Lug 9P30X3
Accepts the following wire sizes:
Solid, Single —14-4 AWG

Main Contact Ordering and Replacement Information

Contact Replacement Kits

Contact replacement kits for 3 pole models include 3 contact pressure springs, 3 movable contact assemblies and 6 stationary contact assemblies. Kits for 4 pole models include 4 contact pressure springs, 4 movable contact assemblies and 8 stationary contact assemblies. Contact replacement kits are for use only on those models with form X contact arrangements.

Kits for P30 contactors:

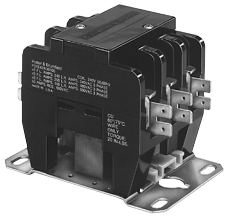
3 Form X models - Kit No. 9P30X1
4 Form X models - Kit No. 9P30X2

Kits for P40 contactors:

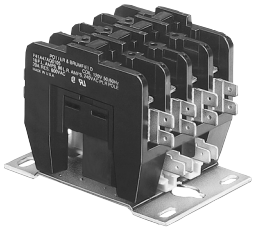
3 Form X models - Kit No. 9P40X1
4 Form X models - Kit No. 9P40X2

To Replace Contacts:

1. Remove screws holding dust cover in place, and remove cover.
2. Compress and remove contact pressure springs.
3. Lift movable contacts and remove.
4. Remove screws holding stationary contact in place, and remove contacts.
5. Reverse the above procedure to install new stationary and movable contacts.
   Caution: Do not overtighten the screws, as it is possible to strip the threads.



P31



P41

P31/P41 series

Definite Purpose Magnetic Contactor 16 to 40 Amp Full Load 20 to 50 Amp Resistive

File E25575 P31 No. R 9071107
File LR15734 P41 No. R 9071106

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- 3 phase and single phase switching.
- Integral dual QC terminals.
- Class "B" coil insulation.
- Variety of main terminals.
- Applications include HVAC industrial control.
- Direct activated DC coils.

Contact Data @ 25°C

Main Contacts:
Arrangements: 3 Form X (3PST-NO-DM) and 4 Form X (4PST-NO-DM).
Ratings: See Main Contact Ratings Table.
Material: Silver-cadmium oxide.
Initial Breakdown Voltage: 2,200V rms minimum between all elements and between all elements to ground.
Expected Life: 200,000 operations at motor load.
500,000 operations, mechanical.
Minimum Contact Data: 3A @ 120VAC.

Initial Dielectric Strength

Initial Breakdown Voltage: 2,200V rms minimum between all elements and between all elements and ground.

Main Contact Ratings @ 25°C, 60 Hz. AC (Per Pole)

	@ 240VAC		@ 480VAC		@ 600VAC		
	LRA	FLA	LRA	FLA	LRA	FLA	RES
P31C	150	25	125	25	100	25	35
P31E	240	40	200	40	160	40	50
P41B	120	20	100	20	80	20	25
P41C	150	25	125	25	100	25	35

Coil Data @ 25°C

Voltage: 12 and 24V DC. See Coil Data table.
Power: 8W.
Duty Cycle: Continuous.
Insulation: Class B.
Initial Insulation Resistance: 100 megohms minimum.

Coil Data @ +25°C

Code	Nominal Voltage	DC Resistance in Ohms ± 10%	Must Operate Voltage	Nominal Coil Current (mA)
DFO	12DC	21	9	571
DHO	24DC	84	18	286

*Applicable for vertical or horizontal mounting, but not for upside-down mounting.

Note: Coil suppression is recommended for all units.

Operate Data @ 25°C

Must-Operate Voltage: See Coil Data Table.

Environmental Data

Temperature Range: –55°C to +65°C.

Mechanical Data

Mounting: Universal mounting bracket. See Outline Drawings.
Termination:
Contacts: Dual .250" (6.35mm) quick connect with or without binder head screw or box lug.
Coil: Dual .250" (6.35mm) quick connect.
Weight: 18 oz. (510g) approximately.

Ordering Information

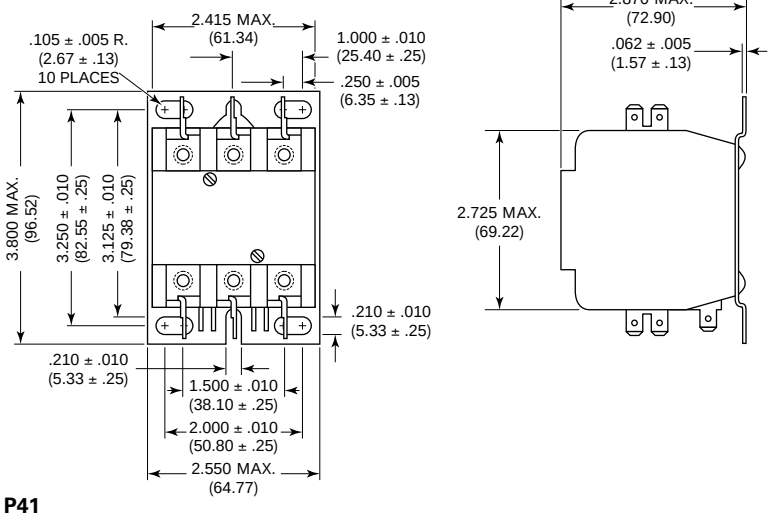
Typical Part No. ▶	P41	C	47	D	HO	1	03

1. **Type:**
P31 = 3 Pole P41 = 4 Pole
2. **Contact Rating**
C = 25 Amp E = 40 Amp (40A rating only offered on P31)
3. **Contact Arrangement:**
42 = 3 Form X (3PST-NO-DM) 47 = 4 Form X (4PST-NO-DM) P41 only
4. **Coil Input:**
D = Direct Current (Direct Operated)
5. **Coil Voltage:**
FO = 12VDC, with coil cover HO = 24VDC, with coil cover
6. **Coil Terminal Location And Marking (See Terminal Location and Marking Diagram):**
1 = Dual .250" (6.35mm) quick connect
7. **Contact Terminals (See Contact Terminal Options Diagram):**
03 = Dual .250" (6.35mm) quick connect turned up per Figure 03 (25 amps, Max.)
05 = #10-32 binder head screw with dual .250" (6.35mm) quick connect per Figure 05
08 = Aluminum box lug (for #4-#14 copper wire) with dual .250" (6.35mm) quick connect per Figure 08

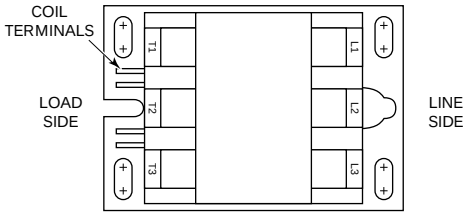
Our authorized distributors are more likely to maintain the following items in stock for immediate delivery.
None at present.

Outline Dimensions

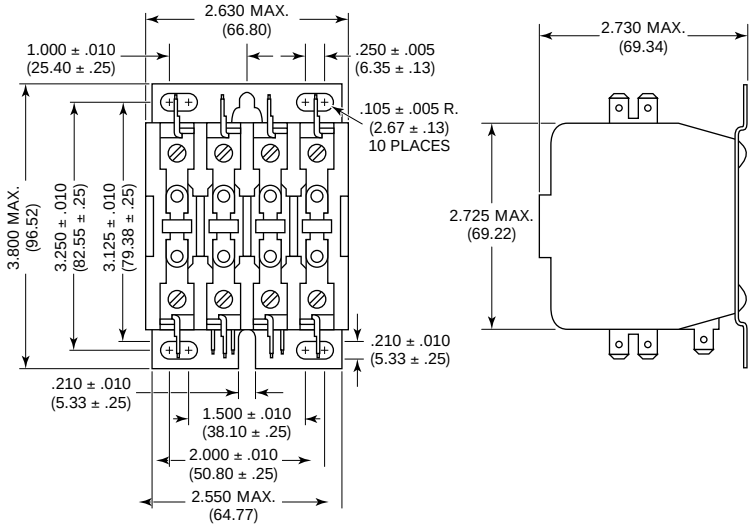
P31



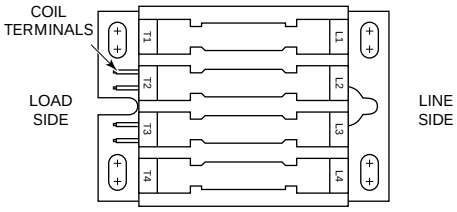
Top View



P41



Top View



Contact Terminal Options

Figure 02

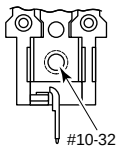


Figure 03

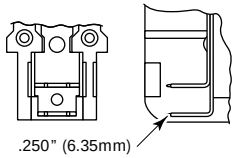


Figure 05

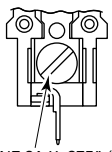


Figure 06

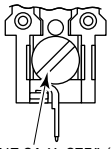


Figure 07

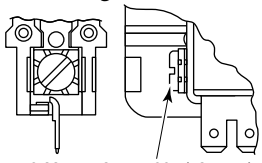
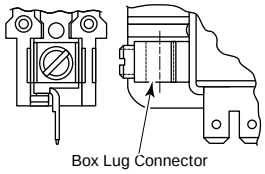
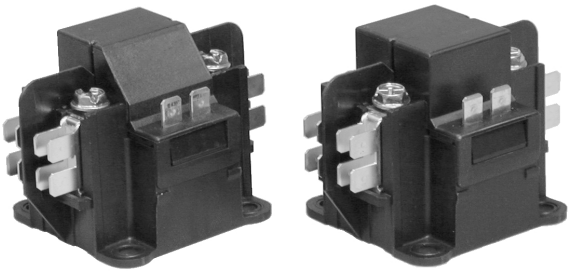


Figure 08



PRELIMINARY DATA



Model 2000 series

Definite Purpose Contactor
1- or 2-pole, 25-30 FLA
AC Coil

c UL us File E75492

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features
- Next-generation contactor is smaller and lighter than previous models.
- Enclosed case affords contact and coil protection while working in conjunction with plastic mounting base to reduce operational noise level and electrically isolate unit.
- Snap-together assembly and reduced part count help to hold down cost.
- Design permits direct access to holes in mounting base.

Coil Data @ 25°C
Voltage: 24, 100, 120, 200, 208-240 and 277 VAC, 50/60 Hz.
Nominal Power: 6 VA (60 Hz.); 8 VA (50 Hz.).
Nominal Inrush Power: 25 VA (60 Hz.); 30 VA (50 Hz.).
Coil Temperature Rise: 65°C Max.
Insulation Class: UL Class B (130°C).
Duty Cycle: Continuous.

Contact Data @ 25°C
Arrangements: 1 Form X (SPST-NO-DM) with or without shunt and 2 Form X (DPST-NO-DM).
Maximum Ratings: See Contact Ratings Table.
Minimum Ratings: 96VA.
Material: Silver Cadmium Oxide.
Expected Life (application dependent): 200,000 ops., at rated load. 500,000 ops., mechanical.

Operate Data @ 25°C
Must Operate Voltage: 85% of nominal coil voltage or less.
Must Release Voltage: 10% of nominal coil voltage or more.
Initial Operate Time: 20 ms, typical.
Initial Release Time: 10 ms, typical.
Max. Bounce Time: 0-10 ms, typical.

Contact Ratings

Model	Maximum Voltage VAC	Full Load Amps	Locked Rotor Amps	Resistive Load Amps
25 Amp Contactor	277	25	150	30
30 Amp Contactor	277	30	150	40

Environmental Data
Temperature Range: Storage and Operating: -40°C – +65°C.
Flammability: UL 94-HB housing.

Initial Dielectric Strength
Initial Breakdown Voltage:
Between Contacts and Coil: 1,600 VAC
Between Poles: 1,600 VAC
Between Open Contacts: 1,600 VAC

Mechanical Data
Contact Termination:
Type: #10-32 Screw with quad 0.250" (6.35 mm) quick connects.
Wire Size: 16-8 AWG (Must use ring terminal for 8 AWG wire.)
Tightening Torque: 22 in.-lbs.
Coil Termination: Dual 0.250" (6.35 mm) quick connects.
Weight: 4.93 oz. (140 g) approximately

Ordering Information

Typical Part No. ▶	2000	-	20	Q	6	999

1. Series:
2000 = 1- or 2-pole, 25-30FLA contactor

2. Packaging:
Y = Individual Pack
- = Bulk Pack
A-ZZZ = Customer specific information (assigned by factory)

3. Pole Configuration:
10 = 1 Form X (SPST-NO-DM)
15 = 1 Form X (SPST-NO-DM) with Shunt
20 = 2 Form X (DPST-NO-DM)

4. Coil Voltage (50/60 Hz.):
Q = 24VAC T = 120VAC U = 208/240VAC
P = 100VAC S = 200VAC V = 277VAC

5. Contact Ratings (Inductive):
1 = 25 FLA on 1-pole models 5 = 25 FLA on 2-pole models
2 = 30 FLA on 1-pole models 6 = 30 FLA on 2-pole models

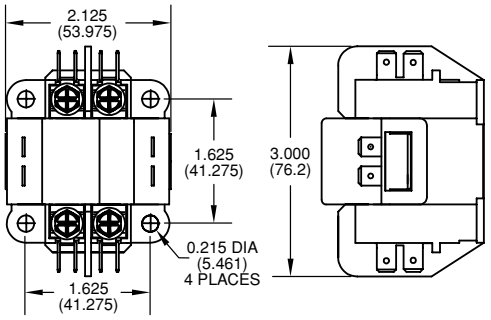
6. Customer ID Suffix:
999 = Standard Model 000-998 = Factory assigned customer ID

7. Option Code:
Leave Blank = No customer-specific options A - ZZ = Factory assigned customer-specific options.

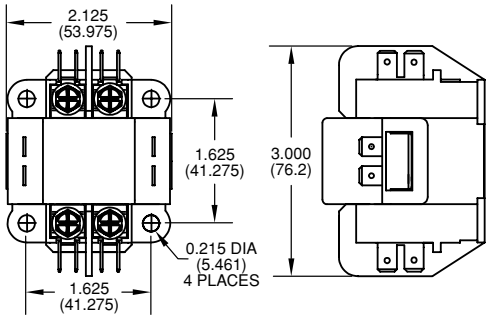
Standard part numbers listed below are more likely to be available from stock.

2000-15Q1999	2000-20Q5999	2000-15T1999	2000-20T5999	2000-15U1999	2000-20U5999
2000-15Q2999	2000-20Q6999	2000-15T2999	2000-20T6999	2000-15U2999	2000-20U6999

Outline Dimensions



Model 2000-10 (one pole)
Model 2000-15 (one pole with shunt)

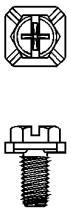


Model 2000-20 (two pole)

Termination Options

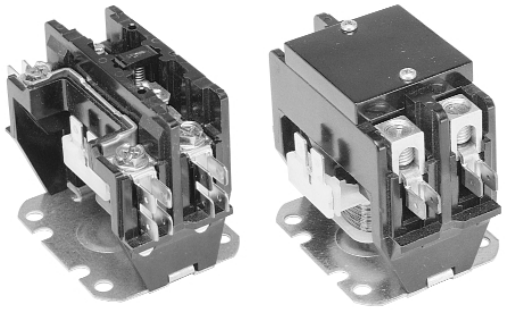


STANDARD
#10-32 Combination Phillips, Slotted & 5/16 Hex Head #12 Washer



SPECIAL
#10-32 Sems Screw with Pressure Plate

ORDERING NOTE: "Standard" terminals need not be specified in the "Ordering Information" chart above. "Special" terminals are offered on a special order basis. Special order items may be subject to extended leadtimes and significant minimum order quantities. Your Tyco Electronics sales engineer must consult with the factory before providing price and availability information regarding items with these options.



Model 96 - 3100 series

Definite Purpose Contactor
1- or 2-pole, 20-40 FLA
AC Coil

c UL us File E75492
CE Ⓢ File EN60947-4-1:1991
IEC 947-4-1

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features
- Robust 1- and 2-pole contactors.
- Shunt available on 1-pole models.
- Convenient mounting plate.

Contact Data @ 25°C
Arrangements: 1 Form X (SPST-NO-DM) with or without shunt and 2 Form X (DPST-NO-DM).
Maximum Ratings: See Contact Ratings Table.
Material: Silver Cadmium Oxide.

Coil Data @ 25°C
Voltage: 24 - 277 VAC, 50/60 Hz. See Coil Data Table below.
Insulation Class: UL Class B (130°C).
Duty Cycle: Continuous.

Environmental Data
Temperature Range: Storage and Operating: -40°C – +65°C.
Flammability: UL 94-HB housing.

Mechanical Data
Contact Termination:
20, 25, 30 FLA Models
Type: #10-32 Screw with quad 0.250" (6.35 mm) quick connects.
Wire Size: 16-8 AWG (Stranding must be split for 8 AWG wire.)
Tightening Torque: 25 in.-lbs.
40 FLA Models
Type: Box Lug with dual 0.250" (6.35 mm) quick connects.
Wire Size: 14-4 Cu/Al AWG
Tightening Torque: 40 in.-lbs.
Coil Termination: Dual 0.250" (6.35 mm) quick connects.
Arc Cover: Optional on 20-30 FLA models, standard on 40 FLA models.
Weight: One Pole Types: 8 oz. (227 g) approximately.
Two Pole Types: 9.6 oz. (273 g) approximately

Contact Ratings

Full Load Amps	Number of Poles	Line Voltage	Locked Rotor Amps	Resistive Amps Rating	Maximum Horsepower	
					Voltage	Single Phase
20	2	240/277 480 600	120 100 80	30 30 30	120 240	2 3
25	1	240/277 480 600	150 50 40	30 30 30	120 240	1 2
25	2	240/277 480 600	150 125 100	35 35 35	120 240	2 3
30	1	240/277 480 600	150 75 50	40 40 40	120 240	1 2
30	2	240/277 480 600	150 125 100	40 40 40	120 240	2 3
40	1	240/277 480 600	240 200 160	50 50 50	120 240	2 3
40	2	240/277 480 600	240 200 160	50 50 50	120 240	2 3

Coil Data

	1-Pole Models				2-Pole Models			
Nominal Coil Voltage	24	120	208/240	277	24	120	208/240	277
Maximum Pickup Volts	18	88	177	221	18	88	177	221
Drop-Out Volts Range	6 - 15	20 - 70	40 - 140	50 - 165	6 - 15	20 - 70	40 - 140	50 - 165
Nominal Inrush VA @ 50 Hz	22.5	22.5	22.5	22.5	37	37	37	37
Nominal Inrush VA @ 60 Hz	20	20	20	20	35	35	35	35
Nominal Sealed VA @ 50 Hz	7	7	7	7	8	8	8	8
Nominal Sealed VA @ 60 Hz	5.25	5.25	5.25	5.25	7	7	7	7
Nominal DC Resistance - Ohms	16.5	420	1850	2650	11	250	1000	1600

Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.
www.tycoelectronics.com
Technical support:
Refer to inside back cover.

Ordering Information

Typical Part No. ▶	3100	-	20	Q	6	999

1. Series:
3100 = 1- or 2-pole, 20-40 FLA contactor

2. Packaging:
Y = Individual Pack
- = Bulk Pack
A-ZZZ = Customer specific information (assigned by factory)

3. Pole Configuration:
10 = 1 Form X (SPST-NO-DM)
15 = 1 Form X (SPST-NO-DM) with Shunt
20 = 2 Form X (DPST-NO-DM)

4. Coil Voltage (50/60 Hz.):
Q = 24VAC T = 120VAC U = 208/240VAC
P = 100VAC S = 200VAC V = 277VAC

5. Contact Ratings (Inductive):
1 = 25 FLA on 1-pole models
2 = 30 FLA on 1-pole models
14 = 35 FLA on 1-pole models
19 - 40 FLA on 1-pole models
3 = 20 FLA on 2-pole models
5 = 26 FLA on 2-pole models
6 = 30 FLA on 2-pole models
18 = 40 FLA on 2-pole models

6. Customer ID Suffix:
999 = Standard Model
000-998 = Factory assigned customer ID

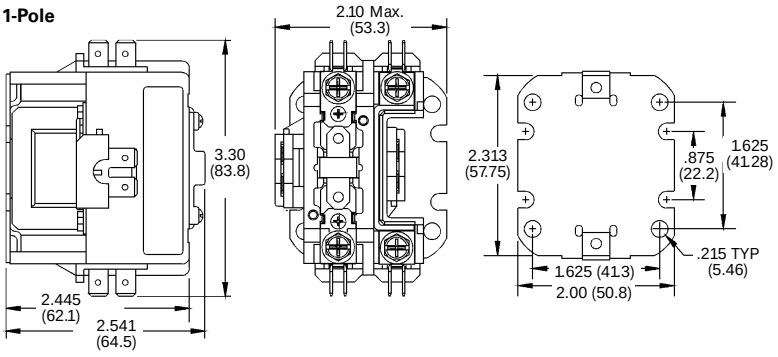
7. Option Code:
Leave Blank = No customer-specific options
A - ZZ = Factory assigned customer-specific options.

Standard part numbers listed below are more likely to be available from stock.

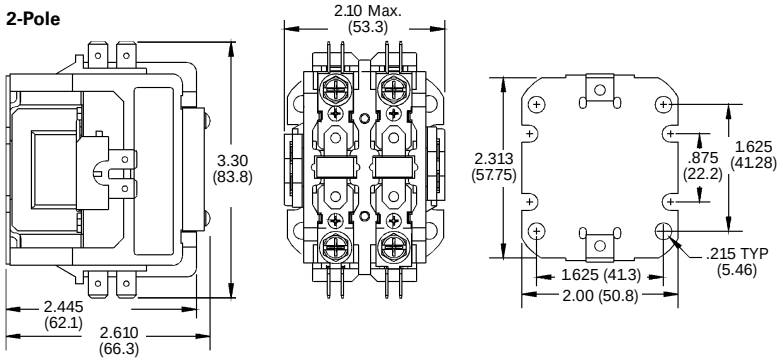
3100-15Q2999	3100-20Q6999	3100-20Q18999CL
3100-15T2999	3100-20T6999	3100-20T18999CL
3100-15U2999	3100-20U6999	3100-20U18999CL

Outline Dimensions

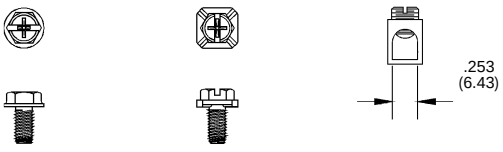
1-Pole



2-Pole



Termination Options

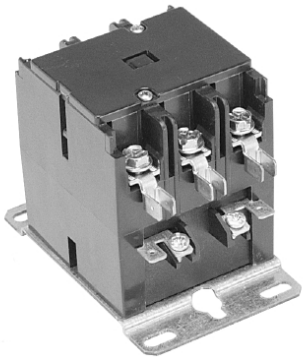


Standard on 20, 25, 30, 35 FLA
#10-32 Combination Phillips, Slotted & 5/16 Hex Head #12 Washer

Special on 20, 25, 30, 35 FLA
#10-32 Sems Screw with Pressure Plate

Standard on 40 FLA
Lug accepts 14-4 Cu/Al AWG

ORDERING NOTE: "Standard" terminals need not be specified in the "Ordering Information" chart above. "Special" terminals are offered on a special order basis. Special order items may be subject to extended leadtimes and significant minimum order quantities. Your Tyco Electronics sales engineer must consult with the factory before providing price and availability information regarding items with these options.



Model 98 - 3100 series

Definite Purpose Contactor
3-pole, 20-40 FLA
AC Coil

c UL us File E75492
CE Ⓢ File EN60947-4-1:1991
IEC 947-4-1

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features
- 3-pole contactors.
- Industry-standard mounting plate.
- Optional interlock/auxiliary switches available.
- Manual test button is standard.
- Coil dust cover helps keep dust and dirt away from magnet and coil area.
- Double E magnet system provides optimal performance.

Contact Data @ 25°C
Arrangements: 3 Form X (3PST-NO-DM).
Maximum Ratings: See Contact Ratings Table.
Material: Silver Cadmium Oxide.

Coil Data @ 25°C
Voltage: 24 - 480 VAC, 50/60 Hz. See Coil Data Table below.
Insulation Class: UL Class B (130°C).
Duty Cycle: Continuous.

Environmental Data
Temperature Range: Storage and Operating: -40°C – +65°C.
Flammability: UL 94-HB housing.

Mechanical Data
Contact Termination:
20, 25, 30 FLA Models
Type: #10-32 Screw with quad 0.250" (6.35 mm) quick connects.
Wire Size: 16-8 AWG (Stranding must be split for 8 AWG wire.)
Tightening Torque: 25 in.-lbs.
40 FLA Models
Type: Box Lug with dual 0.250" (6.35 mm) quick connects.
Wire Size: 14-4 Cu/Al AWG
Tightening Torque: 40 in.-lbs.
Coil Termination: Dual 0.250" (6.35 mm) quick connects, standard.
A 0.250" quick connect and a #6-32 screw, optional.
Arc Cover: Optional on 20-30 FLA models, standard on 40 FLA models.
Weight: 16 oz. (455 g) approximately

Contact Ratings

Full Load Amps	Number of Poles	Line Voltage	Locked Rotor Amps	Resistive Amps Rating	Maximum Horsepower		
					Voltage	Single Phase	Three Phase
20	3	240/277 480 600	120 100 80	30 30 30	110/120 200/240 480/600	1.5 3 -	- 7.5 7.5
25	3	240/277 480 600	150 125 100	35 35 35	110/120 200/208 240/277 480 600	2 - 5 - -	- 7.5 10 15 20
30	3	240/277 480 600	180 150 120	40 40 40	110/120 200/208 240/277 480 600	2 - 5 - -	- 10 10 15 20
40	3	240/277 480 600	240 200 160	50 50 50	110/120 200/208 240/277 480 600	3 - 7.5 - -	- 10 10 20 25

Coil Data

Nominal Coil Voltage	24	120	208/240	277	480
Maximum Pickup Volts	18	88	177	220	384
Drop-Out Volts Range	6 -15	20 - 70	40 - 140	65 - 185	150 - 270
Nominal Inrush VA @ 50 Hz	60	60	60	60	65
Nominal Inrush VA @ 60 Hz	53	53	53	53	53
Nominal Sealed VA @ 50 Hz	6.0	6.0	6.0	6.0	6.0
Nominal Sealed VA @ 60 Hz	5	5	5	5	5
Nominal DC Resistance - Ohms	7	180	720	950	3100

Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.

Ordering Information

Typical Part No. ▶	3100	-	30	Q	9	999

1. Series:
3100 = 3-pole, 20-40 FLA contactor

2. Packaging:
Y = Individual Pack
- = Bulk Pack
A-ZZZ = Customer specific information (assigned by factory)

3. Pole Configuration:
30 = 3 Form X (3PST-NO-DM)

4. Coil Voltage (50/60 Hz.):
Q = 24VAC U = 208/240VAC H = 480VAC J = 120VAC, molded M = 277VAC, molded
T = 120VAC V = 277VAC I = 24VAC, molded K = 208/240VAC, molded W = 480VAC, molded

5. Contact Ratings (Inductive):
7 = 20 FLA 8 = 25 FLA 9 = 30 FLA 10 = 40 FLA

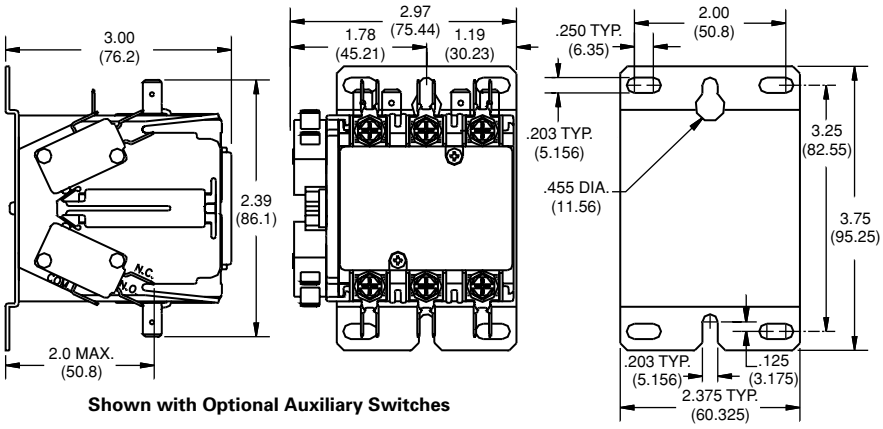
6. Customer ID Suffix:
999 = Standard Model 000-998 = Factory assigned customer ID

7. Option Code:
Leave Blank = No customer-specific options A - ZZ = Factory assigned customer-specific options.

Standard part numbers listed below are more likely to be available from stock.

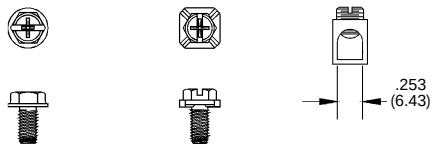
3100-30Q9999CY 3100-30U9999CY 3100-30T10999CG
3100-30T9999CY 3100-30Q10999CG 3100-30U10999CG

Outline Dimensions



Shown with Optional Auxiliary Switches

Termination Options



Standard on 20, 25, 30, 35 FLA
#10-32 Combination Phillips, Slotted & 5/16 Hex Head #12 Washer

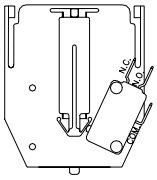
Special on 20, 25, 30, 35 FLA
#10-32 Sems Screw with Pressure Plate

Standard on 40 FLA
Lug accepts 14-4 Cu/Al AWG

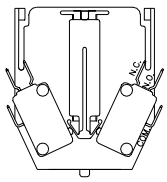
ORDERING NOTE: "Standard" terminals need not be specified in the "Ordering Information" chart above. "Special" terminals are offered on a special order basis. Special order items may be subject to extended leadtimes and significant minimum order quantities. Your Tyco Electronics sales engineer must consult with the factory before providing price and availability information regarding items with these options.

Auxiliary Switches

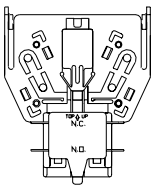
Various interlock / auxiliary switches are available for the Model 98 contactor. All auxiliary switches for the Model 98 are snap-on design, no tools required.



ONE SPDT SWITCH PER SIDE



TWO SPDT SWITCHES PER SIDE



1 N/O / 1 N/C

Equipped with 0.250" (6.35) Quick Connect Terminals

Description	Factory Modifications Contact Config. NO	NC	Field Added Kits Kit Catalog Number	Number of Kits Required
Single unit interlock	1	0	98220-303	1
configurations listed.	0	1	98220-331	1
Maximum of two.	1	1	98220-332	1
(One on each side.)	2	0	98220-303	2
	0	2	98220-331	2
See footnote (1) for ratings.	2	2	98220-332	2
SPDT Circuit	1	1	98220-337	1
(Either one or two	2	2	98220-338	1
switches per side.)	2	2	98220-337	2
See footnote (2) for ratings.	4	4	98220-338	2
SPDT Dry Circuit	1	1	98220-341	1
0.1 amp max.	2	2	98220-340	1
Gold Flashed Contacts	4	4	98220-340	2

Equipped with #6-32 Screw Terminals & Saddle Clamps

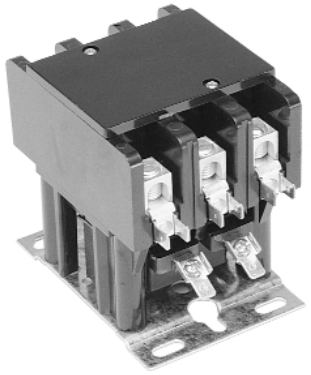
Description	Factory Modifications Contact Config. NO	NC	Field Added Kits Kit Catalog Number	Number of Kits Required
Single unit interlock	1	0	98220-303	1
configurations listed.	0	1	98220-331	1
Maximum of two.	1	1	98220-332	1
(One on each side.)	2	0	98220-303	2
	0	2	98220-331	2
See footnote (1) for ratings.	2	2	98220-332	2

Footnotes: Ratings of Auxiliary Interlocks / Switches

(1) Contact Rating Single Circuit NO or NC and two circuit NO/NC:

	120V	240V	480V	600V
Amperes - Break	3.0	1.5	0.75	0.6
Amperes - Make	30	15	7.5	6
Amperes - Continuous	10	10	10	10

(2) Contact Rating SPDT (337):
10A, 1/3 HP, 125 or 250 VAC
1/2A, 125 VDC; 1/4A, 250 VDC:
4A 120 VAC on Lamp Load



Model 93 - 3100 series

Definite Purpose Contactor
3-pole, 50-60 FLA
AC Coil

c UL us File E75492
CE Ⓢ File EN60947-4-1:1991
IEC 947-4-1

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features
- 3-pole contactors.
- Convenient "universal" mounting plate.
- Optional interlock/auxiliary switches available.

Contact Data @ 25°C
Arrangements: 3 Form X (3PST-NO-DM).
Maximum Ratings: See Contact Ratings Table.
Material: Silver Cadmium Oxide.

Coil Data @ 25°C
Voltage: 24 - 480 VAC, 50/60 Hz. See Coil Data Table below.
Insulation Class: UL Class B (130°C).
Duty Cycle: Continuous.

Environmental Data
Temperature Range: Storage and Operating: -40°C – +65°C.
Flammability: UL 94-HB housing.

Mechanical Data
Contact Termination:
Type: Box Lug with dual 0.250" (6.35 mm) quick connects.
Wire Size: 14-2 Cu/Al AWG
Tightening Torque: 50 in.-lbs.
Coil Termination: Dual 0.250" (6.35 mm) quick connects, standard.
A 0.250" quick connect and a #6-32 screw, optional.
Arc Cover: Standard.
Weight: 32 oz. (910 g) approximately

Contact Ratings

Full Load Amps	Number of Poles	Line Voltage	Locked Rotor Amps	Resistive Amps Rating	Maximum Horsepower		
					Voltage	Single Phase	Three Phase
50	3	240	300	65	110/120	3	-
		480	250	65	200/208	7.5	15
		600	200	65	240/277	10	15
					480	-	25
					600	-	25
60	3	240	360	75	110/120	5	-
		480	300	75	200/208	7.5	25
		600	240	75	240/277	10	25
					480	-	30
					600	-	30

Coil Data

Nominal Coil Voltage	24	120	208/240	277	480
Maximum Pickup Volts	182	93	177	235	374
Drop-Out Volts Range	6 -15	20 - 70	40 - 135	50-180	120 - 286
Nominal Inrush VA @ 50 Hz	140	140	140	140	140
Nominal Inrush VA @ 60 Hz	132	132	132	132	132
Nominal Sealed VA @ 50 Hz	20	20	20	20	20
Nominal Sealed VA @ 60 Hz	14	14	14	14	14
Nominal DC Resistance - Ohms	2.4	45	180	280	852

Ordering Information

Typical Part No. ▶	3100	-	30	Q	16	999

1. Series:
3100 = 3-pole, 50-60 FLA contactor

2. Packaging:
Y = Individual Pack
- = Bulk Pack
A-ZZZ = Customer specific information (assigned by factory)

3. Pole Configuration:
30 = 3 Form X (3PST-NO-DM)

4. Coil Voltage (50/60 Hz.):
Q = 24VAC U = 208/240VAC H = 480VAC J = 120VAC, molded M = 277VAC, molded
T = 120VAC V = 277VAC I = 24VAC, molded K = 208/240VAC, molded W = 480VAC, molded

5. Contact Ratings (Inductive):
16 = 50 FLA 17 = 60 FLA

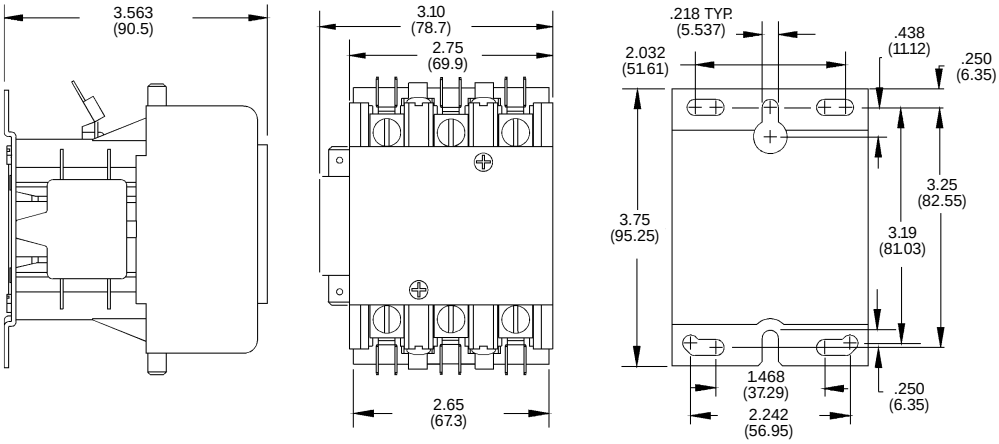
6. Customer ID Suffix:
999 = Standard Model 000-998 = Factory assigned customer ID

7. Option Code:
Leave Blank = No customer-specific options A - ZZ = Factory assigned customer-specific options.

Standard part numbers listed below are more likely to be available from stock.

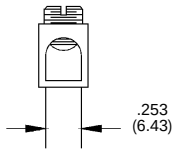
None at present.

Outline Dimensions



Shown with Optional Auxiliary Switch

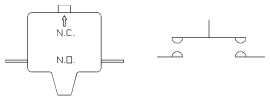
Termination



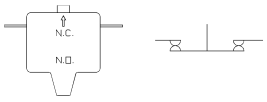
Standard
on 50-60 FLA
Lug accepts 14-2
Cu/Al AWG

Auxiliary Switches

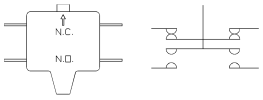
Various interlock / auxiliary switches are available for the Model 93 contactor.



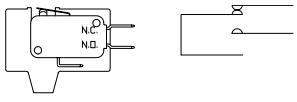
NORMALLY OPEN
-303 STYLE



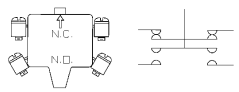
NORMALLY CLOSED
-331 STYLE



NORMALLY OPEN & CLOSED
-332 STYLE



SPDT
-337 & -341 STYLE



W/ #6-32 SCREW & SADDLE CLAMP
-344 STYLE

Equipped with 0.250" (6.35) Quick Connect Terminals

Factory Modifications			Field Added Kits	
Description	Contact Config. NO	NC	Kit Catalog Number	Number of Kits Required
Single unit interlock configurations listed. Maximum of two. Must be same polarity. See footnote (1) for ratings.	1	0	34300-303	1
	0	1	34300-331	1
	1	1	34300-332	1
	2	0	34300-303	2
	0	2	34300-331	2
	2	2	34300-332	2
SPDT Circuit See footnote (2) for ratings.	1	1	34300-337	1
	2	2	34300-337	2
SPDT Dry Circuit, 0.1 amp max. Gold Flashed Contacts	1	1	34300-341	1
	2	2	34300-340	1

Equipped with #6-32 Screw Terminals & Saddle Clamps

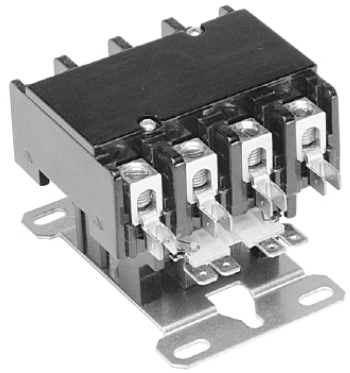
Factory Modifications			Field Added Kits	
Description	Contact Config. NO	NC	Kit Catalog Number	Number of Kits Required
Single unit interlock configurations listed. Maximum of two. Must be same polarity. (note 1)	1	0	34300-342	1
	0	1	34300-343	1
	1	1	34300-344	1

Footnotes: Ratings of Auxiliary Interlocks / Switches

(1) Contact Rating Single Circuit NO or NC and two circuit NO/NC:

	120V	240V	480V	600V
Break	3.0A	1.5A	0.75A	0.6A
Make	30A	15A	7.5A	6A
Continuous	10A	10A	10A	10A

(2) Contact Rating SPDT (337): 10A, 1/3 HP, 125 or 250 VAC 1/2A, 125 VDC; 1/4A, 250 VDC: 4A 120 VAC on Lamp Load



Model 93 - 3100 series

Definite Purpose Contactor
4-pole, 25-40 FLA
AC Coil

c UL us File E75492
CE Ⓢ File EN60947-4-1:1991
IEC 947-4-1

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features
- 4-pole contactors.
- Convenient "universal" mounting plate.
- Optional interlock/auxiliary switches available.

Contact Data @ 25°C
Arrangements: 4 Form X (4PST-NO-DM).
Maximum Ratings: See Contact Ratings Table.
Material: Silver Cadmium Oxide.

Coil Data @ 25°C
Voltage: 24 - 480 VAC, 50/60 Hz. See Coil Data Table below.
Insulation Class: UL Class B (130°C).
Duty Cycle: Continuous.

Environmental Data
Temperature Range: Storage and Operating: -40°C – +65°C.
Flammability: UL 94-HB housing.

Mechanical Data
Contact Termination:
25, 30 FLA Models
Type: #10-32 Screw with quad 0.250" (6.35 mm) quick connects.
Wire Size: 16-8 AWG (Stranding must be split for 8 AWG wire.)
Tightening Torque: 25 in.-lbs.
40 FLA Models
Type: Box Lug with dual 0.250" (6.35 mm) quick connects.
Wire Size: 14-4 Cu/Al AWG
Tightening Torque: 40 in.-lbs.
Coil Termination: Dual 0.250" (6.35 mm) quick connects, standard.
A 0.250" quick connect and a #6-32 screw, optional.
Arc Cover: Optional on 25-30 FLA models, standard on 40 FLA models.
Weight: 24 oz. (683 g) approximately

Contact Ratings

Full Load Amps	Number of Poles	Line Voltage	Locked Rotor Amps	Resistive Amps Rating	Maximum Horsepower		
					Voltage	Single Phase	Three Phase
25	3	240/277	150	35	110/120	2	-
		480	125	35	200/208	-	7.5
		600	100	35	240/277	5	10
					480	-	15
30	3	240/277	180	40	110/120	2	-
		480	150	40	200/208	-	10
		600	120	40	240/277	5	10
					480	-	15
40	3	240/277	240	50	110/120	3	-
		480	200	50	200/208	-	10
		600	160	50	240/277	7.5	10
					480	-	20

Coil Data

Nominal Coil Voltage	24	120	208/240	277	480
Maximum Pickup Volts	19.2	93	177	220	384
Drop-Out Volts Range	6 -15	20 - 70	40 - 140	50-185	150 - 270
Nominal Inrush VA @ 50 Hz	68	68	68	58	48
Nominal Inrush VA @ 60 Hz	60	60	60	52	52
Nominal Sealed VA @ 50 Hz	14	14	14	11	11
Nominal Sealed VA @ 60 Hz	9	9	9.5	9.5	9
Nominal DC Resistance - Ohms	5	148	520	750	2700

Ordering Information

Typical Part No. ▶	3100	-	40	Q	9	999

1. Series:
3100 = 4-pole, 25-40 FLA contactor

2. Packaging:
Y = Individual Pack
- = Bulk Pack
A-ZZZ = Customer specific information (assigned by factory)

3. Pole Configuration:
40 = 4 Form X (4PST-NO-DM)

4. Coil Voltage (50/60 Hz.):
Q = 24VAC U = 208/240VAC H = 480VAC J = 120VAC, molded M = 277VAC, molded
T = 120VAC V = 277VAC I = 24VAC, molded K = 208/240VAC, molded W = 480VAC, molded

5. Contact Ratings (Inductive):
8 = 25 FLA 9 = 30 FLA 10 = 40 FLA

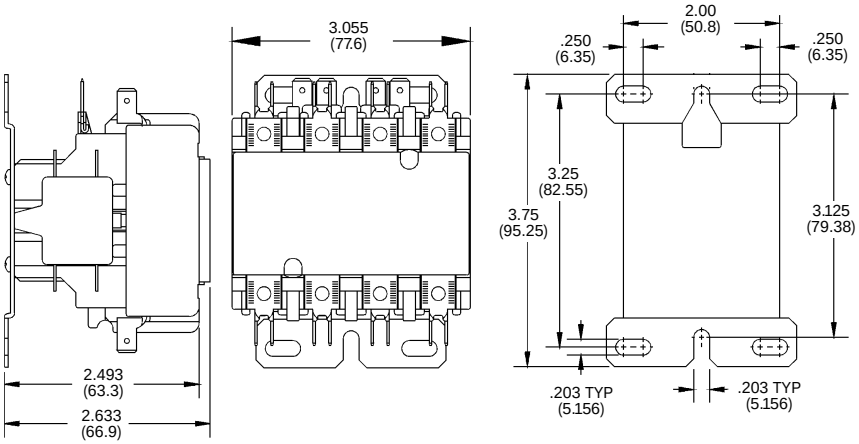
6. Customer ID Suffix:
999 = Standard Model 000-998 = Factory assigned customer ID

7. Option Code:
Leave Blank = No customer-specific options A - ZZ = Factory assigned customer-specific options.

Standard part numbers listed below are more likely to be available from stock.

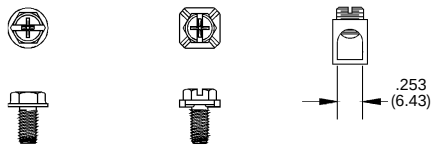
None at present.

Outline Dimensions



Shown with Optional Auxiliary Switch

Termination Options



Standard on 25, 30 FLA
#10-32 Combination Phillips, Slotted & 5/16 Hex Head #12 Washer

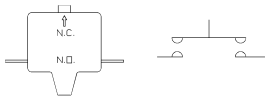
Special on 25, 30 FLA
#10-32 Sems Screw with Pressure Plate

Standard on 40 FLA
Lug accepts 14-4 Cu/Al AWG

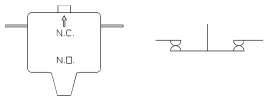
ORDERING NOTE: "Standard" terminals need not be specified in the "Ordering Information" chart above. "Special" terminals are offered on a special order basis. Special order items may be subject to extended leadtimes and significant minimum order quantities. Your Tyco Electronics sales engineer must consult with the factory before providing price and availability information regarding items with these options.

Auxiliary Switches

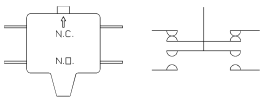
Various interlock / auxiliary switches are available for the Model 93 contactor.



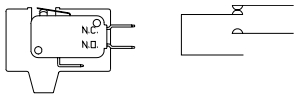
NORMALLY OPEN
-303 STYLE



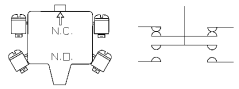
NORMALLY CLOSED
-331 STYLE



NORMALLY OPEN & CLOSED
-332 STYLE



SPDT
-337 & -341 STYLE



W/ #6-32 SCREW & SADDLE CLAMP
-344 STYLE

Equipped with 0.250" (6.35) Quick Connect Terminals

Factory Modifications			Field Added Kits	
Description	Contact Config. NO	NC	Kit Catalog Number	Number of Kits Required
Single unit interlock configurations listed. Maximum of two. Must be same polarity. See footnote (1) for ratings.	1	0	34220-303N	1
	0	1	34220-331N	1
	1	1	34220-332N	1
	2	0	34220-303N	2
	0	2	34220-331N	2
	2	2	34220-332N	2
SPDT Circuit See footnote (2) for ratings.	1	1	34220-337N	1
	2	2	34220-337N	2
SPDT Dry Circuit, 0.1 amp max. Gold Flashed Contacts	1	1	34220-341N	1
	2	2	34220-340N	1

Equipped with #6-32 Screw Terminals & Saddle Clamps

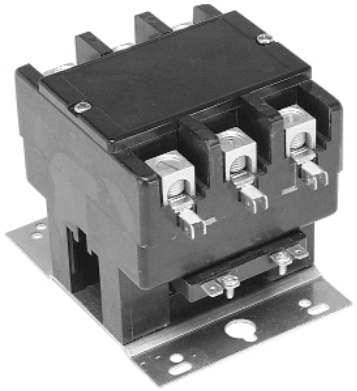
Factory Modifications			Field Added Kits	
Description	Contact Config. NO	NC	Kit Catalog Number	Number of Kits Required
Single unit interlock configurations listed. Maximum of two. Must be same polarity. (note 1)	1	0	34220-342N	1
	0	1	34220-343N	1
	1	1	34220-344N	1

Footnotes: Ratings of Auxiliary Interlocks / Switches

(1) Contact Rating Single Circuit NO or NC and two circuit NO/NC:

	120V	240V	480V	600V
Break	3.0A	1.5A	0.75A	0.6A
Make	30A	15A	7.5A	6A
Continuous	10A	10A	10A	10A

(2) Contact Rating SPDT (337): 10A, 1/3 HP, 125 or 250 VAC 1/2A, 125 VDC; 1/4A, 250 VDC: 4A 120 VAC on Lamp Load



Model 96 - 3186 series

Definite Purpose Contactor
3-pole, 75-90 FLA
AC Coil

c UL us File E75492
CE Ⓢ File EN60947-4-1:1991
IEC 947-4-1

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features
- 3-pole contactors.
- Convenient "universal" mounting plate.
- Optional interlock/auxiliary switches available.

Environmental Data
Temperature Range: Storage and Operating: -40°C – +65°C.
Flammability: UL 94-HB housing.

Mechanical Data
Contact Termination:
Type: Box Lug with dual 0.250" (6.35 mm) quick connects.
Wire Size: 14-1/0 Cu/Al AWG
Tightening Torque: 50 in.-lbs.
Coil Termination: 0.250" quick connect and a #6-32 screw.
Arc Cover: Standard.
Weight: 64 oz. (1820 g) approximately

Contact Data @ 25°C
Arrangements: 3 Form X (3PST-NO-DM).
Maximum Ratings: See Contact Ratings Table.
Material: Silver Cadmium Oxide.

Coil Data @ 25°C
Voltage: 24 - 480 VAC, 50/60 Hz. See Coil Data Table below.
Insulation Class: UL Class B (130°C).
Duty Cycle: Continuous.

Contact Ratings

Full Load Amps	Number of Poles	Line Voltage	Locked Rotor Amps	Resistive Amps Rating	Maximum Horsepower		
					Voltage	Single Phase	Three Phase
75	3	240 480 600	450 375 399	93 93 93	110/120 200/208 240/277 480 600	5 10 15 - -	- 20 25 40 25
90	3	240 480 600	540 450 360	120 120 120	110/120 200/208 240/277 480 600	7.5 15 20 - -	- 25 30 50 50

Coil Data

Nominal Coil Voltage	24	120	208/240	277	480
Maximum Pickup Volts	18	88	177	220	384
Drop-Out Volts Range	6 -15	20 - 70	40 - 110	65-185	150 - 270
Nominal Inrush VA @ 50 Hz	285	285	285	285	285
Nominal Inrush VA @ 60 Hz	240	240	240	240	240
Nominal Sealed VA @ 50 Hz	42	42	42	42	42
Nominal Sealed VA @ 60 Hz	27	27	27	27	27
Nominal DC Resistance - Ohms	.63	15.6	63.5	84	255

Ordering Information

Typical Part No. ▶	3186	-	30	Q	90	999

1. Series:
3186 = 3-pole, 75-90 FLA contactor

2. Packaging:
Y = Individual Pack
- = Bulk Pack
A-ZZZ = Customer specific information (assigned by factory)

3. Pole Configuration:
30 = 3 Form X (3PST-NO-DM)

4. Coil Voltage (50/60 Hz.):
Q = 24VAC U = 208/240VAC H = 480VAC J = 120VAC, molded M = 277VAC, molded
T = 120VAC V = 277VAC I = 24VAC, molded K = 208/240VAC, molded W = 480VAC, molded

5. Contact Ratings (Inductive):
75 = 75 FLA 90 = 90 FLA

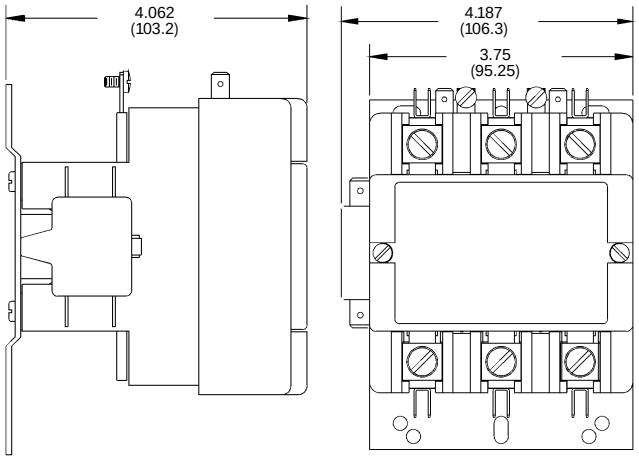
6. Customer ID Suffix:
999 = Standard Model 000-998 = Factory assigned customer ID

7. Option Code:
Leave Blank = No customer-specific options A - ZZ = Factory assigned customer-specific options.

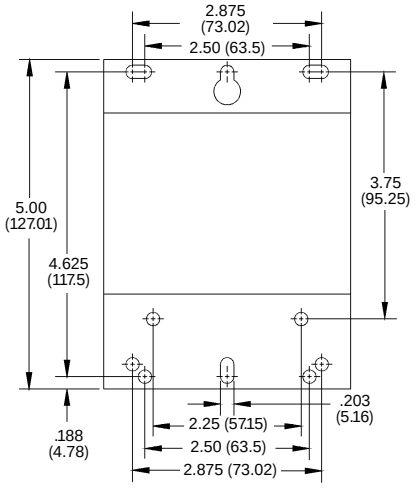
Standard part numbers listed below are more likely to be available from stock.

None at present.

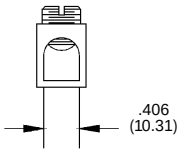
Outline Dimensions



Shown with Optional Auxiliary Switch



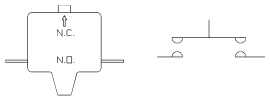
Termination



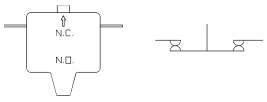
Standard on 75-90 FLA
Lug accepts 14-1/0 Cu/Al AWG

Auxiliary Switches

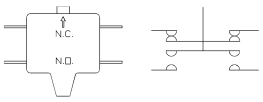
Various interlock / auxiliary switches are available for the Model 96 contactor.



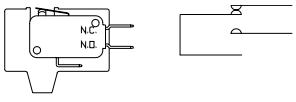
NORMALLY OPEN
-303 STYLE



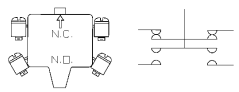
NORMALLY CLOSED
-331 STYLE



NORMALLY OPEN & CLOSED
-332 STYLE



SPDT
-337 & -341 STYLE



W/ #6-32 SCREW & SADDLE CLAMP
-344 STYLE

Equipped with 0.250" (6.35) Quick Connect Terminals

Factory Modifications			Field Added Kits	
Description	Contact Config. NO	NC	Kit Catalog Number	Number of Kits Required
Single unit interlock configurations listed. Maximum of two. Must be same polarity. See footnote (1) for ratings.	1	0	34300-303	1
	0	1	34300-331	1
	1	1	34300-332	1
	2	0	34300-303	2
	0	2	34300-331	2
	2	2	34300-332	2
SPDT Circuit See footnote (2) for ratings.	1	1	34300-337	1
	2	2	34300-337	2
SPDT Dry Circuit, 0.1 amp max. Gold Flashed Contacts	1	1	34300-341	1
	2	2	34300-340	1

Equipped with #6-32 Screw Terminals & Saddle Clamps

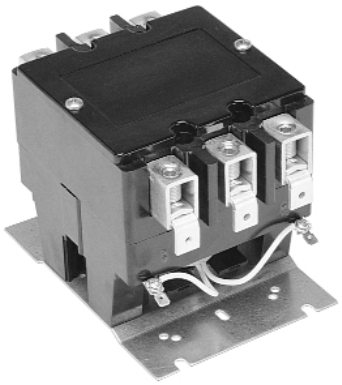
Factory Modifications			Field Added Kits	
Description	Contact Config. NO	NC	Kit Catalog Number	Number of Kits Required
Single unit interlock configurations listed. Maximum of two. Must be same polarity. (note 1)	1	0	34300-342	1
	0	1	34300-343	1
	1	1	34300-344	1

Footnotes: Ratings of Auxiliary Interlocks / Switches

(1) Contact Rating Single Circuit NO or NC and two circuit NO/NC:

	120V	240V	480V	600V
Break	3.0A	1.5A	0.75A	0.6A
Make	30A	15A	7.5A	6A
Continuous	10A	10A	10A	10A

(2) Contact Rating SPDT (337): 10A, 1/3 HP, 125 or 250 VAC 1/2A, 125 VDC; 1/4A, 250 VDC: 4A 120 VAC on Lamp Load



Model A - 3100 series

Definite Purpose Contactor
3-pole, 120 FLA
AC Coil

c UL us File E75492

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features
- 3-pole contactors.
- Convenient "universal" mounting plate.
- Optional interlock/auxiliary switches available.

Environmental Data
Temperature Range: Storage and Operating: -40°C – +65°C.
Flammability: UL 94-HB housing.

Contact Data @ 25°C
Arrangements: 3 Form X (3PST-NO-DM).
Maximum Ratings: See Contact Ratings Table.
Material: Silver Cadmium Oxide.

Mechanical Data
Contact Termination:
Type: Box Lug with dual 0.250" (6.35 mm) quick connects.
Wire Size: 2 – 4-0 Cu/Al AWG
Tightening Torque: 100 in.-lbs.
Coil Termination: 0.250" quick connect and a #6-32 screw.
Arc Cover: Standard.
Weight: 128 oz. (3640 g) approximately

Coil Data @ 25°C
Voltage: 24 - 480 VAC, 50/60 Hz. See Coil Data Table below.
Insulation Class: UL Class B (130°C).
Duty Cycle: Continuous.

Contact Ratings

Full Load Amps	Number of Poles	Line Voltage	Locked Rotor Amps	Resistive Amps Rating	Maximum Horsepower		
					Voltage	Single Phase	Three Phase
120	3	240	720	150	110/120	10	-
		480	600	150	200/208	20	30
		600	480	150	240	25	40
					480	-	75
					600	-	75

Coil Data

Nominal Coil Voltage	24	120	208/240	277	480
Maximum Pickup Volts	20.4	93	176	235	374
Drop-Out Volts Range	6 -15.6	20 - 70	40 - 135	65-180	150 - 270
Nominal Inrush VA @ 50 Hz	470	600	600	600	–
Nominal Inrush VA @ 60 Hz	400	510	510	510	510
Nominal Sealed VA @ 50 Hz	43	50	50	50	–
Nominal Sealed VA @ 60 Hz	40	48	48	40	48
Nominal DC Resistance - Ohms	.264	4.73	18.6	30.25	78

Ordering Information

Typical Part No. ▶	3100	-	30	Q	120	999

1. Series:
3100 = 3-pole, 120 FLA contactor

2. Packaging:
Y = Individual Pack
- = Bulk Pack
A-ZZZ = Customer specific information (assigned by factory)

3. Pole Configuration:
30 = 3 Form X (3PST-NO-DM)

4. Coil Voltage (50/60 Hz.):
Q = 24VAC U = 208/240VAC H = 480VAC J = 120VAC, molded M = 277VAC, molded
T = 120VAC V = 277VAC I = 24VAC, molded K = 208/240VAC, molded W = 480VAC, molded

5. Contact Ratings (Inductive):
120 = 120 FLA

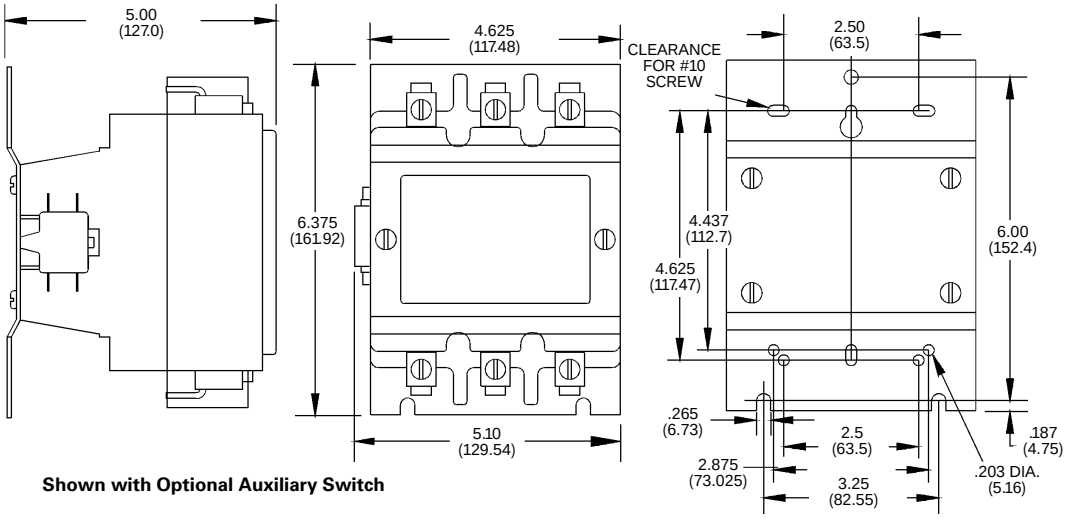
6. Customer ID Suffix:
999 = Standard Model 000-998 = Factory assigned customer ID

7. Option Code:
Leave Blank = No customer-specific options A - ZZ = Factory assigned customer-specific options.

Standard part numbers listed below are more likely to be available from stock.

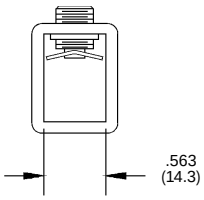
3100Y30Q120999CJ 3100Y30T120999CJ 3100Y30U120999CJ

Outline Dimensions



Shown with Optional Auxiliary Switch

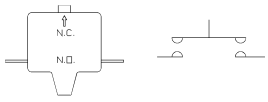
Termination



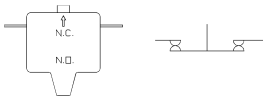
Standard on 120 FLA
Lug accepts 14-0 Cu/Al AWG

Auxiliary Switches

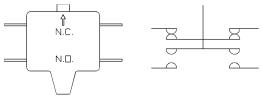
Various interlock / auxiliary switches are available for the Model A contactor.



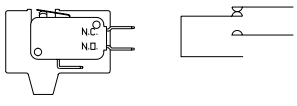
NORMALLY OPEN -303 STYLE



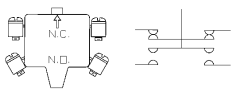
NORMALLY CLOSED -331 STYLE



NORMALLY OPEN & CLOSED -332 STYLE



SPDT -337 & -341 STYLE



W/ #6-32 SCREW & SADDLE CLAMP -344 STYLE

Equipped with 0.250" (6.35) Quick Connect Terminals

Factory Modifications			Field Added Kits	
Description	Contact Config. NO	NC	Kit Catalog Number	Number of Kits Required
Single unit interlock configurations listed. Maximum of two. Must be same polarity. See footnote (1) for ratings.	1	0	34300-303	1
	0	1	34300-331	1
	1	1	34300-332	1
	2	0	34300-303	2
	0	2	34300-331	2
	2	2	34300-332	2
SPDT Circuit See footnote (2) for ratings.	1	1	34300-337	1
	2	2	34300-337	2
SPDT Dry Circuit, 0.1 amp max. Gold Flashed Contacts	1	1	34300-341	1
	2	2	34300-340	1

Equipped with #6-32 Screw Terminals & Saddle Clamps

Factory Modifications			Field Added Kits	
Description	Contact Config. NO	NC	Kit Catalog Number	Number of Kits Required
Single unit interlock configurations listed. Maximum of two. Must be same polarity. (note 1)	1	0	34300-342	1
	0	1	34300-343	1
	1	1	34300-344	1

Footnotes: Ratings of Auxiliary Interlocks / Switches

(1) Contact Rating Single Circuit NO or NC and two circuit NO/NC:

	120V	240V	480V	600V
Break	3.0A	1.5A	0.75A	0.6A
Make	30A	15A	7.5A	6A
Continuous	10A	10A	10A	10A

(2) Contact Rating SPDT (337): 10A, 1/3 HP, 125 or 250 VAC 1/2A, 125 VDC; 1/4A, 250 VDC: 4A 120 VAC on Lamp Load

Engineering Notes

Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.
www.tycoelectronics.com
Technical support:
Refer to inside back cover.

Alphanumeric Index

Series	Type	Page
136	Traffic Light (Flash Transfer) Relay	916
GP	Control Relay	917
KBP	Mechanical Latching Relay	910
KUL	Magnetic Latching Relay	908
MDR	Rotary Relay (High Shock Resistance)	914
ML	Magnetic Latching Control Relay	917
TR	Timing Control Relay	917
PE (latching)	Magnetic Latching Relay	902
PCKWK	Magnetic Latching Relay	904
RT (latching)	Magnetic Latching Relay	906
S89R/S90R	Impulse Relay	912

NOTE: In addition to the products listed in this section of the databook, we offer latching versions of some of our other relay series. Following is a list of these products:

Low Signal Relays

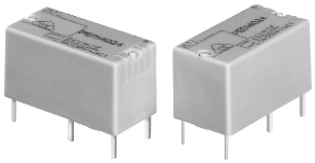
FP2 323
FX2 329
IM 321
V23026 (P1) 314
V23079 (P2) 325

Mid-range PC Board Relays

0409 488
RP 3 SL 486
V23148 (U/UB) 428

Many of the products in our line of high performance relays and contactors (see overview in section 14 of this databook) are also offered as latching devices.

Latching, Impulse, Rotary & Special Application Relays ... 901-920 **9**



PE Latching series

5 Amp, Miniature, Single Coil Printed Circuit Board Relay

File E38891

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- 1 Form C (SPDT).
- 5 amp rated current.
- 10mm height.
- Flux-tight for wave soldering.
- Supplied in tubes.
- DIP configuration.
- 4kV coil-to-contact insulation.

Contact Data

Arrangement: 1 Form C (SPDT).
Material: Silver-nickel 90/10.
Expected Mechanical Life: 5 million operations.
Ratings: 5 amp 250VAC resistive 100,000 operations.

Initial Dielectric Strength

Between Open Contacts: 1,000VAC.
Between Coil and Contacts: 4,000VAC.
Creepage/Clearance Coil-Contact: >3.2/4mm.

Coil Data @ 20°C

Nominal Coil Power: 360mW.

Nominal Voltage VDC	DC Resistance in Ohms ±10%	Pull-in Voltage VDC	Reset Voltage VDC	Nominal Coil Current (mA)
03	25	2.25	2.25	120.0
05	69	3.75	3.75	72.0
06	100	4.5	0.6	60.0
12	400	9.0	1.2	30.0
24	1,600	18.0	2.4	15.0

Operate Data

Minimum Energization Time: 20 ms, at nom. voltage. (Consult factory on information on reduced pulse duration at higher voltages.)
Maximum Energization Time: 1 min. at 10% duty cycle.
Maximum Reset Voltage: 120% of nominal voltage at -40°C.
Switching Rate: 360 ops./hr. max. at rated load.

Coil Operation

Version	A..		C..	
Coil Terminals	A1	A2	A1	A2
Pull-In Polarity	+	–	–	+
Reset Polarity	–	+	+	–

Note: Contact position not defined at delivery.

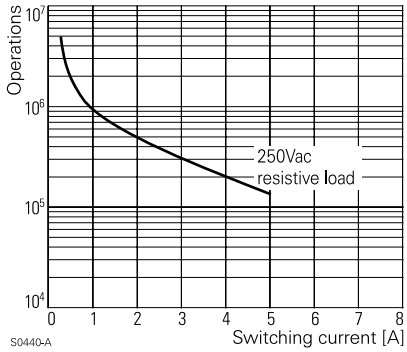
Environmental Data

Temperature Range:
Operating: -40°C to +70°C.
Shock (Destructive): >100g.

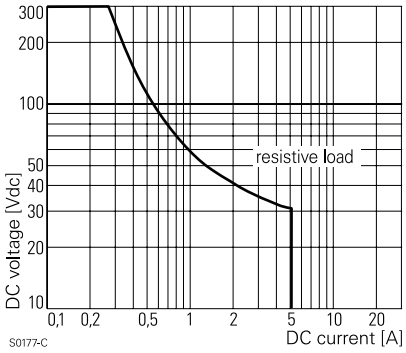
Mechanical Data

Termination: Printed circuit terminals.
Enclosure (94 V-0 rated): Flux-tight plastic case.
Weight: 0.18 oz. (5 g) approximately.

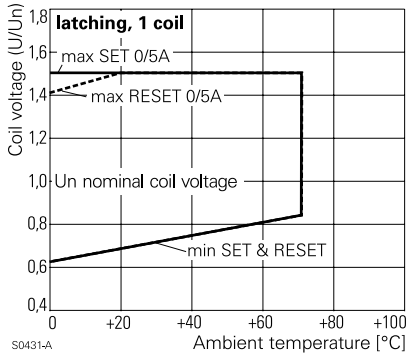
Contact Life



Max. DC Load Breaking Capacity



Coil Operating Range



Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.
www.tycoelectronics.com
Technical support:
Refer to inside back cover.

Ordering Information

Typical Part Number ►	PE	0	1	4	A06

1. Basic Series:
PE = Miniature printed circuit board relay.

2. Enclosure*:
0 = Flux-tight.

3. Contact Arrangement:
1 = 1 Form C (SPDT)

4. Contact Material:
4 = Silver-nickel 90/10

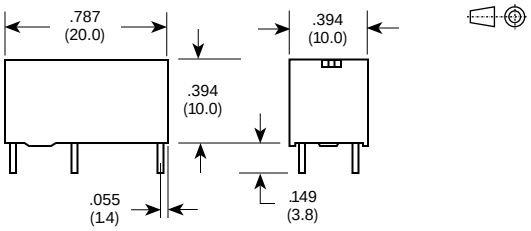
5. Coil Type & Voltage (see Coil Data table and Coil Operation table for details):
A03 = 3VDC, positive voltage applied to Terminal A1 results in pull-in.
C03 = 3VDC, positive voltage applied to Terminal A2 results in pull-in.
A05 = 5VDC, positive voltage applied to Terminal A1 results in pull-in.
C05 = 5VDC, positive voltage applied to Terminal A2 results in pull-in.
A06 = 6VDC, positive voltage applied to Terminal A1 results in pull-in.
C06 = 6VDC, positive voltage applied to Terminal A2 results in pull-in.
A12 = 12VDC, positive voltage applied to Terminal A1 results in pull-in.
C12 = 12VDC, positive voltage applied to Terminal A2 results in pull-in.
A24 = 24VDC, positive voltage applied to Terminal A1 results in pull-in.
C24 = 24VDC, positive voltage applied to Terminal A2 results in pull-in.

* Sealed version available on request.

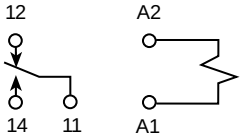
Our authorized distributors are more likely to maintain the following items in stock for immediate delivery.

None at present.

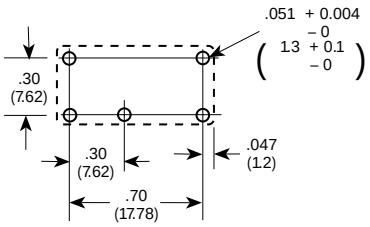
Outline Dimensions



Wiring Diagram (Bottom View)



PC Board Layout (Bottom View)





PCKWK series

Latching, Slim 16Amp Miniature Power PC Board Relay

Appliances, HVAC, Office Machines.

Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- Efficient, latching operation.
- Slim outline to save board space.
- 1 Form A contact arrangement.

Contact Data @ 20°C

Arrangements: 1 Form A (SPST-NO).
Material: Ag Alloy.
Max. Switching Rate: 300 ops./ min. (no load).
20 ops./ min. (rated load).
Expected Mechanical Life: 5 million ops (no load).
Expected Electrical Life: 100,000 ops (16A @ 250VAC).
Minimum Load: 100mA @ 5VDC.
Initial Contact Resistance: 100 milliohms @ 1A, 6VDC.

Contact Ratings

Ratings: 16A @ 277VAC resistive.
Max. Switched Voltage: AC: 277V.
Max. Switched Current: 16A.
Max. Switched Power: 4,432VA.

Initial Dielectric Strength

Between Open Contacts: 1,000VAC, 50/60 Hz. (1 min.);
1,200VAC, 50/60 Hz. (1 sec.).
Between Contacts and Coil: 4,000VAC, 50/60 Hz. (1 min.);
4,800VAC, 50/60 Hz. (1 sec.).
Surge Voltage Between Coil and Contacts: 10,000V (1.2/50µs).

Initial Insulation Resistance

Between Mutually Insulated Conductors: 1,000Mohm @ 500VDC.

Coil Data

Voltage: 12VDC (Consult factory for other coil voltage).
Nominal Power: 1.8W (SET).
800mW (RESET).
Max. Coil Power: 130% of nominal at 20°C.

Coil Data @ 20°C

PCKWK				
Rated Coil Voltage (VDC)	**SET Coil Resistance (ohms) ± 10%**	**RESET Coil Resistance (ohms) ± 10%**	**SET Coil Voltage Range (VDC)**	**RESET Coil Voltage Range (VDC)**
12	80	180	6.0 - 9.0	2.0 - 7.0

Operate Data @ 20°C

SET Time: 10 ms max. (including bounce) at rated voltage.
8 ms max. (including bounce) at 130% rated voltage.
RESET Time: 10 ms max. at rated voltage.
8 ms max. at 130% rated voltage.

The pulse to either the set or reset coil of the PCKWK relay should be no less than 30 milliseconds duration, and no more than 1 second duration.

Observe coil polarity.

Do not apply voltage to both SET and RESET coils simultaneously.

External magnetic fields may affect the operation of the relay.

Environmental Data

Temperature Range:
Operating: -30°C to +70°C.
Vibration, Mechanical: 10 to 55Hz., 1.5mm double amplitude for 2 hr.
Operational: 10 to 55Hz., 1.5mm double amplitude for 5 min.
Shock, Mechanical: 980m/s^2.
Operational (when SET): 98m/s^2.
Operational (when RESET): 980m/s^2.
Operating Humidity: 20 to 65% RH. (Non-condensing).

Mechanical Data

Termination: Printed circuit terminals.
Enclosure: Vented (Flux-tight) plastic cover.
Weight: 0.49 oz (14g) approximately.

Ordering Information

Typical Part Number ▶	PCKWK	-1	12	D	2	M	,000

1. Basic Series:
PCKW = 16A double coil relay

2. Termination:
1 = 1 pole

3. Coil Voltage:
12= 12VDC Consult factory for other voltages.

4. Coil Input:
D = Standard

5. Contact Material:
2 = AgSnO

6. Contact Arrangement:
M = 1 Form A (SPST-NO)

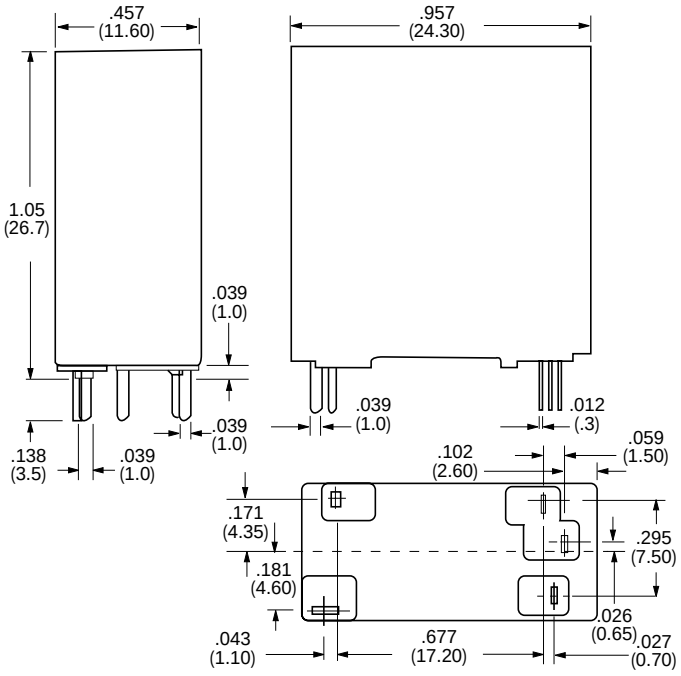
7. Suffix:
,000 = Standard model Other Suffix = Custom model

* Not suitable for immersion cleaning processes.

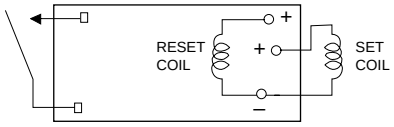
Our authorized distributors are more likely to maintain the following items in stock for immediate delivery.

None at present.

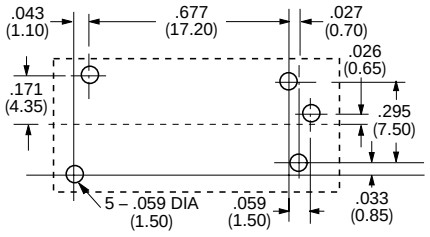
Outline Dimensions

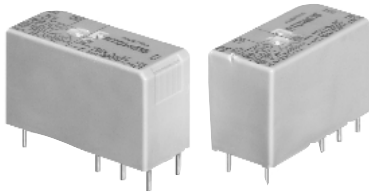


Wiring Diagram (Bottom View)



PC Board Layout (Bottom View)





RT series (Latching)

16 Amp Miniature Printed Circuit Board Relay

c UL us File E38891

VDE NR 6106

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- Latching relay with 1 or 2 coils.
- SPDT (16A) and DPDT (8A) contact arrangements.
- Flux tight enclosure.
- Meets VDE 10mm spacing, 5kV dielectric, coil to contacts.
- Conforms to UL 508, 1873 and 353.
- UL Class F (155°C) coil construction
- Schrack brand

Contact Data

Arrangements: 1 Form C (SPDT) Wiring Diagram Code 3.
2 Form C (DPDT) Wiring Diagram Code 5.
Material: Silver-nickel 90/10.
Minimum Load: 12V/100mA.
Expected Mechanical Life: 5 million operations, 1 pole.
2 million operations, 2 pole.

Designed to meet UL/CSA/VDE ratings with relay properly vented. Remove vent nib after soldering and cleaning.

UL/CSA ratings @ 70°C:

Code	NO/NC Load	Type	Operations
3	16A/8A @ 240VAC	GP	6K
	8A @ 28VDC	Resistive	30K
	1/2 HP @ 120VAC*	Motor	6K
	1HP @ 240VAC*	Motor	6K
	48 LRA, 8 FLA @ 240VAC	Motor	30K
	B300	Pilot Duty	6K
5	8A @ 240VAC	Resistive	30K
	8A @ 28VDC	Resistive/GP	30K
	1/2 HP @ 240VAC	Motor	6K
	1/4 HP @ 120VAC	Motor	6K
	B300	Pilot Duty	6K

* Form A only

VDE Ratings @ 70°C:

Code	NO/NC Load	Type	Operations
3	16A@ 250VAC	Resistive	10K
	8A @ 250VAC	Resistive	30K
5	8A @ 250VAC	Resistive	30K
	8A @ 250VAC	Resistive	100K

Initial Dielectric Strength

Between Open Contacts: >1,000VAC (1 minute).
Between Poles (code 5): >2,500VAC (1 minute).
Between Coil and Contacts: >5,000VAC (1 minute).
Creepage/Clearance, Coil to Contact: 10/10mm.

Coil Data @ 20°C

Voltage: 5 to 24VDC*, 1 coil.
3 to 24VDC*, 2 coil.
Nominal Power @ 25°C: 400mW, 1 coil.
600mW, 2 coil.
Duty Cycle: Continuous.
Initial Insulation Resistance: 10,000 megohms, min., at 20°C, 500VDC and 50% rel. humidity.
Coil Construction: UL Class F (155°C).

* Other coil voltages upon request.

1 Coil Data

Nominal Voltage VDC	DC Resistance in Ohms ±10%	Set Voltage VDC	Reset Voltage VDC	Nominal Coil Current (mA)
05	62	3.5—6.0	2.75—6.0	80.0
06	90	4.2—7.2	3.30—7.2	66.7
12	360	8.4—14.4	6.60—14.4	33.3
24	1,440	16.8—28.8	13.20—28.8	16.7

2 Coil Data

Nominal Voltage VDC	DC Resistance in Ohms ±10%	Set Voltage VDC	Reset Voltage VDC	Nominal Coil Current (mA)
05	42	3.5—7.5	2.75—4.5	120.0
06	55	4.2—9.0	3.30—9.0	108.0
12	240	8.4—18.0	6.60—18.0	50.0
24	886	16.8—36.0	13.20—36.0	27.0

Operate Data @ 20°C

Must Operate Voltage: See coil data.
Operate Time (Excluding Bounce): 5 ms, typ., at nom. voltage.
Release Time (Excluding Bounce): 4 ms, typ., at nom. voltage.
Max. Switching Rate: 360 ops. at rated load.

Environmental Data

Temperature Range:
Storage: -40°C to +105°C.
Operating: -40°C to +70°C at rated current.
Vibration: 30 - 500 Hz:
N/C opens at >3g and changes from reset to set at >5g;
Shock: N/C opens at >6g and changes from reset to set at >15g.;

Mechanical Data

Termination: Printed circuit terminals.
Enclosures: RT 3, 4: Flux-tight, top vented, plastic case.
Weight: 0.46 oz. (13g) approximately.

Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.
www.tycoelectronics.com
Technical support:
Refer to inside back cover.

Ordering Information (Latching Model)

Typical Part Number ▸	RT	3	2	4	A05

1. Basic Series:
RT = Miniature, printed circuit board relay.

2. Enclosure:
3 = 1 pole 16A, Pinning 5mm, flux-tight (Code 3).
4 = 2 pole 8A, Pinning 5mm, flux-tight (Code 5).

3. Contact Arrangement:
1 = 1 Form C (SPDT) (Requires wiring diagram code 3.)
2 = 2 Form C (DPDT) (Requires wiring diagram code 5.)

4. Contact Material:
4 = Silver-nickel 90/10.

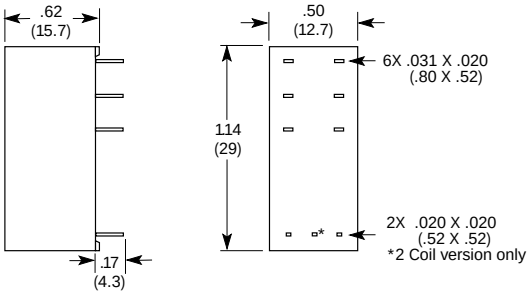
5. Coil Voltage:

1 Coil	2 Coil	Voltage
A05	F05	= 5VDC
A06	F06	= 6VDC
A12	F12	= 12VDC
A24	F24	= 24VDC

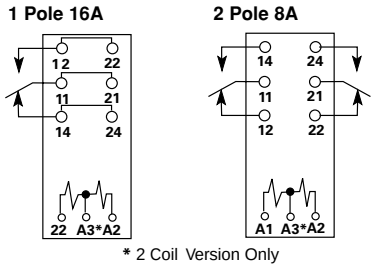
Note: All latching model RT part numbers are Schrack brand, are orange in color and have UL Class F (155°C) coil construction.

Our authorized distributors are more likely to stock the following items for immediate delivery.
None at present.

Outline Dimensions



Wiring Diagrams (Bottom View)



* 2 Coil Version Only

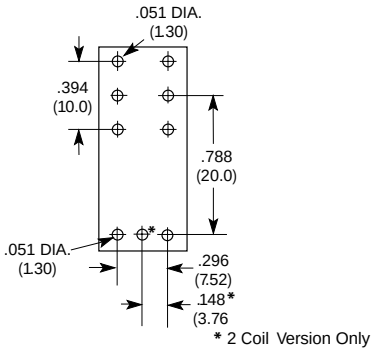
Code 3 **Code 5**

	1 Coil		2 Coils		
Coil Terminals	**A1**	**A2**	**A1**	**A3**	**A2**
Operate	+	–		+	–
Reset	–	+	–	+	

Contact position not defined at delivery.

PC Board Layout (Bottom View)

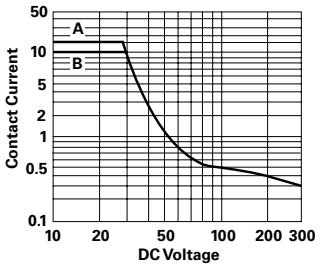
1 Pole 16A
2 Pole 8A
5mm



Code 3 & 5

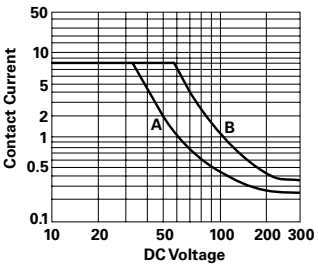
Breaking Capacity

1 Pole



A: 16A Version.
B: 12A Version.

2 Pole



A: 1 Contact.
B: 2 Contacts in series.



KUL series

10 Amp Magnetic Latching Relay

File E22575
File 15734

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- Single or dual-wound DC coils or single-wound AC coils.
- Contact arrangements to 3PDT.
- Reset occurs by reversing polarity in a single coil relay or by energizing the reset winding in dual coil relays.
- Uses same sockets as other KU relays.
- Well suited for applications such as alarm systems, machine tools, battery chargers and process controls.

Contact Data @ 25°C

Arrangements:
DC Single Coil: 1 Form C (SPDT), 2 Form C (DPDT) and 3 Form C (3PDT).
DC Dual Coil: 1 Form C (SPDT) and 2 Form C (DPDT).
AC Single Coil: 1 Form C (SPDT), 2 Form C (DPDT) and 3 Form C (3PDT).
Materials: Siver-cadmium oxide.
Expected Life:
Mechanical: 10 million operations.
Electrical: 100,000 operations minimum at rated load.

Contact Ratings

Contact Code	Arrangement	Ratings
5	1,2,3 poles	10A @ 28VDC or 240VAC, 80% PF; 1/4 HP @ 120VAC, 1/3 HP @ 240VAC

Initial Dielectric Strength

Between Open Contacts: 500V rms.
Between Adjacent Contacts: 1,500V rms.
Between Contacts and Coil: 1,500V rms.

Coil Data @ 25°C

Duty Cycle: Continuous. (Latch and reset not to be energized simultaneously).
Initial Insulation Resistance: 100 megohms, minimum.
Initial Breakdown Voltage: 1500V rms, 60 Hz. between all elements.

Note: On single coil AC models one terminal is common. Latch/Reset function is accomplished by input in series with a diode to provide the correct polarity to the coil. To perform either function, the terminal not being used (Latch or Reset) must be open or isolated with no other path to common or ground.

Coil Data

	Nominal Voltage	DC Resistance in Ohms ± 10%†	Must Operate Voltage	0.5 W Resistor
DC Coils	**Single Coil**			
	12	120	9.0	___
	24	472	18.0	___
	48	1,800	36.0	___
	Dual Coil*			
	12	90	9.0	___
	24	350	18.0	___
	48	1400	36.0	___
AC Coils 50/60 Hz.	**Single Coil with Diodes****			
	24	176	20.4	680Ω
	120	3,700	102.0	15,000Ω
	240	17,900	204.0	68,000Ω
	Dual Coil			
		Latch / Reset		
	24	100 / 250	20.4	___
	120	2525 / 7800	102.0	___

* Dual coil available only with 1 or 2 Form C contacts. On standard dual coil relays, the latch and unlatch voltage must be the same. For unlike voltages, please contact your sales representative.
** Diodes and resistors included inside relay with 1 and 2 Form C contacts. For 3 Form C relays, the customer must furnish and wire diodes and resistors externally.
† ±15% for AC coils.

Operate Data @ 25°C

Must Operate Voltage:
DC Coils: 75% of nominal voltage.
AC Coils: 85% of nominal voltage.
Operate Time : 25 milliseconds maximum at nominal voltage.
Release or Reset Time: 25 milliseconds maximum at nominal voltage.

Environmenal Data

Temperature Range:
Storage: -45°C to +105°C.
Operating:
Single Coil AC & DC: -45°C to +70°C.
Dual Coil DC: -45°C to +50°C.

Mechanical Data

Termination: .187" (4.75mm) quick connect/solder terminals. Sockets are available.
Enclosure: Clear plastic polycarbonate heat and shock resistant case.
Weight: 3.4 oz. (96g) approximately.

Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.
www.tycoelectronics.com
Technical support:
Refer to inside back cover.

Ordering Information

Typical Part No. ▶	KUL	-11	D	1	1	D	-12

1. Basic Series:
KUL magnetic latching relay

2. Contact Arrangement:
5 = 1 Form C (SPDT) 11 = 2 Form C (DPDT) 14 = 3 Form C (3PDT)

3. Coil Input:
A = AC D = DC

4. Mounting:
1 = Plain case 5 = Bracket mount case

5. Terminal & Contact Materials:
5 = .187" (4.75mm) quick connect/solder; silver-cadmium oxide, 10 amps.

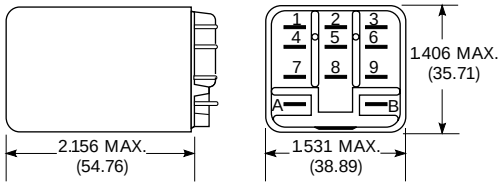
6. Number of Coils:
S = Single coil D = Dual coil (1 & 2 pole models only)

7. Coil Voltages:
Single coil—24-240VAC
12-48VDC
Dual coil—12-48VDC, 24 or 120VAC (to 2 Form C)

Our authorized distributors are more likely to maintain the following items in stock for immediate delivery..

KUL-5A15S-120
KUL-11A15S-24
KUL-11A15S-120
KUL-11D15D-12
KUL-11D15D-24
KUL-11D15S-12
KUL-11D15S-24

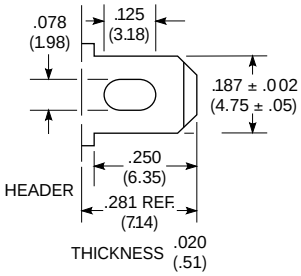
Outline Dimensions



See KU series drawings for bracket mount case.

Terminal Dimensions

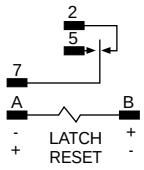
.187" (4.75mm) Standard



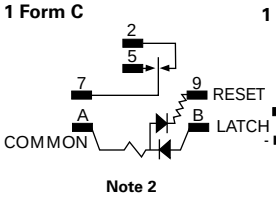
Wiring Diagrams (Bottom Views)

Single Coil Type S

DC Single Coil
1 Form C

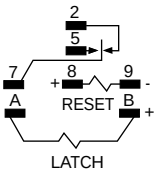


AC Coil
1 Form C

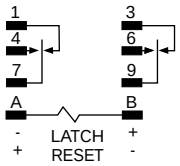


Dual Coil Type D

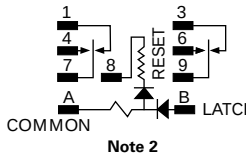
AC or DC Dual Coil
1 Form C



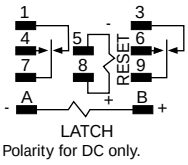
2 Form C



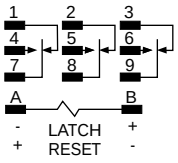
2 Form C



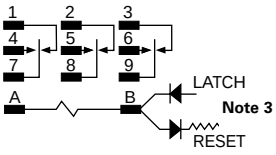
2 Form C



3 Form C



3 Form C



Note 1 Contact positions shown in diagrams is with the "RESET" input having been energized last.

Note 2 Do not connect any low impedance loads from terminal B to A.

Note 3 Resistor and diodes connected by customer. See Coil Data Chart on KUL Series engineering data page for resistor value. Recommended using 1N4007 diode.



KBP series

10 Amp Dual Coil Latching Relay

File E29244

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- Dual coil latching relay accepts a momentary impulse to one coil to latch and a second impulse to the other coil to release.
- Enclosed in a clear polycarbonate dust cover.
- AC or DC coils.
- Contacts up to 5PDT.
- Mounts in 11 or 20-pin octal-type plugs.

Contact Data @ +25°C

Arrangements: From 2 Form C (DPDT) to 5 Form C (5PDT), (3PDT each coil).
Ratings: 10 amps @ 120VAC.
Materials: 10 amp models: Silver-cadmium oxide.
Expected Life: 500,000 operations, mechanical; 50,000 operations minimum at rated loads.

Initial Dielectric Strength

Between Open Contacts: 500V rms.
Between Adjacent Contacts: 1,000V rms.
Between Contacts and Coil: 1,000V rms.

Coil Data @ +25°C

Nominal Power:
DC Coils: 2.7W.
AC Coils: 5.3VA to 4 pole; 7.8VA to 5 pole.
Maximum Power: DC coils - 4.0W.
Duty Cycle: Intermittent.
Initial Insulation Resistance: 100 megohms.

Coil Data

	Nominal Voltage	Resistance in Ohms ±10% @ 25°C	Nominal Current Milliamperes
DC Coils (to 5 pole)	12	52.0	230
	24	230	104
	48	850	56.5
	110	4560	24
	220	Use 110 volt relay with 5000 Ohms, 5 watt resistor in series.	
	Nominal Voltage	**Resistance in Ohms ±15% @ 25°C**	**Nominal Current Milliamperes**
AC Coils	**Up to 4 Pole Relays**		
	24	42	210
	120	1030	44
	240	4100	22
	For 5 Pole Relays		
	24	27	325
	120	700	68

Operate Data @ +25°C

Must-Operate Voltage:
DC: 75% of nominal voltage.
AC: 85% of nominal voltage.
Operate Time: 25 milliseconds excluding bounce.

Environmental Data

Temperature Range:
Storage: 105°C.
Operating: -45°C to +85°C.

Mechanical Data

Termination: See terminals table on next page.
Enclosures: Plastic dust cover standard. Hermetically sealed metal case available on special order.
Weight: 10.8 oz. (306g) approximately.

Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.

Ordering Information

Typical Part Number ▶	KBP	-11	A	G	-24

1. Type:
KBP = Enclosed, dual coil latching relay. KB = Open, dual coil latching relay.

2. Contact Arrangement:
11 = 2 Form C (DPDT)
17 = 4 Form C (4PDT)
20 = 5 Form C (5PDT)

3. Coil Input:
A = AC
D = DC

4. Contact Rating:
G = 10 amps @ 120VAC, 80% PF.

5. Coil Voltage:
12, 24, 48, 110VDC
24, 120, 240VAC

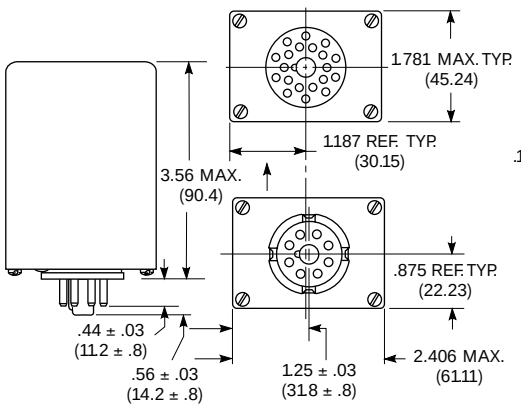
Specify the same latch and release coil voltage for standard KBP relays. Unlike coils available on special order.

Our authorized distributors are more likely to maintain the following items in stock for immediate delivery.

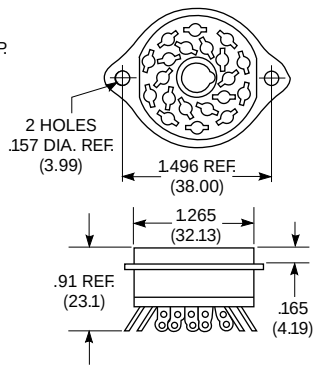
KB-17AG-120	KBP-11AG-120	KBP-11DG-110
KB-17DG-12	KBP-11DG-24	KBP-20AG-120

Outline Dimensions

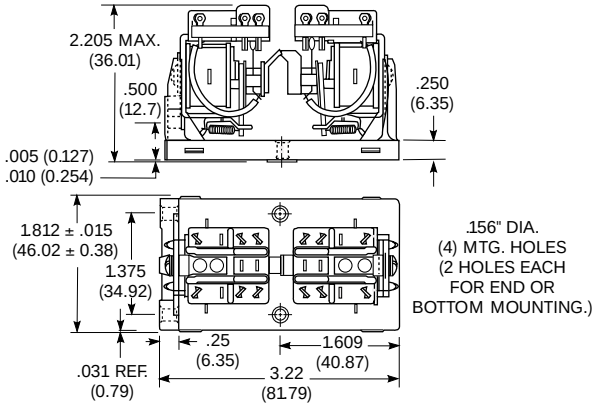
Dust Cover



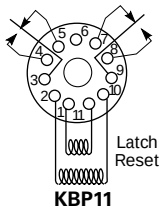
27E928 Socket



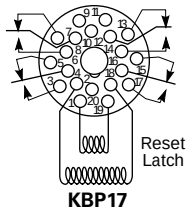
KB-Open Style



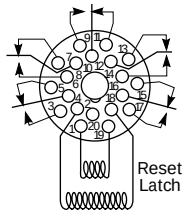
Wiring Diagrams (Bottom Views)



KBP11



KBP17



KBP20

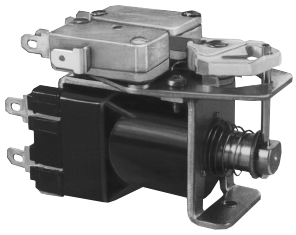
Note: Shown with reset coil energized last.

S89R/S90R series

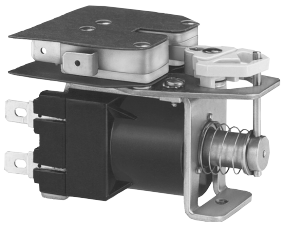
Bistable, Impulse Relay
15 and 20 Amp Industrial Rating
Continuous Coil Rating

File E22575
File LR15734

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.



S89R



S90R

Features

- Low cost, bistable impulse relay.
- Operates on 75ms min. pulse.
- Used in garage door controls, motor reversing and lighting controls.
- S89R available with plastic cover and octal plug-in base.

Contact Data @ 25°C

Ratings: S89R: 15 amps, 1/2 HP, 125/250VAC; 5 amps, 125VAC, tungsten filament lamp load; 1/2 amp, 125VDC; 1/4 amp, 250VDC.
Expected Life: 100,000 operations, mechanical; 50,000 operations at rated loads.
Ratings: S90R:

Load	Minimum Life
20A, 120VAC or 7.5A, 277VAC, Tungsten.	10,000 Cycles
15A, 125VAC or 7A, 277VAC, Fluorescent.	10,000 Cycles
20A, 277VAC, 75-80% PF.	50,000 Cycles
1 HP, 125VAC, 50/60 Hz.	50,000 Cycles
2 HP, 250VAC, 50/60 Hz.	50,000 Cycles
12 FLA, 60 LRA, 120VAC.	50,000 Cycles
8 FLA, 48 LRA, 240VAC.	50,000 Cycles
Pilot Duty, 360VA, 125/250VAC.	50,000 Cycles

Coil Data @ 25°C

Nominal Power:
DC Coils: 6.33 Watts @ +25°C.
AC Coils: 9VA @ +25°C.

Insulation: Class B (130°C).
Initial Breakdown Voltage: 1,500V rms, 60 Hz.
Must-Operate Voltage:
DC Coils: 75% of nominal voltage @ +25°C.
AC Coils: 85% of nominal voltage @ +25°C.

Coil Data

Nominal Voltage	Resistance DC Ohms ±15% @ +25°C	Nominal Current mA
24VAC	8.7	375
120VAC	260	75
240VAC	1084	38
6VDC	5.8	1035
12VDC	22.5	533
24VDC	92	260

Environmental Data

Temperature Range: -10°C to +60°C.

Mechanical Data

Weight: 7.75 oz. (241g) approximately.

Ordering Information

Typical Part No. ▶	S89R	5	A	B	D	1	-24

1. Basic Series:
S89R = 15A
S90R = 20A

2. Contact Arrangement:
5 = SPDT 11 = DPDT 17 = 4PDT

3. Coil Input:
A = AC
D = DC

4. Coil Terminal Style:
A = .187" (4.75mm) Quick connect/solder.
B = .250" (6.35mm) Quick connect/solder.
P = Dust cover with octal plug-in base. (S89R only.)

5. Switch Terminal Style:
C = .187" (4.75mm) Quick connect.*
D = .250" (6.35mm) Quick connect.
P = Dust cover with octal plug-in base.*
* S89R only.

6. Switch Terminal Configuration:
1 = Style 1 (See outline drawings.)

7. Coil Voltage:
24, 120, 240VAC
6, 12, 24VDC

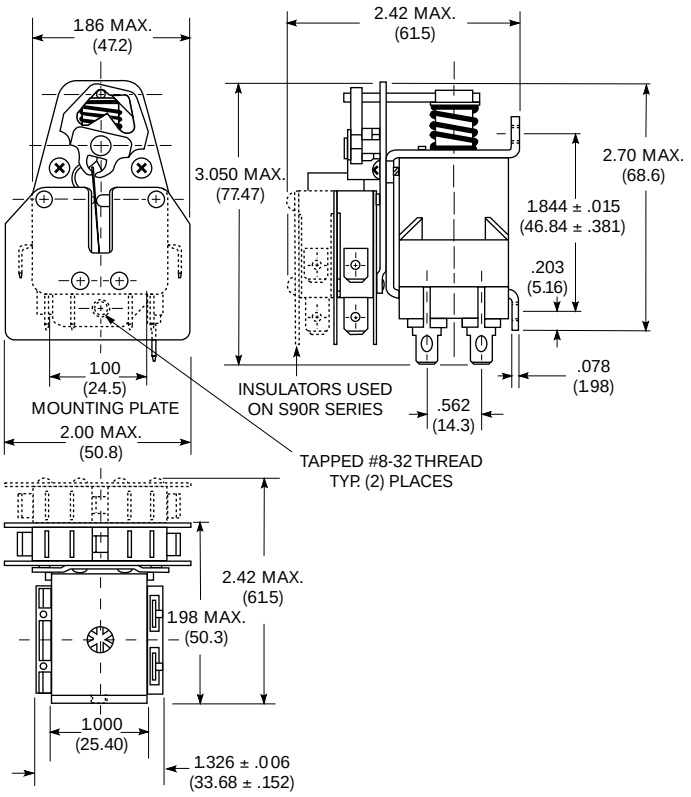
Our authorized distributors are more likely to maintain the following items in stock for immediate delivery.

S89R5ABD1-24	S89R11AAC1-24	S89R11ABD1-120	S89R11DAC1-24	S90R5ABD1-120
S89R5ABD1-120	S89R11AAC1-120	S89R11APP1-120	S89R11DBD1-12	S90R11ABD1-24
S89R5DBD1-12	S89R11ABD1-24	S89R11DAC1-12	S89R11DBD1-24	S90R11ABD1-120

Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.
www.tycoelectronics.com
Technical support:
Refer to inside back cover.

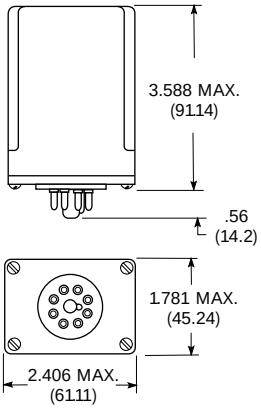
Outline Dimensions

Open Relays

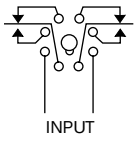


Enclosed Relays

S89 Series

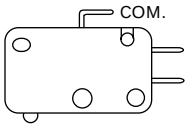


Wiring Diagram



Switch Terminal Configuration

Style 1

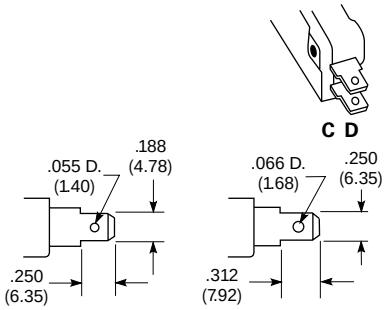


Switch Terminal Style

C = .187" (4.75mm) Quick-connect
D = .250" (6.35mm) Quick-connect

.187" (4.75mm) Quick Connect
S89R

.250" (6.35mm) Quick Connect
S89R
S90R





Small 4PDT



Medium 24PDT

MDR series

10 Amp Rotary Relay For Demanding Shock & Vibration Applications

Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- AC and DC coils, latching and non-latching.
- 4PDT through 24PDT contact arrangements.
- Contacts will not chatter when relays are subjected to high-impact shock blows of 2000 ft.-lbs.

Contact Data

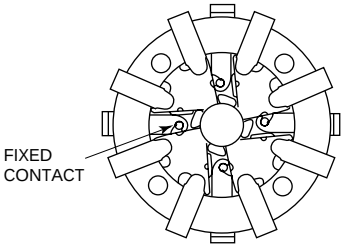
Arrangements: 4 Form C (4PDT) through 24 Form C (24PDT).

Contact Ratings

Single Contacts	Two Contacts in Series
10A, 115VAC	3A, 440VAC
3A, 28VDC	15A, 115VAC
0.8A, 125VDC	1.5A, 125VDC

The above AC contact ratings are based on contact loads having a 50% power factor. The DC contact ratings are based on resistive loads.

Contact Section

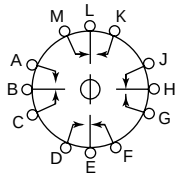


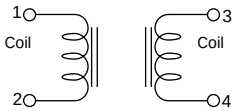
Operate Data @ 25°C

Type	Typ. Operate Time (ms)	Typ. Release Time (ms)
Small AC Non-Latching	5 to 12	5 to 18
Small DC Non-Latching	15 to 30	5 to 15
Small AC Latching	6 to 12	N/A
Small DC Latching	10 to 16	N/A
Medium AC Non-Latching	6 to 12	6 to 20
Medium DC Non-Latching	65 to 90	10 to 30
Medium AC Latching	8 to 14	N/A
Medium DC Latching	30 to 80	N/A

Latching Two-Position Types: Except for the latching feature, MDR latching relays utilize the same general construction as non-latching types. They have two sets of coils and provide a latching two-position operation.

Contacts Shown With Coil 1-2 De-Energized and Coil 3-4 Energized.





Coils Must be Energized Alternately, Not Simultaneously

Environmental Data

Temperature Range: **Standard models:** 0°C to +65°C.
Special order models: 0°C to +90°C.

Mechanical Data

Termination: #5-40 screw terminals supplied.
Weight (Approx.):
Small – 4 & 8PDT: 32 oz. (0.914 kg); 12PDT: 33 oz. (0.943 kg).
Medium – 16PDT: 72 oz. (2.04 kg); 24PDT: 74 oz. (2.10 kg).

Ordering Information and Coil Characteristics – No models in this series are maintained in stock.

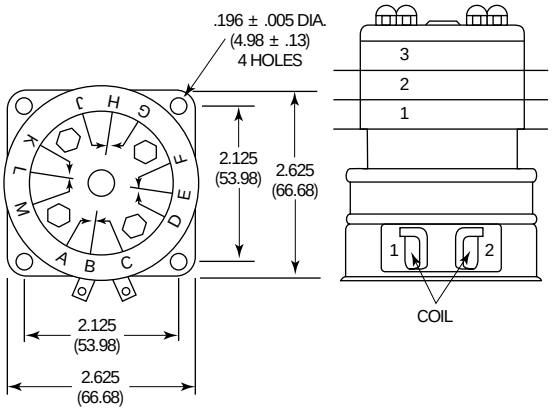
Type	Part Number	Contacts	Coil Voltage (60 Hz. for AC)	Coil Current (Amps)	DC Coil Resistance (Ohms)	Coil Power* (Watts)	Breakdown (Volts RMS)
Small Non - Latching	MDR-131-1	4PDT	115VAC	0.215	66	6.5	1,230
	MDR-131-2	4PDT	440VAC	0.045	1,256	5.1	1,880
	MDR-135-1	4PDT	28VDC	0.362	76	10.0	1,308
	MDR-137-8	4PDT	125VDC	0.082	1,520	10.3	2,375
	MDR-134-1	8PDT	115VAC	0.215	66	6.5	1,230
	MDR-134-2	8PDT	440VAC	0.045	1,256	5.1	1,880
	MDR-136-1	8PDT	28VDC	0.362	76	10.0	1,308
	MDR-138-8	8PDT	125VDC	0.082	1,520	10.3	2,375
	MDR-163-1	12PDT	115VAC	0.230	62	6.9	1,230
	MDR-163-2	12PDT	440VAC	0.055	940	6.3	1,880
Medium Non - Latching	MDR-170-1	16PDT	115VAC	0.620	8.4	17.0	1,230
	MDR-170-2	16PDT	440VAC	0.160	107	17.0	1,880
	MDR-172-1	16PDT	28VDC	0.667	42	18.7	1,308
	MDR-173-1	16PDT	125VDC	0.125	1,024	16.0	2,375
	MDR-141-1	24PDT	115VAC	0.620	8.4	17.0	1,230
	MDR-141-2	24PDT	440VAC	0.160	107	17.0	1,880
	MDR-167-1	24PDT	28VDC	0.667	42	18.7	1,308
Small Latching	MDR-67-2	4PDT	115VAC	0.150	210	5.5	1,230
	MDR-4091	4PDT	440VAC	0.020	4,500	3.0	1,880
	MDR-67-3	4PDT	28VDC	0.778	36	21.8	1,308
	MDR-5060	4PDT	125VDC	0.164	760	20.6	2,375
	MDR-4076	8PDT	115VAC	0.150	210	5.5	1,230
	MDR-4092	8PDT	440VAC	0.020	4,500	3.0	1,880
	MDR-5035	8PDT	28VDC	0.778	36	21.8	1,308
	MDR-5061	8PDT	125VDC	0.164	760	20.6	2,375
Medium Latching	MDR-6064	12PDT	115VAC	0.380	24	12.0	1,230
	MDR-7020	12PDT	28VDC	0.316	88.6	8.8	1,308
	MDR-66-4	16PDT	115VAC	0.380	24	12.0	1,230
	MDR-7036	16PDT	125VDC	0.083	1,500	10.4	2,375

* Actual Wattmeter readings

Outline Dimensions

Tolerances: Decimals ± .010 (± .25) Unless Otherwise Specified

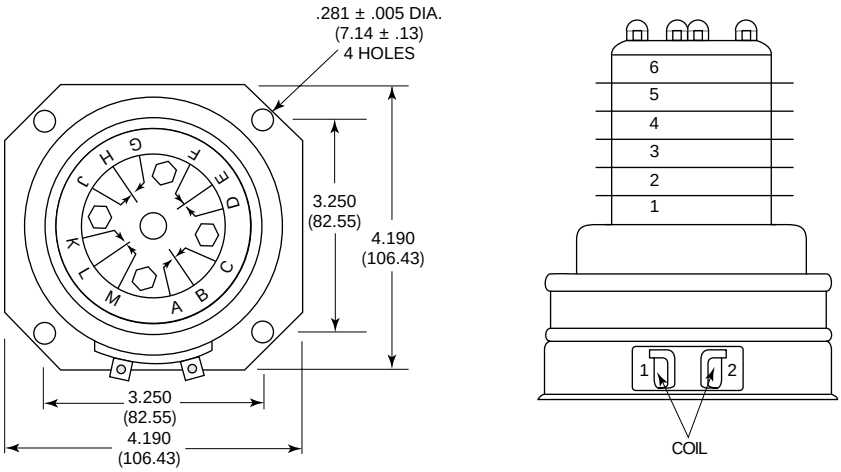
Small Models



Overall Height
4PDT 3.13" (79.5mm) Max.
8PDT 3.53" (89.7mm) Max.
12PDT 3.88" (98.6mm) Max.

Coil and Contact Terminal Screws #5-40 Supplied

Medium Models



Overall Height
12PDT 4.63" (117.6mm) Max.
16PDT 5.00" (127.0mm) Max.
24PDT 5.75" (146.1mm) Max.

Coil and Contact Terminal Screws #5-40 Supplied



136 series

DPDT, 20 Amp
Traffic Control (flash transfer) Relay

CALTRANS approved

NEMA approved

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- The Type 136 is a small power relay that will switch a 20 amp tungsten load at 120VAC.
- Mechanical life in excess of 5 million operations is obtained by the use of a wide friction-free knife-edge frame design and armature assembly.
- The dust cover enclosure is fitted with an 8-position Jones plug.
- All ratings are at 25°C ambient.

Contact Data @ 25°C

Materials: Silver-palladium, .375 (9.52) diameter.
Rating: 20 amps, tungsten @ 120VAC.
Expected Life: 5 million operations, mechanical; 250,000 operations at rated load.

Initial Dielectric Strength

Between All Points: 1,500VAC.

Coil Data @ 25°C

Nominal Voltage: 120VAC.
Resistance (±10%): 390 ohms.
Nominal Power: 10VA.
Duty Cycle: Continuous.
Temperature Rise: 45°C.

Operate Data @ 25°C

Must Operate Voltage: 85% of nominal voltage.

Mechanical Data

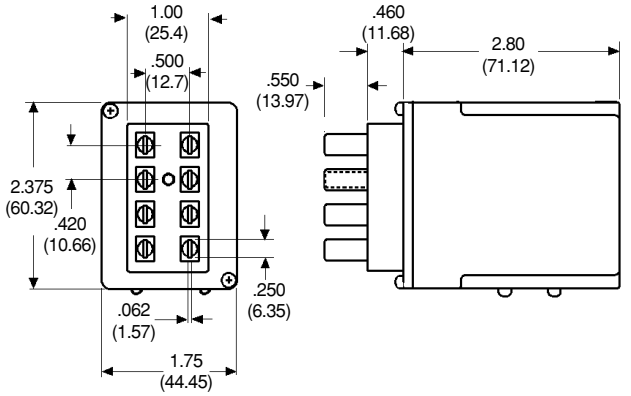
Mounting: Socket mount.
Termination: 8-position Jones Plug compatible with CINCH 2400 series socket.
Enclosure: Clear polycarbonate dust cover.
Weight: 11 oz. (312g) approximately.

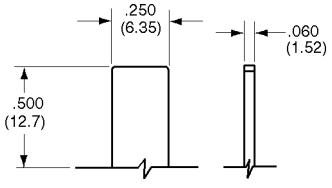
Ordering Information

Part Number	Description
136-62T3A1	Traffic Control (Flash Transfer Function) Relay (120VAC coil; contacts rated 20A tungsten @ 120VAC)

Our authorized distributors are likely to maintain the above-listed part number in stock for immediate delivery.

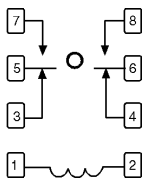
Outline Dimensions





Terminal Detail

Wiring Diagram



Dimensions are shown for reference purposes only.

Dimensions are in inches over (millimeters) unless otherwise specified.

Specifications and availability subject to change.



SERIES GP



SERIES TR

GP/ML/TR series

10 Amp Control Relay
Non-latching, Latching & Timing Versions

File E15631 File LR29186

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

GP/ML/TR Design Features

Among the advances AGASTAT control relays offer over existing designs is a unique contact operating mechanism. An articulated arm assembly amplifies the movement of the solenoid core, allowing the use of a short stroke coil to produce an extremely wide contact gap. The long support arms used in conventional relays are eliminated. Both current capacity and shock/vibration tolerance are greatly increased, as well as life expectancy.

Design/Construction

AGASTAT control relays are operated by a moving core electromagnet whose main gap is at the center of the coil. A shoe is fitted to the core which overlaps the yoke and further increases the magnetic attraction.

The coil itself is in the form of an elongated cylinder, which provides a low mean turn length and also assists heat dissipation. Since the maximum travel of the electromagnet does not provide optimum contacts movement, an ingenious amplifying device has been designed.

This consists of a W-shaped mechanism, shown in figure 1. When the center of the W is moved vertically the lower extremities move closer to each other as can be seen in the illustration. The center of the W mechanism is connected to the moving core of the electromagnet and the two lower points are connected to the moving contacts.

Two of these mechanisms are placed side-by-side to actuate the four contacts sets of the relay. The outer arms of the W mechanisms are leaf springs, manufactured from a flat piece of non-ferrous metal. These outer arms act as return springs for their corresponding contacts. This provides each contact with its own separate return spring, making the contacts independent.

The mechanical amplification of the motion of the electromagnet permits a greater distance between the contacts, while the high efficiency of the electromagnet provides a nominal contact force in excess of 100 grams on the normally open contacts.

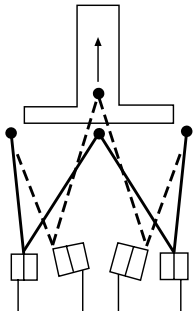
All the contacts are positioned well away from the cover and are well ventilated and separated from each other by insulating walls.

The absence of metal-to-metal friction, the symmetrical design of the contact arrangement and the lack of heavy impacts provides a mechanical life of 100,000,000 operations.

For use in AC circuits, the relay is supplied with a built-in rectification circuit, thus retaining the high DC efficiency of the electromagnet. The current peak on energizing is also eliminated and consequently the relay can operate with a resistance in series (e.g. for high voltages or for drop-out by shorting the coil). The use of the rectification circuit offers still other advantages. The same model can operated at frequencies ranging from 40 to 400 cycles. Operation of the relay is crisp; even with a low AC voltage, there is a complete absence of hum and vibration.

The plastic dust cover has two windows through which the iron yoke protrudes to facilitate cooling and also to allow direct mounting arrangement of the relay irrespective of the terminals.

Figure 1 – Illustration of Amplification



This diagram illustrates amplification obtained by the articulated operating mechanism.

NOTE: Seismic & radiation tested EGP, EML and ETR models are available. Consult factory for detailed information.

Features

- Occupies very small panel space
- May be mounted singly, in continuous rows or in groups.
- Available with screw terminal molded socket.
- 4 SPDT contacts.
- Magnetic blowout device option increases DC current carrying ability approximately ten times for both N.O. and N.C. contacts. In both AC and DC operation, the addition of the device will normally double the contact life, due to reduced arcing.

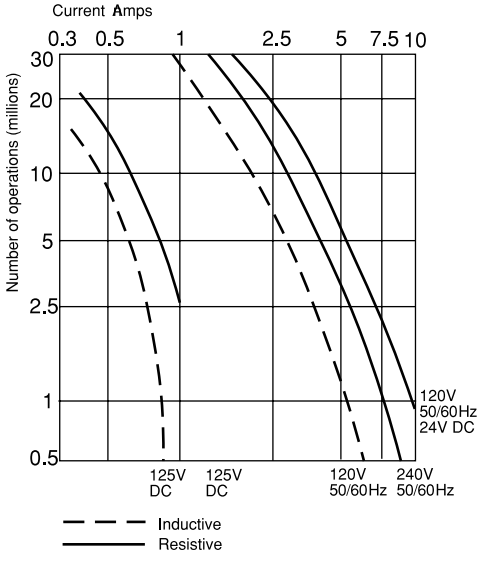
GP/ML Contact Data @ 25°C

Arrangements: 4 Form C (4PDT)
Material: Siver plated.
Ratings: See chart.
Expected Life: **Mechanical:** 100 million operations.
Electrical: See chart and graph.

Contact Ratings and Expected Life

Voltage	Current (Amps)	Power Factor or Time Constant	Number of Electrical Operations	Remarks
540 VAC	3	COS Ø = 0.5	15,000	2 contacts in series
380 VAC	15	Resistive	10,000	2 contacts in parallel
380 VAC	10	Resistive	200,000	
380 VAC	3 x 3.3	COS Ø = 0.8	200,000	3hp motor
220 VAC	20	Resistive	20,000	2 contacts in parallel
220 VAC	15	COS Ø = 0.5	20,000	2 contacts in parallel
220 VAC	10	Resistive	400,000	
220 VAC	3 x 6	COS Ø = 0.8	200,000	3hp motor
220 VAC	5		1,500,000	Filament lamps
220 VAC	5	Resistive	3,000,000	
220 VAC	2.5	COS Ø = 0.25	2,000,000	
220 VAC	2	Resistive	15,000,000	
220 VAC	1.25	Resistive	30,000,000	
120 VDC	1.5	Resistive	20,000,000	with blow-out device
48 VDC	10	Resistive	1,000,000	

Load Life Curve



Initial Dielectric Strength

Between non-connected terminals: 2,000V rms, 60 Hz.
Between non-connected terminals & relay yoke: 2,000V rms, 60 Hz.

Initial Insulation Resistance

Between non-connected terminals: 10^9 ohms at 500VDC.
Between non-connected terminals & relay yoke: 10^9 ohms at 500VDC.

Coil Data

Voltage: 24, 120 & 220VAC, 60 Hz. Add series resistor for 380-440VDC; 12, 24, 48, 125 & 250VDC.

Duty Cycle: Continuous.
Nominal Coil Power: 6VA for AC coils; 6W for DC coils.
There is no surge current during operation.

Coil Operating Voltage

	DC					AC, 50/60Hz		
Nominal Coil Voltage	12	24	48	125	250	24	120	220
Minimum Pick-up Voltage at 20°C	9	18	36	94	187	19	92	175
Minimum Pick-up Voltage at 40°C	9.5	19	38	100	200	20	102	188
Maximum voltage for continuous use	13.5	27	53	143	275	27	137	245

For 380VAC – Use 6800 ohms 4 watt resistor in series with 220VAC relay.
For 440VAC – Use 8200 ohms 6 watt resistor in series with 220VAC relay.

Drop-out voltage is between 10% and 40% of the nomninal voltages for both DC and AC (For example: in a 120 VAC unit, drop-out will occur between 12 and 48 volts.) DC relays will function with unfiltered DC from a full-wave bridge rectifier.

Operate Data @ 20°C

Operate Time at Rated Voltage: Between energizing and opening of normally closed contacts, less than 18 milliseconds on AC and less than 15 milliseconds on DC.
Release Time: Between energizing and closing of normally open contacts, less than 35 milliseconds on AC and less than 30 milliseconds on DC. Between de-energizing and opening of normally open contacts, less than 70 milliseconds on AC and less than 8 milliseconds on DC. Between de-energizing and closing of normally closed contacts, less than 85 milliseconds on AC and less than 25 milliseconds on DC.

Environmenal Data

Operating Temperature Range: 0°C to +60°C.
Vibration: Single axis fragility curve data are available on request at frequencies from 5 Hz. to 33 Hz.
Shock: The relay, when kept energized by means of one of its own contact sets, will withstand 40g shock load when operating on DC, and 150g shock load on AC.

Mechanical Data

Mounting Terminals: 16 flat base pins. Screw terminal sockets are available.
Wire Connection: The 16 flat pins are arranged in four symmetrical rows of four pins; the pitch in both directions being .394". Connection may be made to the relay by soldering. Sockets are available with screw terminals.
The internal wiring of the relay is also symmetrical as shown in the adjacent figure, allowing the relay to be inserted into the socket in either of two positions. Terminals B2 and B3 are provided as extra connections for special applications.
Weight: 10.9 oz. (308g) approximately.

Ordering Information

Typical Part No. ➤	GP	I	N

1. Basic Series:
GP = Non-latching Control Relay
ML = Magnetic Latching Control Relay

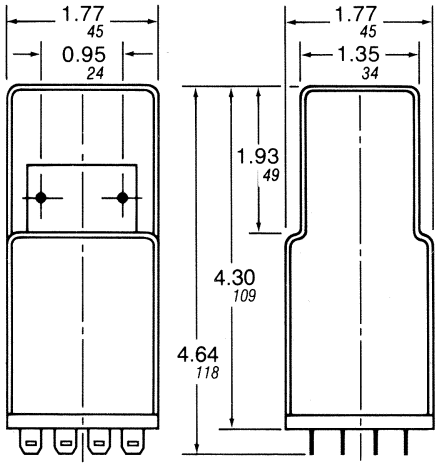
2. Coil Voltage:
A = 12VDC
B = 24VDC
C = 48VDC
D = 125VDC
F = 250VDC
G = 24VAC, 60 Hz.
I = 120VAC, 60 Hz.
J = 220VAC, 60 Hz.

3. Options:
N = Magnetic Blow-out Device
Q = Light to indicate coil energization (GP only. 120VAC, 125VDC, 220VAC and 250VDC voltages only.)
R = Internal diode to suppress coil de-energization transient. (GP only. When used on DC unit, relay release time increases to same value as AC unit).

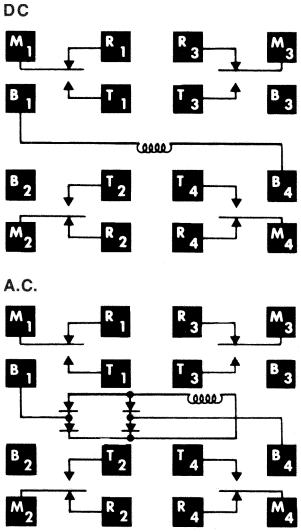
Our authorized distributors are more likely to maintain the following items in stock for immediate delivery..

GPD
GPDN

Outline Dimensions



Wiring Diagrams (Bottom Views)



Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.
www.tycoelectronics.com
Technical support:
Refer to inside back cover.

TR series

10 Amp Control Relay – Timing Version

TR Features

- 8 timing ranges.
- 4 SPDT contacts.
- Magnetic blowout device option increases DC current carrying ability approximately ten times for both N.O. and N.C. contacts. In both AC and DC operation, the addition of the device will normally double the contact life, due to reduced arcing.

TR Design/Construction

Couples an advanced electromechanical design with a field-proven solid-state timing network, an adaptation of the circuit used in the AGASTAT premium grade SSC Timer.

This unique circuit also eliminates the need for supplementary temperature-compensation components, affording unusual stability over a realistically broad operating temperature range. It also provides transient protection and protection against premature switching of the output contacts due to power interruption during timing.

Timing Specifications

Operating Mode: On-Delay (Delay on energization).
Timing Adjustment: Internal fized or internal potentiometer.
Timing Ranges:

.15 to 3 sec.	4 to 120 sec.
.55 to 15 sec.	10 to 300 sec.
1 to 30 sec.	1 to 30 min.
2 to 60 sec.	2 to 60 min.

Accuracy:
Repeat: ±2% as fixed temerature and voltage.
Overall: ±5% over combined rated extremes of temerature and voltage.
Reset Time: 75ms.

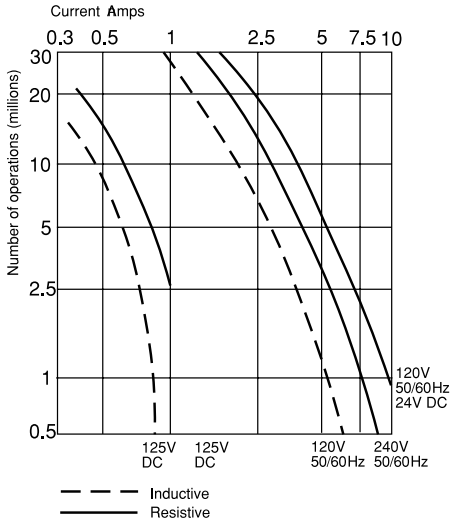
Contact Data @ 25°C

Arrangements: 4 Form C (4PDT)
Nominal Rating: 10A @ 120VAC.
Contact Pressure:
Between movable and normally closed contacts: 30 g, typical.
Between movable and normally open contacts: 100 g, typical.
Expected Life: **Mechanical:** 100 million operations.
Electrical: See load/life graph.

Initial Dielectric Strength

Between terminals and case and between mutually-isolated contacts: 2,000VAC.

Load Life Curve



Initial Insulation Resistance

Between non-connected terminals: 10^9 ohms at 500VDC.
Between non-connected terminals & relay yoke: 10^9 ohms at 500VDC.

Coil Data

Voltage: 120VAC, 50-60 Hz.; 24 & 125VDC.

Transient Protection

1,500 volt transient of less than 100 microseconds, or 1,000 volts or less.

Environmenal Data

Operating Temperature Range: 0°C to +50°C.

Mechanical Data

Mounting Terminals: 16 flat base pins. Screw terminal sockets are available.
Weight: 11 oz. (311g) approximately.

Ordering Information

Typical Part No. ➤	TR	1	4	B	1	A	N

1. Basic Series:
TR = Timing control relay

2. Operation:
1 = On-delay

3. Output:
4 = 4PDT (4 form C)

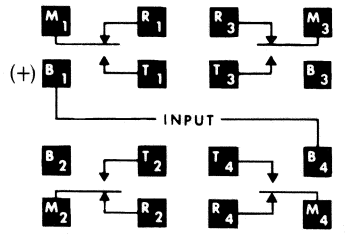
4. Operating Voltage:
B = 24VDC D = 215VDC I = 120VAC, 50/60 Hz.

5. Timing Adjustment:
1 = Internal fixed. 3 = Internal potentiometer.

6. Timing Range:
A = .15 to 3 sec. C = 1 to 30 sec. E = 4 to 120 sec. I = 2 to 60 min.
B = .55 to 15 sec. D = 2 to 60 sec. G = 10 to 300 sec. N = 1 to 30 min.

7. Options:
N = Magnetic blow-out device.

Wiring Diagram (Bottom View)



Outline Dimensions

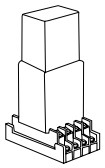
Same as GP/MR. See previous page.

Our authorized distributors are more likely to maintain the following items in stock for immediate delivery..

None at present.

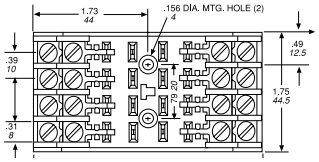
Accessories for GP/ML/TR series control relays

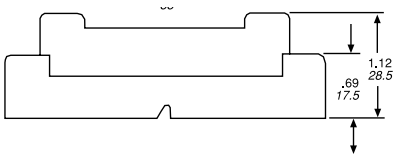
Front connected sockets

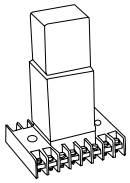


Cat. No. CR0001
With captive clamp terminals

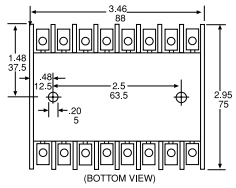
Cat. No. CR0002
With (#6) binding head screws

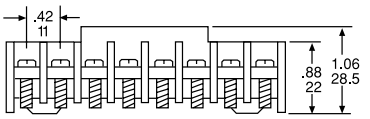






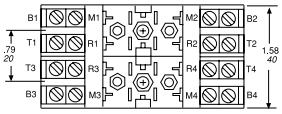
Cat. No. CR0095
With (#6) screw terminals

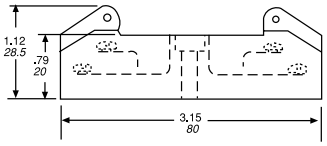




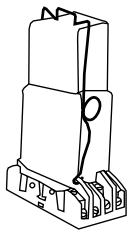


Cat. No. CR0067
With (#6) screw terminals

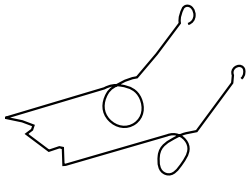


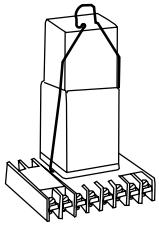


Hold down (locking) springs

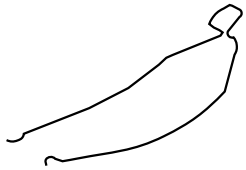


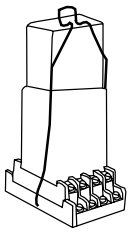
Cat. No. CR0069
For socket: CR0067





Cat. No. CR0070
For socket: CR0095

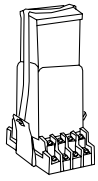




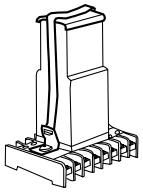
Cat. No. CR0111
For sockets: CR0001& CR0002



Heavy-duty hold down (locking) straps



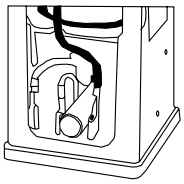
***Cat. No. CR0133**
For socket: CR0001 & CR0002



***Cat. No. CR0155**
For socket: CR0095

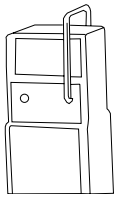
* Catalog number includes strap, strap plate and necessary brackets.

Magnetic blowout device



Cat. No. CR0190
Reduces arcing on the relay contacts when they make or break contact, either upon energizing or de-energizing, resulting in less contact degradation. Extends the life of the contact.

Extracting handle



Cat. No. CR0179
Used to remove GP, ML and TR units from mounting bases.

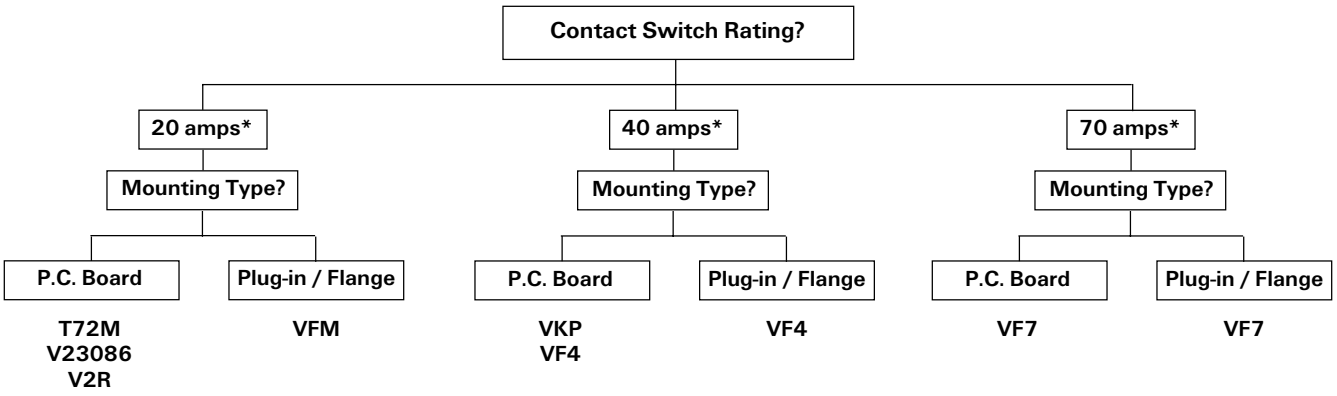
Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.
www.tycoelectronics.com
Technical support:
Refer to inside back cover.

Alphanumeric Index

Series	Type	Page
T72M	Single 20A Relay	1005
V23086	Single or Dual 20A Relay	1002
V2R	20A Motor Reversing Module	1012
VF4	40A Relay	1017
VF7	70A Relay	1021
VFM	20A Relay	1014
VKP	40A Relay	1007
VTF	Flasher Module	1024

Automotive Relay Question Tree

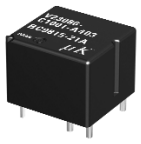
This guide helps the user select one or more relay series which may be appropriate for a given application. The user should then refer to detailed specifications elsewhere in this catalog to determine the actual part number to be specified. Of course, the user must assume ultimate responsibility for determining the suitability of a relay for a particular application.



***** Typical loads at 14VDC, resistive, for comparison purposes. See catalog pages for a given series for detailed rating specifications.

Automotive Relays 1001-1026 **10**

NOTE: The "automotive" relays described in this section are DC coil relays designed to switch 14VDC loads in automobiles. They may also be suitable for non-automotive applications such as electric wheelchairs and other battery powered equipment. They are not UL recognized.



V23086 series

20 Amp Micro K (Single & Dual) PC Board Relay for Automotive Applications

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- 30A, 16VDC switching rating.
- 40A inrush at 16VDC.
- 20A continuous contact rating @ 85°C.
- Immersion cleanable plastic case with knock-off nib for ventilation.
- 60% less volume than other comparable power relays.
- 1 Form A and 1 Form C arrangements in single and dual relay packages.
- Choice of AgNi 0.15 or AgSnO contacts.

Conditions

All parametric, environmental and life tests are performed according to EIA Standard RS-407-A at standard test conditions (23°C Ambient, 20-50% RH, 29.5 ± 1.0" Hg.) unless otherwise noted.

Contact Data

Arrangements: 1 Form A (SPST-NO) and 1 Form C (SPDT) in single relay and dual relay configurations.
Material: AgNi 0.15 - Recommended for inductive loads.
AgSnO - Recommended for high inrush, lamp and capacitive loads and applications prone to contact material transfer.
Max. Switching Rate: 20 operations per second with no contact load.
6 operations per minute for rated life at rated load.
Max. Load Current (@ 14VDC Load Voltage):

Load	Form A (NO)	Form C	
		NO	NC
Max. Continuous Current	**30A**	**30A**	**25A**
Max. Break Current	**30A**	**30A**	**25A**
Max. Make Current			
AgSnO	**100A**	**100A**	**15A**
AgNi 0.15	**40A**	**40A**	**10A**

Max. Switching Power: 35-320 watts DC (voltage dependent).
Min. Recommended Current: 0.5 amp @ 12VDC.
Initial Voltage Drop: 200 millivolts, maximum, for normally open contacts @ 10 amp contact load.
250 millivolts, maximum, for normally closed contacts @ 5 amp contact load.
Expected Life: 10 million operations, mechanical; 100,000 operations at 20 amps, 14VDC, resistive load on normally open contact.

Initial Dielectric Strength

Between Contacts and Coil: 500V rms.

Coil Data

Voltage: 12 VDC.
Resistance: See Coil Data table.
Nom. Power: 0.55 watts @ 23°C coil temp. and rated coil voltage.
Thermal Resistance: 50°C per actual coil watt in still air with no contact load current.

Operate Data

Must Operate and Must Release Voltage: See Coil Data table.
Initial Operate Time: 3 milliseconds, typical, with rated coil voltage applied.
Initial Release Time: 1.5 milliseconds, typical, with zero volts applied (for unsuppressed relays after having been energized at rated coil voltage.)

Environmental Data

Temperature Range: Storage: -40°C to +155°C.
Operating: -40°C to +105°C.
Shock: 20g, 11 milliseconds, half sine wave pulse.
Vibration: (For NC contacts, NO contacts are significantly higher.)
10-40 Hz., 1.27mm double amplitude.
40-70 Hz., 5g's constant.
70-100 Hz., 0.5mm double amplitude.
100-500 Hz., 10g's constant.

Mechanical Data

Termination: Printed circuit terminals.
Enclosure: Immersion cleanable, sealed plastic cover.
Weight: Sealed: 4 gm (0.14 oz.) approximately.

Abnormal Operation

Overload Current: 50A, 5 sec.(2)
87.5A, 0.5 sec.
150A, 0.1 sec.
24V Jump Start: 24VDC for 5 minutes conducting rated contact current @ 23°C.
Drop Test: Capable of meeting specifications after a 1.0 meter drop onto concrete in final enclosure.
Flammability: UL94-HB or better (meets FMVSS 302).

Notes

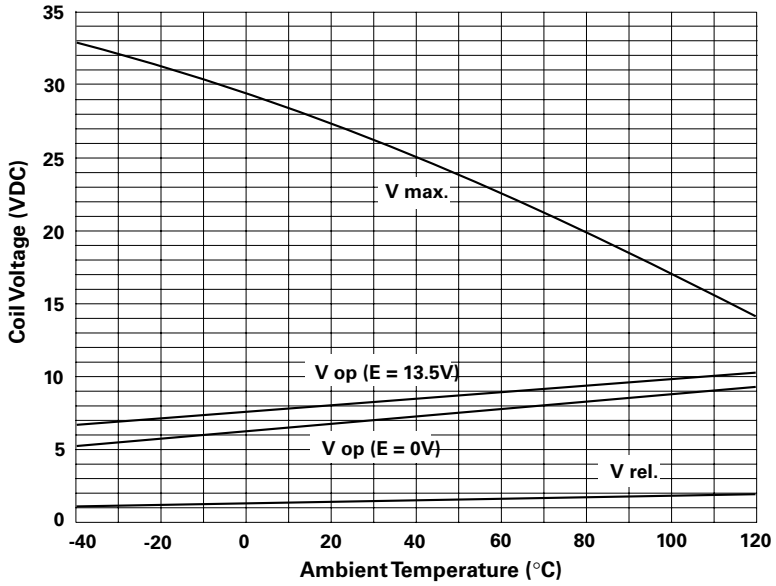
(1) Allowable overdrive is rated at ambient temperature of 23°C and 105°C as stated with no load current flowing through the relay contacts and minimum coil resistance with power applied for 30 sec. max. (20% max. duty cycle.)
(2) Current and times are compatible with circuit protection by a typical 25A fuse. Relay will make, carry and break the specified current.

Coil Data (@ 23°C Coil Temperature)

Coil Designator	Rated Coil Voltage (VDC)	Coil Resistance ±10% (Ohms)	Must-Operate Voltage (VDC)	Must-Release Voltage (VDC)	Allowable(1) Overdrive (VDC)	
					@ 23°C	@ 105°C
001	12	254	6.9	1.5	27.2	16.5

Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.

Figure 1 - Operating Voltage Range



Does not take into account the temperature rise due to the contact current.

V op = Operation Voltage

E = Pre-Generation

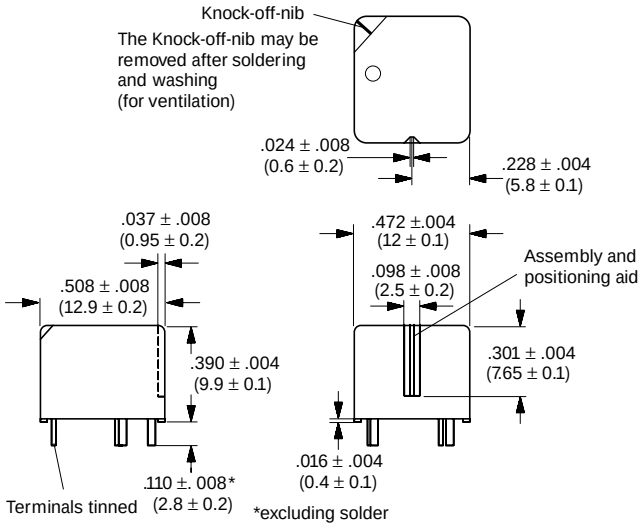
Ordering Information

Part Number	Contact Arrangement	Enclosure	Contact Materials
V23086-C1001-A303	1 Form C	Sealed, Plastic Cover	AgNi 0.15
V23086-C1001-A402	1 Form A	Sealed, Plastic Cover	AgSnO
V23086-C1001-A403	1 Form C	Sealed, Plastic Cover	AgSnO
V23086-C2001-A303	Dual Form C	Sealed, Plastic Cover	AgNi 0.15
V23086-C2001-A403	Dual Form C	Sealed, Plastic Cover	AgSnO

Our authorized distributors are more likely to maintain the following items in stock for immediate delivery.

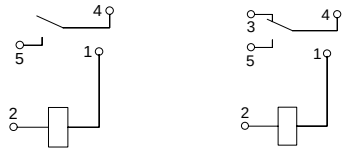
V23086-C1001-A303
V23086-C1001-A403

Outline Dimensions – Single Relay

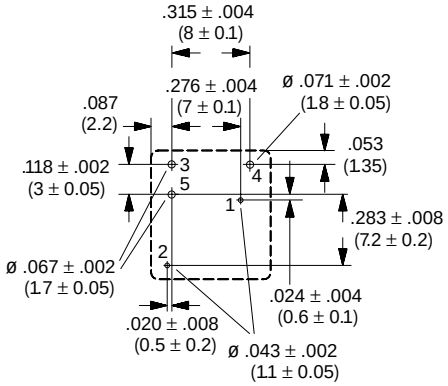


Wiring Diagrams – Single Relay (Bottom Views)

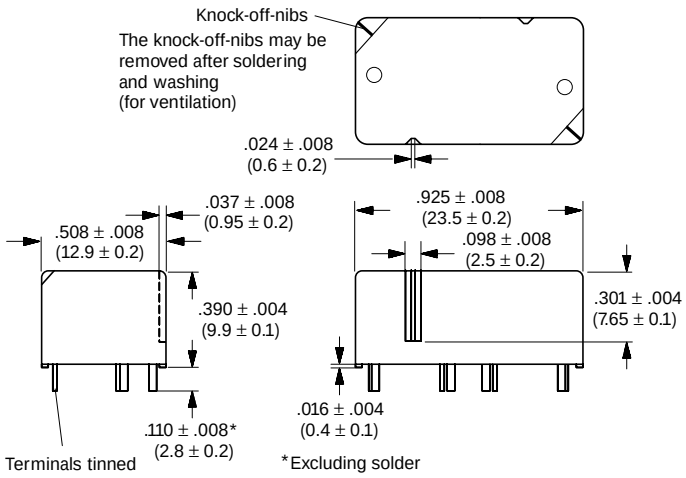
1 Form A **1 Form C**

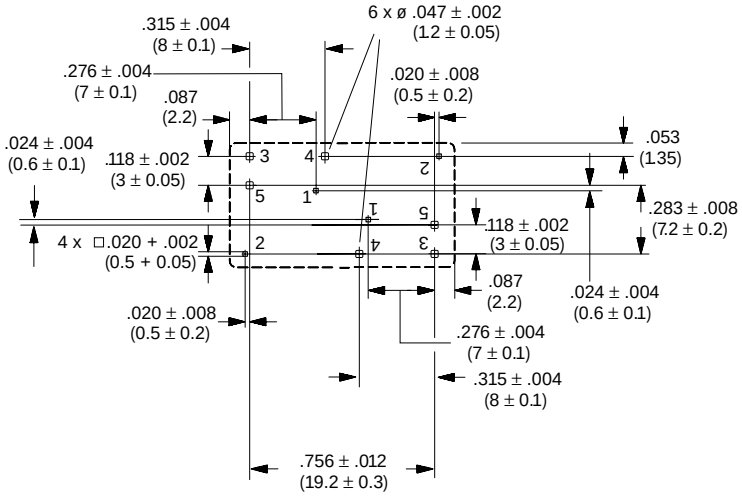


Suggested PC Board Layout – Single Relay (Bottom View)



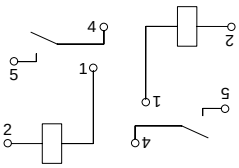
Outline Dimensions – Dual Relay



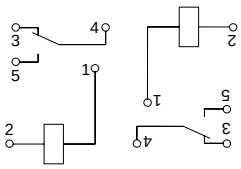


Wiring Diagrams - Dual Relay (Bottom Views)

1 Form A

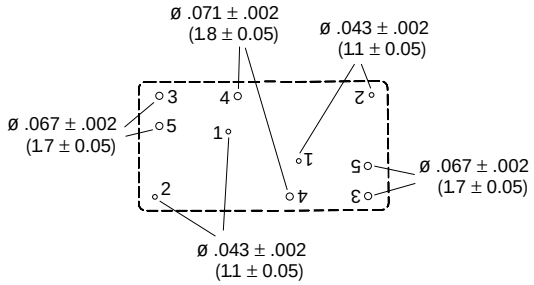


1 Form C



Suggested PC Board Mtg. Holes – Dual Relay (Bottom View)

See bottom view of relay (above) for hole-to-hole spacing



Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.
www.tycoelectronics.com
Technical support:
Refer to inside back cover.



T72M series

20 Amp Miniature PC Board Relay for Automotive Applications

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- 20A, 16VDC switching rating.
- 60A inrush at 16VDC.
- 15A continuous contact rating @ 105°C.
- Immersion cleanable plastic case with knock-off nib for ventilation.
- Low profile package has a seated height of only .67'' (17mm).
- 1 Form C arrangement.
- Choice of AgNi 0.15 or AgSnO contacts.

Conditions

All parametric, environmental and life tests are performed according to EIA Standard RS-407-A at standard test conditions (23°C Ambient, 20-50% RH, 29.5 ± 1.0" Hg.) unless otherwise noted.

Contact Data

Arrangements: 1 Form C (SPDT).
Material: AgNi 0.15 - Recommended for inductive loads.
AgSnO - Recommended for high inrush, lamp and capacitive loads and applications prone to contact material transfer.
Max. Switching Rate: 20 operations per second with no contact load.
6 operations per minute for rated life at rated load.
Max. Switching Voltage: 75VDC(1).
Max. Load Current (@ 14VDC Load Voltage):

Load	Form C	
	NO	NC
Max. Continuous Current	**20A**	**10A**
Max. Break Current (1)	**20A**	**20A**
Max. Make Current (2)		
AgNi 0.15	**60A**	**12A**
AgSnO	**80A**	**15A**

Max. Switching Power: 35-320 watts DC (voltage dependent)(1).
Min. Recommended Current: 0.5 amp @ 12VDC.
Initial Voltage Drop: 200 millivolts, maximum, for normally open contacts @ 10 amp contact load.
250 millivolts, maximum, for normally closed contacts @ 5 amp contact load.
Expected Life: 10 million operations, mechanical; 100,000 operations at 20 amps, 14VDC, resistive load on normally open contact.

Initial Dielectric Strength

Between Contacts and Coil: 500V rms.

Coil Data

Voltage: 12 and 24VDC.
Resistance: See Coil Data table.
Nom. Power: 0.80 watts @ 23°C coil temp. and rated coil voltage.
Thermal Resistance: 50°C per actual coil watt in still air with no contact load current.

Operate Data

Must Operate and Must Release Voltage: See Coil Data table.
Initial Operate Time: 5 milliseconds, typical, with rated coil voltage applied.
Initial Release Time: 2 milliseconds, typical, with zero volts applied (for unsuppressed relays after having been energized at rated coil voltage.)

Environmental Data

Temperature Range: **Storage:** -40°C to +155°C.
Operating: -40°C to +105°C(4).
Shock: 20g, 11 milliseconds, half sine wave pulse.
Vibration: (For NC contacts, NO contacts are significantly higher.)
10-40 Hz., 1.27mm double amplitude.
40-70 Hz., 5g's constant.
70-100 Hz., 0.5mm double amplitude.
100-500 Hz., 10g's constant.

Mechanical Data

Termination: Printed circuit terminals.
Enclosure: Immersion cleanable, sealed plastic cover.
Weight: Sealed: 12 gm (0.4 oz.) approximately.
Audible Sound: 95dBA @ 10 cm, 14VDC coil voltage.
77dBA @ 1 M, 14VDC coil voltage.

Abnormal Operation

Overload Current: 40A, 36 sec.(5)
80A, 10 sec.
150A, 2.5 sec.
24V Jump Start: 24VDC for 5 minutes conducting rated contact current @ 23°C.
Drop Test: Capable of meeting specifications after a 1.0 meter drop onto concrete in final enclosure.
Flammability: UL94-HB or better (meets FMVSS 302).

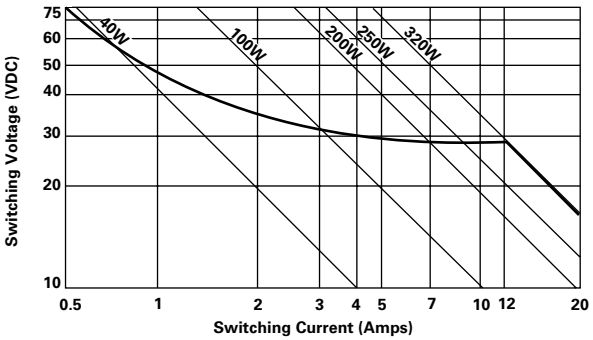
Notes

(1) See Figure 1.
(2) Inrush current for lamp load.
(3) Allowable overdrive is rated at ambient temperature of 23°C and 105°C as stated with a 10A load current flowing through the relay contacts and minimum coil resistance with power applied for 30 sec. max. (20% max. duty cycle.) For continuous duty information, see Figure 2. (Ambient Termerature vs. Coil Voltage for Continuous Duty.)
(4) See Figure 2.
(5) Current and times are compatible with circuit protection by a typical 20A circuit breaker. Relay will make, carry and break the specified current.

Coil Data (@23°C Coil Temperature)

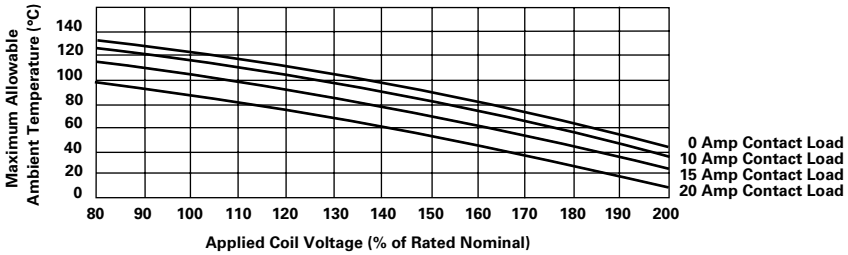
Coil Designator	Rated Coil Voltage (VDC)	Coil Resistance ±10% (Ohms)	Coil Inductance (H) (Ref.)	Must-Operate Voltage (VDC)	Must-Release Voltage (VDC)	Allowable (3) Overdrive (VDC)	
						@ 23°C	@ 105°C
12	12	180	0.9	6.3	1.2	24.6	14.3
24	24	720	3.2	12.6	2.4	49.3	28.7

Figure 1 - Limiting Curve for Power Load



Safe breaking, arc extinguished (normally open contact) for resistive loads.

Figure 2 - Ambient Temperature vs. Coil Voltage for Continuous Duty



Assumptions:

1. Thermal resistance = 50°C per watt
2. Still air
3. Nominal coil resistance
4. Maximum mean coil temperature = 155°C
5. Coil temperature rise due to load
   - = 8°C @ 10 amps
   - = 20°C @ 15 amps
   - = 35.5°C @ 20 amps
6. Curves are based on 800mW at 23°C
7. When full lifetime is at high ambient and high load current, subtract 25°C from maximum allowable ambient temperature.

Ordering Information

Part Number	Contact Arrangement	Enclosure	Contact Materials
T72M5D121-*	1 Form C	Sealed, Plastic Cover	AgNi 0.
T72M5D155-*	1 Form C	Sealed, Plastic Cover	AgSnO

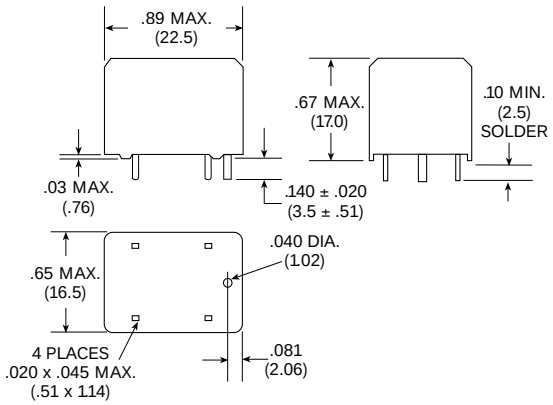
*Standard Coil Voltages: 12 = 12VDC
24 = 24VDC (Consult factory for availability).

Our authorized distributors are more likely to maintain the following items in stock for immediate delivery.

None at present.

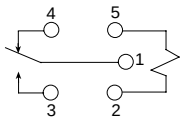
Outline Dimensions

Tolerance (unless otherwise noted): 3 decimal: ± .010 (±.254); 2 decimal: ±.015 (±.381).

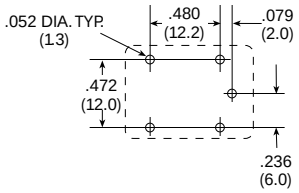


Wiring Diagram (Bottom View)

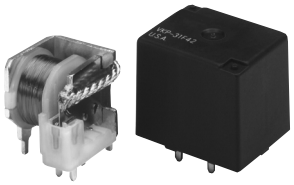
Code 5
1 Form C



Suggested PC Board Layout (Bottom View)



Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.
www.tycoelectronics.com
Technical support:
Refer to inside back cover.



VKP series

Compact, 40 Amp, Open or Sealed PC Board Relay For Automotive Applications

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- 40A continuous contact rating @ 85°C.
- 1 Form A and 1 Form C arrangements.
- PC board terminals.
- Available as open frame or sealed relay.
- Choice of AgNi 0.15 or AgSnO contacts.

Conditions

All parametric, environmental and life tests are performed according to EIA Standard RS-407-A at standard test conditions (23°C Ambient, 20-50% RH, 29.5 ± 1.0" Hg.) unless otherwise noted.

Contact Data

Arrangements: 1 Form A (SPST-NO) and 1 Form C (SPDT).
Material: AgNi 0.15 – Recommended for inductive loads.
AgSnO – Recommended for high inrush, lamp and capacitive loads and applications prone to contact material transfer.
Max. Switching Rate: 20 operations per second with no contact load.
6 operations per minute for rated life at rated load.
Max. Switching Voltage: 75VDC (1).
Max. Load Current (@ 14VDC Load Voltage):

Load		Form A (NO)	Form C	
			NO	NC
Max. Continuous Current	Open Frame	**45A**	**45A**	**30A**
	Sealed Cover	**45A**	**45A**	**30A**
Max. Break Current (1)		**60A**	**60A**	**30A**
Max. Make Current (2)				
AgNi 0.15		**100A**	**100A**	**30A**
AgSnO		**180A**	**180A**	**30A**

Max. Switching Power: 50-500 watts DC (voltage dependent) (1).
Min. Recommended Current: 1 amp @ 12VDC.
Initial Voltage Drop: 200 millivolts, maximum, for normally open contacts @ 40 amp contact load.
250 millivolts, maximum, for normally closed contacts @ 20 amp contact load.
Expected Life: 10 million operations, mechanical; 100,000 operations at 40 amps, 14VDC, resistive load on normally open contact.

Initial Dielectric Strength

Between Contacts and Coil: 500V rms.

Coil Data

Voltage: 12 and 24VDC.
Resistance: See Coil Data table.
Nom. Power: 1.6 watts @ 23°C coil temp. and rated coil voltage.
Thermal Resistance: 45°C per actual coil watt in still air with no contact load current.

Operate Data

Must Operate and Must Release Voltage: See Coil Data table.
Initial Operate Time: 5 milliseconds, typical, with rated coil voltage applied.
Initial Release Time: 3 milliseconds, typical, with zero volts applied (for unsuppressed relays after having been energized at rated coil voltage).

Environmental Data

Temperature Range: Storage: -40°C to +155°C.
Operating: -40°C to +125°C (4).
Shock: 20g, 11 milliseconds, half sine wave pulse.
Vibration: (For NC contacts, NO contacts are significantly higher.)
10-40 Hz., 1.27mm double amplitude.
40-70 Hz., 5g's constant.
70-100 Hz., 0.5mm double amplitude.
100-500 Hz., 10g's constant.

Mechanical Data

Termination: Printed circuit terminals.
Enclosure: Sealed relay is suitable for immersion cleaning of PCB assembly or conformal coating. Relay may be vented after cleaning by cutting the vent projection from the corner of the relay after processing using a razor knife or equivalent.
Weight: 20g (0.7 oz.) approximately.

Abnormal Operation

Overload Current: Consult factory.
24V Jump Start: 24VDC for 5 minutes conducting rated contact current @ 23°C.
Drop Test: Capable of meeting specifications after a 1.0 meter drop onto concrete in final enclosure.
Flammability: UL94-HB or better, internal parts (meets FMVSS 302).

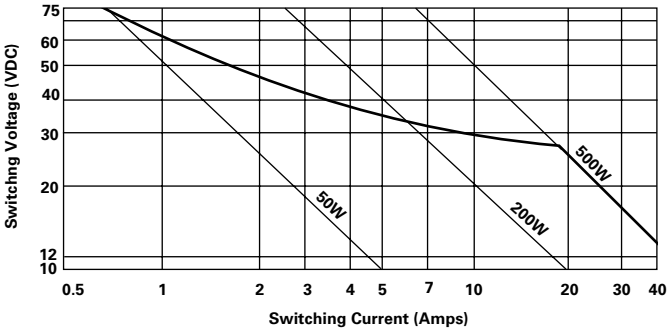
Notes

(1) See Figure 1.
(2) Inrush current for lamp load.
(3) Allowable overdrive is rated at ambient temperature for 23°C or 85°C as stated with no load current flowing through the relay contacts and minimum coil resistance. Also see Figure 2 for maximum ambient temperature versus applied coil voltage.
(4) See Figure 2.
(5) Current and times are compatible with circuit protection by a typical automotive circuit breaker. Relay will make, carry and break the specified current.

Coil Data (@ 23°C Coil Temperature)

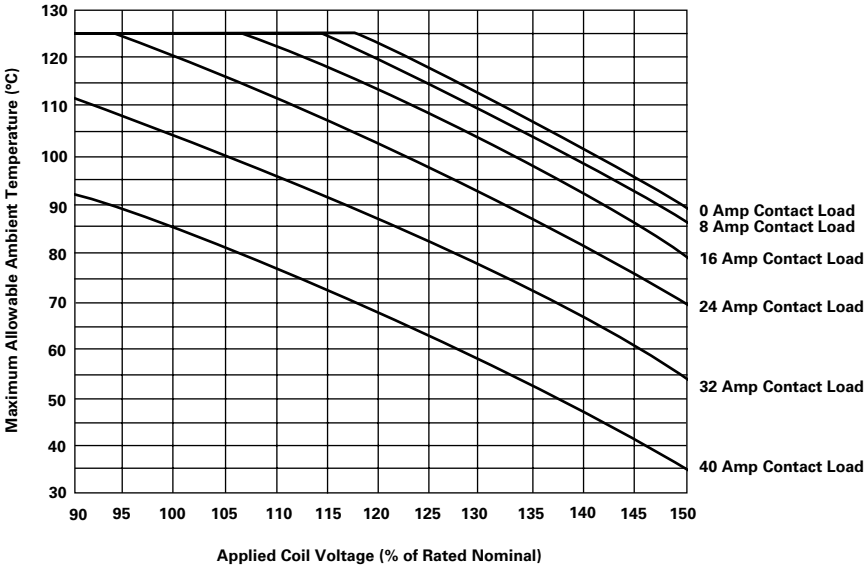
Coil Designator	Rated Coil Voltage (VDC)	Coil Resistance ±10% (Ohms)	Coil Inductance (H) (Ref.)	Must-Operate Voltage (VDC)	Must-Release Voltage (VDC)	Allowable (3) Overdrive (VDC)	
						@ 23°C	@ 85°C
F	12	90	0.6	6.8	1.2	19.6	14.3
H	24	362	2.3	13.9	2.4	39.3	28.6

Figure 1 – Limiting Curve for Power Load



Safe breaking, arc extinguished (normally open contact) for resistive loads.

Figure 2 – Ambient Temperature vs. Coil Voltage for Continuous Duty



Assumptions:

1. Thermal resistance = 40°C per watt.
2. Still air.
3. Nominal coil resistance.
4. Maximum mean coil temperature = 180°C.
5. Coil temperature rise due to load.
   = 3.5°C @ 8 amps.
   = 10°C @ 16 amps.
   = 20°C @ 24 amps.
   = 36°C @ 32 amps.
   = 55°C @ 40 amps.
6. Thermal resistance and power dissipation based on coil resistance at 180°C.
7. Curves are based on 1.6 watts at 23°C.
8. When full lifetime is at high ambient and high load current, subtract 25°C from maximum allowable ambient temperature.
9. Data is for open relays.
10. Subtract 10°C from the maximum allowable ambient temperature for sealed version.

Ordering Information

Part Number	Contact Arrangement	Contact Material	Enclosure	Termination Footprint
VKP-11 * 42	1 Form A	AgNi 0.15	Open	U.S.A.
VKP-15 * 42	1 Form C	AgNi 0.15	Open	U.S.A.
VKP-11 * 52	1 Form A	AgSnO	Open	U.S.A.
VKP-15 * 52	1 Form C	AgSnO	Open	U.S.A.
VKP-31 *42	1 Form A	AgNi 0.15	Immersion Cleanable Case	U.S.A.
VKP-35 * 42	1 Form C	AgNi 0.15	Immersion Cleanable Case	U.S.A.
VKP-31 * 52	1 Form A	AgSnO	Immersion Cleanable Case	U.S.A.
VKP-35 * 52	1 Form C	AgSnO	Immersion Cleanable Case	U.S.A.

*Standard Coil Voltages: F = 12VDC
H = 24VDC (Consult factory for availability)

Our authorized distributors are more likely to maintain the following items in stock for immediate delivery.

None at present.

Note: See page 1011 for Wiring Diagrams, Suggested PC Board Layouts and Outline Dimensions.

New Relay for Flashing Lamp Applications

VKP series

PC Board Relay

Features

- 30A flashing lamp rating up to 85°C.
- Long life for flashing lamp load applications.
- 1 Form A and 1 Form C arrangements.
- Available as open frame or sealed relay.
- Choice of standard or high current model.

Conditions

All parametric, environmental and life tests are performed accourding to EIA Standard RS-407-A at standard test conditions (23°C Ambient, 20-50% RH, 29.5 ± 1.0" Hg.) unless otherwise noted.

Contact Data

Arrangements: 1 Form A (SPST-NO) and 1 Form C (SPDT).
Material: PdCu/AgNi 0.15.
Max. Switching Rate: 20 operations per second with no contact load.
90 operations per minute for rated life at rated load.
270 operations per minute for passenger car lamp outage indication.
Max. Switching Voltage: 28VDC.
Max. Load Current (@ 14VDC Load Voltage):

Standard Current Types				
Load		Form A (NO)	Form C NO	Form C NC
Steady-State Flashing[1]	Open Frame	15A	15A	5A
	Sealed Cover	12A	12A	5A
Alternate Flashing[2]	Open Frame	-	4A	4A
	Sealed Cover	-	4A	4A
Max. Make Current[3]		120A	120A	30A
Max. Break Current		20A	20A	10A

High Current Types				
Load		Form A (NO)	Form C NO	Form C NC
Steady-State Flashing	Open Frame	30A	30A	10A
	Sealed Cover	25A	25A	10A
Alternate Flashing	Open Frame	-	8A	8A
	Sealed Cover	-	8A	8A
Max. Make Current[3]		240A	240A	60A
Max. Break Current		30A	30A	20A

Min Recommended Current: 1 amp @ 12VDC.
Initial Voltage Drop: 100 millivolts, maximum, for normally open contacts @ 10A contact load.
200 millivolts, maximum, for normally closed contacts @ 10A contact load.
Expected Life: **Mechanical Life:** 10 million operations.
Electrical Life: (See application information.)

Electrical Isolation

Dielectric Strength (coil to contacts): 500 Vrms.

Coil Data

Voltage: 12 and 24VDC.
Resistance: See Coil Data table.
Nom. Power: 1.6 watts @ 23°C coil temp. and rated coil voltage.
Thermal Resistance: 45°C per actual coil watt in stil air with no contact load current.

Operate Data

Must Operate and Must Release Voltage: See Coil Data table.
Initial Operate Time: 5 milliseconds, typical, with rated coil voltage applied.
Initial Release Time: 3 milliseconds, typical, with zero volts applied (for unsuppressed relays after having been energized at rated coil voltage).

Environmental Data

Temperature Range: **Storage:**
Open Types: -40°C to +155°C.
Sealed Types: -40°C to +125°C.
Operating: -40°C to125°C[4].
Shock: 20g, 11 milliseconds, half sine wave pulse.
Vibration: (For NC contacts, NO contacts are significantly higher.)
10-40 Hz., 1.27mm double amplitude.
40-70 Hz., 5g's constant.
70-100 Hz., 0.5mm double amplitude.
100-500 Hz., 10g's constant.

Mechancial Data

Termination: Printed circuit terminals. (U.S.A. footprint style only)
Enclosure: Sealed relay is suitable for immersion cleaning of PCB assembly or conformal coating. Relay may be vented cutting the vent projection from the corner of the relay after processing using razor knife or equivalent.
Weight: 20g (0.7 oz.) approximately.

Abnormal Operation

Overload Current: Consult factory.
24V Jump Start: 24VDC for 5 minutes conducting rated contact current @ 23°C.
Drop Test: Capable of meeting specifications after a 1.0 meter drop onto concrete in final enclosure.
Flammability: UL94-HB or better (meets FMVSS 302).

Notes

(1) Continuous On-Off cycling of a single set of lamps at 60 to 90 cycles per minute and approximately a 50% duty cycle.
(2) Continuous cycling between two sets of lamps with one set switched by the N.O. contacts and the other by the N.C. contacts, at 60 to 90 cycles per minute and aproximately a 50% duty cycle.
(3) Inrush current for lamp load.
(4) Allowable overdrive is rated at ambient temperature for 23°C or 85°C as stated with no load current flowing through the relay contacts and minimum coil resistance. Also see Figure 2 for maximum ambient temperature versus applied coil voltage.
(5) Current and times are compatible with circuit protection by a typical automotive circuit breaker. Relay will make, carry and break the specified current.

Coil Data (@ 23°C Coil Temperature)

Coil Designator	Rated Coil Voltage (VDC)	Coil Resistance ±10% (Ohms)	Coil Inductance (H) (Ref.)	Must-Operate Voltage (VDC)	Must-Release Voltage (VDC)	Allowable[4] Overdrive (VDC)	
						@ 23°C	@ 85°C
F	12	90	0.6	6.8	1.2	19.6	14.3
H	24	362	2.3	13.9	2.4	39.3	28.6

Application Information

Load Polarity: VKP series relays for flashing lamp applications are constructed with Palladium-Copper movable contacts and fine grain silver stationary contacts. This causes the relay to be sensitive to the polarity of the load voltage. This type of VKP relay must be mechanized in the circuit such that the more positive connection is made to the movable contact (identified as terminal 4 in the wiring diagrams). Failure to do so will nullify the benefit of the Palladium Copper and will result in contact welding.

Typical Applications: VKP series relays for flashing lamp applications are typically used for turn signal, hazard warning, emergency vehicle, and security system applications. They may also be used for high in-rush current capacitive loads such as audio amplifiers. Use on inductive loads or loads with high continuous load currents should be avoided. The relay should also not be used for applications which do not have a significant make current as high contact voltage drop may result.

Standard Current Relays: VKP series relays for flashing lamp applications which are indicated as "standard current" units are generally suitable for passenger car and light truck applications for turn signal, hazard warning, or combination flashers (with or without normal trailering requirements) for 2 or 3 bulb turn signal systems. They are also generally suitable for security system applications for lamp flashing and for most audio amplifier applications.

High Current Relays: VKP series relays for flashing lamp applications which are designated as "high current" have larger contacts, a larger shunt connecting the movable contacts to the output terminals, and other performance enhancing characteristics to provide longer life and provide higher current carrying capacity. This type relay should be used for truck applications which have greater load current and in applications such as emergency vehicle lighting and service vehicle hazard warning lights which have very high cycle life requirements . The high current versions are also recommended for most alternating flasher applications, as this version has much improved performance of the normally closed contact. However, optimum life can be obtained for alternating applications by using two normally open relays and powering the coils alternately.

Electrical Life Test Information

Standard Current Relays: 3 bulb T/S (turn signal) system, combined turn signal and hazard warning with normal trailering (test requirements):

3 bulb	1.8 million operations
4 bulb	130 K operations
6 bulb	194 K operations
8 bulb	248 K operations
TOTAL	2.3 million operations

This application represent about the limit of the performance capability of the "standard current" types and is generally the limit of the industry requirement for passenger car applications.

Note: Bulb as used here is a 27 watt turn signal bulb, trade #1156. Testing includes operations at -40°C, 23°C, and 85°C.

High Current Relays: 3 bulb T/S system, combined turn signal and hazard warning with special trailering (test requirements):

3 bulb	2.1 million operations
6 bulb	194 K operations
7 bulb	259 K operations
14 bulb	497 K operations
TOTAL	3.0 million operations

This application represent about the limit of the performance capability of the "high current" types. It should be noted that the low current operations have very little affect on the total product life where as the 14 bulb (33 ampere) operations are extremely destructive. Units test on 14 bulb (only) loads can be expected to fail at less than 1 million operations.

Note: Bulb as used here is a 27 watt turn signal bulb, trade #1156. Testing includes operations at -40°C, 23°C, and 85°C.

Design Considerations: It should be noted that although the VKP series relays are capable of handling relatively high currents, when applying the product under high current and high ambient temperature conditions, providing adequate conductor volume is critical, as is the solder connection, particularly with respect to the normally open contact terminal. It may be necessary to use high temperature solder, a plated through hole PCB, or a copper lead frame type construction under these conditions to prevent failure of the solder joint.

Figure 2 – Ambient Temperature vs. Coil Voltage for Continuous Flashing at 50% Duty Cycle (Steady Current, Open Style)

Consult factory.

Ordering Information

Part Number	Contact Arrangement	Contact Material	Enclosure	Load Ratings
VKP-11 * 32	1 Form A	PdCu/AgNi 0.15	Open	Standard Current
VKP-11 * 62	1 Form A	PdCu/AgNi 0.15	Open	High Current
VKP-15 * 62	1 Form C	PdCu/AgNi 0.15	Open	High Current
VKP-31 * 32	1 Form A	PdCu/AgNi 0.15	Immersion Cleanable Case	Standard Current
VKP-31 * 62	1 Form A	PdCu/AgNi 0.15	Immersion Cleanable Case	High Current
VKP-35 * 62	1 Form C	PdCu/AgNi 0.15	Immersion Cleanable Case	High Current

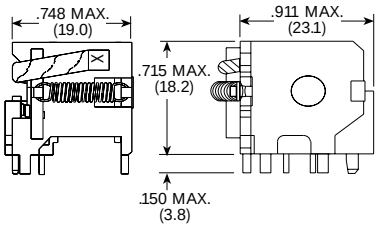
*Standard Coil Voltages: F = 12VDC
H = 24VDC (Consult factory for availability)

Our authorized distributors are more likely to maintain the following items in stock for immediate delivery.

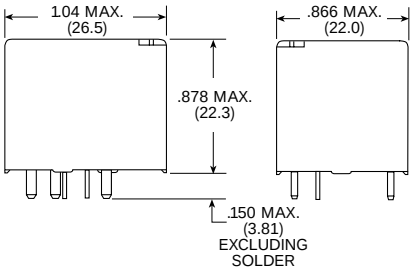
None at present.

Outline Dimensions

Open Model



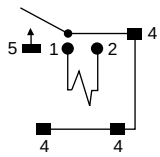
Sealed Model



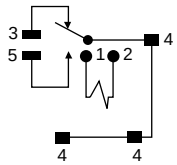
Wiring Diagrams (Bottom Views)

Open Models

1 Form A

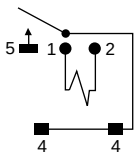


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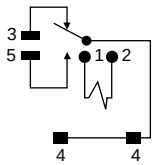


Sealed Models

1 Form A



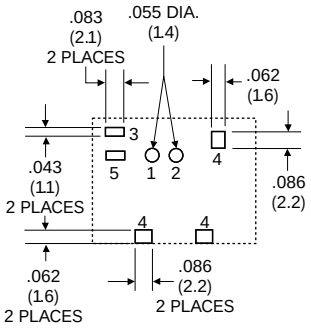
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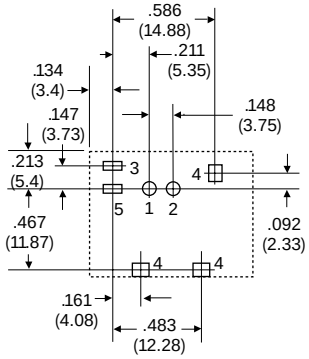
Suggested PC Board Layouts (Bottom Views)

Open Model

Hole Size

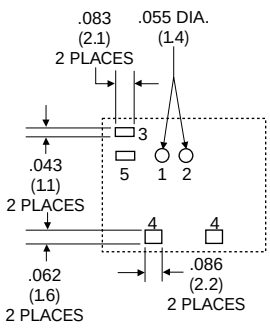


Center-To-Center

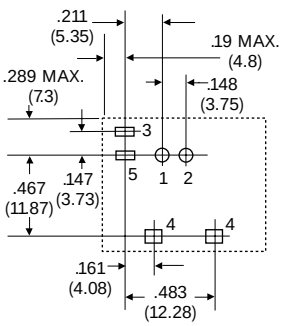


Sealed Model

Hole Size



Center-To-Center





V2R series

20 Amp DC Motor Reversing PC Board Relay for Automotive Applications

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- 20A, 16VDC switching rating.
- 75A inrush at 16VDC.
- 20A continuous contact rating @ 85°C.
- Operation to 105°C ambient.
- Immersion cleanable plastic case with knock-off nib for ventilation.
- Low profile package has a seated height of only .67" (17 mm).
- H-Bridge motor reversing arrangement.

Conditions

All parametric, environmental and life tests are performed according to EIA Standard RS-407-A at standard test conditions (23°C Ambient, 20-50% RH, 29.5 ± 1.0" Hg.) unless otherwise noted.

Contact Data

Arrangements: 2 x 1 Form C (H-Bridge).
Material: AgNi 0.15 (consult factory for other contact materials).
Max. Switching Rate: 20 operations per second with no contact load.
6 operations per minute for rated life at rated load.
Max. Switching Voltage: 24VDC.
Max. Load Current 23°C (@ 14VDC Load Voltage):
Continuous Carry: 20 Amperes
Intermittent Carry: 40 Amperes for 30 seconds.
Make: 75 Amperes
Break: 40 Amperes
Max. Switching Power: 320 watts DC (voltage dependent)(1)
Min. Recommended Current: 0.5 amp @ 12VDC.
Initial Voltage Drop: 400 millivolts, maximum (measured between load terminals) @ 10 amp contact load.
Nominal Circuit Resistance: 6 milliohms load terminal to load terminal @ 10 amp (this value is provided for circuit design purposes only and is not a specified parameter).
Expected Life:
Mechanical: 10 million operations.
Electrical: 20A, 14VDC, 1mH > 100K operations.
40A, 14VDC, 0.5mH > 10K operations.

Initial Insulation Resistance @ 500VDC

Between Contacts and Coil: 10 megaohms.
Between Open Contacts: 10 megaohms.

Coil Data

Voltage: 12VDC.
Resistance: See Coil Data table.
Nom. Power: See Coil Data table.
Thermal Resistance: 55°C per actual coil watt in still air with no contact load current.

Operate Data

Must Operate and Must Release Voltage: See Coil Data table.
Initial Operate Time: 5 milliseconds, typical, with rated coil voltage applied.
Initial Release Time: 2 milliseconds, typical, with zero volts applied (for unsuppressed relays after having been energized at rated coil voltage.)

Environmental Data

Temperature Range: Storage: -40°C to +155°C.
Operating: -40°C to +105°C.(2)
Shock: 20g, 11 milliseconds, half sine wave pulse.
Vibration: (For NC contacts, NO contacts are significantly higher.)
10-40 Hz., 1.27mm double amplitude.
40-70 Hz., 5g's constant.
70-100 Hz., 0.5mm double amplitude.
100-500 Hz., 10g's constant.

Mechanical Data

Termination: Printed circuit terminals.
Enclosure: Immersion cleanable, sealed plastic cover.
Weight: Sealed: 25 gm (0.9 oz.) approximately.
Audible Sound: 95dBA @ 10 cm, 14VDC coil voltage.
77dBA @ 1 M, 14VDC coil voltage.

Abnormal Operation

Overload Current: 40A, 36 sec.(3)
80A, 10 sec.
150A, 2.5 sec.
24V Jump Start: 24VDC for 5 minutes conducting rated contact current @ 23°C.
Drop Test: Capable of meeting specifications after a 1.0 meter drop onto concrete in final enclosure.
Flammability: UL94V-0 (meets FMVSS 302).

Notes

(1) See Figure 1.
(2) See Figure 2.
(3) Current and times are compatable with circuit protection by a typical 20A circuit breaker. Relay will make, carry and break the specified current.
(4) Allowable overdrive is rated at ambient temperature of 23°C and 105°C, as stated, with a 10A load current flowing throuth the relay contacts and minimum coil resistance with power applied for 30 sec. max. (20% max. duty cycle). For continuous duty information, see Figure 2 (AmbientTemperature vs. Coil Voltage for Continuous Duty.)

Coil Data (@ 23°C Coil Temperature)

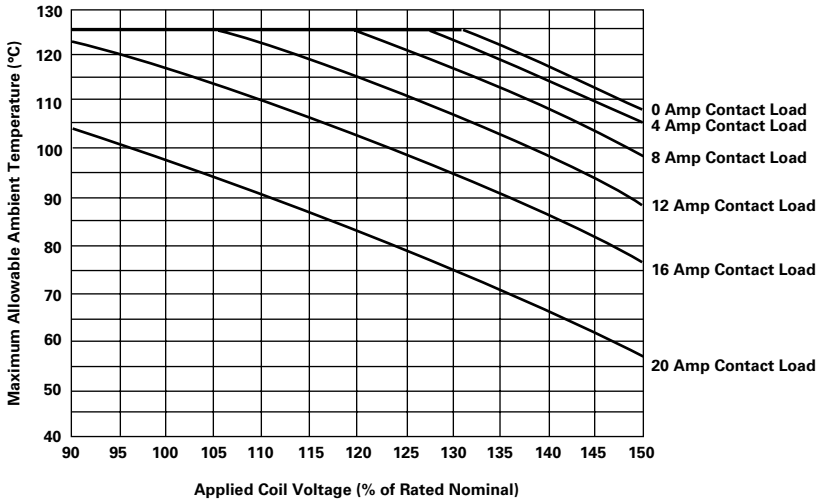
Relay Part Number	Rated Coil Voltage (VDC)	Coil Resistance ±10% (Ohms)	Coil Inductance (H) (Ref.)	Must-Operate Voltage (VDC)	Must-Release Voltage (VDC)	Nominal Power (Watts)	Allowable (4) Overdrive (VDC)	
							@ 23°C	@ 105°C
V2R-1001	12	150	0.7	6.0	0.9	0.93	24V	16V

Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.

Figure 1 - Limiting Curve for Power Load

At present, these data are still to be determined.

Figure 2 - Ambient Temperature vs. Coil Voltage for Continuous Duty



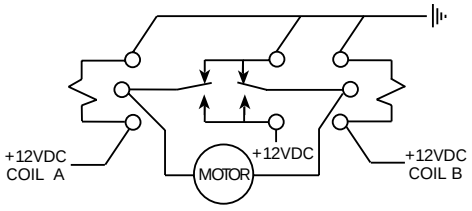
Assumptions:

1. Thermal resistance = 55°C per watt
2. Still air
3. Nominal coil resistance (150Ω)
4. Maximum mean coil temperature = 180°C
5. Coil temperature rise due to load = 3°C @ 4 amps
   = 9°C @ 8 amps
   = 19°C @ 12 amps
   = 31°C @ 16 amps
   = 51°C @ 20 amps
6. Thermal resistance and power dissipation based on coil resistance at 180°C
7. Curves are based on 0.96 watts at 23°C
8. When full lifetime is at high ambient and high load current, subtract 25°C from maximum allowable ambient temperature.

Ordering Information

Part Number	Coil Resistance
V2R-1001	150Ω

Typical Application Schematic

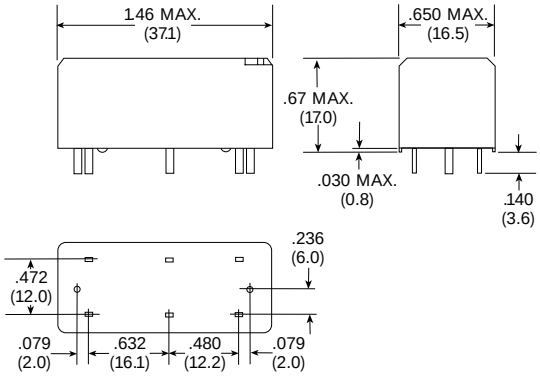


Our authorized distributors are more likely to maintain the following items in stock for immediate delivery.

None at present.

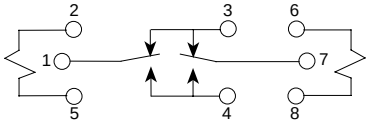
Outline Dimensions

Tolerance (unless otherwise noted): 3 decimal: ± .010 (±.254); 2 decimal: ±.015 (±.381).

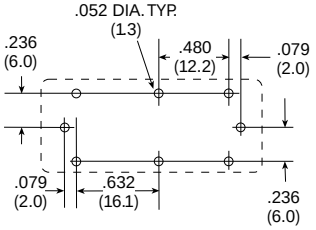


Wiring Diagram (Bottom View)

2 x 1 Form C (H-Bridge)



Suggested PC Board Layout





VFM series

20 Amp Relay With Quick Connect Terminals for Automotive Applications

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- 20A continuous contact rating @ 85°C.
- 1 Form A and 1 Form C arrangements.
- Plug-in terminals.
- Plastic enclosure.

Conditions

All parametric, environmental and life tests are performed according to EIA Standard RS-407-A at standard test conditions (23°C Ambient, 20-50% RH, 29.5 ± 1.0" Hg.) unless otherwise noted.

Contact Data

Arrangements: 1 Form A (SPST-NO) and 1 Form C (SPDT).
Material: AgNi 0.15 and AgSnO (consult factory for other contact materials).
Max. Switching Rate: 20 operations per second with no contact load.
6 operations per minute for rated life at rated load.
Max. Switching Voltage: 75VDC(1).
Max. Load Current (@ 14VDC Load Voltage):

Load	Form A (NO)	Form C	
		NO	NC
Max. Continuous Current	20A	20A	10A
Max. Make Current	120A(2)	120A(2)	40A
Max. Break Current(1)	30A	30A	15A

Max. Switching Power: 35-250 watts DC (voltage dependent(1).
Min. Recommended Current: 1.0 amp @ 12VDC.
Initial Voltage Drop: 200 millivolts, maximum, for normally open contacts @ 15 amp contact load.
250 millivolts, maximum, for normally closed contacts @ 10 amp contact load.
Expected Life: 10 million operations, mechanical; 100,000 operations at 20 amps, 14VDC, resistive load on normally open contact.

Initial Dielectric Strength

Between Contacts and Coil: 500V rms.

Coil Data

Voltage: 12VDC.
Resistance: See Coil Data table.
Nom. Power: (@ 23°C coil temp. and rated coil voltage.):
1.6W, unsuppressed.
1.81W, with 680 ohm resistor.
Thermal Resistance: 50°C per actual coil watt in still air with no contact load current.

Operate Data

Must Operate and Must Release Voltage: See Coil Data table.
Initial Operate Time: 4 milliseconds, typical, with rated coil voltage applied.
Initial Release Time: 1.5 milliseconds, typical, with zero volts applied (for unsuppressed relays after having been energized at rated coil voltage).

Environmental Data

Temperature Range: Storage: -40°C to +155°C.
Operating: -40°C to + 125°(4).
Shock: 10g, 11 milliseconds, half sine wave pulse.
Vibration: (For NC contacts, NO contacts are significantly higher.)
10-40 Hz., 1.27mm double amplitude.
40-70 Hz., 5g's constant.
70-100 Hz., 0.5mm double amplitude.
100-500 Hz., 10g's constant.

Mechanical Data

Termination: Quick connect.
Enclosure: Plastic dust cover.
Weight: With QC terminals: 20g (0.7 oz.) approximately.

Abnormal Operation

Overload Current: 40A, 36 sec.(5)
80A, 10 sec.
200A, 2.5 sec.
24V Jump Start: 24VDC for 5 minutes conducting rated contact current @ 23°C.
Drop Test: Capable of meeting specifications after a 3.28 foot (1.0 meter) drop onto concrete in final enclosure.
Flammability: UL94-HB or better (meets FMVSS 302).

Notes

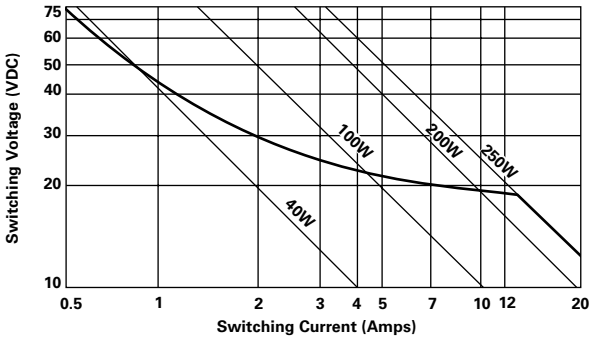
(1) See Figure 1.
(2) Inrush current for lamp load.
(3) Allowable overdrive is rated at ambient temperature for 23°C or 85°C as stated with no load current flowing through the relay contacts and minimum coil resistance. Also see Figure 2 for maximum ambient temperature versus applied coil voltage.
(4) See Figure 2.
(5) Current and times are compatible with circuit protection by a typical 20A automotive circuit breaker. Relay will make, carry and break the specified current.

Coil Data (@ 23°C Coil Temperature)

Coil Designator (VDC)	Rated Coil Voltage (VDC)	Coil Resistance ±10% (Ohms)	Coil Inductance (H) (Ref.)	Must-Operate Voltage (VDC)	Must-Release Voltage (VDC)	Allowable(3) Overdrive	
						@ 23°C	@ 85°C
F	12	90	0.5	7.2	1.2	20.4	14.9

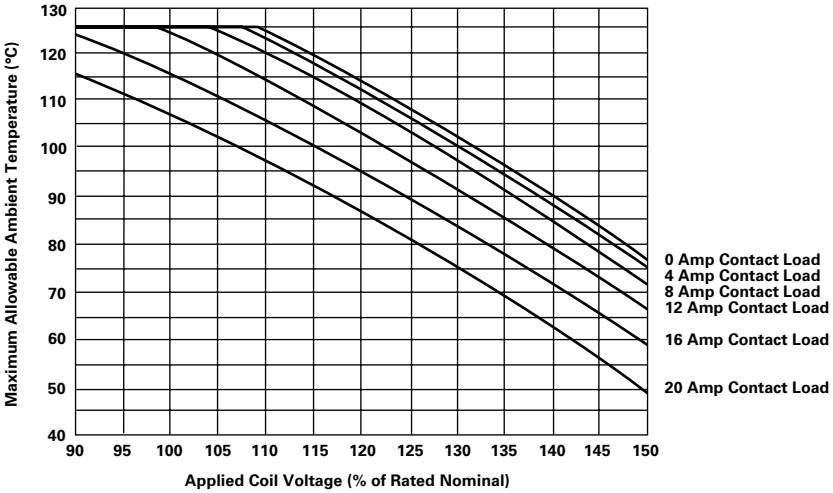
Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.

Figure 1 – Limiting Curve for Power Load



Safe breaking, arc extinguished (normally open contact) for resistive loads.

Figure 2 – Ambient Temperature vs. Coil Voltage for Continuous Load



Assumptions:

1. Thermal resistance = 50°C per watt
2. Still air
3. Nominal coil resistance
4. Maximum mean coil temperature = 180°C
5. Coil temperature rise due to load
   = 1°C @ 4 amps
   = 4.5°C @ 8 amps
   = 9.5°C @ 12 amps
   = 18°C @ 16 amps
   = 26.5°C @ 20 amps
6. Thermal resistance and power dissipation based on coil resistance at 180°C
7. Curves are based on 1.5 watts at 23°C
8. When full lifetime is at high ambient and high load current, subtract 25°C from maximum allowable ambient temperature.

Ordering Information

Part Number	Contact Arrangement	Terminals	Contact Material
VFM-11F21	1 Form A	Quick connect	AgNi 0.15
VFM-11F41	1 Form A	Quick connect	AgSnO
VFM-15F21	1 Form C	Quick connect	AgNi 0.15
VFM-15F41	1 Form C	Quick connect	AgSnO

*Standard Coil Voltages: F = 12VDC

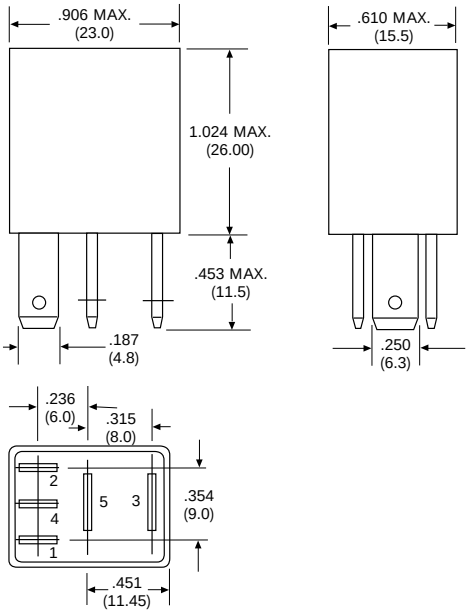
Optional Coil Suppression

Add suffix -S01 for 680 ohm resistor in parallel with 12VDC coil.

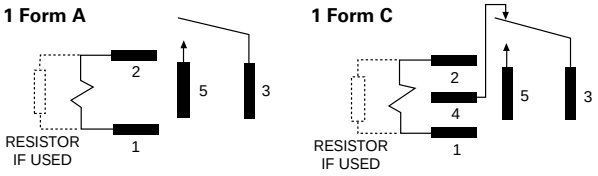
Our authorized distributors are more likely to maintain the following items in stock for immediate delivery.

None at present..

Outline Dimensions



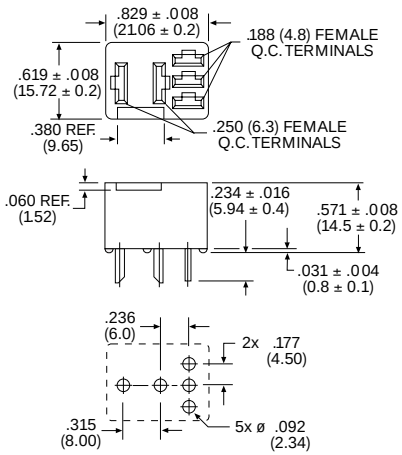
Wiring Diagrams (Bottom Views)



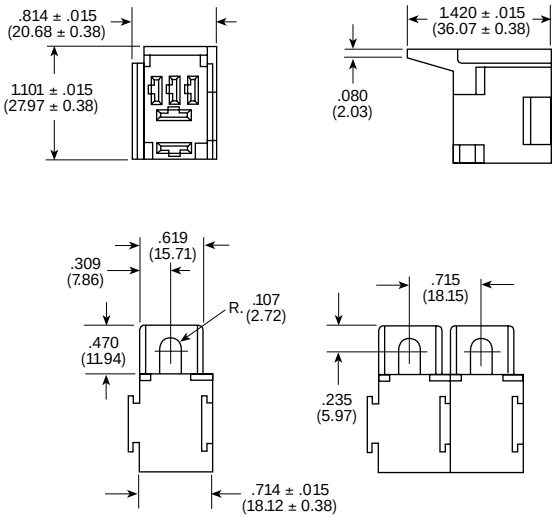
Connector

Connectors For Use With VFM Relays

PC Board Socket
VCFM-1000



Wire Harness Style, Bracket Mount Socket (Order Terminals Separately)
VCFM-1002



Connector/Terminal Usage Chart - Boldface items are stocked.

Connector	Terminal P/N	Required Crimp Terminals (Order Separately)					
		Alternate P/N	Wire AWG	Qty. Required		Use in Cavities	
				Form A	Form C	Form A	Form C
VCFM-1000	None	None	N/A	N/A	N/A	N/A	N/A
VCFM-1002	**26A1349A**	AMP 60249-1	12-16	2	2	3 & 5	3 & 5
	26A1349B	AMP 42281-1	14-18				
	26A1492A	G&H K26313	15-20	2	3	1 & 2	1, 2 & 4
	26A1492B	G&H K26312	14-16				

Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.
www.tycoelectronics.com
Technical support:
Refer to inside back cover.



VF4 series

40 Amp Relay With PC Board or Quick Connect Terminals for Automotive Applications

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- 40A continuous contact rating @ 85°C.
- 1 Form A and 1 Form C arrangements.
- Plug-in or PC board terminals.
- Optional mounting bracket.
- Various enclosure options.

Conditions

All parametric, environmental and life tests are performed according to EIA Standard RS-407-A at standard test conditions (23°C Ambient, 20-50% RH, 29.5 ± 1.0" Hg.) unless otherwise noted.

Contact Data

Arrangements: 1 Form A (SPST-NO) and 1 Form C (SPDT).
Material: AgNi 0.15 (consult factory for other contact materials).
Max. Switching Rate: 20 operations per second with no contact load.
6 operations per minute for rated life at rated load.
Max. Switching Voltage: 75VDC(1).
Max. Load Current (@ 14VDC Load Voltage):

Load	Form A (NO)	Form C	
		NO	NC
Max. Continuous Current	**60A**	**60A**	**40A**
Max. Make Current(2)	**120A**	**120A**	**45A**
Max. Break Current(1)	**60A**	**60A**	**40A**

Max. Switching Power: 50-500 watts DC (voltage dependent)(1).
Min. Recommended Current: 1 amp @ 12VDC.
Initial Voltage Drop: 200 millivolts, maximum, for normally open contacts @ 40 amp contact load.
250 millivolts, maximum, for normally closed contacts @ 30 amp contact load.
Expected Life: 10 million operations, mechanical; 100,000 operations at 40 amps, 14VDC, resistive load on normally open contact.

Initial Dielectric Strength

Between Contacts and Coil: 500V rms.

Coil Data

Voltage: 6, 12 and 24VDC.
Resistance: See Coil Data table.
Nom. Power: (@ 23°C coil temp. and rated coil voltage.):
16W, unsuppressed.
1.81W, with 680 ohm resistor.
Thermal Resistance: 50°C per actual coil watt in still air with no contact load current.

Operate Data

Must Operate and Must Release Voltage: See Coil Data table.
Initial Operate Time: 7 milliseconds, typical, with rated coil voltage applied.
Initial Release Time: 2 milliseconds, typical, with zero volts applied (for unsuppressed relays after having been energized at rated coil voltage.)

Environmental Data

Temperature Range: Storage: -40°C to +155°C.
Operating: -40°C to +125°C(4).
Shock: 20g, 11 milliseconds, half sine wave pulse.
Vibration: (For NC contacts, NO contacts are significantly higher.)
10-40 Hz., 1.27mm double amplitude.
40-70 Hz., 5 g's constant.
70-100 Hz., 0.5mm double amplitude.
100-500 Hz., 10 g's constant.

Mechanical Data

Termination: 0.250" quick connect and printed circuit terminals.
Enclosures:
Dust Cover: Protects relay from dust. For use in passenger compartment or enclosures.
Shrouded Dust Cover: Protects relay and relay connector (order separately) from dust and splash.
Weatherproof Cover: Mates with a connector (order separately) to seal relay from salt spray etc. Recommended for under hood application.
Cover Retention: Dust cover will withstand a 33.7 pound (150 Newton) force (axially applied) without detachment. Ultrasonic cover: 50 pound (220 Newton).
Weight: 31g (1.1 oz.) approximately (dust cover model).

Abnormal Operation

Overload Current: Consult factory.
24V Jump Start: 24VDC for 5 minutes conducting rated contact current @ 23°C.
Drop Test: Capable of meeting specifications after a 3.28 foot (1.0 meter) drop onto concrete.
Flammability: UL94V-0 external; UL94-HB or better, internal parts (meets FMVSS 302).

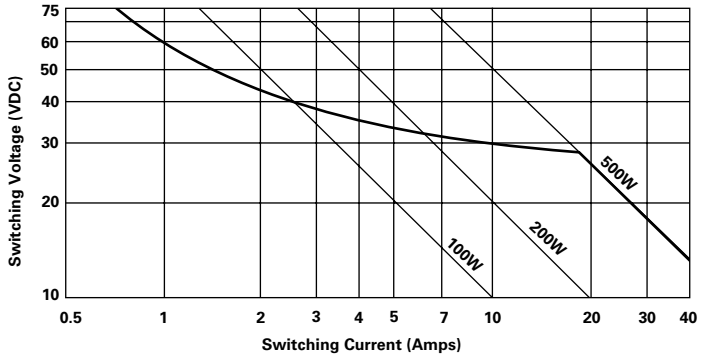
Notes

(1) See Figure 1.
(2) Inrush current for lamp load.
(3) Allowable overdrive is rated at ambient temperature for 23°C or 85°C as stated with no load current flowing through the relay contacts and minimum coil resistance. Also see Figure 2 for maximum ambient temperature versus applied coil voltage.
(4) See Figure 2.
(5) Current and times are compatible with circuit protection by a typical automotive circuit breaker. Relay will make, carry and break the specified current.

Coil Data

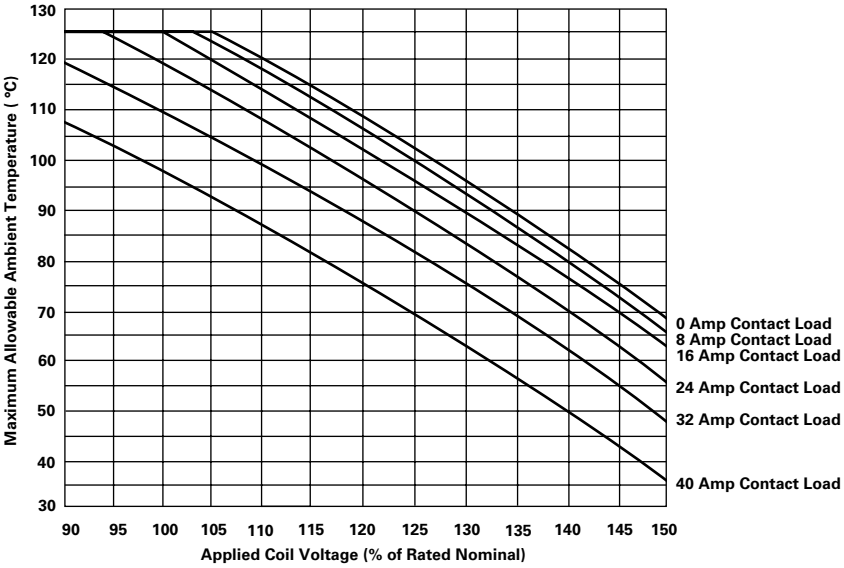
Coil Designator	Rated Coil Voltage (VDC)	Coil Resistance ±10% (Ohms)	Coil Inductance (H) (Ref.)	Must-Operate Voltage (VDC)	Must-Release Voltage (VDC)	Allowable(3) Overdrive (VDC)	
						@ 23°C	@ 85°C
D	6	22.5	0.2	3.6	0.6	10.1	7.9
F	12	90	0.8	7.2	1.2	20.2	15.7
H	24	360	2.7	14.4	2.4	40.5	31.5

Figure 1 – Limiting Curve for Power Load



Safe breaking, arc extinguished (normally open contact) for resistive loads.

Figure 2 – Ambient Temperature vs. Coil Voltage for Continuous Duty



Assumptions:

1. Thermal resistance = 50°C per watt
2. Still air
3. Nominal coil resistance
4. Maximum mean coil temperature = 180°C
5. Coil temperature rise due to load
   - = 2°C @ 8 amps
   - = 5°C @ 16 amps
   - = 11°C @ 24 amps
   - = 20°C @ 32 amps
   - = 32°C @ 40 amps
6. Thermal resistance and power dissipation based on coil resistance at 180°C
7. Curves are based on 1.6 watts at 23°C
8. When full lifetime is at high ambient and high load current, subtract 25°C from maximum allowable ambient temperature.

Ordering Information

Part Number	Contact Arrangement	Contact Material	Enclosure	Terminals
VF4-11_*_11	1 Form A	AgNi0.15	Dust cover	Quick connect
VF4-11_*_13	1 Form A	AgNi0.15	Dust cover	Printed circuit
VF4-15_*_11	1 Form C	AgNi0.15	Dust cover	Quick connect
VF4-15_*_13	1 Form C	AgNi0.15	Dust cover	Printed circuit
VF4-25_*_11	1 Form C	AgNi0.15	Shrouded dust cover	Quick connect
VF435_*_11	1 Form C	AgNi0.15	Weatherproof cover	Quick connect
VF4-41_*_11	1 Form A	AgNi0.15	Dust cover with bracket	Quick connect
VF4-45_*_11	1 Form C	AgNi0.15	Dust cover with bracket	Quick connect
VF4-45_*_21	1 Form C	AgSnO	Dust cover with bracket	Quick connect
VF4-51_*_11	1 Form A	AgNi0.15	Shrouded dust cover with bracket	Quick connect
VF4-55_*_11	1 Form C	AgNi0.15	Shrouded dust cover with bracket	Quick connect
VF4-61_*_11	1 Form A	AgNi0.15	Weatherproof cover with bracket	Quick connect
VF4-65_*_11	1 Form C	AgNi0.15	Weatherproof cover with bracket	Quick connect
VF4-81_*_11	1 Form A	AgNi0.15	Dust cover with molded bracket	Quick connect
VF4-85_*_11	1 Form C	AgNi0.15	Dust cover with molded bracket	Quick connect

*Standard Coil Voltages: D = 6VDC (Consult factory for availability).
F = 12VDC
H = 24VDC (Consult factory for availability).

Optional Coil Suppression
Add suffix -S07 for 180 ohm resistor in parallel with 6VDC coil.
Add suffix -S01 for 680 ohm resistor in parallel with 12VDC coil.
Add suffix -S08 for 2,700 ohm resistor in parallel with 24VDC coil.

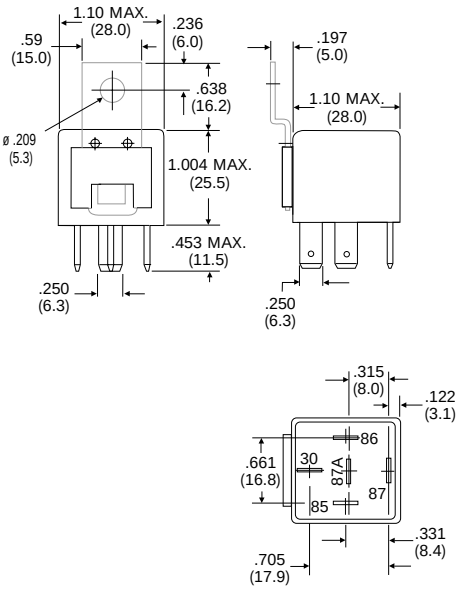
Epoxy Sealed Construction
Add suffix -C01 for epoxy sealed unit.
Add suffix -C05 for epoxy sealed unit with resistor.

Our authorized distributors are more likely to maintain the following items in stock for immediate delivery.

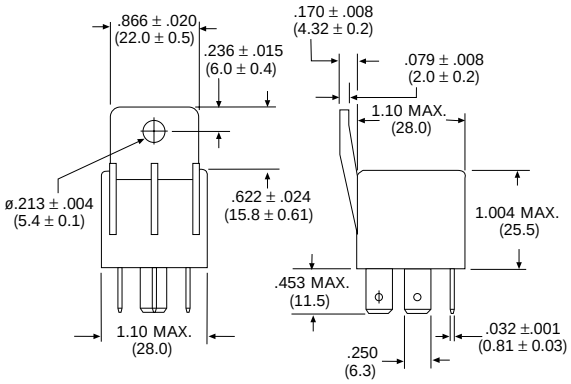
VF4-15F11
VF4-15F13
VF4-45F11
VF4-15H11
VF4-15H13
VF4-65F11-S01

Outline Dimensions

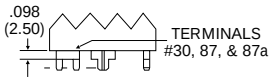
Dust Cover With Quick Connect Terminals
VF4-1_ _ (Without Bracket) & VF4-4_ _ (With Bracket)



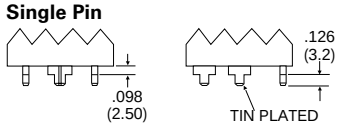
Plastic Bracket Cover With Quick Connect Terminals
VF4-8_ _ _ _



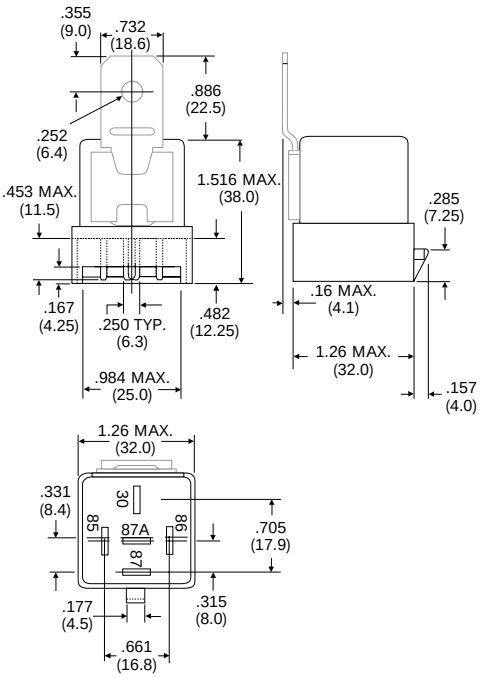
Printed Circuit Board Terminals
Clinchable Power



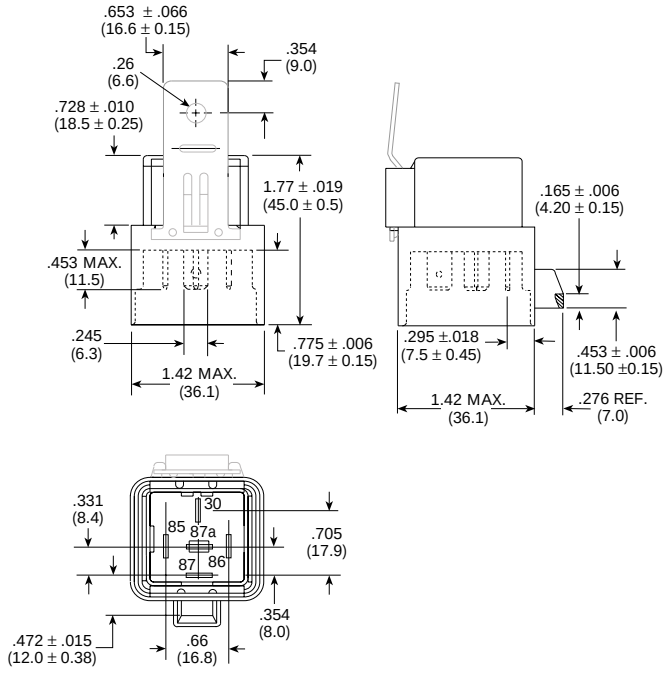
Single Pin



Shrouded Dust Cover With Quick Connect Terminals
VF4-2_ _ (Without Bracket) & VF4-5_ _(With Bracket)

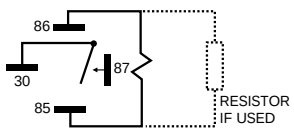


Weatherproof Cover With Quick Connect Terminals
VF4-3_ _ (Without Bracket) & VF4-6_ _(With Bracket)

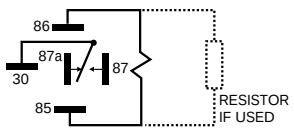


Wiring Diagrams (Bottom Views)

1 Form A

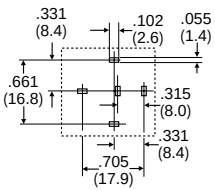


1 Form C

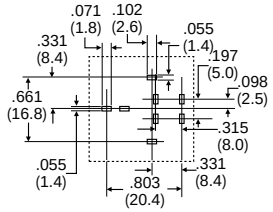


Suggested PC Board Layouts (Bottom Views)

VF4-XXX13



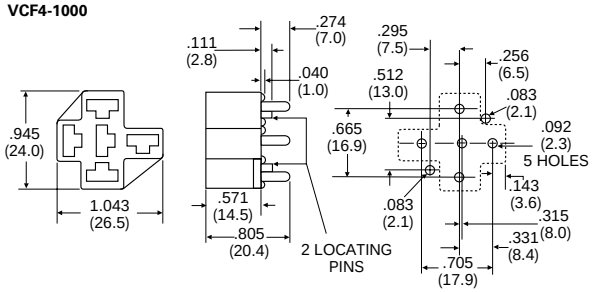
VF4-XXX12



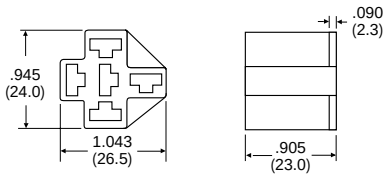
Connectors

Connectors For Use With Quick Connect Terminal VF4-1_ _ _ _, VF4-4_ _ _ _ And VF4-8_ _ _ _ Relays

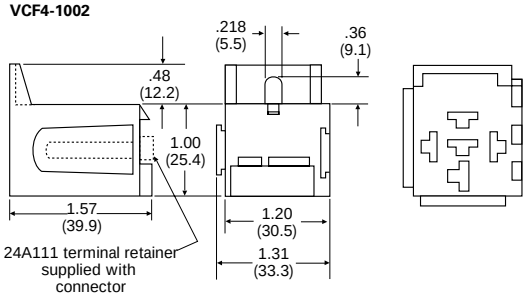
PC Board Socket
VCF4-1000



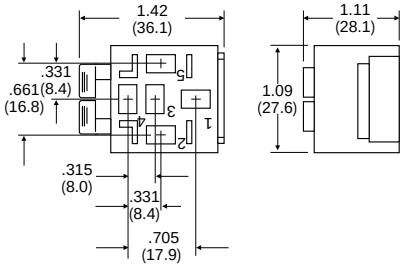
Wiring Harness Style Connector (order terminals separately)
VCF4-1001



Wiring Harness Style, Bracket Mount Socket (order terminals separately)
(Mount individually or can be interlocked)
VCF4-1002



Connector For Use With VF4-2_ _ _ _ or VF4-5_ _ _ _
Relays With Shrouded Dust Cover (order terminals separately)
VCF4-1003



Connector For Use With VF4-3_ _ _ _ or VF4-6_ _ _ _ Relays With Weatherproof Cover
Connectors to mate with the weatherproof cover relays are available from Delphi Packard (1-800-PACKARD).
(Typical Delphi Packard part number: 12065685).

Connector/Terminal Usage Chart - Our authorized distributors are more likely to stock boldface items.

Connector	Terminal P/N	Required Crimp Terminals (Order Separately)			
		Alternate P/N	Wire AWG	Qty. Required	
				Form A	Form C
VCF4-1000	None	None	N/A	0	0
VCF4-1001	**26A1349A**	AMP 60249-1	12-16	4	5
	26A1349B	AMP 42281-1	14-18		
VCF4-1002 VCF4-1003	**26A1348A**	Packard 12015864	18-20	4	5
	26A1348B	Packard 12015865	14-16		
	26A1348C	Packard 12084588	10-12		

Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.
www.tycoelectronics.com
Technical support:
Refer to inside back cover.



VF7series

70 Amp Relay With PC Board or Quick Connect Terminals for Automotive Applications

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- 70A continuous contact rating @ 85°C.
- 1 Form A arrangements.
- Plug-in or PC board terminals.
- Optional mounting bracket.

Conditions

All parametric, environmental and life tests are performed according to EIA Standard RS-407-A at standard test conditions (23°C Ambient, 20-50% RH, 29.5 ± 1.0" Hg.) unless otherwise noted.

Contact Data

Arrangements: 1 Form A (SPST-NO).
Material: AgNi 0.15 (consult factory for other contact materials).
Max. Switching Rate: 20 operations per second with no contact load.
6 operations per minute for rated life at rated load.
Max. Switching Voltage: 75VDC(1).
Max. Load Current (@ 14VDC Load Voltage):
Max. Continuous Current: 70A.
Max. Make Current: 120A(2).
Max. Break Current (1): 70A.
Max. Switching Power: 60-800 watts DC (voltage dependent)(1).
Min. Recommended Current: 1 amp @ 12VDC.
Initial Voltage Drop: 200 millivolts, max., @ 70 amp contact load.
Expected Life: 10 million operations, mechanical; 100,000 operations at 70 amps, 14VDC, resistive load.

Initial Dielectric Strength

Between Contacts and Coil: 500V rms.

Coil Data

Voltage: 12 and 24VDC.
Resistance: See Coil Data table.
Nom. Power: (@ 23°C coil temp. and rated coil voltage):
2.0W, unsuppressed.
2.21W, with 680 ohm resistor.
Thermal Resistance: 50°C per actual coil watt in still air with no contact load current.

Operate Data

Must Operate and Must Release Voltage: See Coil Data table.
Initial Operate Time: 7 milliseconds, typical, with rated coil voltage applied.
Initial Release Time: 2 milliseconds, typical, with zero volts applied (for unsuppressed relays after having been energized at rated coil voltage).

Environmental Data

Temperature Range: **Storage:** -40°C to +155°C.
Operating: -40°C to +125°C(4).
Shock: 20g, 11 milliseconds, half sine wave pulse.
Vibration: (For NC contacts, NO contacts are significantly higher.)
10-40 Hz., 1.27mm double amplitude.
40-70 Hz., 5g's constant.
70-100 Hz., 0.5mm double amplitude.
100-500 Hz., 10g's constant.

Mechanical Data

Termination: 0.250" and 0.375" quick connect and printed circuit terminals.
Enclosures: Plastic dust cover.
Cover Retention: Cover will withstand a 33.7 pound (150 Newton) force (axially applied) without detachment.
Weight: 31g (1.1 oz.) approximately.

Abnormal Operation

Overload Current: 140A, 60 sec.(5)
245A, 2 sec.
420A, 0.15 sec.
24V Jump Start: 24VDC for 5 minutes conducting rated contact current @ 23°C.
Drop Test: Capable of meeting specifications after a 1.0 meter drop onto concrete, (Sealed model only.)
Flammability: UL94-HB or better (meets FMVSS 302).

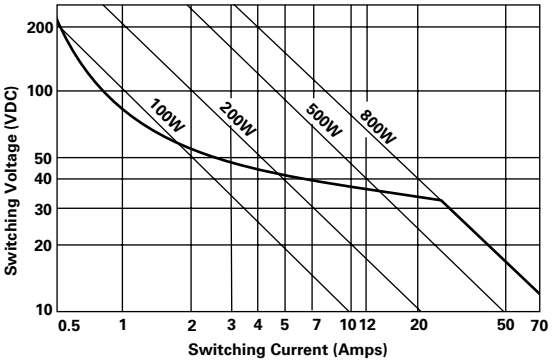
Notes

(1) See Figure 1.
(2) Inrush current for lamp load.
(3) Allowable overdrive is rated at ambient temperature for 23°C or 85°C as stated with no load current flowing through the relay contacts and minimum coil resistance. Also see Figure 2 for maximum ambient temperature versus applied coil voltage.
(4) See Figure 2.
(5) Current and times are compatible with circuit protection by a typical 70A automotive fuse. Relay will make, carry and break the specified current.

Coil Data (@ 23°C Coil Temperature)

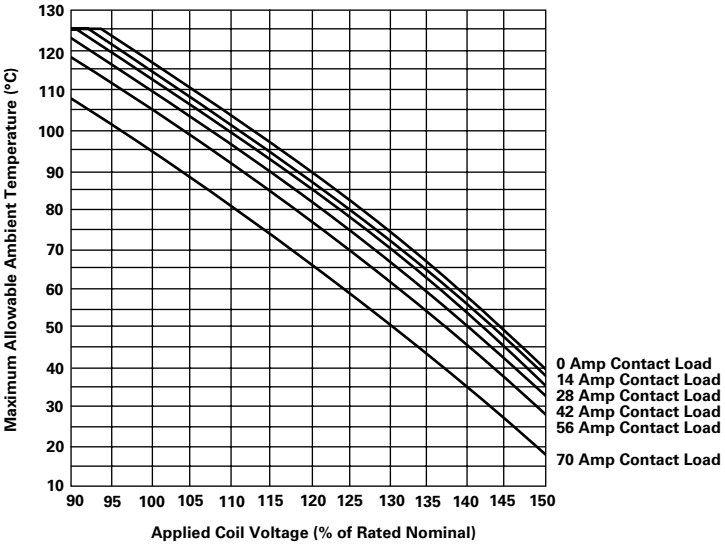
Coil Designator	Rated Coil Voltage (VDC)	Coil Resistance ±10% (Ohms)	Coil Inductance (H) (Ref)	Must-Operate Voltage (VDC)	Must-Release Voltage (VDC)	Allowable (3) Overdrive (VDC)	
						@ 23°C	@ 85°C
F	12	72	0.5	7.2	1.2	18.1	14.1
H	24	288	2.0	14.4	2.4	36.2	28.2

Figure 1 - Limiting Curve for Power Load



Safe breaking, arc extinguished (normally open contact) for resistive loads.

Figure 2 - Ambient Temperature vs. Coil Voltage for Continuous Duty



Assumptions:

1. Thermal resistance = 50°C per watt
2. Still air
3. Nominal coil resistance
4. Maximum mean coil temperature = 180°C
5. Coil temperature rise due to load
   - = 2°C @ 14 amps
   - = 4°C @ 28 amps
   - = 7°C @ 42 amps
   - = 12°C @ 56 amps
   - = 22°C @ 70 amps
6. Thermal resistance and power dissipation based on coil resistance at 180°C
7. Curves are based on 2.0 watts at 23°C
8. When full lifetime is at high ambient and high load current, subtract 25°C from maximum allowable ambient temperature.

Ordering Information

Part Number	Contact Arrangement	Enclosure	Terminals
VF7-11_*_11	1 Form A	Dust cover	Quick connect
VF7-11_*_12	1 Form A	Dust cover	Printed circuit (clinch)
VF7-41_*_11	1 Form A	Dust cover with bracket	Quick connect

*Standard Coil Voltages: F = 12VDC
H = 24VDC (Consult factory for availability)

Optional Coil Suppression
Add suffix -S01 for 680 ohm resistor in parallel with 12VDC coil.
Add suffix -S08 for 2700 ohm resistor in parallel with 24VDC coil.

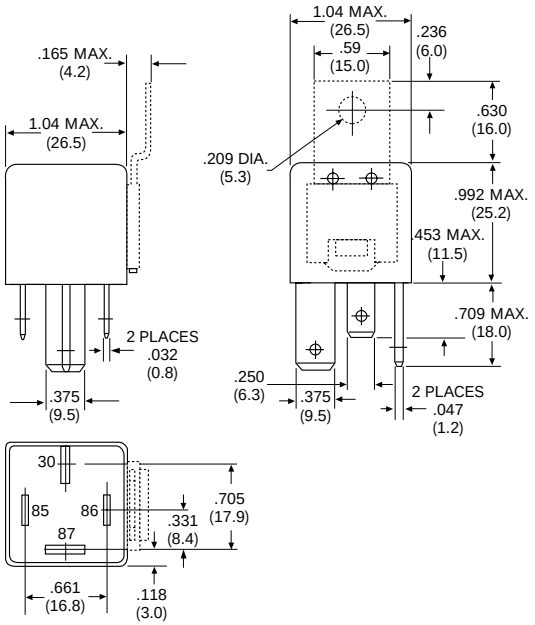
Epoxy Sealed Construction
Add suffix -C01 for epoxy sealed unit.

Our authorized distributors are more likely to maintain the following items in stock for immediate delivery.

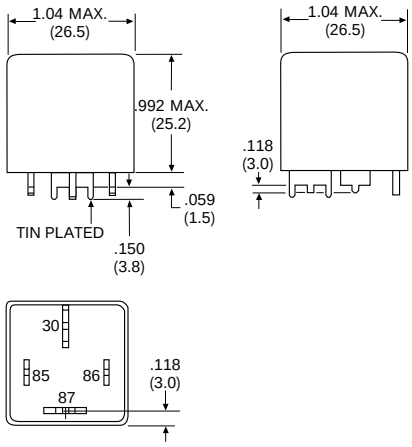
VF7-11F11
VF7-11F12
VF7-41F11

Outline Dimensions

Dust Cover With Quick Connect Terminals

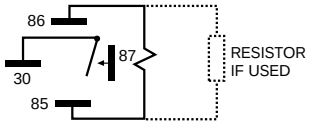


Printed Circuit Board Terminals

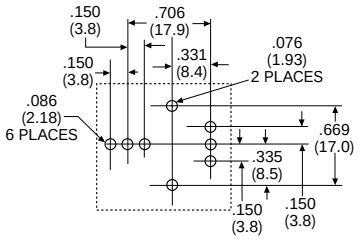


Wiring Diagram (Bottom View)

1 Form A

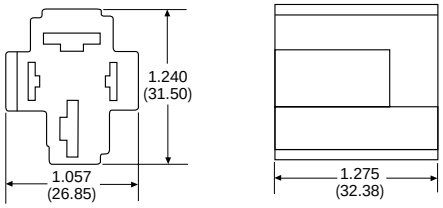


Suggested PC Board Layout (Bottom View)



Connector

Wiring Harness Style Connector For Use With Quick Connect VF7 Relays (order terminals separately)
VCF7-1000



Connector/Terminal Usage Chart - Our authorized distributors are more likely to stock boldface items.

Connector	Terminal P/N	Required Crimp Terminals (Order Separately)		
		Alternate P/N	Wire AWG	Qty. Required
VCF7-1000	**26A 1350A**	AMP 280756-4	10-12	2 (Contacts)
	26A 1350B	AMP 280755-4	6-10	2 (Contacts) and
	26A 1349B	AMP 42281-1	14-18	2 (Coil)

Note: For information on crimping tools, please consult local representative or factory.



VTF series

Flasher Modules for Automotive Applications

Safety Standards:
U.S.A.:
SAE J 590 (turn signal)
SAE J 945 (hazard warning)
SAE J 2068 (turn signal/hazard warning)
FMVSS 108 (all)
European:
Designed to meet ECO guideline 76/756 requirements.

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- Combination turn signal and hazard warning signal flasher.(1)
- Meets all applicable U.S.A. safety standards.
- Stable electronic timing.
- VKP relay with PdCu contact for output.
- Fits ISO 7588 socket.
- Wide operating voltage and temperature range.

Conditions

All parametric, environmental and life tests are performed according to EIA Standard RS407-A at standard test conditions (23°C Ambient, 20-50% RH, 29.5 ± 1.0" Hg.) unless otherwise noted.

Contact Load Requirements @ 12.8VDC

	Turn Signal Mode	Hazard Mode
Loads	5 Lamp System	5 Lamp System
Rated Loads	5x27W + 1x3.5W + 1x1.3W	10x27W + 2x3.5W + 2x1.3W

Flash Rate and Duty Cycle Data

Turn Signal Mode		Hazard Mode	
Normal Signal		Normal Signal	
FPM	**Duty Cycle**	**FPM**	**Duty Cycle**
70-110	35-55%	70-110	35-55%

Operate Data

Nominal Voltage: 12VDC system.
Operating Voltage Range: 9 - 16VDC.
Device Voltage Drop: Less than 0.400 VDC at rated turn signal load.
Less than 0.450 VDC at rated hazard signal load.
Inital Turn-on Time: Less than or equal to 50 msec.
Start Time: Less than 1.0 sec per FMVSS 108.
Sound Pressure Level : Min. 72 dbA at 1.0 meters.(2)

Environmental Data

Operating Ambient Temperature Range: -40°C to +85°C.
Storage Ambient Temperature Range: -40°C to +125°C.
Shock: 20g, 10 millisecond, half sine wave pulse.
Vibration: 10-40 Hz., 1.27mm double amplitude.
40-70 Hz., 5g's constant.
70-100 Hz., 0.5mm double amplitude.
100-500 Hz., 10g's constant.

Mechanical Data

Termination: 0.250"(6.35mm) quick connect.
Enclosures:
Dust Cover: Protects relay from dust.
Cover Retention: 50 pound (220 Newton) minimum.
Weight: 1.3 oz. (37g) approximately.

Abnormal Operation

Drop Test: Capable of meeting specifications after a 3.28 foot (1.0 meter) drop onto concrete in final enclosure.
Flammability: UL94-HB or better (meets FMVSS 302).

Notes

(1) Three lamp combination flashers with three terminals do not meet U.S. Federal motor vehicle safety requirements when lamp outage occurs during hazard mode operation. For more information consult factory.
(2) The actual sound pressure is highly dependent on mounting method used.

Ordering Information

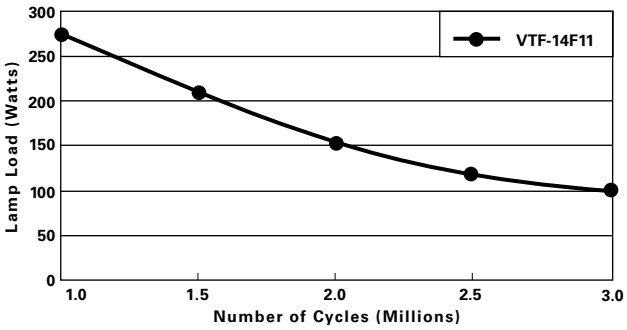
Part Number	Meets the Safety Standard of:	Flasher Type		Turn Signal Mode	Max. Number of Lamps	Lamp Outage Sensing
	U.S.A.	Turn	Turn/Hazard Warning	5 Lamp System	Hazard	No
VTF-11F31	X	X				
VTF-14F11	X		X	X	10	X

Our authorized distributors are more likely to maintain the following items in stock for immediate delivery.

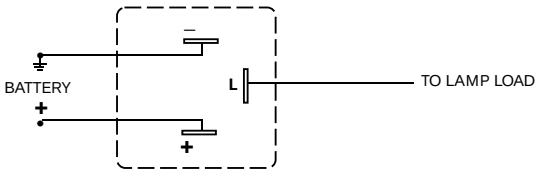
None at present.

Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.
www.tycoelectronics.com
Technical support:
Refer to inside back cover.

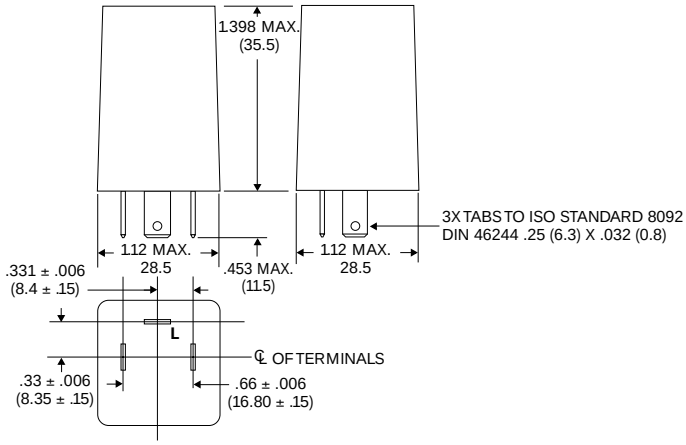
Figure 1 - Electrical Contact Life vs. Load Power



Wiring Diagram (Bottom View)

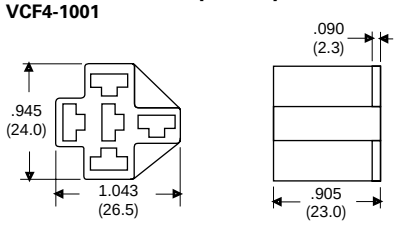


Outline Dimensions



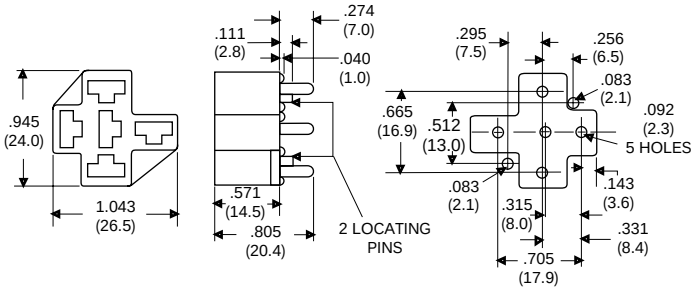
Connectors

Wiring Harness Style Connector (order terminals separately)
VCF4-1001

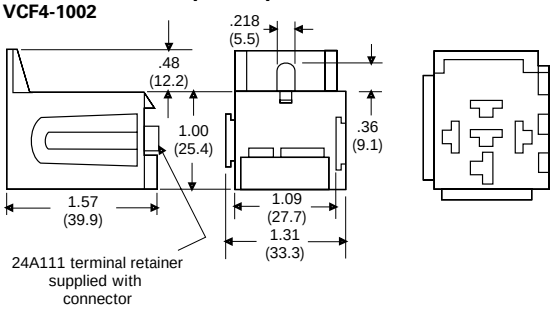


Sockets

PC Board Socket
VCF4-1000



Wiring Harness Style, Bracket Mount Socket (order terminals separately)
VCF4-1002



Connector/Terminal Usage Chart - Our authorized distributors are more likely to stock boldface items.

Connector	Required Crimp Terminals (Order Separately)			
	Terminal P/N	Alternate P/N	Wire AWG	Qty. Required
VCF4-1000	None	None	N/A	0
VCF4-1001	**26A1349A**	AMP 60249-1	12-16	3
	26A1349B	AMP 42281-1	14-18	
VCF4-1002	**26A1348A**	Packard 12015864	18-20	3
	26A1348B	Packard 12015865	14-16	
	26A1348C	Packard 12084588	10-12	

Engineering Notes

Dimensions are shown for reference purposes only.

Dimensions are in inches over (millimeters) unless otherwise specified.

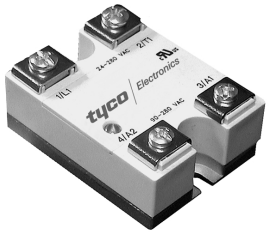
Specifications and availability subject to change.

Alphanumeric Index

Series	Type	Page
2IO	Mtg. Board for Standard I/O Modules	1114
2IOM	Mtg. Board for Slim Line I/O Modules	1122
IAC	Standard AC Input Modules	1110
IACM	Slim Line AC Input Modules	1118
IDC	Standard DC Input Modules	1110
IDCM	Slim Line DC Input Modules	1118
OAC	Standard AC Output Module	1110
OACM	Slim Line AC Output Module	1118
ODC	Standard DC Output Module	1110
ODCM	Slim Line DC Output Module	1118
SSR	Solid State Relay, Paired SCR Output	1104
SSRD	Dual Solid State Relay	1106
SSRQ	Quad Solid State Relay	1108
SSRT	Solid State Relay, Triac Output	1102

Additional solid state relays are included in our CII high performance relay product line. For an overview of the CII product line, see section 14 of this databook.

Solid State Relays & Input/Output Modules 1101-1126 **11**



SSRT series

"Hockey Puck" Solid State Relay With Snubberless Triac Output

c UL us File E29244

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- Standard "hockey puck" package.
- Enhanced noise immunity (designed to meet level 3 requirements of European EMC Directive).
- LED indicator.
- Floating terminal design.
- Low cost snubberless triac outputs.
- 10A & 25A rms versions.
- AC & DC input versions.
- 4000V rms isolation.

Engineering Data

Form: 1 Form A (SPST-NO).
Duty: Continuous.
Isolation: 4000V rms minimum, input - output.
Capacitance: 8.0 pf typical (input to output).
Temperature Range:
Storage: –40°C to +100°C
Operating Temperature: –20°C to + 80°C
Case Material: Plastic, UL rated 94V-0.
Case and Mounting: Refer to outline dimension.
Termination: Refer to outline dimension.
Approximate Weight: 3.5 oz. (98g).

Ordering Information

Sample Part Number ►	SSRT	-240	D	10

1. **Basic Series:** SSRT = "hockey puck" triac output solid state relay
2. **Line Voltage:** 240 = 24 - 280 VAC
3. **Input Type & Voltage:** A = 90 - 280 VAC linear
   D = 3 - 32 VDC constant current
4. **Maximum Switching Rating:** 10 = .1 - 10A rms, mounted to heatsink
   25 = .1 - 25A rms, mounted to heatsink

Our authorized distributors are more likely to maintain the following items in stock for immediate delivery.

SSRT-240A10 SSRT-240D10
SSRT-240A25 SSRT-240D25

Input Specifications

Parameter	AC Input/AC Output	DC Input/AC Output
Control Voltage Range V_{IN}	90 - 280VAC	3 - 32VDC
Must Operate Voltage $V_{IN(OP)}$ (Max.)	90VAC	3VDC
Must Release Voltage $V_{IN(REL)}$ (Min.)	10VAC	1VDC
Input Current (Max.)	8.5mA	14mA

Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.

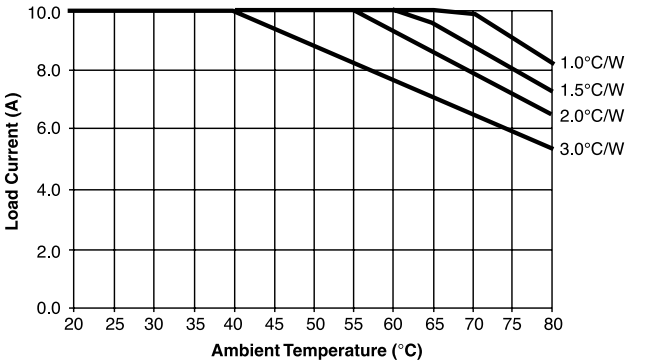
Output Specification (@ 25°C, unless otherwise specified)

Parameter	Conditions	Units	SSRT-240A10 & SSRT-240D10	SSRT-240A25 & SSRT-240D25
Load Voltage Range V_L		V rms	24 - 280	
Repetitive Blocking Voltage (Min.)		V peak	±600	
Load Current Range I_L*	Resistive	A rms	.1 - 10	.1 - 25
Single Cycle Surge Current (Min.)		A peak	100	250
Leakage Current (Off-State) (Max.)	f = 60 Hz. V_L = Nom. (120 or 240 V rms)	mA rms	.1	
On-State Voltage Drop (Max.)	I_L = Max.	V peak	1.5	1.3
Static dv/dt (Off-State) (Min.)		V/µs	500	
Thermal Resistance, Junction to Case ($R_{\theta j\text{-}c}$) (Max.)		° C/W	2.2	1.7
Turn-On Time (Max.)	f = 60 Hz.	ms	8.3 for DC input types, 20 for AC input types	
Turn-Off Time (Max.)	f = 60 Hz.	ms	8.3 for DC input types, 30 for AC input types	
I^2t Rating	t = 8.3 ms	A^2 Sec.	41	240
Load Power Factor Rating	I_L = Max.		0.5 - 1.0	

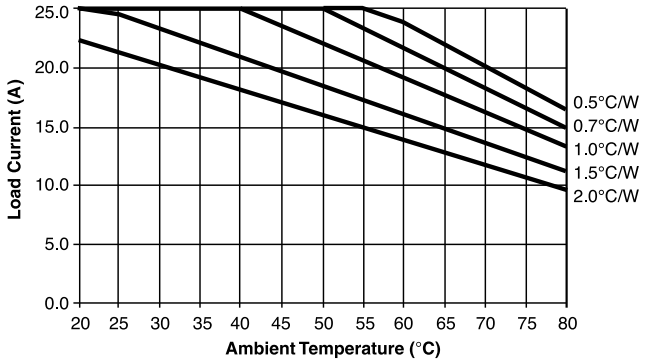
*See Derating Curves

Electrical Characteristics (Thermal Derating Curves)

10A Units



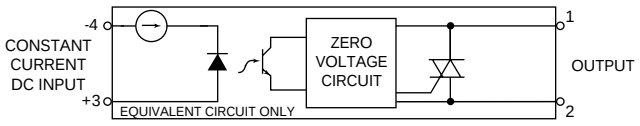
25A Units

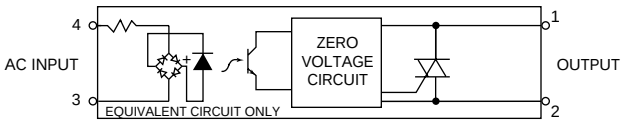


Heatsink Recommendations

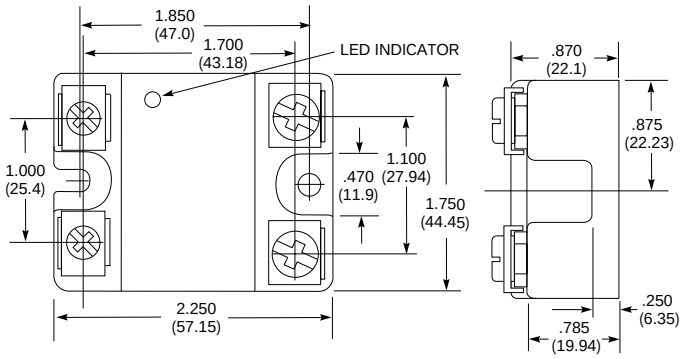
- We recommend that solid state relay modules be mounted to a heatsink sufficient to maintain the module's base temperature at less than 85°C under worst case ambient temperature and load conditions.
- The heatsink mounting surface should be a smooth (30-40 micro-inch finish), flat (30-40 micro-inch flatness across mating area), un-painted surface which is clean and free of oxidation.
- An even coating of thermal compound (Dow Corning DC340 or equivalent) should be applied to both the heatsink and module mounting surfaces and spread to a uniform depth of .002" to eliminate all air pockets.
- The module should be mounted to the heatsink using two#10 screws.

Operating Diagrams

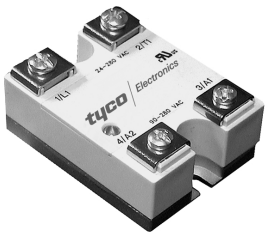




Outline Dimensions



SSR series



"Hockey Puck" Solid State Relay With Paired SCR Output

c UL us File E81606

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- Standard "hockey puck" package.
- Enhanced noise immunity (designed to meet level 3 requirements of European EMC Directive).
- LED indicator.
- Inverse parallel SCR output.
- 25, 50, & 125A rms versions.
- 120/240VAC & 480VAC output types.
- Zero voltage and random voltage turn-on versions.
- AC & DC input versions.
- 4,000V rms optical isolation.
- Floating terminal design.

Engineering Data

Form: 1 Form A (SPST-NO).
Duty: Continuous.
Isolation: 4,000V rms minimum.
Capacitance: 8 pf typical (input to output).
Temperature Range:
Storage: –40°C to +100°C
Operating: –20°C to +80°C
Case Material: Plastic, UL rated 94V-0.
Case and Mounting: Refer to outline dimension.
Termination: Refer to outline dimension.
Approximate Weight: 3.5 oz. (98g).

Ordering Information

Sample Part Number ► **SSR -240 D 25**

1. **Basic Series:** SSR = "hockey puck" inverse parallel SCR output solid state relay
2. **Line Voltage:** 240 = 24 - 240VAC 480 = 48 - 660VAC
3. **Input Type & Voltage:** A = 90 - 280VAC
   D = 3 - 32VDC
4. **Maximum Switching Rating/Output:** 25 = .1 - 25A rms, mounted to heatsink
   50 = .1 - 50A rms, mounted to heatsink
   125 = .1 - 125A rms, mounted to heatsink
5. **Options:** Leave Blank = Zero voltage turn-on
   R = Random voltage turn-on (phase controllable)

Our authorized distributors are more likely to maintain the following items in stock for immediate delivery.

SSR-240A25	SSR-240D25	SSR-240D50
SSR-240A50	SSR-240D25R	SSR-480D125

Input Specifications

Parameter	AC Input	DC Input
	Zero V Turn-on Units	Zero and Random V Turn-on Units
Control Voltage Range V_{IN}	90 - 280VAC	3 - 32VDC
Must Operate Voltage $V_{IN(OP)}$ (Min.)	90VAC	3VDC
Must Release Voltage $V_{IN(REL)}$ (Min.)	10VAC	1VDC
Input Current (Max.)	15mA	15mA

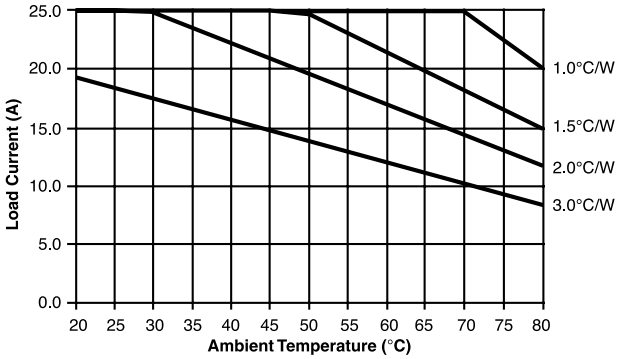
Output Specifications (@ 25° C, unless otherwise specified)

Parameter	Nom. Line Voltage	Conditions	Units	25A Models	50A Models	125A Models
Load Voltage Range V_L	120/240V Model		V rms	24 - 280		
	480V Model		V rms	48 - 660		
Repetitive Blocking Voltage (Min.)	120/240 Model		V peak	±600		
	480V Model		V peak	±1200		
Load Current Range I_L*	120/240 & 480V Models	Resistive	A rms	.05 - 25	.1 - 50	.1 - 125
Single Cycle Surge Current (Min.)	120/240 & 480V Models		A peak	250	750	1,700
Leakage Current (Off-State) (Max.)	120/240V Model	f = 60 Hz. V_L = 240V rms	mA rms	.1		
	480V Model	f = 60 Hz. V_L = 480V rms		.25		
On-State Voltage Drop (Max.)	120/240 & 480V Models	I_L = Max.		1.35		
Static dv/dt (Off-State) (Min.)	120/240 & 480V Models		V/µs	500		
Thermal Resistance, Junction to Case ($R_{\theta J-C}$) (Max.)	120/240 & 480V Models		°C/W	0.4	0.25	.15
Turn-On Time (Max.)	120/240 & 480V Models	f = 60 Hz.	ms	8.3 for Zero Voltage Turn-On DC input types, 20 for Zero Voltage Turn-On AC input types, 0.02 for Random Voltage Turn-On Models		
Turn-Off Time (Max.)	120/240 & 480V Models	f = 60 Hz.	ms	8.3 for DC input types, 30 for AC input types		
I^2T Rating	120/240 & 480V Models	t = 8.3 ms	A^2 Sec.	937	2,458	12,000
Load Power Factor Rating	120/240 & 480V Models	I_L = Max.		0.5 - 1.0		

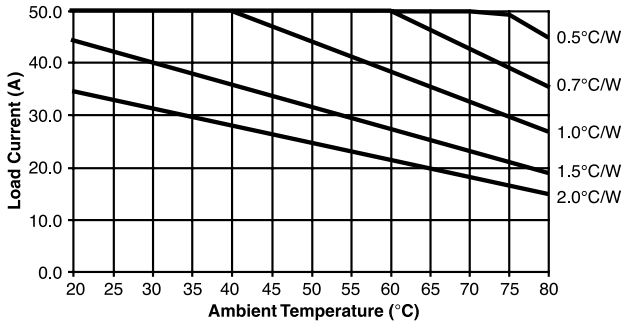
*See Derating Curves

Electrical Characteristics (Thermal Derating Curves)

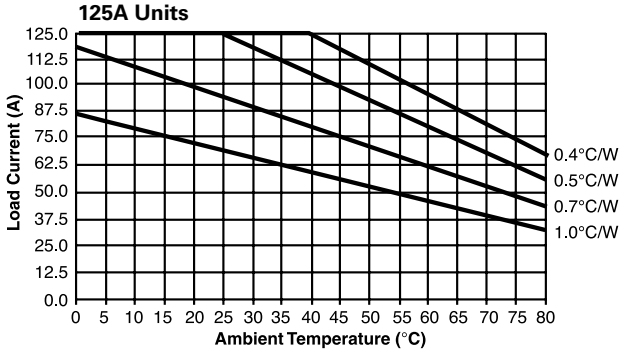
25A Units



50A Units



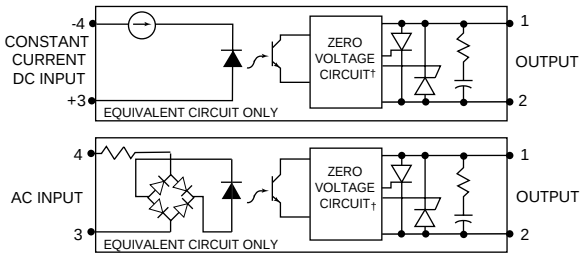
125A Units



Heatsink Recommendations

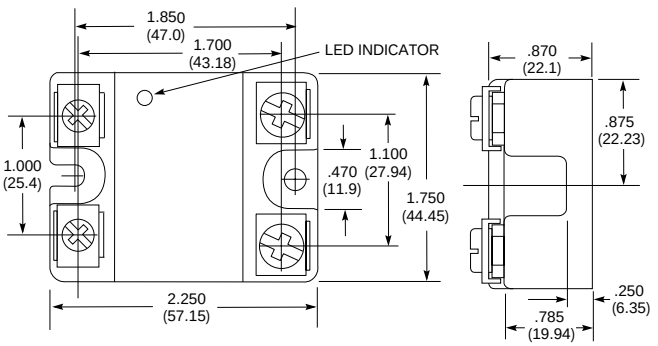
- We recommend that solid state relay modules be mounted to a heatsink sufficient to maintain the module's base temperature at less than 85°C under worst case ambient temperature and load conditions.
- The heatsink mounting surface should be a smooth (30-40 micro-inch finish), flat (30-40 micro-inch flatness across mating area), un-painted surface which is clean and free of oxidation.
- An even coating of thermal compound (Dow Corning DC340 or equivalent) should be applied to both the heatsink and module mounting surfaces and spread to a uniform depth of .002" to eliminate all air pockets.
- The module should be mounted to the heatsink using two #10 screws.

Operating Diagrams



† Random Turn-on Units have a Random Turn-on circuit instead of Zero Voltage Circuit

Outline Dimensions



SSRD series

Dual AC Output "Hockey Puck" Solid State Relay With Paired SCR Outputs



c UL us File E81606

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- Two independent AC output solid state relays in one standard package.
- Enhanced noise immunity (designed to meet level 3 requirements of European EMC Directive).
- Inverse parallel SCR outputs.
- 25A rms & 40A rms versions available.
- 4-15 VDC input control.
- Zero voltage and random voltage turn-on versions.
- 4000V rms optical isolation.
- Quick connect style terminals.

Engineering Data

Form: 2 Form A (2 SPST-NO).
Duty: Continuous.
Isolation: 4000V rms input-to-output;
2500V rms input or output to ground.
Capacitance: 8.0 pf typical (input to output).
Temperature Range:
Storage: –40°C to +100°C
Operating: –40°C to + 80°C
Case Material: Plastic, UL rated 94V-0.
Case and Mounting: Refer to outline dimension.
Termination: Refer to outline dimension.
Approximate Weight: 3.5 oz. (98g).

Ordering Information

Sample Part Number ►	SSRD	-240	D	25

1. **Basic Series:** SSRD = Dual output SSR - 2 SPST - NO
2. **Line Voltage:** 240 = 24-280 VAC
3. **Input Type & Voltage:** D = 4-15 VDC
4. **Maximum Switching Rating/Output:** 25 = .1-25A rms @ 25°C, mounted to heatsink
   40 = .1-40A rms @ 25°C, mounted to heatsink
5. **Options:** Blank = Zero voltage turn-on (both outputs)
   R = Random voltage turn-on (both outputs)

Our authorized distributors are more likely to maintain the following items in stock for immediate delivery.

SSRD-240D25 SSRD-240D40

Input Specifications

Parameter	Units	Zero V Turn-on and Random V Turn-on Units
Control Voltage Range V_{IN}	VDC	4-15
Must Operate Voltage $V_{IN(OP)}$ (Min.)	VDC	3.75
Must Release Voltage $V_{IN(REL)}$ (Min.)	VDC	1
Input Current (Max.)	mA DC	34
Input Current (Min. for On-State)	mA DC	7.5
Input Resistance	Ohms	500

Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.

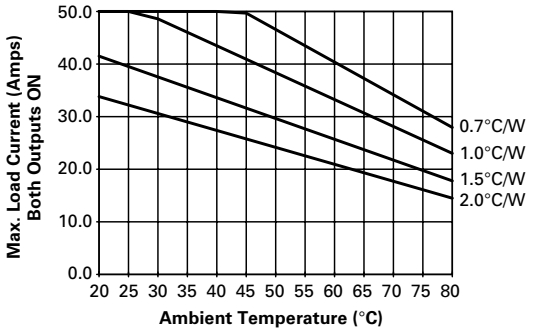
Output Specifications (@ 25° C, unless otherwise specified)

Parameter	Conditions	Units	25A Models	40A Models
Load Voltage Range V_L	f = 47 - 63 Hz.	V rms	24-280	
Peak Voltage (Min.)	t = 1 Min.	V peak	550	
Load Current Range I_L*	Resistive	A rms	0.1-25	0.1-40
Single Cycle Surge Current (Max.)		A peak	500	780
One Second Surge Current (Max.)		A peak	150	234
Leakage Current (Off-State) (Max.)	V_L = 280V rms	mA rms	0.1	
On-State Voltage Drop (Max.)	I_L = Max.	V peak	1.4	1.3
Static dv/dt (Off-State) (Min.)		V/µs	500	
Thermal Resistance, Junction to Baseplate ($R_{\theta J-B}$) (Max.)	Both Sections On	°C/W	0.6	0.6
Turn-On Time (Max.)	f = 60 Hz.	ms	8.33 for Zero Voltage Turn-On Models <0.1 for Random Voltage Turn-On Models	
Turn-Off Time (Max.)	f = 60 Hz.	ms	8.33	
I^2t Rating	t = 8.3 ms	A^2 Sec.	1,041	2,435
Load Power Factor Rating	I_L = Max.		0.5 - 1.0	

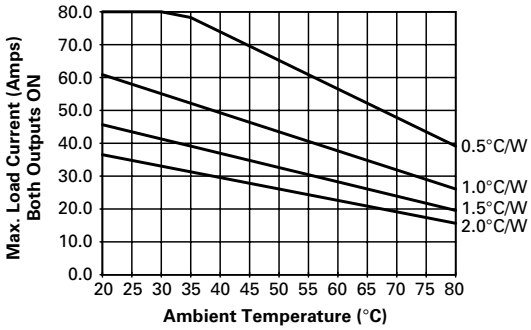
*See Derating Curves

Electrical Characteristics (Thermal Derating Curves)

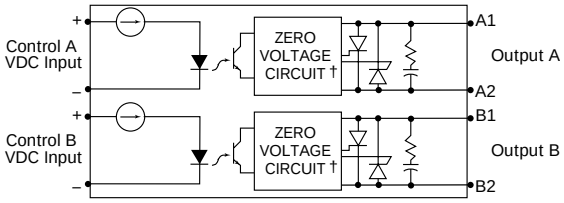
25A Units



40A Units



Operating Diagram

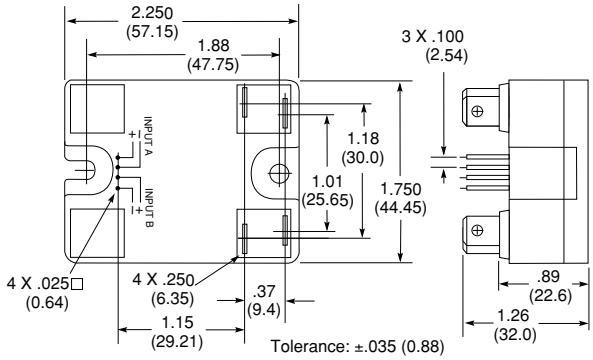


† Random Turn-on Units have a Random Turn-on circuit instead of Zero Voltage Circuit

Heatsink Recommendations

- We recommend that solid state relay modules be mounted to a heatsink sufficient to maintain the module's base temperature at less than 85°C under worst case ambient temperature and load conditions.
- The heatsink mounting surface should be a smooth (30-40 micro-inch finish), flat (30-40 micro-inch flatness across mating area), un-painted surface which is clean and free of oxidation.
- An even coating of thermal compound (Dow Corning DC340 or equivalent) should be applied to both the heatsink and module mounting surfaces and spread to a uniform depth of .002" to eliminate all air pockets.
- The module should be mounted to the heatsink using two #10 screws.

Outline Dimensions



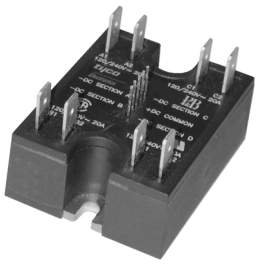
Input Terminal Connectors are available from several different manufacturers.

AMP P/N: 103976-3 or 640440-4
Methode P/N: 1300-004-422

Consult your local distributor for these or equivalent connectors.

SSRQ series

Quad AC Output "Hockey Puck" Solid State Relay With Triac Outputs



c UL us File E29244

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- Four independent AC output solid state relays in one standard package.
- 20A rms triac outputs.
- 4-15 VDC input control.
- Zero voltage and random voltage turn-on versions.
- 2500V rms optical isolation.
- Quick connect style terminals.

Engineering Data

Form: 4 Form A (4 SPST-NO).
Duty: Continuous.
Isolation: 2500V rms input-to-output-to-ground.
Capacitance: 10.0 pf maximum (input to output).
Temperature Range:
Storage: –40°C to +125°C
Operating: –40°C to + 80°C
Case Material: Plastic, UL rated 94V-0.
Case and Mounting: Refer to outline dimension.
Termination: Refer to outline dimension.
Approximate Weight: 3.5 oz. (98g).

Ordering Information

Sample Part Number ►	SSRQ	-240	D	20

1. Basic Series: SSRQ = Quad output SSR - 4 SPST - NO

2. Line Voltage: 240 = 24 - 280 VAC

3. Input Type & Voltage: D = 4 - 15VDC, zero voltage turn-on types.
R = 4 - 15VDC, random voltage turn-on types.

4. Maximum Switching Rating/Output: 20 = .05 - 20A rms, mounted to heatsink. NOTE: 60A max. per package.

5. Options: Blank = Zero voltage turn-on (all sections) Requires "D" input type above.
R = Random voltage turn-on (all sections) Requires "R" input type above.

Our authorized distributors are more likely to maintain the following items in stock for immediate delivery.

SSRQ-240D20

Input Specifications

Parameter	Conditions	Units	Zero V or Random V Turn-on Units
Control Voltage Range V_{IN}	@ 25°C	VDC	4-15
Must Operate Voltage $V_{IN(OP)}$ (Min.)	@ 25°C	VDC	4
Must Release Voltage $V_{IN(REL)}$ (Min.)	@ 25°C	VDC	1
Input Current (Typ.)	@ 25°C	mA DC	12
Input Impedance (Nom.)	@ 25°C	ohms	330

Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.

Output Specifications (@ 25° C, unless otherwise specified)

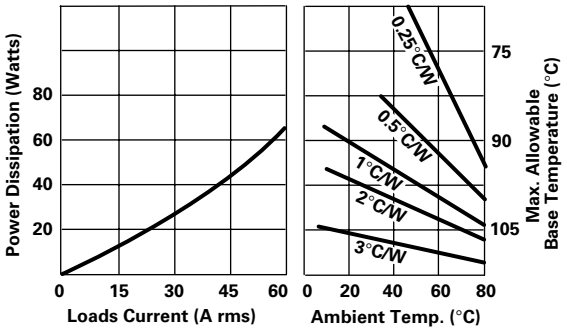
Parameter	Conditions	Units	
Load Voltage Range V_L		V rms	24-280
Repetitive Blocking Voltage (Min.)		V peak	±600
Load Current Range I_L*	Resistive	A rms	.15-20
Single Cycle Surge Current (Min.)		A peak	250
Leakage Current (Off-State) (Max.)	f = 60 Hz. V_L = 280Vrms	mA rms	10
On-State Voltage Drop (Max.)	I_L = Max.	V peak	1.6
Static dv/dt (Off-State) (Min.)	V_L = 280Vrms	V/µs	200
Thermal Resistance, Junction to Case ($R_{\theta J-C}$) (Max.)	All Sections On	°C/W	1.2
Turn-On Time (Max.)	f = 60 Hz.	ms	8.3 for Zero Voltage Turn-On Models 0.1 for Random Voltage Turn-On Models
Turn-Off Time (Max.)	f = 60 Hz.	ms	8.3
I^2t Rating	t = 8.3 ms	A^2Sec.	260
Load Power Factor Rating	I_L = Max.		0.5 - 1.0

*See Thermal Derating Curves. Note: While each output section is rated for a maximum of 20A, the maximum output per package is 60A.

Electrical Characteristics (Thermal Derating Curves)

How To Use These Curves

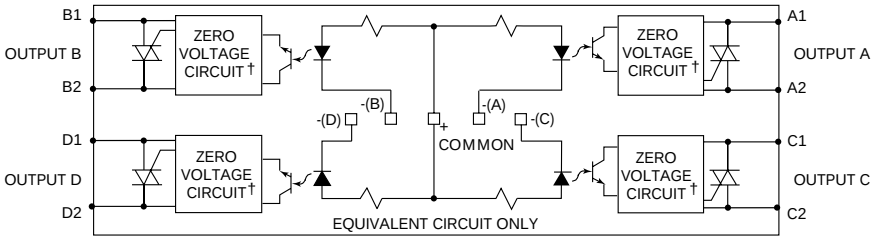
Knowing maximum load current and maximum ambient temperature, use derating curves to determine required heat sink and maximum allowable base plate temperature. On left hand power dissipation curve, locate the point corresponding to maximum load current. Extend a line to the right from that point to the intersection of vertical line on right hand chart corresponding to maximum ambient temperature. From heat sink curve, read directly or extrapolate required heat sink size. Extend the line farther to the right and read on the right hand scale the maximum allowable base plate temperature.



Example #1:
Given: I_L = Four 7.5A loads @ 60°C
Find: Minimum heatsink required
Solution: From Thermal Dissipation Graph
4 x 7.5A = 30A 4 sections ON
Heatsink = 2°C/W minimum

Example #2:
Given: SSRQ24020
Find: Maximum rating mounting to 1.0°C/W HS @ 60°C All sections ON
Solution: From Thermal Dissipation Graph
Rating mounted to 1.0°C/W HS @ 60°C = 36A total
9A for 4 Sections ON = 36A total
12A for 3 Sections ON = 36A total

Operating Diagram

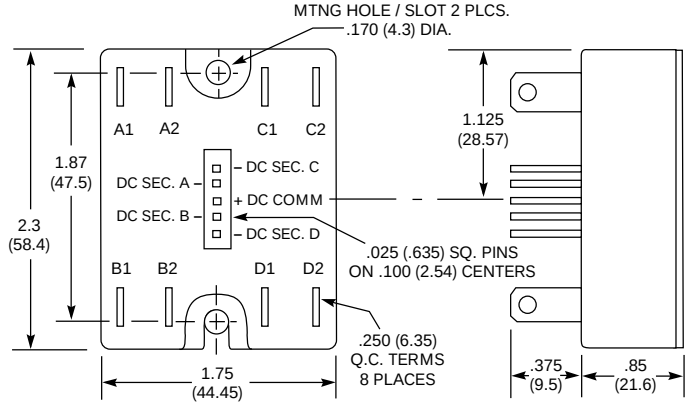


† Random Turn-On Units Have A Random Turn-On Circuit Instead Of A Zero Voltage Circuit

Heatsink Recommendations

- We recommend that solid state relay modules be mounted to a heatsink sufficient to maintain the module's base temperature at less than 85°C under worst case ambient temperature and load conditions.
- The heatsink mounting surface should be a smooth (30-40 micro-inch finish), flat (30-40 micro-inch flatness across mating area), un-painted surface which is clean and free of oxidation.
- An even coating of thermal compound (Dow Corning DC340 or equivalent) should be applied to both the heatsink and module mounting surfaces and spread to a uniform depth of .002" to eliminate all air pockets.
- The module should be mounted to the heatsink using two #10 screws.

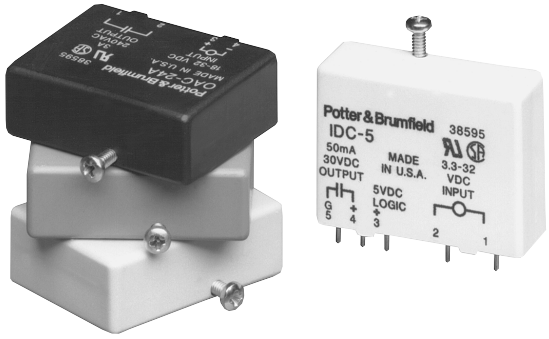
Outline Dimensions



Input Terminals mate with the following connectors or equivalent:

AMP P/N: 103976-4

Consult your local distributor for connectors.



IAC/OAC
IDC/ODC

Input/Output Modules

File E81606 & E29244
File LR38595M77

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- Industry standard package and pin-out.
- Color coded by function.
- 4,000V rms optical isolation.
- High immunity to false operation.
- Series compatible.
- Output modules can be controlled from sinking or sourcing logic.
- Compatible with 2IO series mounting boards.

Engineering Data (all I/O modules)

Switch Form: 1 Form A (SPST-NO)
Duty: Continuous.
Isolation: 4,000V rms, 60 Hz.
Capacitance: 8 pF Typical (input to output).
Operating Temperature: –30°C to +80°C.
Storage Temperature: –40°C to +85°C.
Potting Compound Flammability: UL94V-0.
Approximate Weight: 1.38 oz. (35g).

Ordering Information

Typical Part Number ▶	OAC	-5	H

1. Basic Series:
IAC = AC input module - yellow case
IDC = DC input module - white case
OAC = AC output module - black case
ODC = DC output module - red case

2. Input or Logic Voltage:
5 = 5VDC
15 = 15VDC
24 = 24VDC

3. Options:

Blank =	IAC Type	—	120VAC/VDC input (90-140VAC/VDC) * *
	IDC Type	—	3.3-32VDC input * *
	OAC Type	—	3A, 24-280VAC, zero voltage turn-on output
	ODC Type	—	3A, 3-60VDC output
A =	IAC Type	—	240VAC/VDC input (180-280VAC/VDC) * *
	OAC Type	—	3A, 24-280VAC, zero voltage turn-on output
	ODC Type	—	1A, 3-250VDC output
	IDC Type	—	10-60VDC input * *
E =	IAC Type	—	18-36VAC/VDC input * *
F =	IDC Type	—	4-32VDC input & fast turn-on & turn-off times * *
H =	OAC Type	—	5A, 24-280VAC, zero voltage turn-on output
R =	OAC Type	—	5A, 12-280VAC, random voltage turn-on output

* * Is not polarity sensitive.

Our authorized distributors are more likely to maintain the following items in stock for immediate delivery.

IAC-5	IDC-24	OAC-24A
IAC-5A	OAC-5	ODC-5
IAC-5E	OAC-5A	ODC-5A
IAC-15	OAC-5H	ODC-15
IAC-24	OAC-15	ODC-15A
IDC-5	OAC-24	ODC-24

Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.

IAC
AC Input Modules

Input Specifications

Parameter	Conditions	Units	IAC-5 IAC-15 IAC-24			IAC-5A IAC-15A IAC-24A			IAC-5E IAC-15E IAC-24E		
			Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.
Control Voltage Range V_{IN}		VAC/VDC	90	120	140	180	240	280	18	24	36
Must Operate Voltage $V_{IN(OP)}$		VAC/VDC			90			180			18
Must Release Voltage $V_{IN(REL)}$		VAC/VDC	20			20			3		
Max. Input Current	@V_{IN}=Max.	mA			6			6			18
Input Resistance		Ohms		28K			75K			2K	

Output Specifications (@ +25˚C unless otherwise specified)

Parameter	Conditions	Units	IAC-5 IAC-5A IAC-5E			IAC-15 IAC-15A IAC-15E			IAC-24 IAC-24A IAC-24E		
			Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.
Maximum Output Voltage		VDC			30			30			30
Maximum Output Current		mADC			50			50			50
Maximum Output Leakage Current	V_{OUT}=Max.	µADC			10			10			10
Maximum Output Voltage Drop	I_{SINK}=50mA	VDC			.2			.2			.2
Logic Supply Voltage V_{CC}		VDC	3	5	6	12	15	18	20	24	30
Logic Supply Current	V_{CC}=Max.	mADC			18			18			18
Turn-On Time (Nominal)	I_{SINK}=25mA	ms			20			20			20
Turn-Off Time (Nominal)	I_{SINK}=25mA	ms			30			30			30
Output Type (Open Collector)			Normally Open(SINKING)			Normally Open(SINKING)			Normally Open(SINKING)		

OAC
AC Output Modules

Input Specifications

Parameter	Conditions	Units	OAC-5 OAC-5A OAC-5H OAC-5R			OAC-15 OAC-15A OAC-15H OAC-15R			OAC-24 OAC-24A OAC-24H OAC-24R		
			Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.
Control Voltage Range V_{IN}		VDC	3	5	8	9	15	18	18	24	32
Must Operate Voltage $V_{IN(OP)}$		VDC			3			9			18
Must Release Voltage $V_{IN(REL)}$		VDC	1			1			1		
Maximum Input Current	@V_{IN}=Nominal	mADC			20			16			13
Input Resistance R_{IN}		Ohms		220			1000			2000	

PIN-3 must be positive with respect to PIN-4 for correct operation.

Output Specifications (47 to 63 Hz.,@ +25˚C unless otherwise specified)

Parameter	Conditions	Units	OAC-5 OAC-5A OAC-15 OAC-15A OAC-24 OAC-24A			OAC-5H IAC-15H OAC-24H			OAC-5R OAC-15R OAC-24R		
			Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.
Load Voltage V_L		V rms	24	120/240	280	24	120/240	280	24	120/240	280
Repetitive Blocking Voltage		V peak			±600			±600			±600
Load Current I_L*		A rms	.05		3	.05		5	.05		5
Ouput Current		mA/°C		58mA/°C			66mA/°C			66mA/°C	
Derating				40°C - 80°C			30°C - 80°C			30°C - 80°C	
Single Cycle surge Current		A peak			100			250			250
Leakage Current (Off-State)	V_L=120VAC	mA rms			1			1			1
@ 60 Hz.	V_L=240VAC	mA rms			2			2			2
On-State Voltage Drop	I_L=Max.	V peak			1.6			1.6			1.6
Static dv.dt (Off-State)		V/µs			200			200			200
Turn-On Time	@f=60 Hz.	ms			8.3			8.3			.1
Turn-Off Time		ms			8.3			8.3			8.3
Output Type (Form)			Normally Open 1A			Normally Open 1A			Normally Open 1A		
H/P/ Rating @ 240VAC			1/4HP			1/2HP			1/2HP		

IDC
DC Input Modules

Input Specifications

Parameter	Conditions	Units	IDC-5 IDC-15 IDC-24			IDC-5A IDC-15A IDC-24A			IDC-5F IDC-15F IDC-24F		
			Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.
Control Voltage Range V_{IN}		VDC	±3.3	±24	±32	±10		±60	±4		±32
Must Operate Voltage $V_{IN(OP)}$		VDC			±3.3			±10			±4
Must Release Voltage $V_{IN(REL)}$		VDC	±2			±3			±1		
Maximum Input Current	@ V_{IN}=Max.	mA		34			34			68	
Input Resistance		Ohms		1K			2K			500	

Output Specifications (@ +25˚C unless otherwise specified)

Parameter	Conditions	Units	IDC-5 IDC-5A			IDC-15 IDC-15A			IDC-24 IDC-24A			IDC-5F			IDC-15F			IDC-24F		
			Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max
Maximum Output Voltage		VDC			30			30			30			30			30			30
Maximum Output Current		mADC			50			50			50			50			50			50
Maximum Output Leakage Current	V_{OUT}=Max.	µADC			10			10			10			10			10			10
Maximum Output Voltage Drop	I_{SINK}=50mA	VDC			.2			.2			.2			.2			.2			.2
Logic Supply Voltage V_{CC}		VDC	3	5	6	12	15	18	20	24	30	3	5	6	12	15	18	20	24	30
Logic Supply Current	V_{CC}=Max.	mADC			18			18			18			18			18			18
Turn-On Time (Nominal)	I_{SINK}=25mA	ms		1*			1*			1*			.05			.05			.05	
Turn-Off Time (Nominal)	I_{SINK}=25mA	ms		1*			1*			1*			.10			.10			.10	
Output Type (Open Collector)			Normally Open (SINKING)			Normally Open (SINKING)			Normally Open (SINKING)			Normally Open (SINKING)			Normally Open (SINKING)			Normally Open (SINKING)		

* Nominal Turn-On and Turn-Off times for IDC5A, IDC15A & IDC24A are 5 ms.

ODC
DC Output Modules

Input Specifications

Parameter	Conditions	Units	ODC-5 ODC-5A			ODC-15 ODC-15A			ODC-24 ODC-24A		
			Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.
Control Voltage Range V_{IN}		VDC	3	5	8	9	15	18	18	24	32
Must Operate Voltage $V_{IN(OP)}$		VDC			3			9			18
Must Release Voltage $V_{IN(REL)}$		VDC	1			1			1		
Maximum Input Current	@ V_{IN}=Nominal	mADC			18			16			13
Input Resistance R_{IN}		Ohms		250			1000			2000	

PIN-3 must be positive with respect to PIN-4 for correct operation.

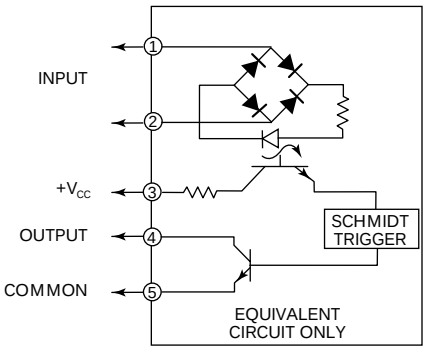
Output Specifications (@ +25˚C unless otherwise specified)

Parameter	Conditions	Units	ODC-5 ODC-24 ODC-15			ODC-5A ODC-24A ODC-15A		
			Min.	Typ.	Max.	Min.	Typ.	Max.
Load Voltage V_L		VDC	3		60	3		250
Load Current I_L		ADC	.01		3	.01		1
Maximum Surge Current for 1 Second		ADC			5			5
Maximum Leakage Current (Off-State)	V_L=MAX	µADC			500			2000
Maximum On-State Voltage Drop	I_L=MAX	VDC			1.5			1.5
MaximumTurn-On Time		ms			.1			.1
MaximumTurn-Off Time		ms			.75			.75

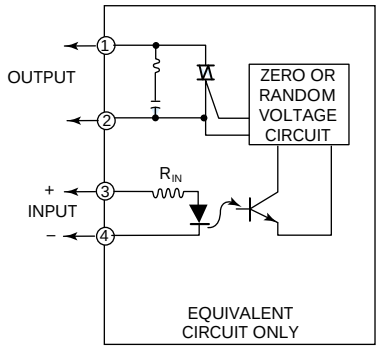
At 40°C, derate by 50mA/°Cto 80°C.

PIN-1 must be positive with respect to PIN-2 for correct operation.

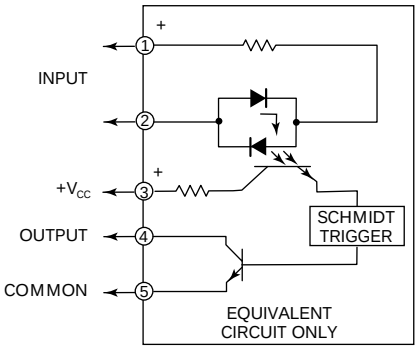
IAC Operating Diagram



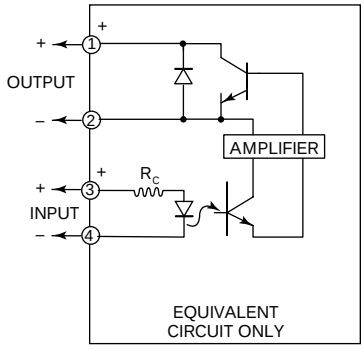
OAC Operating Diagram



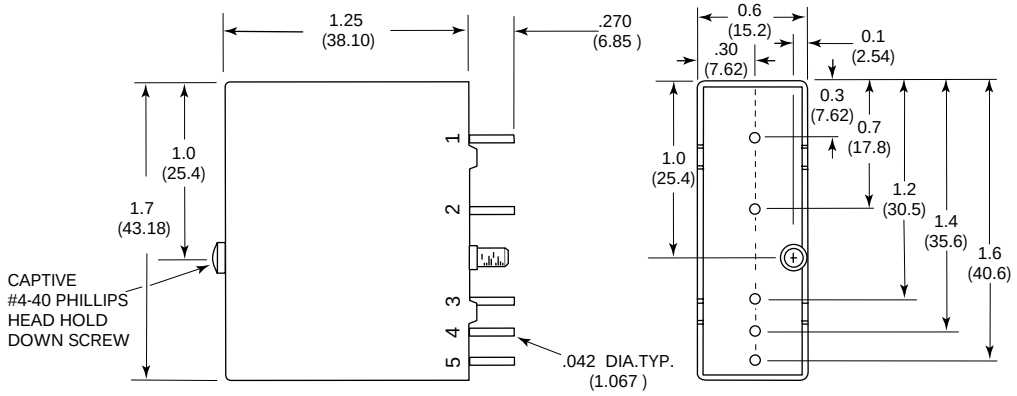
IDC Operating Diagram



ODC Operating Diagram



Outline Dimensions



Note: Pin 5 is not present on Output Modules.



2IO series

Mounting Boards for Input/Output Modules

- LED status indicators, plug-in fuses & pull-up resistors
- Card edge logic connections (2IO8, 2IO16 & 2IO24)
- Screw terminal logic connections (2IO4A, 2IO4B, 2IO4C, 2IO16A, 2IO16B & 2IO16C)
- Screw terminals for field wiring
- UL recognized/CSA certified for 125V max. with 5A fuses; 250V max. with #22 solid copper jumper wire instead of fuses

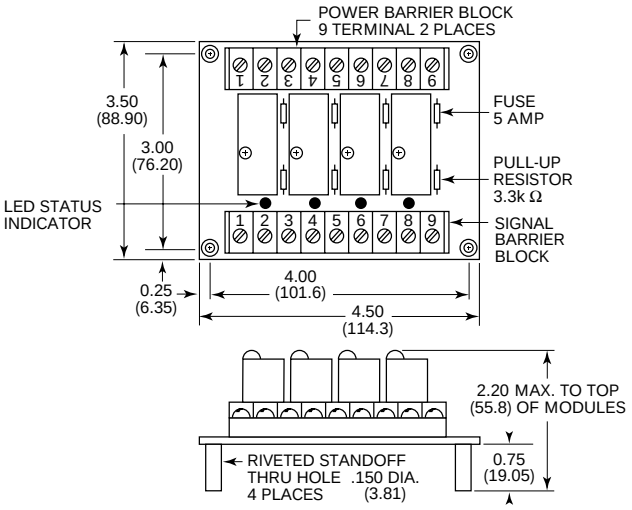
File E61482
File LR15734-93

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Ordering Information – Boldface items listed below are more likely to be maintained in stock by authorized distributors.

Part Number	2IO4A	2IO4B	2IO4C	2IO8	2IO16	2IO16A	2IO16B	2IO16C	2IO24
Number of I/O Channels	4	4	4	8	16	16	16	16	24
Number of Module Positions	4	4	4	8	16	16	16	16	24
Field Terminals: Screw Terminals	X	X	X	X	X	X	X	X	X
Logic Terminals: Screw Terminals	X	X	X			X	X	X	
Logic Terminals: 26-pin card edge connector				X					
Logic Terminals: 50-pin card edge connector				X	X				X
Designed for neg. true logic; one logic voltage	X			X	X	X			X
Designed for neg. or pos. true logic; mult. logic voltages		X					X		
Designed for neg. true logic; mult. logic voltages			X					X	

2IO4A, 2IO4B & 2IO4C Outline Dimensions



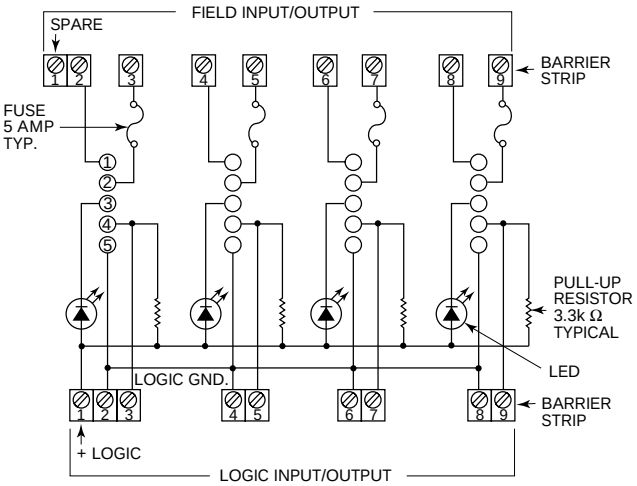
Mating Connectors and Fuses

26-pin card edge connector	Thomas & Betts 622-2615*
50-pin card edge connector	Thomas & Betts 622-5015*
5 amp fuse	Littelfuse 251-005*
1 amp fuse**	Littelfuse 251-001*

* Or equivalent
** Used on 2IO24 only.

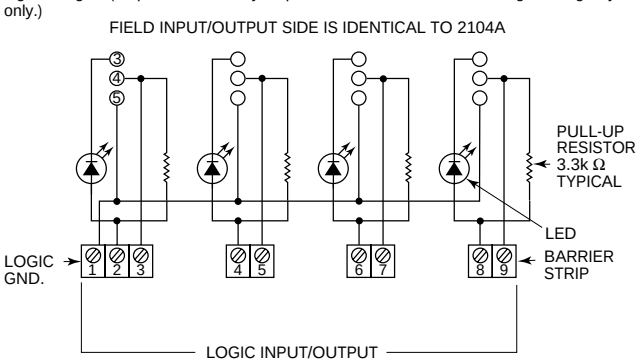
2IO4A Schematic

Designed to operate with neg. true logic (active low) systems & one logic voltage.



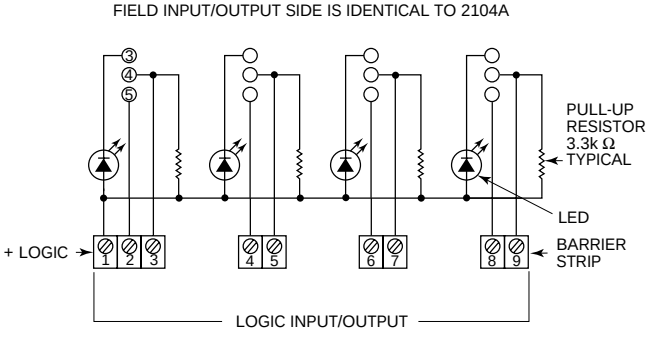
2IO4B Schematic

Designed to operate with either neg. or pos. true logic (active low or high) systems & different logic voltages. (output modules only - input modules must be used in negative logic systems only.)



2IO4C Schematic

Designed to operate with neg. true logic (active low) systems & different logic voltages.



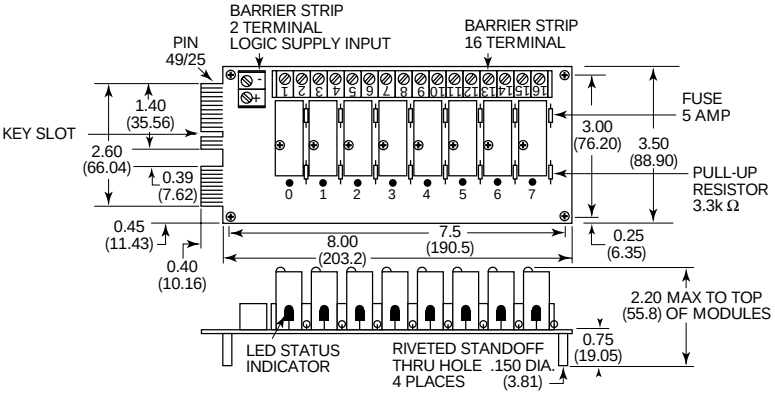
Dimensions are shown for reference purposes only.

Dimensions are in inches over (millimeters) unless otherwise specified.

Specifications and availability subject to change.

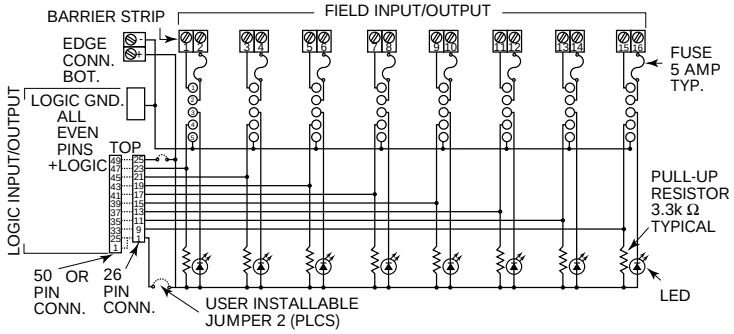
www.tycoelectronics.com
Technical support:
Refer to inside back cover.

2IO8 Outline Dimensions

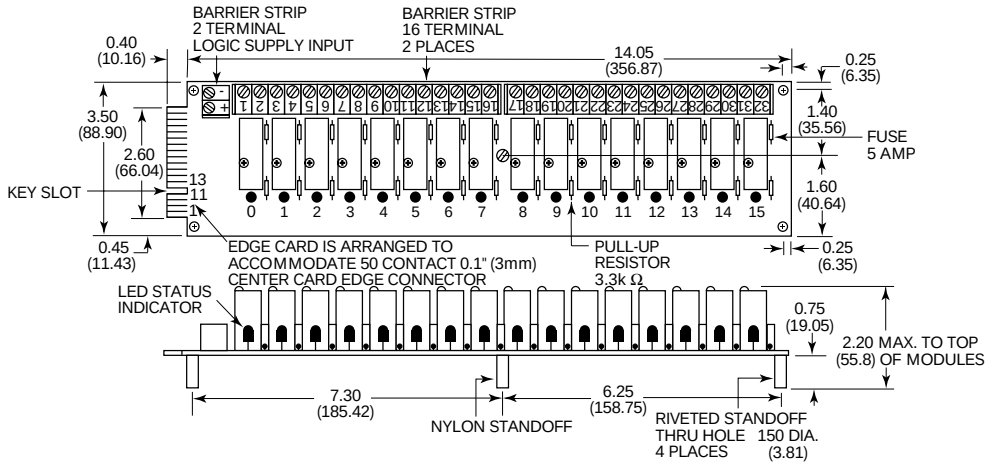


2IO8 Schematic

Designed to operate with neg. true logic (active low) systems & one logic voltage.

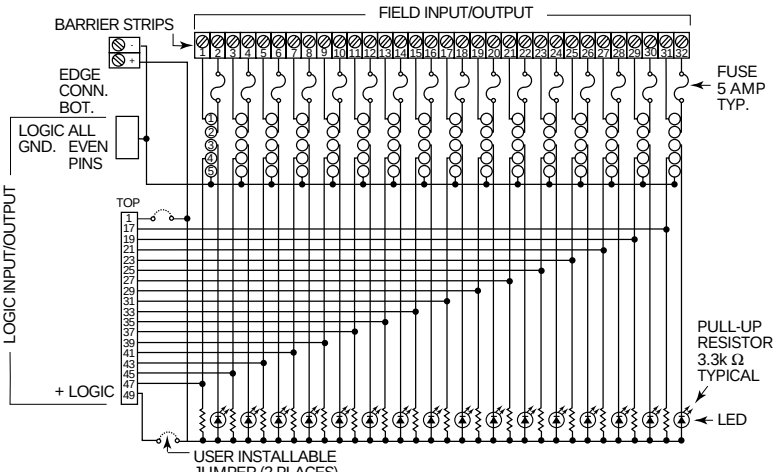


2IO16 Outline Dimensions

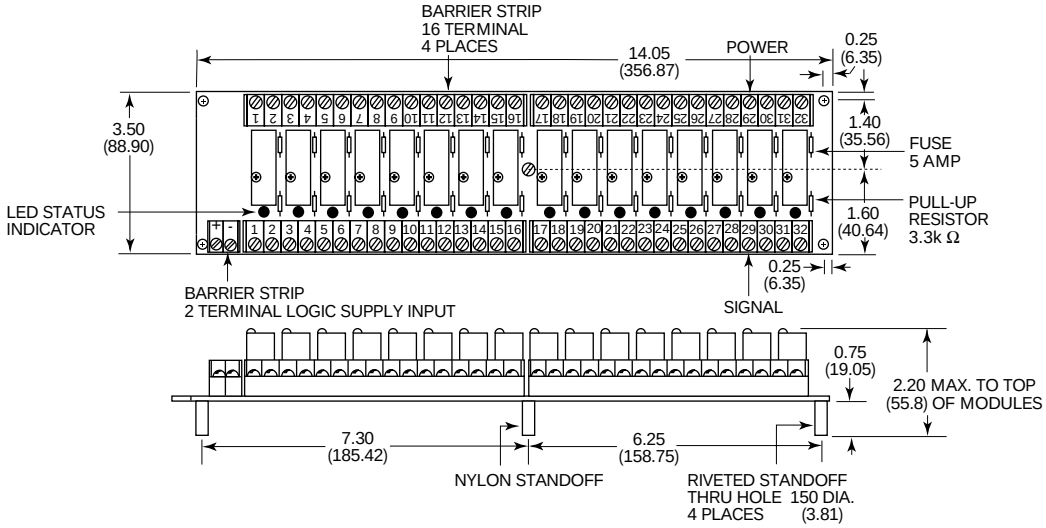


2IO16 Schematic

Designed to operate with neg. true logic (active low) systems & one logic voltage.

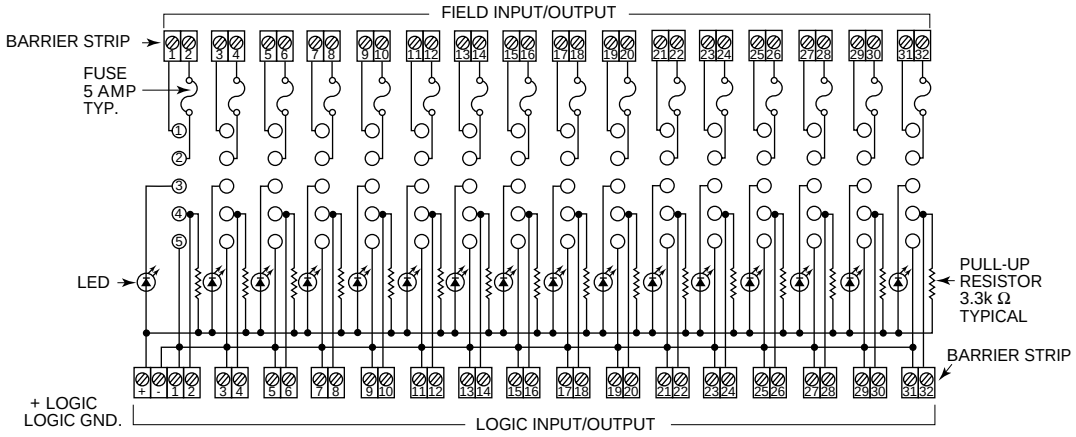


2IO16A, 2IO16B & 2IO16C Outline Dimensions



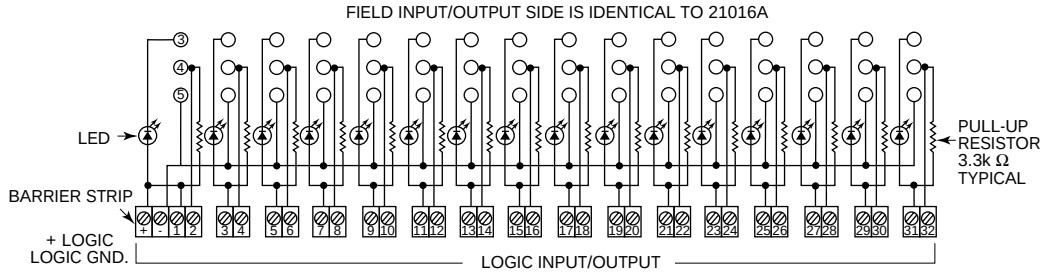
2IO16A Schematic

Designed to operate with neg. true logic (active low) systems & one logic voltage.



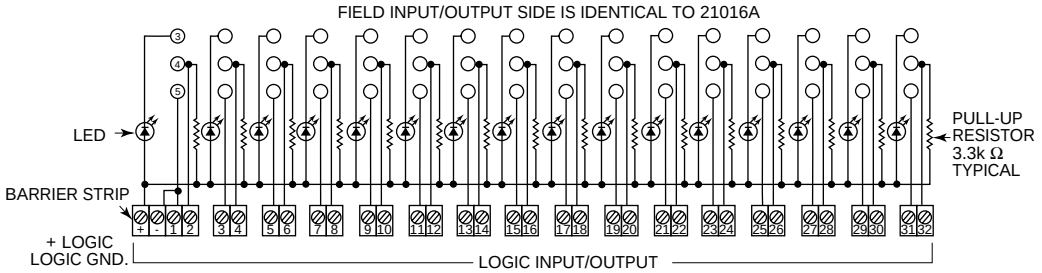
2IO16B Schematic

Designed to operate with either neg. or pos. true logic (active low or high) systems & different logic voltages.
(Note above applies to output modules only. Input modules must be use in negative logic systems only.)

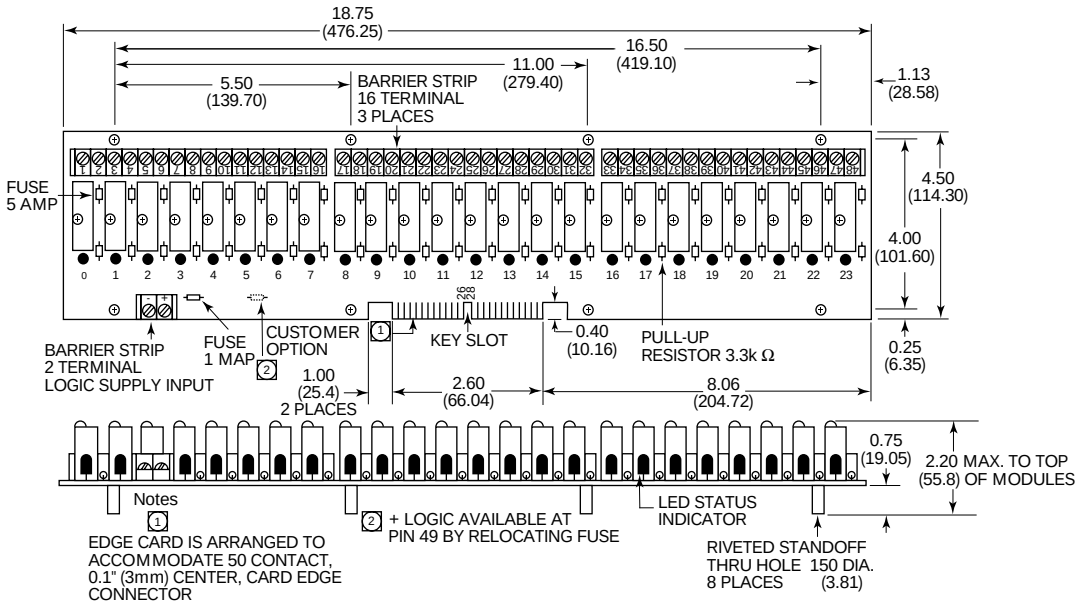


2IO16C Schematic

Designed to operate with neg. true logic (active low) systems & different logic voltages.

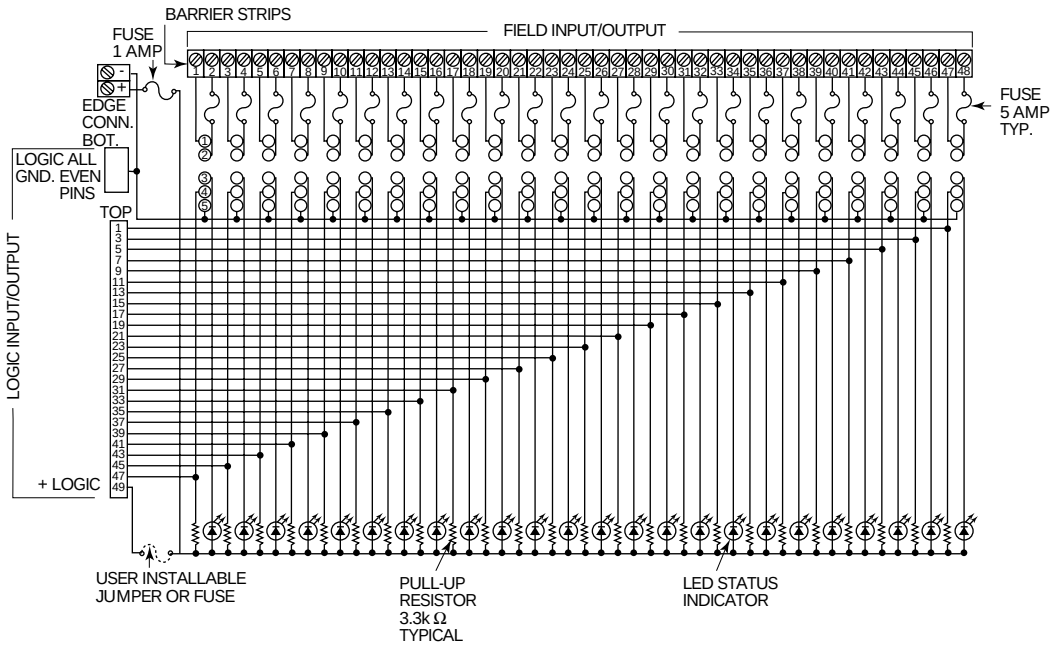


2IO24 Outline Dimensions

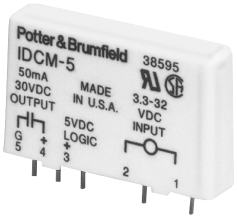


2IO24 Schematic

Designed to operate with neg. true logic (active low) systems & one logic voltage.







IACM/OACM IDCM/ODCM

Slim Line Input/Output Modules

File E81606 & E29244
File LR38595M77

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Features

- Slim line .4" (10.16mm) thick package.
- Foot print same as .6" (15.24mm) thick package.
- 4,000V rms optical isolation.
- Color coded by function.
- High immunity to false operation.
- Series compatible.
- Output modules can be controlled from sinking or sourcing logic.
- Compatible with 2IOM series mounting boards.

Engineering Data (all I/O modules)

Switch Form: 1 Form A (SPST-NO)
Duty: Continuous.
Capacitance: 8 pF Typical (input to output).
Operating Temperature: –30°C to +80°C.
Storage Temperature: –40°C to +85°C.
Potting Compound Flammability: UL94V-0.
Solderability: 260°C for 5 seconds, maximum.
Approximate Weight: .87 oz. (22.1g).

Ordering Information

Typical Part Number ▶	OACM	–5	H

1. Basic Series:
IACM = Slim line AC input module — yellow case
IDCM = Slim line DC input module — white case
OACM = Slim line AC output module — black case
ODCM = Slim line DC output module — red case

2. Input or Logic Voltage:
5 = 5VDC
15 = 15VDC
24 = 24VDC
U = OACM & ODCM Types 3-15VDC input voltage

3. Options:

Blank = IACM Type — 120VAC/VDC input (90-140VAC/VDC) * *<None>
IDCM Type — 3.3-32VDC input * *
OACM Type — 3A, 24-280VAC, zero voltage turn-on output
ODCM Type — 3A, 3-60VDC output

A = IACM Type — 240VAC/VDC input (180-280VAC/VDC) * *
IDCM Type — 10-60VDC input * *
OACM Type — 3A, 24-280VAC
ODCM Type — 1A, 5-250VDC output

E = IACM Type — 18-36VAC/VDC input * *

F = IDCM Type — 4-32VDC input & fast turn-on & turn-off times * *

H = OACM Type — 5A, 24-280VAC, zero voltage turn-on output

* * Is not polarity sensitive.

Our authorized distributors are more likely to maintain the following items in stock for immediate delivery.

IACM-5	OACM-5H
IACM-5A	OACM-U
IDCM-5	OACM-UH
OACM-5	ODCM-5

Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.
www.tycoelectronics.com
Technical support:
Refer to inside back cover.

IACM
AC Input Modules

Input Specifications

Parameter	Conditions	Units	IACM-5 IACM-15 IACM-24			IACM-5A IACM-15A IACM-24A			IACM-5E IACM-15E IACM-24E		
			Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.
Control Voltage Range V_{IN}		VAC/VDC	90	120	140	180	240	280	18	24	36
Must Operate Voltage $V_{IN(OP)}$		VAC/VDC			90			180			18
Must Release Voltage $V_{IN(REL)}$		VAC/VDC	20			20			3		
Max. Input Current	@ V_{IN}=Max.	mA			6			6			18
Input Resistance RIN		Ohms		28K			75K			2K	

Output Specifications (@ +25˚C unless otherwise specified)

Parameter	Conditions	Units	IACM-5 IACM-5A IACM-5E			IACM-15 IACM-15A IACM-15E			IACM-24 IACM-24A IACM-24E		
			Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.
Maximum Output Voltage		VDC			30			30			30
Maximum Output Current I_{SINK}		mADC			50			50			50
Maximum Output Leakage Current	V_{OUT}=Max.	µADC			10			10			10
Maximum Output Voltage Drop	I_{SINK}=50mA	VDC			.2			.2			.2
Logic Supply Voltage V_{CC}		VDC	3	5	6	12	15	18	20	24	30
Maximum Logic Supply Current	V_{CC}=Max.	mADC			18			18			18
Turn-On Time (Nominal)	I_{SINK}=25mA	ms			20			20			20
Turn-Off Time (Nominal)	I_{SINK}=25mA	ms			30			30			30
Output Type (Open Collector)			Normally Open (Sinking)			Normally Open (Sinking)			Normally Open (Sinking)		

OACM
AC Output Modules

Input Specifications

Parameter	Conditions	Units	OACM-5 OACM-5H OACM-5R			OACM-15 OACM-15H OACM-15R			OACM-24 OACM-24H OACM-24R			OACM-U OACM-UH OACM-UH		
			Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max	.Min.	Typ.	Max.
Control Voltage Range V_{IN}		VDC	3	5	8	9	15	18	18	24	32	3	5	15
Must Operate Voltage $V_{IN(OP)}$		VDC			3			9			18			3
Must Release Voltage $V_{IN(REL)}$		VDC	1			1			1			1		
Input Current	@V_{IN}=Nominal	mADC			20			16			13			44
Input Resistance R_{IN}		Ohms		220			1000			2000			360	

PIN-3 must be positive with respect to PIN-4 for correct operation.

Output Specifications (47 to 63 Hz.,@ +25˚C unless otherwise specified)

Parameter	Conditions	Units	OACM-5 OACM-15 OACM-24 OACM-U			OACM-5H IAC-15H OAC-24H OACM-UH			OACM-5R OACM-15R OACM-24R OACM-UR		
			Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.
Load Voltage V_L		V rms	24	120/240	280	24	120/240	280	24	120/240	280
Repetitive Blocking Voltage		V peak			±600			±600			±600
Load Current I_L*		A rms	.05		3	.05		5	.05		5
Output Current		mA/°C		58mA/°C			66mA/°C			66mA/°C	
Derating				40°C - 80°C			30°C - 80°C			30°C - 80°C	
Single Cycle Surge Current		A peak			100			250			250
Leakage Current (Off-State)	V_L=120VAC	mA rms			1			1			1
	V_L=240VAC	mA rms			2			2			2
On-State Voltage Drop	I_L=Max.	V peak			1.6			1.6			1.6
Static dv.dt (Off-State)		V/µs			200			200			200
Turn-On Time	@ f=60 Hz.	ms			8.3			8.3			.1
Turn-Off Time		ms			8.3			8.3			8.3
H/P/ Rating	@ 240VAC	HP			1/4			1/2			1/2

IDCM
DC Input Modules

Input Specifications

Parameter	Conditions	Units	IDCM-5 IDCM-15 IDCM-24			IDCM-5A IDCM-15A IDCM-24A			IDCM-5F IDCM-15F IDCM-24F		
			Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.
Control Voltage Range V_{IN}		VDC	±3.3	±24	±32	±10		±60	±4		±32
Must Operate Voltage $V_{IN(OP)}$		VDC			±3.3			±10			±4
Must Release Voltage $V_{IN(REL)}$		VDC	±2			±3			±1		
Maximum Input Current	@V_{IN}=Max.	mA		34			34			68	
Input Resistance R_{IN}		Ohms		1000			2000			500	

Output Specifications (@ +25˚C unless otherwise specified)

Parameter	Conditions	Units	IDCM-5 IDCM-5A			IDCM-15 IDCM-15A			IDCM-24 IDCM-24A			IDCM-5F			IDCM-15F			IDCM-24 IDCM-24F		
			Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max
Maximum Output Voltage		VDC			30			30			30			30			30			30
Maximum Output Current		mADC			50			50			50			50			50			50
Maximum Output Leakage Current	V_{OUT}=Max.	µADC			10			10			10			10			10			10
Maximum Output Voltage Drop	I_{SINK}=50mA	VDC			.2			.2			.2			.2			.2			.2
Logic Supply Voltage V_{CC}		VDC	3	5	6	12	15	18	20	24	30	3	5	6	12	15	18	20	24	30
Logic Supply Current	V_{CC}=Max.	mADC			18			18			18			18			18			18
Turn-On Time (Nominal)	I_{SINK}=25mA	ms		1*			1*			1*			.05			.05			.05	
Turn-Off Time (Nominal)	I_{SINK}=25mA	ms		1*			1*			1*			.10			.10			.10	
Output Type (Open Collector)			Normally Open (SINKING)			Normally Open (SINKING)			Normally Open (SINKING)			Normally Open (SINKING)			Normally Open (SINKING)			Normally Open (SINKING)		

* Nominal Turn-On and Turn-Off times for IDCM5A, IDCM15A & IDCM24A are 5 ms.

ODCM
DC Output Modules

Input Specifications

Parameter	Conditions	Units	ODCM-5 ODCM-5A			ODCM-15 ODCM-15A			ODCM-24 ODCM-24A			ODCM-U ODCM-UA		
			Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.
Control Voltage Range V_{IN}		VDC	3	5	8	9	15	18	18	24	32	3	5	15
Must Operate Voltage $V_{IN(OP)}$		VDC			3			9			18			3
Must Release Voltage $V_{IN(REL)}$		VDC	1			1			1			1		
Maximum Input Current	@V_{IN}=Nominal	mADC			18			16			13			44
Input Resistance R_{IN}		Ohms		250			1000			2000			360	

PIN-3 must be positive with respect to PIN-4 for correct operation.

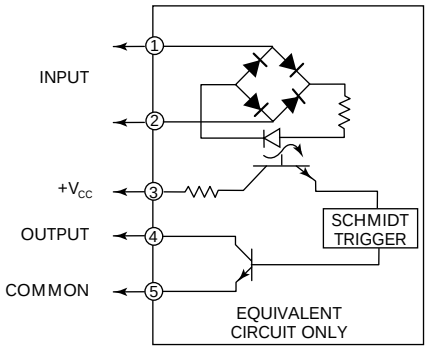
Output Specifications (@ +25˚C unless otherwise specified)

Parameter	Conditions	Units	ODCM-5 ODCM-15 ODCM-24 ODCM-U			ODCM-5A ODCM-15A ODCM-24A ODCM-UA		
			Min.	Typ.	Max.	Min.	Typ.	Max.
Load Voltage V_L		VDC	3		60	3		250
Load Current I_L*		ADC	.01		3	.01		1
Maximum Surge Current for 1 Second		ADC			5			5
Maximum Leakage Current (Off-State)	V_L=MAX	µADC			500			2000
Maximum On-State Voltage Drop	I_L=MAX	VDC			1.5			1.5
MaximumTurn-On Time		ms			.1			.1
MaximumTurn-Off Time		ms			.75			.75

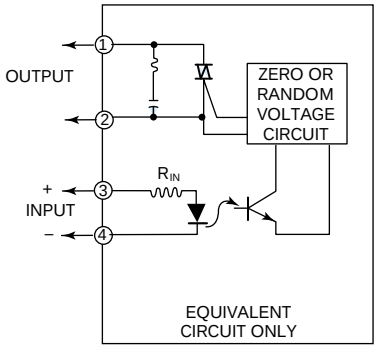
* Above 40°C, derate by 50mA/°C to 80°C.
PIN-1 must be positive with respect to PIN-2 for correct operation.

Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.
www.tycoelectronics.com
Technical support:
Refer to inside back cover.

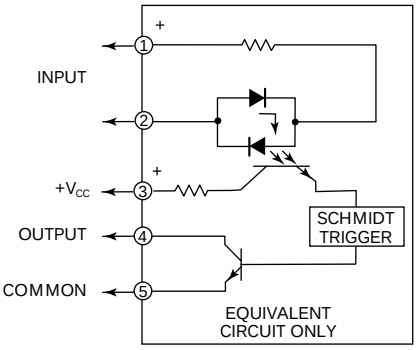
IACM Operating Diagram



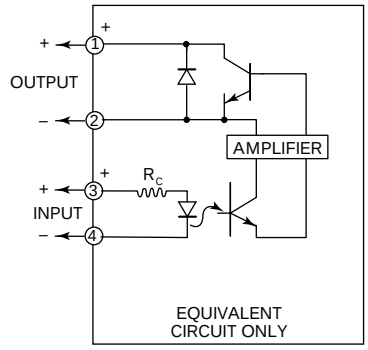
OACM Operating Diagram



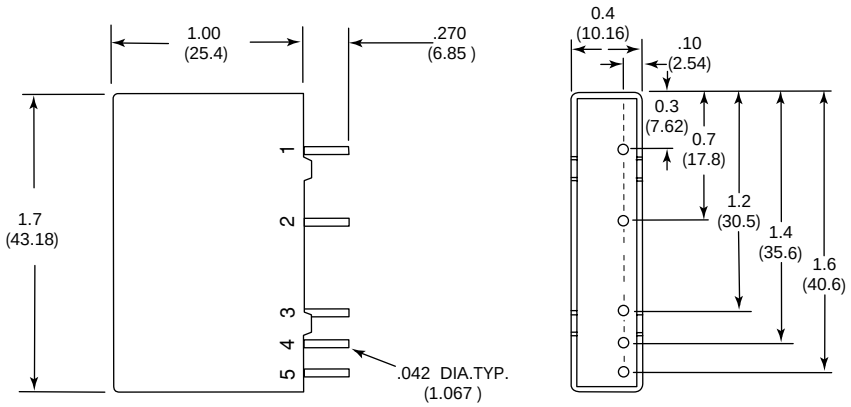
IDCM Operating Diagram



ODCM Operating Diagram



Outline Dimensions



Note: Pin 5 is not present on Output Modules.



2IOM series

Space Saving Mounting Boards for Slim Line Input/Output Modules

- LED status indicators, plug-in fuses & pull-up resistors
- Card edge, straight header, right-angle header and screw terminal logic connections
- Screw terminals for field wiring
- UL recognized/CSA certified for 125V max. with 5A fuses; 250V max. with #22 solid copper jumper wire instead of fuses

File E61482

File LR15734

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Ordering Information - Boldface items listed below are more likely to be maintained in stock by authorized distributors.

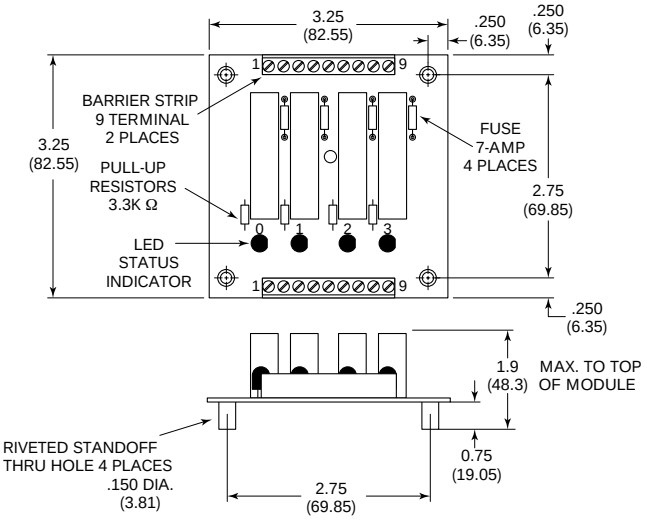
Part Number	2IOM4A	**2IOM16**	2IOM16A	2IOM16E	**2IOM24**	**2IOM24D**	2IOM32D
Number of I/O Channels	4	16	16	16	24	24	32
Number of Module Positions	4	16	16	16	24	24	32
Field Terminals: Screw Terminals	X	X	X	X	X	X	X
Logic Terminals: Screw Terminals	X		X				
Logic Terminals: 50-pin card edge connector		X			X	X	
Logic Terminals: 50-pin straight header						X	X
Logic Terminals: 50-pin right angle header				X			
Will accept 50-pin dual row header		X			X		
Designed for neg. true logic; one logic voltage	X	X	X	X	X	X	X

Mating Connectors and Fuses

50-pin card edge connector	Thomas & Betts 622-5015 [1]
50-pin header connector	Thomas & Betts 609-5030 [1]
5 amp fuse	Littelfuse 251-005 [1]
7 amp fuse [3]	Littelfuse 251-007 [1]
1 amp fuse [2]	Littelfuse 251-001 [1]

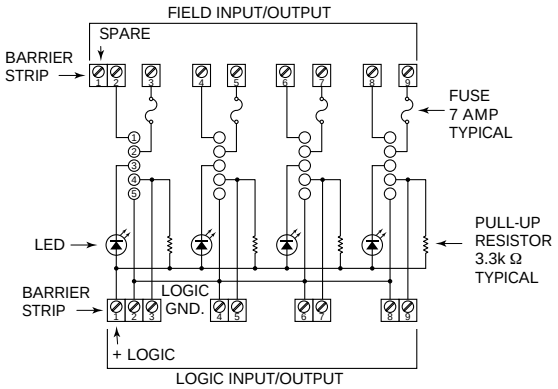
Notes: 1. Or equivalent.
2. Used only on 24 and 32 position models.
3. Used only on 2IOM4A and 2IOM16A.

2IOM4A Outline Dimensions



2IOM4A Schematic

Designed to operate with neg. true logic (active low) systems & one logic voltage.



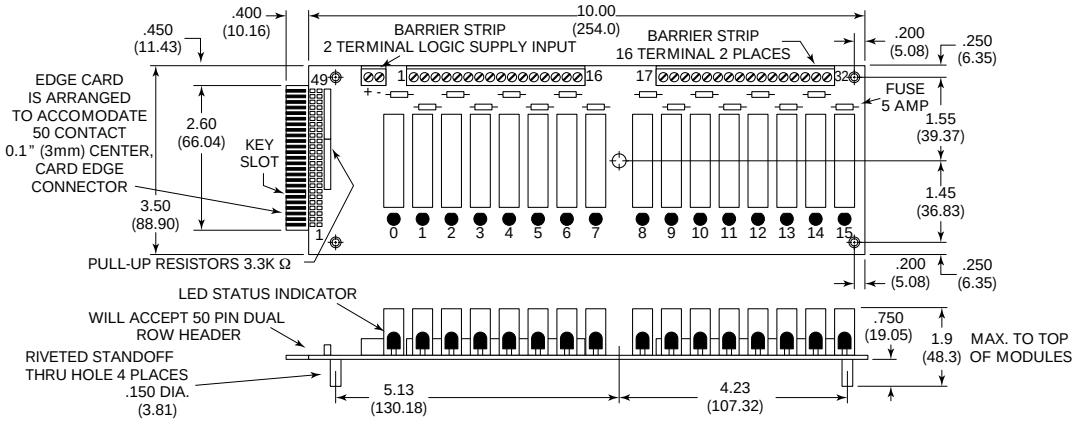
Dimensions are shown for reference purposes only.

Dimensions are in inches over (millimeters) unless otherwise specified.

Specifications and availability subject to change.

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Technical support:
Refer to inside back cover.

2IOM16 & 2IOM16E Outline Dimensions

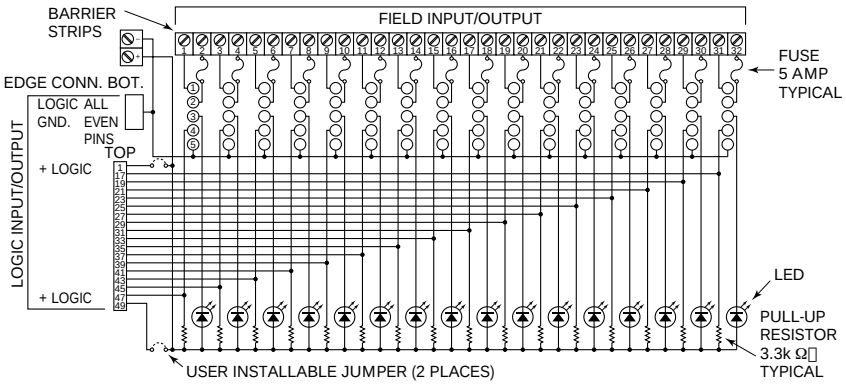


2IOM16E With Right-Angle Header

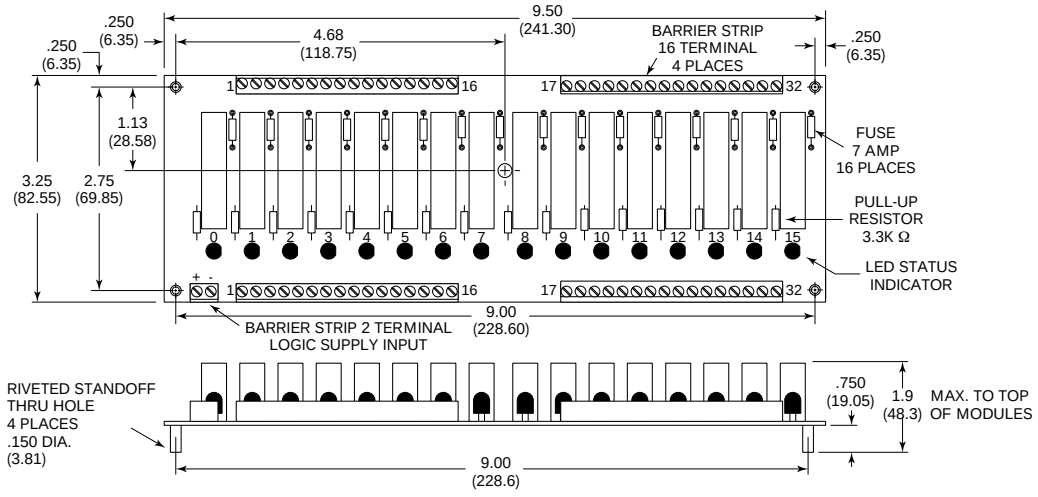


2IOM16 & 2IOM16E Schematic

Designed to operate with neg. true logic (active low) systems & one logic voltage.

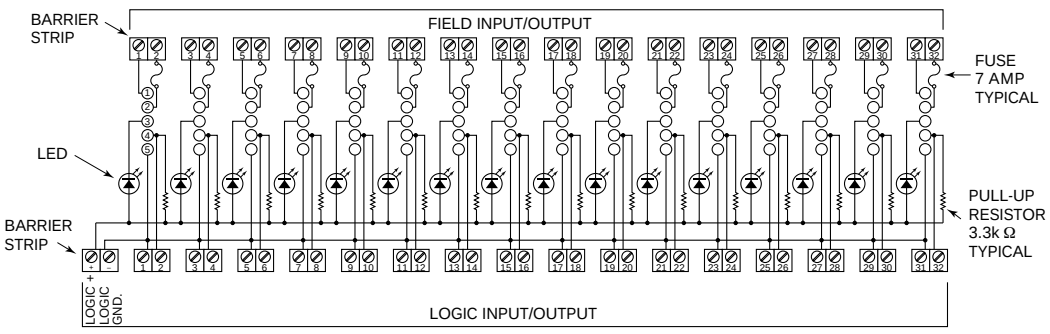


2IOM16A Outline Dimensions

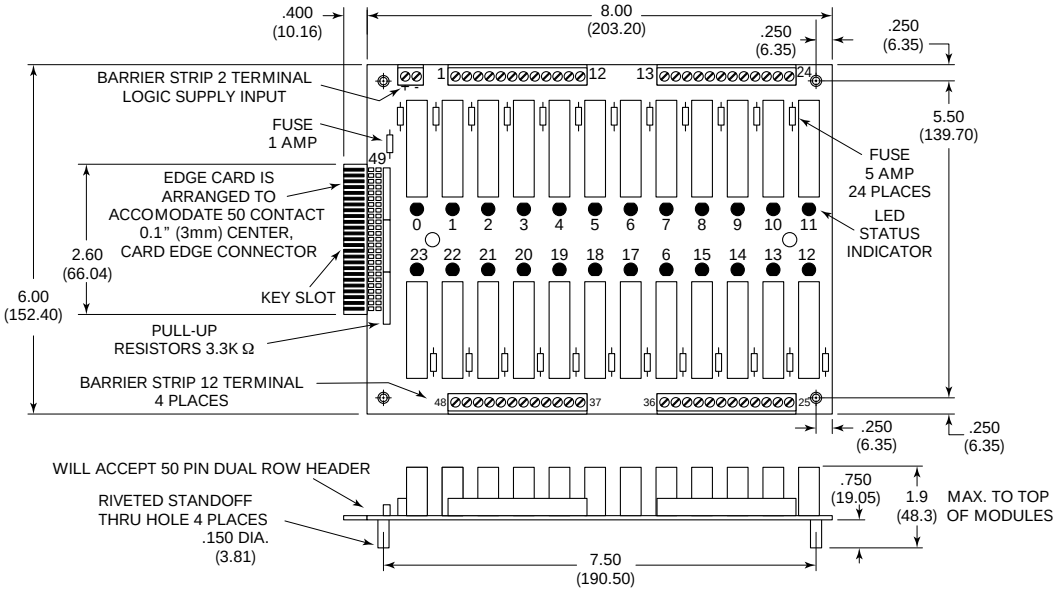


2IOM16A Schematic

Designed to operate with neg. true logic (active low) systems & one logic voltage.



2IOM24 & 2IOM24D Outline Dimensions

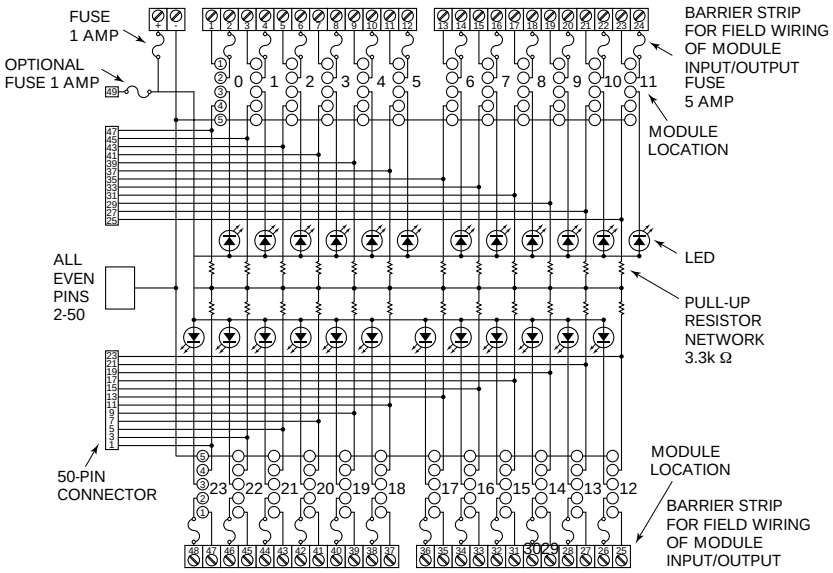


2IOM24D With Straight Header



2IOM24 & 2IOM24D Schematic

Designed to operate with neg. true logic (active low) systems & one logic voltage.



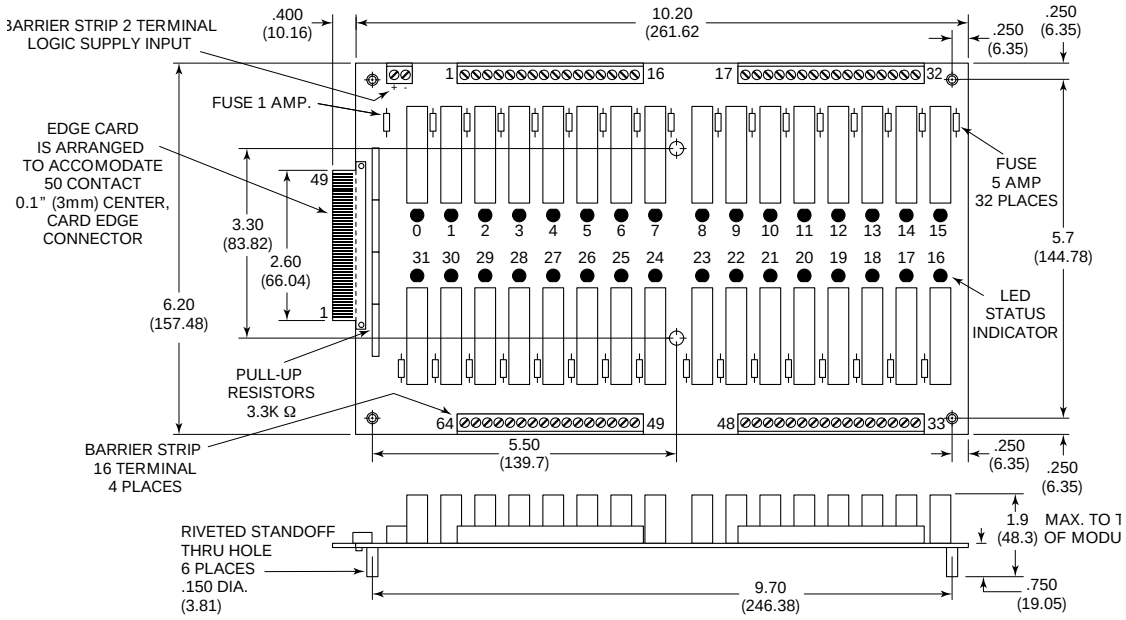
Dimensions are shown for reference purposes only.

Dimensions are in inches over (millimeters) unless otherwise specified.

Specifications and availability subject to change.

www.tycoelectronics.com
Technical support:
Refer to inside back cover.

2IOM32D Outline Dimensions

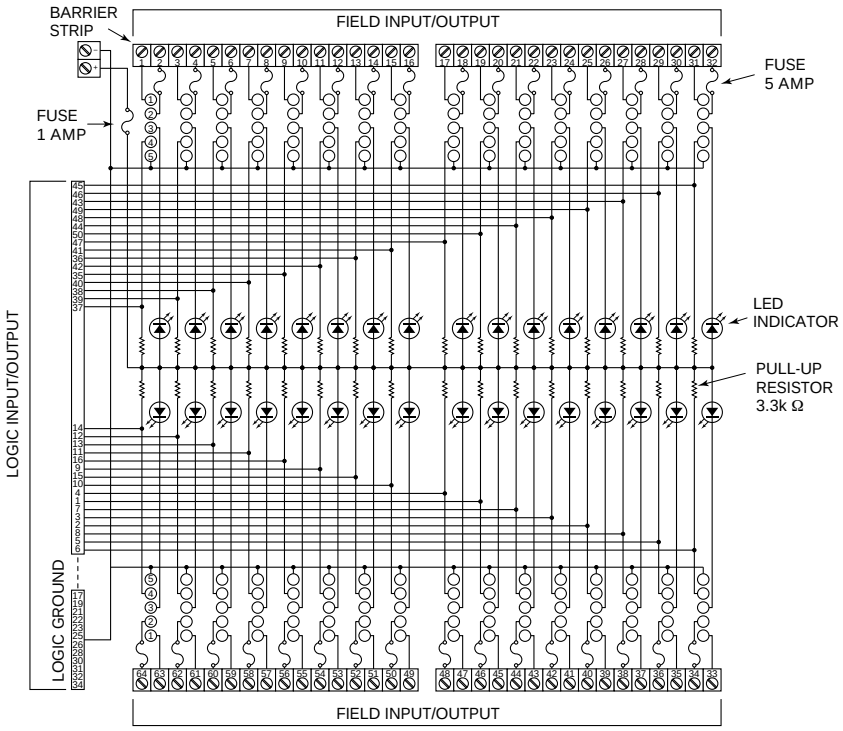


2IOM32D With Straight Header



2IOM32D Schematic

Designed to operate with neg. true logic (active low) systems & one logic voltage.



Engineering Notes

Dimensions are shown for reference purposes only.

Dimensions are in inches over (millimeters) unless otherwise specified.

Specifications and availability subject to change.

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7000	Electropneumatic Timer	1248
3RP15	Programmable Time Delay Relay	1207
48K	Programmable Time Delay Relay	1210
CB	Discrete Function Time Delay Relay	1228
CD	Discrete Function Time Delay Relay	1222
CG	Discrete Function Time Delay Relay	1220
CH	Discrete Function Time Delay Relay	1226
CK	Discrete Function Time Delay Relay	1224
CL	Discrete Function Time Delay Relay	1231
CN1	Discrete Function Time Delay Relay	1219
CNM5	Programmable Time Delay Relay	1215
CNS	Programmable Time Delay Relay	1213
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VTM7	Discrete Function Timing Module	1247
VTMA1	Discrete Function Timing Module	1242
VTMR1	Discrete Function Timing Module	1243

NOTE: In addition to the products listed in this section of the databook, time delay relays are also described in other sections are available with printed circuit board terminals. Following is a list:

Plug-in/Panel Mount Relays

MT* 742

*Relay, socket and module combination.

Latching, Impulse, Rotary & Special Application Relays

TR 917

Time delay relays are also included in our line of high performance relays (see overview in section 14 of this databook).

Time Delay Relays & Modules 1201-1256 **12**

P&B Solid State Time Delay Terms and Definitions

A wide selection of various types of solid state time delay controls are presented by Potter & Brumfield to meet the demands of commerce and industry. Typical applications for P&B time delay relays include data processing operations, machine tool, safety device control and alarm circuit actuating. These diverse applications require a wide variety of time delays such as: fixed time delay on "operate" or "release" which is factory set and cannot be adjusted; resistor-adjustable time delay on "operate" which is adjustable with an external resistor; knob-adjustable time delay on "operate" which has a calibrated knob built into the assembly for ease of adjusting the time period. Each of the series of solid state time delays presented here varies in its degree of accuracy, variety available and cost to meet the requirements of every application.

Timing Variations - Any difference between the actual time delay of a particular device and the nominal value specified for that device.

These variations are due to:

(1) Manufacturing tolerances (component selections and tolerances, adjustments, etc.).
(2) Input voltage variation.
Includes DC or rms voltage variations, plus instantaneous voltage variations at time the control voltage is applied (AC only).
(3) Temperature (ambient plus self heating).
(4) Input cycling conditions:
a. duration of "off" time
b. duration of "on" time after actual time out

The terms used to define and specify time delay relay performance must reflect one or more of these time variation factors with sufficient clarity that both the manufacturer and the user may arrive at essentially the same evaluation of device performance. To this end, the following terms and definitions are used.

Specified Delay Time - The advertised (or print specified) time of the delay function.

Actual Time, Standard Conditions (ATSC) - The actual delay time of a given device operated at 25°C and nominal input voltage, with sufficient "off" time of input voltage to permit full "short term" recovery of the timing interval. For purposes of establishing a reference ATSC it is recommended that the device be cycled @ 25°C, nominal voltage, with input pulses of 1.3X specified delay time, with 1 sec. off times. The resulting average of a group of consecutive time delay readings (excluding the 1st, which had an unknown off time) may be used to determine ATSC. Five cycles should be considered adequate for this determination.

The off time required for full "short term" recovery of the timing interval will vary to some extent, depending on relay type, timing circuit impedance (normally related to length of timing period), whether capacitor shorting contacts are used, whether the previous timing cycle was completed or interrupted during time out, and, if completed, the degree to which the input control "on" time extended beyond actual time out.

In practice, off times used may vary from a minimum approaching the release time of the output (50 to 200 ms typical, depending on the particular design) to a second or more, with as much as 15% difference in the resulting delay times. The greatest rate of change occurs as off times become increasingly short, while the rate of change becomes relatively negligible as increasingly long off times approach 1 second. However, for very long off times (measured in hours), and additional change in the first subsequent operation delay time may be experienced. This additional change may be as much as 1-4% (depending again on time delay type and design) and is usually obtained with off periods from 1-24 hours or more.

Repeatability - The percent variance of time within a group of consecutive timing cycles, starting with the second operation, when the timing device is operated under constant conditions (constant on-off times, input voltage and temperature). The average of a series of five consecutive operations, at any given set of conditions within specifications, will serve as the reference for determining the variation of individual readings within the group from the average. The maximum variation under such conditions should not exceed the repeatability value specified. For convenience, repeatability under standard conditions could be determined from the test used to measure **ATSC (see below, left).**

Tolerance - The variation between the specified delay time and the ATSC value, given in percent of the former.

Delta-Time - The percent timing change (from the ATSC value) for any variation of voltage and/or temperature within specified limits. Tests for this parameter would be essentially the same as described for ATSC, except that any constant combination of specified voltage and temperature extremes may be used.

Recycle Time - The length of time the control voltage must be interrupted, immediately following a timing interval, to produce a subsequent delay of at least 95% of the reference delay under constant conditions of input voltage and ambient temperature. The reference delay may be the ATSC value determined under standard conditions (nominal voltage and 25°C); however, any constant voltage-temperature combination within specifications may be used (must be the same voltage-temperature combination as used for recycle checks).

Note: If control voltage is interrupted prior to completion of a timing period, or at a time other than immediately following time out, the recycle time value (off time) may produce a subsequently shorter timing period, depending upon the particular design and when the interruption occurs within the internal RC charging cycle.

Correspondingly, this subsequent time delay may be from 85% to 95% of the reference actual delay as defined above.

Timing Cycle Interrupt "Transfer" - A momentary transfer (pickup and dropout) of the switching relay contacts which may occur if the timing cycle is interrupted. This phenomenon is inherent in CU series time delays; and, depending on when the timing interval is interrupted, the transfer duration may vary from zero to the release time value for that device.

Release Time - The time required, after time out, for the output switch to return to its normal, de-energized state when the control voltage is removed. This will vary to some extent with the duration of "on" time after actual time out and with temperature and voltage; the shortest release time being obtained when control voltage is removed immediately following completion of a timing period under conditions of minimum temperature and input voltage.

Transient Protection is provided so that the time delay will not be damaged by a transient input.

Polarity Protection is provided internally to protect the time delay of DC units from reversal of input voltage.

Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.

External Resistor Selection Guide for P&B Time Delay Relays

For CL, CK & CU Series

The "minimum" time setting on an external resistor adjustable model in any of these series is obtained by shorting together the external resistor terminals of the relay. The "maximum" time setting (within tolerance limits) is obtained by using the resistance value listed across from the maximum time for that unit in the tables below. Timing values between the minimum and maximum limits are linear with resistance within 10%. It is recommended that a 1/4 watt, mimimum, resistor be used. External timing resistor should have less than 500 PPM temperature coefficient.

The external resistor value R_0 required to obtain any time T_0 can be calculated using the following formula:

$$R_0 = R_1\left(\frac{T_0 - T_S}{T_1 - T_S}\right)$$

T_0 = Desired Time
T_S = Short Time (see relay type)
T_1 = Long Time (see relay type)
R_1 = Extrernal Resistor Value required to obtain T_1
R_0 = External Resistor Value required to obtain T_0

Example: Given a CUH-41-30060, find an external resistor value that will give a 30 second delay.

Known: T_1 = 60 seconds
T_S = 1 second
R_1 = 1 meg

$$R_0 = \frac{1 \times 10^6\ (29)}{59}$$

R_0 = 492K

Note: The actual time obtained will normally be within 5% of the desired time. This is due to construction tolerance.

CL & CU Delay On Operate Resistor Values

Time (Sec.)		Approximate Resistance	
CU	CL	AC	DC
1.0	0.1	Short	Short
10.0	10.0	200K	160K
1.0	0.3	Short	Short
30.0	30.0	600K	500K
1.0	0.6	Short	Short
60.0	60.0	1.2 Meg	1.0 Meg
1.0	1.2	Short	Short
120.0	120.0	2.4 Meg	2.0 Meg

CK Delay On Operate Resistor Values

Time (Sec.)	Approximate Resistance	
	AC	DC
0.1	Short	Short
10.0	750K	750K
1.8	Short	Short
180.0	1.0 Meg	910K

CK Delay On Release Resistor Values

Time (Sec.)	Approximate Resistance
	AC & DC
0.1	Short
10.0	820K
0.6	Short
60.0	910K

For CD Series

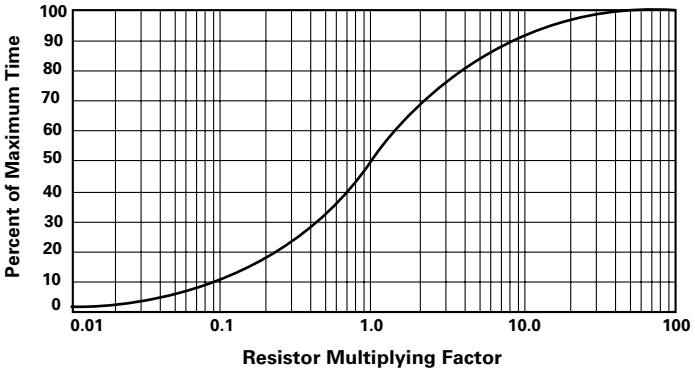
The "minimum" time setting on an external resistor adjustable model in the CD series is obtained by shorting together the external resistor terminals of the relay. The "maximum" time setting (within tolerance limits) is pre-set at the factory, and no external resistor is necessary. Approximate resistance values required to obtain times between the minimum and maximum limits can be determined using the table and graph below. It is recommended that a 1/4 watt, mimimum, resistor be used. External timing resistor should have less than 500 PPM temperature coefficient.

CD Resistor Values (AC & DC Models)

Factory-set Time Delay. No Resistor (seconds)	Approximate Resistance* to Reduce Delay by 1/2	Short Circuit Time Delay (seconds)
1.0	33K ohms	0.1
5.0	200K ohms	0.1
10.0	400K ohms	0.1

* Resistor values shown correspond to a 1.0 multiplying factor. Use the graph below to determine other resistor values required to obtain time periods between the limits stated in the chart.

CD Timing Resistor Curve



To obtain CD series time delay relays having a linear resistance with time, please consult the factory.

AGASTAT Solid State Time Delay Terms and Definitions

Accuracy, absolute (or calibration accuracy) - the deviation of a selected time delay from the actual delay, measured with reference to a time standard, under standard conditions.

Accuracy, "attainable" - the "worst case" deviation in time delay, from a selected value, including all factors that contribute to its "error budget," including long-term drift, temperature drift, resolution, calibration accuracy, line-voltage and line-frequency effects, etc.

Accuracy, overall - the maximum deviation from the average of 100 consecutive time delays at any given time setting throughout the operating temperature, voltage, and frequency ranges.

Accuracy, repeat - the maximum deviation from the average of 100 consecutive time delays at any given time setting and any fixed combination of temperature and operating voltage.

Breakdown, circuit-to-case - the voltage insulation between any part of a TDR's circuitry and the frame or any other conductive part in the structure, including the case.

breakdown, control-to-load - the voltage insulation between control and load circuits.

Calibration linearity - in the mechanical calibration of a TDR delay-setting scale, the largest deviation of the actual delay-vs-rotation curve from a straight line drawn from minimum to maximum delay.

Counting TDR - a TDR in which a stable source generates precisely timed voltage pulses, and a digital counter registers a different voltage pattern or code on its output terminals for each pulse counted. The counter is connected to a digital decoder, preset to recognize a given code, which then operates the load-switching device.

Current drain - the current drawn by the delay and switching circuits in the TDR, not including the current drawn by the load.

delay - an interval of time generated before some planned event is caused to occur.

Delay adjustability - the capability of setting the duration of a time delay generated by a TDR; the

Delay range and resolution - taken together, describe the adjustability.

Delay adjustment - means of setting the duration of a time delay: pointer-knob-and scale, thumbwheel switch, external or internal potentiometer, etc.

delay range - the span of time within which a TDR can generate time delays.

Dielectric withstand - the ability of insulating materials and spacings to withstand specified overvoltages for a specified time without flashover or puncture.

Electromechanical relay (EMR) - a controlled switch operated by causing sufficient current to flow through an electromagnetic coil; the resultant magnetic field, when strong enough, overcomes a spring force and closes and/or opens the switch contacts.

Interface - in a TDR, one of the following: the nature of the means of adjusting time delay; of indicating status of delay and load; of powering control and load circuits, or of switching control and load circuits.

Isolation, control-to-load - the degree to which interaction has been prevented between control and load circuits in a TDR usually expressed as the effective impedance between them.

Leakage current - the current conducted by a solid state switching device in an "off" state.

LED readout - a numerical display made up of light-emitting diodes (solid state devices that glow when current is passed through them).

linearity - the regularity of calibration of a delay scale - i.e., the uniformity of the spacing equal delay increments. In a TDR with externally controlled delay, the constancy of the delay-to-resistance ration.

Line-frequency sensitivity - the deviation in delay, at any setting within specifications, per hertz or percent of line-frequency change from the nominal value, measured at specified line voltage and ambient temperature.

Line-voltage sensitivity - the deviation in delay, at any setting within specification, per volt or percent of line-voltage change from the nominal value, measured at specified line voltage and ambient temperature.

Load-dependent delay - the characteristic of certain TDR's in which there is a significant change, due to internal heating, of a preset delay interval, following a long "load-ON" period.

Load rating - the maximum current, voltage, and frequency (if AC) of the load-circuit energy that may be switched by a TDR, for normal life expectancy.

Load gates - solid state circuits that perform logic "switching functions."

Mode - see operating mode.

Noise - any unwanted signal impinging on a circuit or its environment.

Operate time - the longest interval between energization of an output relay and the completion of contact transfer under any combination of operating temperature and voltage.

Operating life - a measure of the number of operations a TDR can be expected to perform within specifications; for TDRs with electromechanical (EMR) load-switching means, there are two ratings - mechanical and electrical operations at full rated load.

Operating mode - the relationship between control signal input, generation of delay or count, and transfer of load-switching contacts.

operating voltage range - the range of voltages over which a TDR will perform to specification. May be applied to either delay generating circuits, load-switching circuits or both.

Peak current - the maximum short-duration load-circuit rating of the load-switching circuit; also called "in-rush" or "surge" current.

R-C timer - an electronic time-delay relay in which the charging of a capacitor (C) through a resistor (R) generated the delay and an electronic circuit establishes a threshold, or critical value, for the capacitor voltage; when this value is reached, a load-switching device is operated.

Release time - the longest time interval between de-energization of an output relay and the complete transfer of its contacts under any combination of operating temperature and voltage.

Resettability - the precision with which a delay adjustment, once changed, can be reset.

Reset time - the shortest allowable interval between complete or interrupted timing cycles without risk of delay error or malfunction.

Resolution - the precision with which delay adjustment may be set; it depends on the type of adjustment means; for example, in a switch-settable design, the smallest change that can be made by moving one unit in the least-significant decade in a selector switch array.

solid-state relay (SSR) - a relay in which a semiconductor device (e.g., an SCR or TRIAC), switches the load.

Stability, long-term - the measure of the effect of time along on the delay generated by a TDR under specific operating conditions - e.g., the difference in the repeat accuracy between that measured when the TDR is new, and that measured one year later.

Stability, temperature - the effect of ambient temperature on the delay of a TDR, expressed in terms of the percent deviation in a preset delay per degree of temperature change from some nominal value.

TDR - time-delay relay.

Time-delay relay (TDR) - a device that upon energization or operation of a control circuit, generates a delay, at the end of which some planned event (e.g., load switching, or secondary control function) is caused to occur.

Timing diagram or timing ladder - a graphic representation of two or more sequences of events, all drawn to the same horizontal time scale, so that any point in one sequence occurs at the same time as any point directly above or below it in another sequence.

Timing range - the range of time intervals over which a particular TDR will generate delays.

Transfer - the switching of a relay's contacts from one state to the other, but in the past tense commonly used to denote the position of the contacts in the relay's energized or "transferred" state as opposed to its de-energized or "normal" state.

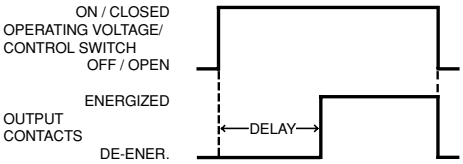
Transient protection or transient suppression - the prevention of malfunction of a TDR due to power-line transients, or the means of doing so. Usually effective only over a stated range or up to a stated maximum transient amplitude and duration.

Transient voltage tolerance - the largest momentary overvoltage peak that a TDR will withstand without damage or catastrophic malfunction.

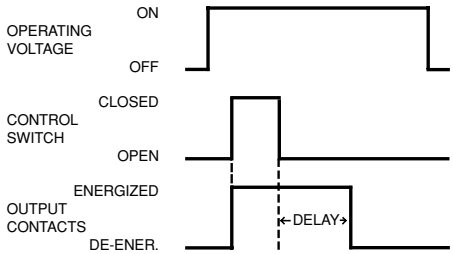
Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.
www.tycoelectronics.com
Technical support:
Refer to inside back cover.

AGASTAT Time Delay Relay Timing Modes

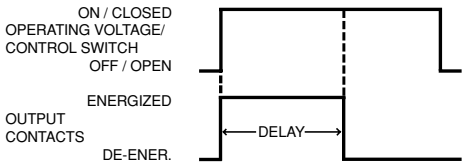
On-Delay: Time delay is initiated upon application of a control signal (i.e., operating voltage or on 11-pin model closure of the control switch). The output contacts energize at the end of the delay. Output contacts and the time delay circuit reset upon removal of the control signal regardless of state.



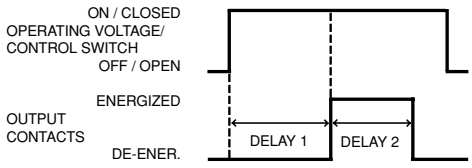
Off-Delay: The output contacts energize when the control switch is closed. The time delay is initiated upon opening of the control switch (operating voltage is applied continuously). De-energization occurs at the end of the delay. Output contacts energize and the time delay circuit resets upon closure of the control switch.



Interval: Time delay is initiated upon application of a control signal (i.e., operating voltage or closure of the control switch on 11-pin models). The output contacts energize when the control signal is applied. At the end of the delay, the output contacts de-energize. Output contacts and the time delay circuit reset upon removal of the control signal regardless of state.

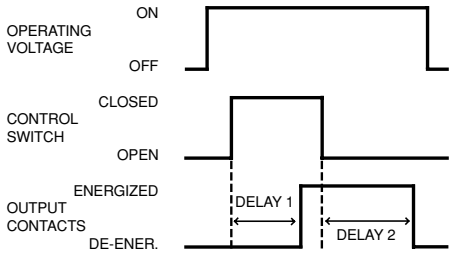


On / Interval : Time delay 1 is initiated upon application of a control signal (i.e., operating voltage or closure of the control switch on 11-pin models). The output contacts energize at the end of time delay 1 and de-energize at the end of time delay 2. Output contacts and the time delay circuit reset upon removal of the control signal regardless of state. Note: For the 48K series, delay 2 is fixed at 0.5 seconds.

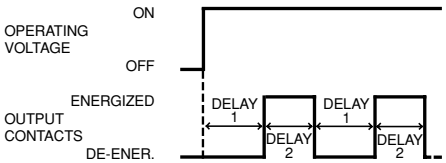


Note: When an external control switch is used, it must be closed before the unit is energized. If external control switch is open, the unit will not time out.

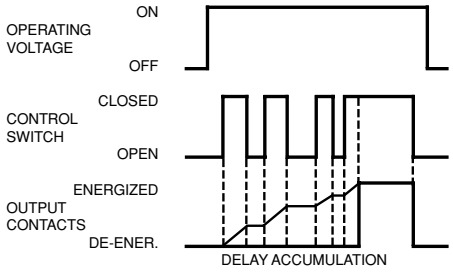
On-Delay / Off-Delay: Time delay is initiated for delay 1 upon closure of the control switch, for delay 2 upon opening of the control switch. (Operating voltage is applied continuously.) Output contacts energize at the end of time delay 1, and de-energize at the end of time delay 2. If the control state is reversed during the time delay, the time delay circuit automatically resets to zero. Note: For the 48K series, time delays 1 and 2 are identical.



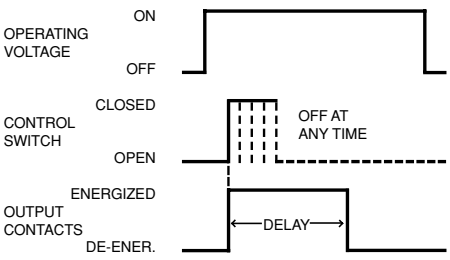
Repeat Cycle: Application of the operating voltage starts time delay 1. Upon expiration of this delay, the output contacts energize. Time delay 2 begins simultaneously. At the end of time delay 2, the output contacts de-energize, and a new cycle begins. The cycles continue until power is removed. To reset the timer, input voltage must be removed. The state of the output contacts may be reversed on the 11-pin 48K by closing the control switch. Note: For the 48K series, the time delays are identical.



Accumulating On-Delay: Time delay is initiated upon closure of the control switch. (Operating voltage is applied continuously.) Energization of the output contacts occurs at the end of the delay. If the control switch is opened during the time delay, the time delay pauses, and the relay holds (remembers) the delay accumulated so far. The time delay resumes when the control switch is re-closed. After energization, reset by opening the control switch. Regardless of state, reset by removing the operating voltage.

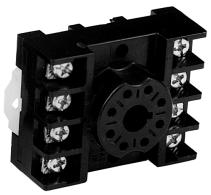


One Shot (Latching Interval): Operating voltage must be applied continuously. Output contacts energize and time delay is initiated upon closure of the control switch. Once closed, state of control switch has no further influence until time delay has expired. Upon expiration of time delay, output contacts de-energize and timer is reset by opening the control switch.



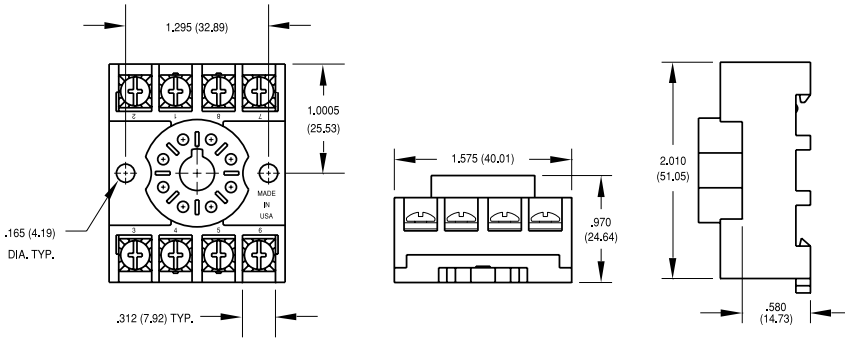
Accessories for AGASTAT Solid State Time Delay Relays

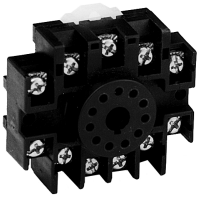
Sockets



BDS08SS Socket

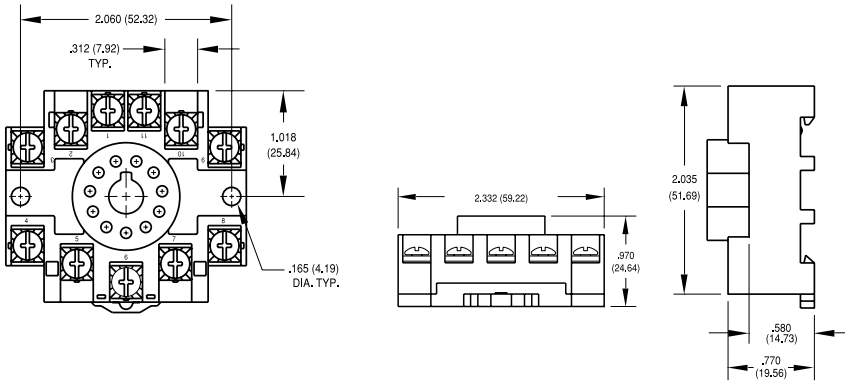
- 8-pin octal socket
- DIN rail or panel mount
- Rated 10A @ 300VAC
- #6-32 screws w/captive clamp plates
- File E140494
- File LR29523M37

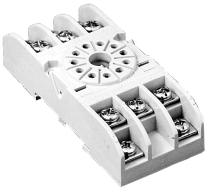




BDS11SS Socket

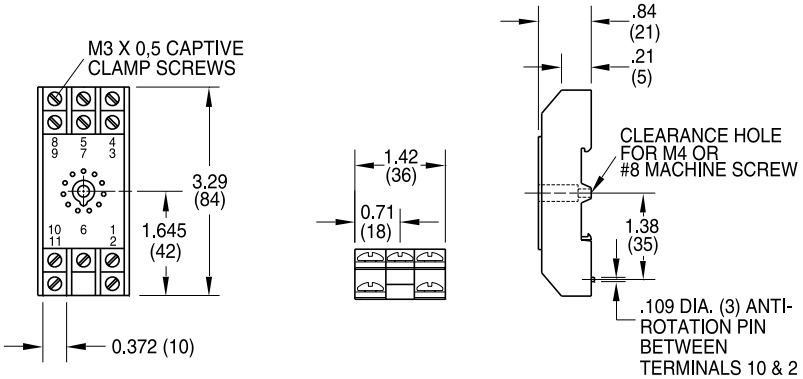
- 11-pin octal-type socket
- DIN rail or panel mount
- Rated 10A @ 300VAC
- #6-32 screws w/captive clamp plates
- File E140494
- File LR29523M37





BCSF11SC Socket

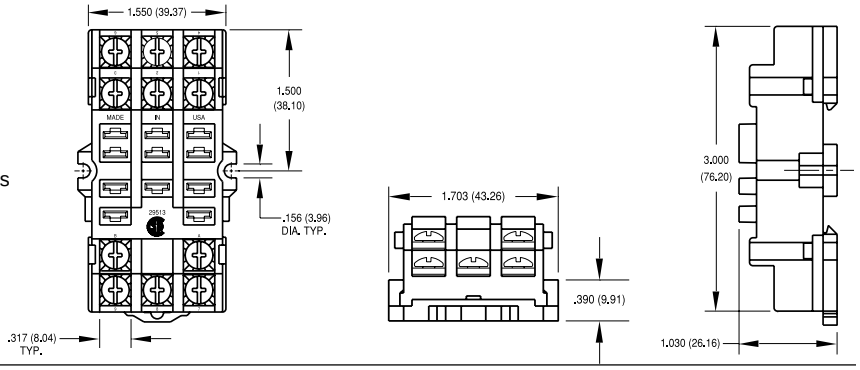
- Use with SCF series timer
- 11-pin octal-type socket
- DIN rail or panel mount
- Rated 10A @ 380VAC
- M3 screws w/captive clamp plates
- File E140494
- File LR29523M37





BDT11SS Socket

- 11-pin tab socket
- DIN rail or panel mount
- Rated 10A @ 300VAC
- #6-32 screws w/captive clamp plates
- File E140494
- File LR29523M37



External Potentiometer



POT1MV External Potentiometer

Time adjustment by external potentiometer or fixed resistor for series SCB, SCC,SSC, STA, VTM-1, VTM1, VTM2, VTM3, VTM4 & VTM7. (Potentiomter or resistor furnished by customer.)

Minimum time is obtained with zero resistance. Longer time is obtained by adding resistance specified at right for each second, hour or cycle above the minimum. Alternatively, an external 1 megohm potiometer may be used.

Time Range	Ohms (±10%)
.1 to 3 sec.	333.3K/sec.
.1 to 10 sec.	100.0K/sec.
.5 to 15 sec.	66.7K/sec.
1 to 30 sec.	33.3K/sec.
2 to 60 sec.	16.7K/sec.
4 to 120 sec.	8.3K/sec.
6 to 180 sec.	5.6K/sec.
10 to 300 sec.	3.3K/sec.

Dimensions are shown for reference purposes only.

Dimensions are in inches over (millimeters) unless otherwise specified.

Specifications and availability subject to change.



3RP1 series

Multifunction Solid State DIN Mount Time Delay Relay

- Available as SPDT or DPDT
- 15 time setting ranges
- .05s - 100hr programmable timing range
- Universal 24-240 VAC/VDC or fixed input types.
- 3A switching current rating
- Fits 35mm DIN track
- Single function, Delay-On available

Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Standards and Specifications

- IEC 721-3-3 "Ambient conditions"
- IEC 61812-1/DIN VDE 0435 Part 2021 "Solid State Relays, Time Relays"
- IEC 1000 "electromagnetic compatibility"
- IEC 947-5-1: DIN VDE 0660 Part 200 "Low-voltage control circuit devices"

Timing Specifications

Timing Ranges: 0.05 to 1 / 0.15 to 3 / 0.5 to 10 / 1.5 to 30 / 5 to 100 sec.;
0.05 to 1 / 0.15 to 3 / 0.5 to 10 / 1.5 to 30 / 5 to 100 min.;
0.05 to 1 / 0.15 to 3 / 0.5 to 10 / 1.5 to 30 / 5 to 100 hr.
Timing Adjustment: Potentiometer adjustable within selected range.
Tolerance: ±5% of full scale value.
Reset Time: 150 ms.
Minimum On Period: 35 msec.
Repeatability: ± 1%.

Timing Modes

See the following page for a description of timing modes.

Contact Data @ 25°C

Arrangements: 1 Form C (SPDT).
2 Form C (DPDT)
Material: Silver tin oxide.
Rating: 3A @ 250VAC.
Switching Frequency: 2,500 ops./hour.
Electrical Life: 200,000 operations min. at rated load.
Mechanical Life: 30 x 10^6 operations.

Input Data @ 25°C

Voltage: Universal Input Type: 24 - 240V, 50/60 Hz. AC or DC.
Fixed Input Type: 24, 100-127, 200-240AC; 24VDC.
Operating Range: AC: 85 to 110%.
DC: 80 to 125%.
Power Requirement:
Universal Input Type: AC: 6VA.
DC: 2W.

Environmental Data

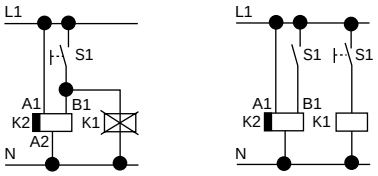
Temperature Range: Storage: -40°C to +80°C.
Operating: -25°C to +60°C.
Protection Category: IP 20 according to EN 60529.

Mechanical Data

Termination: Screw terminal.
Enclosure: Plastic DIN case.
Mounting: 35mm DIN track.
Weight: (3RP1505) 5.29 oz. (150g) approximately.
(3RP1525) 3.88 oz. (110g) approximately.

Configuring

- Changing the timer range and their functions will only be effective when they are carried out in a voltage-free state.
- Trigger input B1 or B3 must only be started when the supply voltage is applied.
- The same potential must be applied to A1 and B1, or A3 and B3. With the two-voltage design, only one voltage range must be connected.
- The triggering of the load paralleled to the start input is not permissible when using AC (see adjacent diagrams).

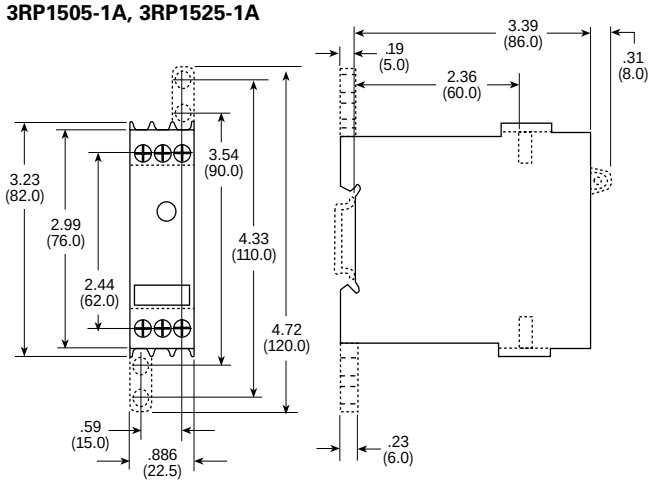


Ordering Information – Authorized distributors are more likely to stock boldface items listed below.

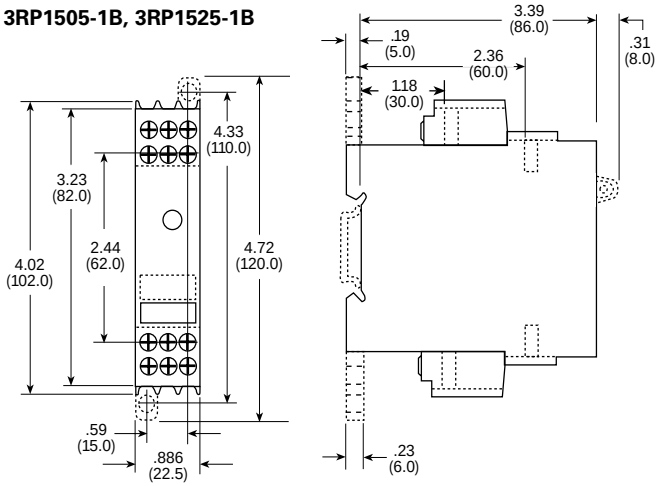
Input Voltage		Input Type	Contact Arrang.	Wiring Diagram	Functions	Part Number
DC	AC					
3RP1505 Multifunction						
24	24, 100-127	Fixed	SPDT	1 to 8	1 to 8	**3RP15 05-1AQ30**
24	24, 200-240	Fixed	SPDT	1 to 8	1 to 8	**3RP15 05-1AP30**
24	24, 100-127	Fixed	DPDT	9 to 24	9 to 24	**3RP15 05-1BQ30**
24-240	24-240	Universal	DPDT	9 to 24	9 to 24	**3RP15 05-1BW30**
3RP1525 Delay On						
24	24, 100-127	Fixed	SPDT	1	1	**3RP15 25-1AQ30**
24	24, 200-240	Fixed	SPDT	1	1	**3RP15 25-1AP30**
24	24, 100-127	Fixed	DPDT	9	9	**3RP15 25-1BQ30**
24	24, 200-240	Fixed	DPDT	9	9	**3RP15 25-1BP30**

Outline Dimensions

3RP1505-1A, 3RP1525-1A



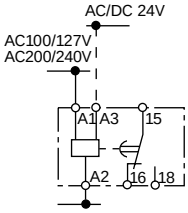
3RP1505-1B, 3RP1525-1B



Wiring Diagram

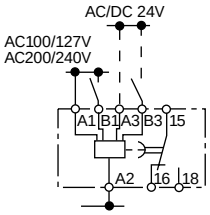
1. On-Delay

3RP1505-1A
3RP1525-1A



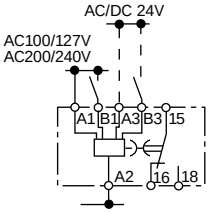
2. Off-Delay With Auxiliary Voltage

3RP1505-1A



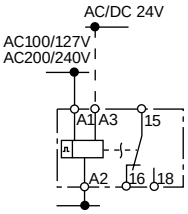
3. On and Off Delay With Auxiliary Voltage

3RP1505-1A



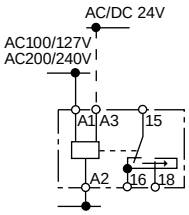
4. Flashing

3RP1505-1A



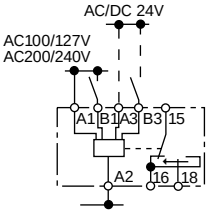
5. Making-Pulse Contact

3RP1505-1A
3RP1525-1A



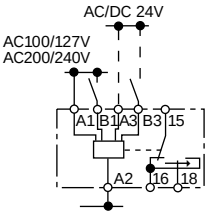
6. Breaking-Pulse Contact With Auxiliary Voltage

3RP1505-1A



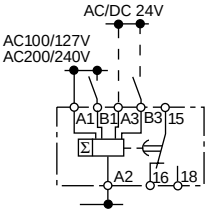
7. Pulse Forming With Auxiliary Voltage

3RP1505-1A



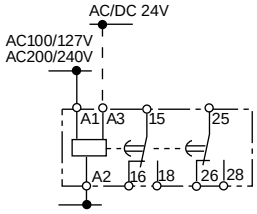
8. Additive On-Delay With Auxiliary Voltage and Instantaneous Contact

3RP1505-1A



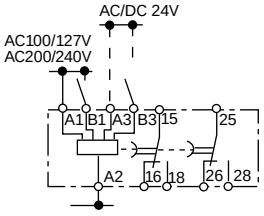
9. On-Delay

3RP1505-1B
3RP1525-1B



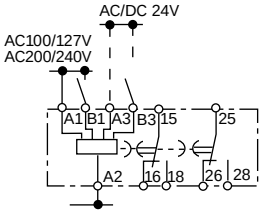
10. Off-Delay With Auxiliary Voltage

3RP1505-1B



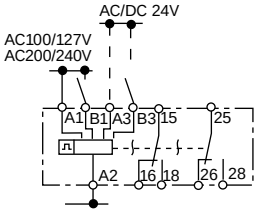
11. On-and Off-Delay With Auxiliary Voltage

3RP1505-1B



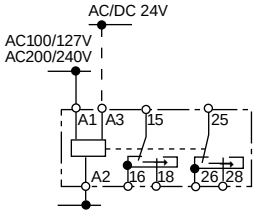
12. Flashing

3RP1505-1B



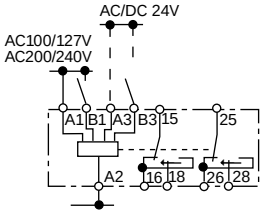
13. Making-Pulse Contact

3RP1505-1B



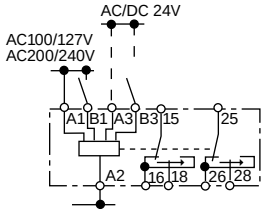
14. Breaking-Pulse Contact With Auxiliary Voltage

3RP1505-1B



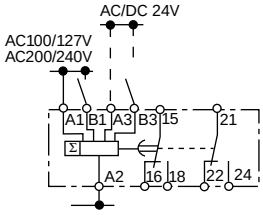
15. Pulse Forming With Auxiliary Voltage

3RP1505-1B



16. Additive On-Delay With Auxiliary Voltage and Instantaneous Contact

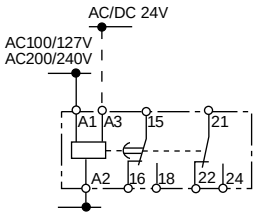
3RP1505-1B



Wiring Diagrams (continued)

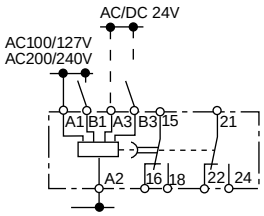
17. On-Delay and Instantaneous Contact

3RP1505-1B



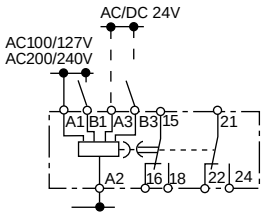
18. Off-Delay With Auxiliary Voltage and Instantaneous Contact

3RP1505-1B



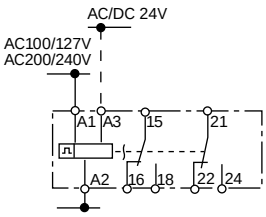
19. On and Off Delay With Auxiliary Voltage and Instantaneous Contact

3RP1505-1B



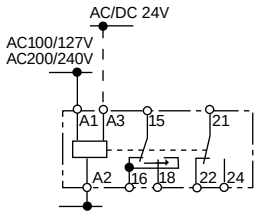
20. Flashing and Instantaneous Contact

3RP1505-1B



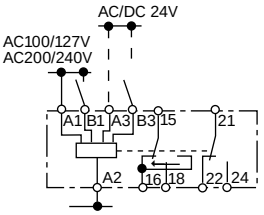
21. Making-Pulse Contact and Instantaneous Contact

3RP1505-1B



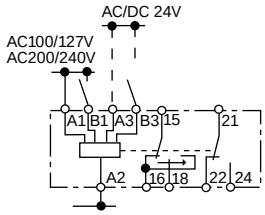
22. Breaking-Pulse Contact With Auxiliary Voltage and Instantaneous Contact

3RP1505-1B



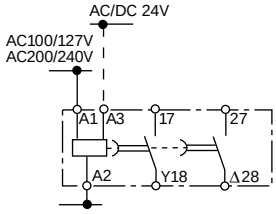
23. Pulse Forming With Auxiliary Voltage and Instantaneous Contact

3RP1505-1B



24. Star-Delta Function

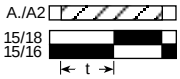
3RP1505-1B



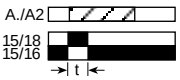
Timing Function Descriptions and Settings

3RP1505-1A

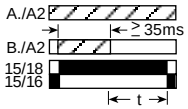
1. On Delay



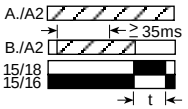
5. Impulse On



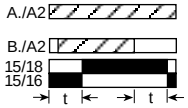
2. Off Delay



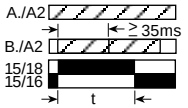
6. Impulse Off



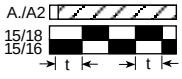
3. On/Off Delay



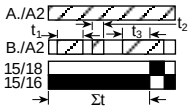
7. Pulse Shaping



4. Flasher



8. Cumulative On Delay

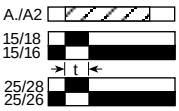


3RP1505-1B

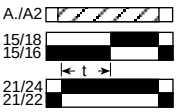
9. On Delay



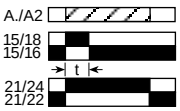
13. Impulse On



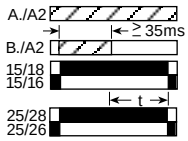
17. On Delay



21. Impulse On



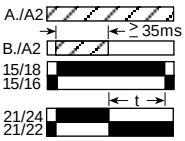
10. Off Delay



14. Impulse Off



18. Off Delay



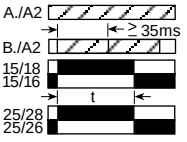
22. Impulse Off



11. On/Off Delay



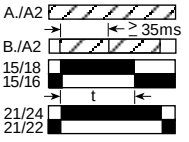
15. Pulse Shaping



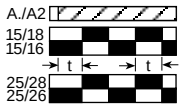
19. On/Off Delay



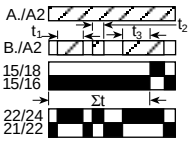
23. Pulse Shaping



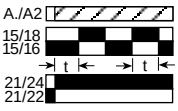
12. Flasher



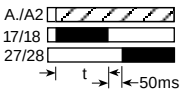
16. Cumulative On Delay



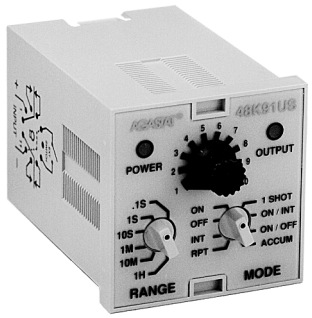
20. Flasher



24. Star/Delta



NOTE: This product is scheduled to soon be discontinued. Suggested alternatives are the P&B CNT, CNS and CNM5 series time delay relays.



48K series

Programmable Time Delay Relay

- Up to 8 user-programmable timing modes
- 0.1 sec. to 10 hr. programmable timing range
- Socket or panel mount (1/16 DIN enclosure)
- Universal (24-240VAC/24-125VDC) and fixed input types
- 10A output relay with DPDT contacts
- Two LED indicators on universal input types
- ANSI C37.90 transient protection on universal input types

File E60363

File LR29186

Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Timing Modes

Modes are user selectable via rotary selector switch (shown above) or screwdriver adjustment on optional recessed knob equipped models that are available on a special order basis for tamper-resistant requirements. Modes offered on specific models are:

48K91U: On-Delay, Off-Delay, Interval, On/Interval, One Shot, Repeat Cycle, On-Delay/Off-Delay, Accumulating On.
48K90U: On-Delay, Interval, On/Interval, Repeat Cycle.
48K01A: On-Delay.

Timing Specifications

Timing Ranges: 0.1 to 1 / 1 to 10 / 10 to 100 sec.; 1 to 10 / 10 to 100 min.; 1 to 10 hr.
Timing Adjustment: Potentiometer adjustment with linear reference calibrations. Recessed dial option is available on a special order basis for tamper-resistant requirements.
Accuracy: **Repeat Accuracy:** ±0.5% ±0.02 sec.
Overall Accuracy: ±1% ±0.02 sec.
Reset Time: 25 ms.
Relay Operate Time: 50 ms.
Relay Release Time: 50 ms.

Contact Data @ 25°C

Arrangements: 2 Form C (DPDT).
Rating: 10A @ 30VDC or 120/240VAC, resistive.
Expected Mechanical Life: 10 million operations.
Expected Electrical Life: 100,000 operations, min., at rated load.

Initial Dielectric Strength

Between Coil, Contacts and Case: 1,500VAC.

Input Data @ 25°C

Voltage: **48K90U & 48K91U:** 24 - 240VAC, 50/60 Hz. and 24-125VDC.
48K01A: 120VAC, 50/60 Hz.
Power Requirement: 2W, max.
Transient Protection: **48K90U & 48K91U:** Meets ANSI C37.90 Transient Specification.
48K01A: 2,500V for 1ms.

Environmental Data

Temperature Range: **Storage:** -25°C to +85°C.
Operating: -25°C to +60°C.

Mechanical Data

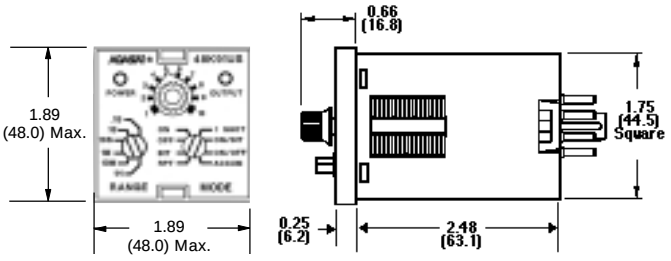
Termination: 8 or 11-pin octal style plug.
Enclosure: Grey plastic 1/16 DIN case for socket or panel mounting.
Indicating LEDs:
48K90U & 48K91U: Power On LED & Output Contacts LED (Typically flashes when timing, stays on when output relay is energized.)
48K01A: Output Contacts LED
Sockets: Fits either 27E123 or 27E892 (snap-on) screw terminal sockets.
Weight: 5 oz. (142g) approximately.

Ordering Information – Authorized distributors are likely to stock boldface part numbers listed below.

Part Number	Timing Modes	Operating Voltage	Termination Pins
48K01AS	**One -** On-Delay	120VAC 50/60 Hz.	8
48K90US	**Four -** On-Delay, Interval, On/Interval, Repeat Cycle	Universal (24-240VAC, 50/60 Hz. or 24-125VDC)	8
48K91US	**Eight -** On-Delay, Off-Delay, Interval, On/Interval, One Shot, Repeat Cycle, On-Delay/Off-Delay, Accumulating On	Universal (24-240VAC, 50/60 Hz. or 24-125VDC)	11

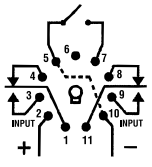
Ordering Note: The part numbers listed above are standard products with knobs for adjustment of mode, range and timing. On a special order basis other models are available with recessed dials requiring a screwdriver for adjustment. On the special order versions, the "S" part number suffix is replaced by an "R" suffix. Consult factory for availability of special order models.

Outline Dimensions

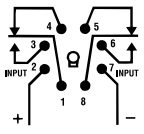


Wiring Diagrams (Bottom Views)

(pins numbered clockwise from keyway)



48K91US
(dotted line represents internal connection)



48K90US
48K01AS

Dimensions are shown for reference purposes only.

Dimensions are in inches over (millimeters) unless otherwise specified.

Specifications and availability subject to change.

CNT series



Multifunction, Digital Time Delay Relay/Counter

- 10 programmable timing modes + 2 counting modes
- 0.1 sec. to 9,990 hr. programmable timing range
- 1 to 99,900 counting range
- LCD digital display
- Universal (24-240VAC/VDC) and fixed input types
- 10A output relay with DPDT contacts
- Thumbwheel switches for programming

File E22575

File LR15734

Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Timing and Counting Modes

See the following page for a complete description of all programmable timing and counting modes.

Timing Specifications

Timing Ranges: 0.1 to 99.9 / 1 to 999 sec.; 0.1 to 99.9 / 1 to 999 min.; 0.1 to 99.9 / 1 to 999 / 10 to 9,990 hr.
Timing Adjustment: Digital adjustment via thumbwheel switches.
Tolerance: ±0.5% ±0.05 sec.
Delta Time (for AC units add ±1 cycle 60 Hz.): ±0.1% ±0.05 sec.
Repeatability (Including first cycle of operation.): ±0.1% ±0.05 sec.
Reset Time (power interruption): 45 ms, typ.; 60 ms, max.
Minimum Pulse Width, Control: 50 ms.
Recycle Time: 45 ms, typ.; 60 ms, max.

Counting Specifications

Maximum Count: 1 to 999; 10 to 9,990 (÷10); 100 to 99,900 (÷100).
Maximum Count Rate: 100 counts per second.
Mimumum Pulse Width:Count (Control): 3 ms.; **Reset:** 3 ms.
Available Counting Functions: Operate at preset count and release at preset count.

Contact Data @ 25°C

Arrangements: 2 Form C (DPDT).
Material: Silver-cadmium oxide alloy.
Rating: 10A @ 30VDC or 277VAC, resistive; 1/2 HP @ 250VAC; 1/3 HP @ 120VAC.
Expected Mechanical Life: 10 million operations.
Expected Electrical Life: 100,000 operations, min., at rated load.

Initial Dielectric Strength

Between Open Contacts: 1,000V rms, 60 Hz.
Between All Other Conductors: 1,500V rms, 60Hz.

Input Data @ 25°C

Voltage: Universal Input Type: 24 - 240V ±15%, 50/60 Hz. AC or DC.
Fixed Input Types: 120VAC ±15%, 50/60 Hz and 12VDC.
Power Requirement:
Universal Input Type: 10VA @ 240VAC; 5VA @ 120VAC; 1VA @ 24VAC. 10W @ 240VDC; 5W @ 120VDC; 1W @ 24VDC.
Fixed Input Types: 3VA @ 120VAC; 3W @ 12VDC.
Transient Protection: Yes.
Reverse Voltage Protection: Yes.

Input Voltages & Limits @ 25°C

Input Type	Nominal Voltage	Minimum Voltage	Maximum Voltage
Universal	24-240VAC/VDC	20.4VAC/VDC	276VAC/VDC
Fixed	120VAC	102VAC	138VAC
	12VDC	10.2VDC	13.8VDC

Note: DC voltage must be filtered (5% p-p ripple max. at nom. voltage). AC models will operate on 50 or 60 Hz.

Environmental Data

Temperature Range: **Storage:** -20°C to +70°C. **Operating:** -10°C to +55°C.
Humidity: 85% relative humidity, non-condensing.

Mechanical Data

Termination: 11-pin octal style plug.
Enclosure: Beige plastic 1/16 DIN case.
Sockets: Fits either 27E123 or 27E892 (snap-on) screw terminal sockets.
Weight: 4.3 oz. (122g) approximately.
External Control: CONTROL, RESET: Active on contact closure or solid state switch closure to RETURN, 0-1.0VDC maximum voltage level (see wiring diagrams for interface circuits.

Ordering Information – Authorized distributors are more likely to stock boldface items listed below.

Universal Input Model

Input Voltage	Part Number
24-240VAC/VDC	**CNT-35-96**

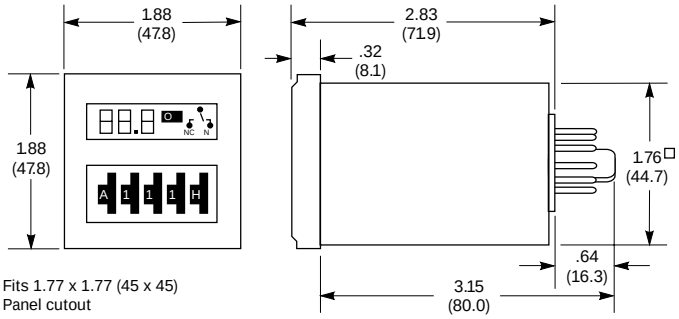
Fixed Input Models

Input Voltage	Part Number
12VDC	**CNT-35-26**
120VAC	**CNT-35-76**

Accessories

Part Number	Name	Description
SSA-24C667	Mounting Clip	Ratchet-fit clip slides onto CNT from behind to secure CNT in panel mount applications.
SSA-24C668	Protective Cover	Clear, flexible cover slips snugly over bezel of CNT to help protect against dust and moisture. Durable cover also helps prevent inadvertant changes of programming switch settings.

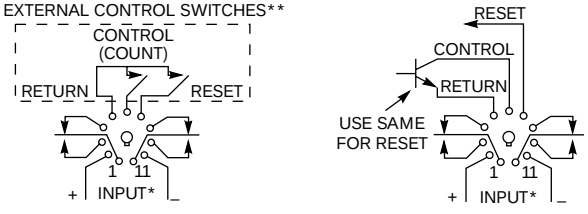
Outline Dimensions



Fits 1.77 x 1.77 (45 x 45) Panel cutout

Wiring Diagrams (Bottom Views)

(pins numbered clockwise from keyway)

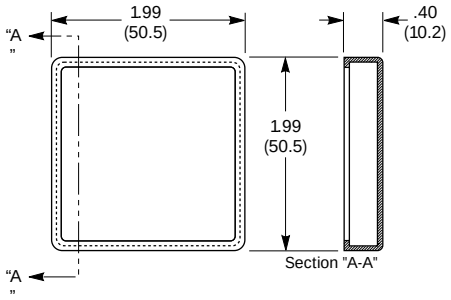


* **Note:** Input polarity for DC operation. For most reliable operation on AC, connect high side to "+" and low side to "–".

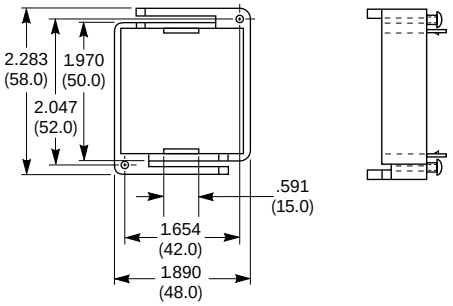
** **Important:** A dry circuit switch is recommended. A "dry circuit" switch is one rated to reliably switch currents of less than 50mA. Use of a switch rated for other than dry circuit may result in failure of the time delay relay to function properly.

Protective Cover & Mounting Clip Dimensions

SSA-24C668
Protective Cover



SSA-24C667
Mounting Clip



Programming Switch Diagram

With this setting, the relay would operate after a delay period of 214 seconds.

A	2	1	4	S

Function Select:

Timer Mode:
A = Delay On Operate
B = Delay On Release
C = Interval On
D = Control-Off Interval On
E = Recycle
F = Single Cycle
G = Control On-Off Interval On
H = Control On-Off Delay
I = Pulse
J = Cumulative Delay On Operate

Counter Mode: B = Divide by 10 C = Divide by 100 A & D-J = Normal Count

Time/Counter Setting: 001 to 999

Time Base/Counter Mode Select:

Time Base: .1S = 0.1 to 99.9 Sec. .1M = 0.1 to 99.9 Min. .1H = 0.1 to 99.9 Hrs. 10H =10 to 9990 Hrs.
S = 1 to 999 Sec. M = 1 to 999 Min. H = 1 to 999 Hrs.

Counter Mode: CO = Operate at Preset Count CR = Release at Preset Count

Timer Function Descriptions

A . Delay On Operate
Output relay turned on at end of programmed time interval which is started by CONTROL input or power-on with CONTROL on. Relay turned off by RESET input until next cycle is started. With CONTROL on, turning RESET off restarts timing

B. Delay On Release
Output relay turned on with CONTROL input and remains on for programmed time interval following removal of CONTROL. During time interval after release of CONTROL, RESET turns relay off until cycle restarted with reapplication of CONTROL. With CONTROL on, relay is held off while RESET is activated.

C. Interval On
Output relay turned on for programmed time interval by CONTROL or power-on with CONTROL on. RESET turns relay off until next cycle is started, and does not restart timing when RESET is removed.

D. Control-Off Interval On
Output relay turned on for programmed time interval by turn-off of CONTROL. RESET turns relay off until next cycle is started, and does not restart timing when RESET is removed.

E. Recycle
Output relay turned on at end of programmed time interval which is started by momentary CONTROL input or power-on with CONTROL on. Relay stays on for equal time interval, then turns off and cycle is repeated on a free-running basis until terminated by momentary RESET, turning relay off. With CONTROL on, turning RESET off restarts cycle.

F. Single Cycle
Output relay turned on at end of programmed time interval which is started by momentary CONTROL input or power-on with CONTROL on. Relay stays on for equal time interval, then turns off. RESET terminates timing and turns relay off. Turning RESET off does not restart timing.

G. Control On-Off Interval On (Watch Dog Timer)
Output relay turned on and programmed time interval started or restarted by change of CONTROL input. RESET turns relay off and stops timing. Turning RESET off does not restart timing.

H. Control On-Off Delay
Output relay turned on at end of programmed timing interval which is started or restarted by change of CONTROL input. If relay is on, turn-off of relay occurs at end of programmed time interval which is started or restarted by change of CONTROL input. RESET turns relay off and stops timing. Turning RESET off does not restart timing.

I. Pulse
Output relay turned on at end of programmed time interval, which is started by CONTROL input, for 0.5 second duration, and continues in pulsed mode at programmed time interval with fixed 0.5 second on-time. Turning CONTROL off turns relay off and stops timing. RESET turns relay off and inhibits operation. With CONTROL on, removal of RESET restarts timing.

J. Cumulative Delay On Operate
Output relay turned on at completion of total accumulate CONTROL input duration equal to programmed time. Turning CONTROL off before accumulation of programmed time results in measured time total being held until CONTROL is again turned on and total programmed time value is reached. RESET input resets time value to zero and turns relay off if energized. Turning RESET off restarts timing if CONTROL is on.

Counter Function Descriptions

CO – Operate at Preset Count – Normal Mode
After initializing by momentary activation of RESET input, each on/off signal at COUNT (CONTROL) input increments displayed count in upcounting manner from initial 000 value until preset count, set by thumbwheel switches, is reached and output relay turns on. Additional inputs continue to increment displayed count. Continued counting past maximum count (999) results in a "wrap-around" effect to 000, followed by contrinued up-counting. Activation of RESET input turns relay off and resets count to zero.

CR – Release at Preset Count – Normal Mode
Initializing by momentary activation of RESET input turns relay on. Operation is similar to CO (Operate at Preset Count) except relay turns off at a preset count.

CO or CR – Divide-by-10 Mode
Operation is as described previously, except count is incremented for every 10 on/off input signals for a maximum presettable count of 9,990.

CO or CR – Divide-by-100 Mode
Operation is as described previously, except count is incremented for every 100 on/off input signals for a maximum presettable count of 99,900.

CNS series

Multifunction Time Delay Relay



- 8 programmable timing modes (4 on 8-pin models)
- 0.1 sec. to 100 min. programmable timing range
- Universal (24-240VAC/VDC) and fixed input types
- 10A output relay with DPDT contacts
- DIP switch selection of timing mode and range
- Knob and dial scale for setting actual delay time

File E22575

File LR15734

Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Timing Modes

See the following page for a complete description of timing modes.

Timing Specifications

Timing Ranges: 0.1 to 1.0 / 1.0 to 10 / 10 to 100 sec.;
0.1 to 1.0 / 1.0 to 10 / 10 to 100 min.
Timing Adjustment: Knob adjustable within selected range.
Tolerance: –0, +20% of max. specified at high end of timing range; min. specified, or less, at low end.
Delta Time (for AC units add ±1 cycle 60 Hz.): ±10%.
Repeatability (Including first cycle of operation.): ±2% (for AC units add ±1 cycle 60 Hz.).
Reset Time (power interruption): 45 ms, typ.; 60 ms, max.
Minimum Pulse Width, Control: 50 ms.
Recycle Time: 45 ms, typ.; 60 ms, max.

Contact Data @ 25°C

Arrangements: 2 Form C (DPDT).
Material: Silver-cadmium oxide alloy.
Rating: 10 A @ 30VDC or 277VAC, resistive; 1/2 HP @ 250VAC; 1/3 HP @ 120VAC.
Expected Mechanical Life: 10 million operations.
Expected Electrical Life: 100,000 operations, min., at rated load.

Initial Dielectric Strength

Between Open Contacts: 1,000V rms, 60 Hz.
Between All Other Conductors: 1,500V rms, 60 Hz.

Input Data @ 25°C

Voltage: Universal Input Type: 24 - 240V ±15%, 50/60 Hz. AC or DC.
Fixed Input Type: 120VAC ±15%, 50/60 Hz.
Power Requirement:
Universal Input Type: 10VA @ 240VAC; 5VA @ 120VAC; 1VA @ 24VAC.
10W @ 240VDC; 5W @ 120VDC; 1W @ 24VDC.
Fixed Input Type: 3VA @ 120VAC.
Transient Protection: Yes.
Reverse Voltage Protection: Yes.

Input Voltages and Limits @ 25°C

Input Type	Nominal Voltage	Minimum Voltage	Maximum Voltage
Universal	24-240VAC/VDC	20.4VAC/VDC	276VAC/VDC
Fixed	120VAC	102VAC	138VAC

Note: DC voltage must be filtered (5% p-p ripple max. at nom. voltage).
AC models will operate on 50 or 60 Hz.

Environmental Data

Temperature Range: **Storage:** -20°C to +70°C.
Operating: -10°C to +55°C.
Humidity: 85% relative humidity, non-condensing.

Mechanical Data

Termination: 8- or 11-pin octal style plug.
Enclosure: Beige plastic 1/16 DIN case. Dial scale provided for knob adjustment reference.
Sockets: Models with 8-pin base fit either 27E122 or 27E891 (snap-on) screw terminal sockets. 11-pin types fit either 27E123 or 27E892 (snap-on) screw terminal sockets.
Weight: 4.3 oz. (122g) approximately.

Ordering Information – Authorized distributors are more likely to stock boldface items listed below.

Universal Input Models

Input Voltage	Timing Functions	No. of Pins	Wiring Dia.	Part Number
24-240VAC/VDC	4	8	1	**CNS-35-92**
24-240VAC/VDC	8	11	2	**CNS-35-96**

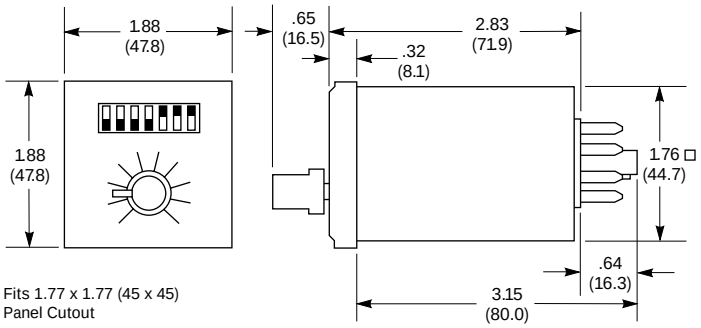
Fixed Input Models

Input Voltage	Timing Functions	No. of Pins	Wiring Dia.	Part Number
120VAC	4	8	1	**CNS-35-72**
120VAC	8	11	2	**CNS-35-76**

Accessory

Part Number	Name	Description
SSA-24C667	Mounting Clip	Ratchet-fit clip slides onto CNS from behind to secure CNS in panel mount applications.

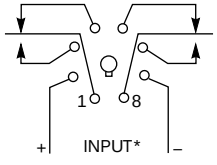
Outline Dimensions

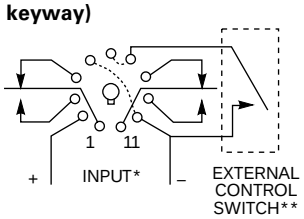


Fits 1.77 x 1.77 (45 x 45)
Panel Cutout

Wiring Diagrams (Bottom Views)

(pins numbered clockwise from keyway)





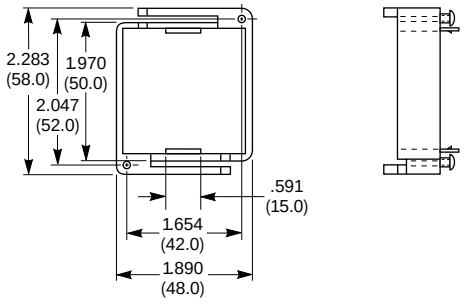
*** Note:** Input polarity for DC operation. For most reliable operation on AC, connect high side to "+" and low side to "–".

**** Important:** A dry circuit switch is recommended. A "dry circuit" switch is one rated to reliably switch currents of less than 50mA. Use of a switch rated for other than dry circuit may result in failure of the time delay relay to function properly.

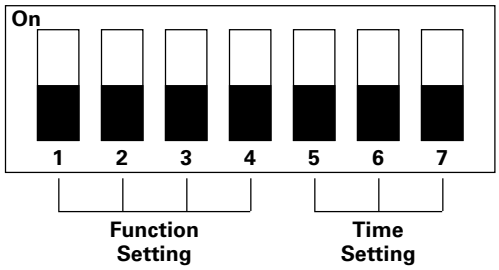
The dotted lines shown between pins on 11-pin diagram indicate internal connections.

Mounting Clip Dimensions

SSA-24C667
Mouting Clip



DIP Switch Layout



Note: The solid black blocks in the DIP switch diagrams indicate the switch positions. For example, all the switches are "off" in the diagram above.

Timing Range Switch Settings

DIP Switch Setting (5 6 7)	Timing Range	DIP Switch Setting (5 6 7)	Timing Range
■ □ □	0.1 - 1.0 Second	□ ■ ■	0.1 - 1.0 Minute
■ ■ □	1.0 - 10 Seconds	□ ■ □	1.0 - 10 Minutes
■ □ ■	10 - 100 Seconds	□ □ ■	10 - 100 Minutes

Timing Function Descriptions and Switch Settings

8 Or 11 Pin

Delay on Operate



72 & 92 - Output relay is energized at the completion of the time interval which is initiated by the application of input voltage.
76 & 96 - Same as the above except, closing the control switch after time out will de-energize the relay and reset the timer. Opening the switch will initiate another time interval. Closing the control switch during timing will reset the time to zero and inhibit timing until opened again.

Interval On (Input Controlled)



72 & 92 - Output relay is energized by the application of input voltage. The time interval is initiated at the same time with the relay de-energizing at the completion of the time interval.
76 & 96 - Same as above. Closing the control switch will have no effect on timing or the state of the relay.

Recycler (Initially Off)



72 & 92 - Output relay will begin cycling at a 50% duty cycle with the application of input power. The initial state of the relay will be de-energized.
76 & 96 - Same as the above except, closing the control switch will de-energize the relay and inhibit timing until it is once again opened, at which time it will start from zero time.

Recycler (Initially On)



72 & 92 - Output relay will begin cycling at a 50% duty cycle with the application of input power. The initial state of the relay will be energized.
76 & 96 - Same as the above except, closing the control switch will energize the relay and inhibit timing until it is once again opened, at which time it will start from zero time.

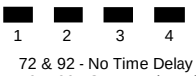
11 Pin Only

Delay on Release



76 & 96 - Output relay is energized by the closing of the control switch with the input applied or the application of input voltage with the control switch already closed. The time interval will be initiated by the opening of the control switch with the relay de-energizing at the completion of the time interval. Closing the control switch after time out will energize the relay in preparation for another time interval. Closing the control switch during timing will reset the time to zero and inhibit timing until opened again.

Inverted Delay on Release



72 & 92 - No Time Delay - Instantly On
76 & 96 - Output relay will energize with the application of the input voltage when the control switch is open. Control switch closing will de-energize the relay. A timing interval will be initiated with the opening of the control switch, at the completion of which the relay willenergize. With the control switch closed upon application of input voltage, the relay will wait until the control switch is opened to initiate a time interval after which the relay will energize. Closing of the control switch during timing will reset the time to zero and inhibit timing until opened again.

Interval On (Switch Controlled)



76 & 96 - Output relay is energized by the application of input voltage with the control switch closed or the closing of the control switch with the input applied. Immediately upon either, timing is initiated with the relay de-energizing at the completion of the time interval. Closing the control switch after time out will reset the timer, energize the relay, and initiate another time interval. Closing the control switch during timing will have no effect on timing or the state of the relay.

Interval Off



76 & 96 - Output relay will initially be energized with the application of the input voltage when the control switch is open. Control switch closing will de-energize the relay and start a time interval. At the completion of the time interval, the relay will energize. With the control switch closed upon application of input voltage, a time interval will be initiated after which the relay will energize. Closing of the control switch during timing will have no effect on timing or the state of the relay.

CNM5 series



Multifunction Time Delay Relay For Plug-In or Panel Mounting

- Five timing functions selectable via rotary switch
- 0.1 sec. to 9,990 hr. timing range
- Fixed input type (120VAC ± 15%)
- 10A output relay with DPDT contacts
- 1/16 DIN style enclosure with 11-pin plug-in base
- Thumbwheel switches for programming delay time

File E22575

File LR15734

Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Timing Functions

See the following page for a complete description of timing functions.

Timing Specifications

Timing Ranges: 0.1 to 99.9 / 1 to 999 sec.;
0.1 to 99.9 / 1 to 999 min.;
0.1 to 99.9 / 1 to 999 / 10 to 9,990 hr.
Timing Adjustment: Digital adjustment via thumbwheel switches.
Tolerance: ±0.05% ±0.04 sec.*
Repeatability (Including first cycle of operation.): < ±0.05% ±0.04 sec.*
Reset Time (power interruption): 45 ms, typ.; 60 ms, max.
Minimum Pulse Width, Control: 50 ms.

* Timing is synchronized with input voltage frequency. Accuracy is dependent on input voltage frequency. Tolerance shows maximum variation from utility companies.

Contact Data @ 25°C

Arrangement: 2 Form C (DPDT).
Material: Silver-cadmium oxide alloy.
Rating: 10A @ 30VDC or 277VAC, resistive;
1/2 HP @ 250VAC; 1/3 HP @ 120VAC.
Expected Mechanical Life: 10 million operations.
Expected Electrical Life: 100,000 operations, min., at rated load.

Initial Dielectric Strength

Between Output Poles: 1,500V rms, 60 Hz.
Between Input and Output: 1,500V rms, 60Hz.

Input Data @ 25°C

Voltage: 120VAC ±15%, 60 Hz.
Power Requirement: 3VA @ 120VAC.
Transient Protection: 13 Joule MOV.

Input Voltage & Limits

Nominal Voltage	Minimum Voltage	Maximum Voltage
120VAC	102VAC	138VAC

Environmental Data

Temperature Range: **Storage:** -40°C to +85°C.
Operating: -10°C to +55°C.
Humidity: 85% relative humidity, non-condensing.

Mechanical Data

Termination: 11-pin octal style plug.
Enclosure: Black plastic 1/16 DIN (48mm x 48mm) case.
Sockets: Fits either 27E123 or 27E892 (snap-on) screw terminal sockets.
Weight: 4.3 oz. (122g) approximate.

Ordering Information – Authorized distributors are more likely to stock boldface items listed below.

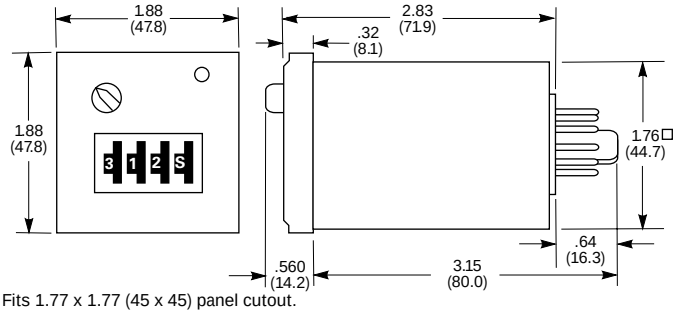
Time Delay Relay

Input Voltage	Part Number
120VAC	**CNM5**

Accessory

Part Number	Name	Description
SSA-24C667	Mounting Clip	Ratchet-fit clip slides onto CNM5 from behind to secure CNM5 in panel mount applications.

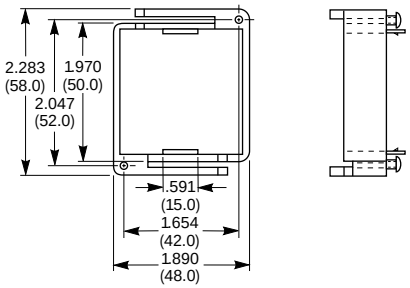
Outline Dimensions



Fits 1.77 x 1.77 (45 x 45) panel cutout.

Mounting Clip Dimensions

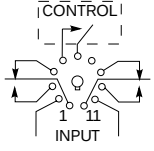
SSA-24C667
Mounting Clip



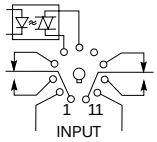
Wiring Diagrams (Bottom Views)

(pins numbered clockwise from keyway)

EXTERNAL CONTROL SWITCH**

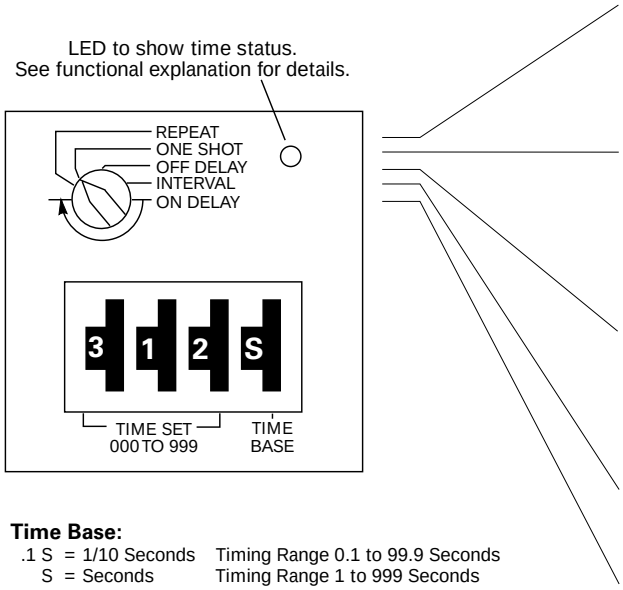


Optional Solid State Input Interface



****Important:** A dry circuit switch is recommended. A "dry circuit" switch is one rated to reliably switch currents of less than 50mA. Use of a switch rated for other than dry circuit may result in failure of the time delay relay to function properly.

Timer Function Descriptions



Time Base:

.1 S	= 1/10 Seconds	Timing Range 0.1 to 99.9 Seconds
S	= Seconds	Timing Range 1 to 999 Seconds
.1 M	= 1/10 Minutes	Timing Range 0.1 to 99.9 Minutes
M	= Minutes	Timing Range 1 to 999 Minutes
.1 H	= 1/10 Hours	Timing Range 0.1 to 99.9 Hours
H	= Hours	Timing Range 1 to 999 Hours
10 H	= 10 Hours	Timing Range 10 to 9990 Hours

Repeat: Output relay is turned on at end of programmed time interval which is started by application of input power. Relay stays on for equal time interval, then turns off and cycle is repeated on a free-running basis with equal on and off times until terminated by removal of input power. LED is flashing when output relay is off and on continuously when the relay is on. Applying CONTROL input during timing will have no effect on timing or the state of the relay.

One Shot: Output relay is turned on by applying CONTROL input with input voltage present or application of input voltage with the CONTROL input on. Immediately upon either, timing is initiated with the output relay turning off at the completion of the selected time interval. Applying CONTROL input after time out will reset the timer, turn on the output relay and initiate another time interval. LED is on continuously when output relay is off and flashes when the relay is on. Applying CONTROL input during timing will have no effect on timing or the state of the relay.

Off Delay: Output relay is turned on by applying CONTROL input with input voltage present or application of input voltage with the CONTROL input on. The time interval will be started by removing the CONTROL input with the output relay turning off at completion of the time interval. Reapplying the CONTROL during timing will reset the time to zero and inhibit timing until removed. LED is off when CONTROL input is on, flashing during timing and on continuously when the output relay is off.

Interval: Output relay is turned on for a programmed time interval by applying input voltage. LED flashes when output relay is on and is on continuously when the output relay is off. Applying CONTROL input will have no effect on timing or the state of the relay.

On Delay: Output relay is off for a programmed time interval which is started by applying input voltage. LED flashes when output relay is off and is on continuously when the output relay is on. Applying CONTROL input will have no effect on timing or the state of the relay.

SSF series

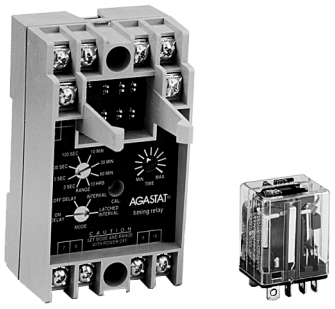
Programmable Time Delay Relay

- 4 user-programmable timing modes
- 0.1 sec. to 10 hr. programmable timing range
- Parameters set with recessed screwdriver dials
- Universal voltage (plug-in relay dependent)
- 10A DPDT replaceable output relay minimizes downtime
- Front screw terminals
- DIN-rail, panel or machine tool track mount

File E15631

File LR29186

Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.



Timing Modes

Modes are user selectable via screwdriver adjustment of recessed 4-position selector dial.
Modes offered are: On-Delay, Off-Delay, Interval and Latching Interval.

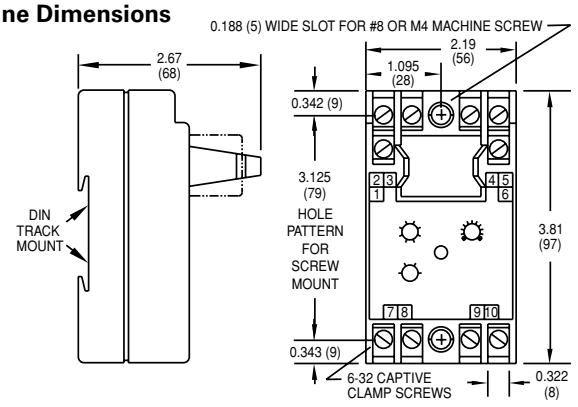
Timing Specifications

Timing Ranges: 0.1 to 3 / 0.33 to 10 / 1 to 30 / 4 to 120 sec.; 0.33 to 10 / 1 to 30 / 2 to 60 min.; 0.33 to 10 hr.
Timing Range Selection: Screwdriver select via recessed 8-position selector dial.
Timing Adjustment: Recessed potentiometer adjustment with reference calibrations.
Accuracy: **Repeat Accuracy:** ±1% ±0.01 sec.
Overall Accuracy: ±3% ±0.01 sec.
Reset Time: 30 ms.
Relay Operate Time: On-Delay and Interval mode: 30 ms.
Relay Release Time: Off-Delay, Interval and Latching Interval: 30 ms. (with factory-installed relay).

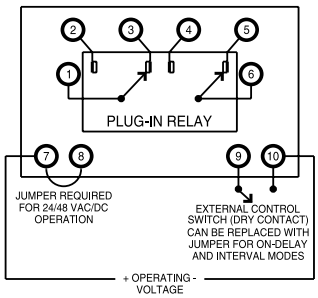
Contact Data @ 25°C

Arrangements: 2 Form C (DPDT).
Rating: 10A @ 28VDC or 120VAC, resistive; 1/3 HP @ 120/240VAC 345VA.
Expected Mechanical Life: 10 million operations (with factory-installed relay).
Expected Electrical Life: 500,000 operations, min., at rated resistive load(with factory-installed relay).

Outline Dimensions



Wiring Diagram (Top View)



Initial Dielectric Strength

Between Coil/Control Switch and Contacts: 1,500VAC for one minute.

Input Data @ 25°C

Voltage: See Ordering Information section for details.
Power Requirement: 2W, max.

Transient Protection: Non-repetitive transients of the following magnitudes will not cause spurious operation of affect function and accuracy.

Operating Voltage	<0.1 ms	<1 ms
24, 48 VAC/VDC	1,000V	480V
120, 240VAC/VDC	3,000V	2500V*

* Min. source impedance of 100 ohm@120/240VAC, 3000V <0.1 , sec.

Environmental Data

Temperature Range: **Storage:** -40°C to +85°C.
Operating: -30°C to +65°C.

Mechanical Data

Mounting/Termination: Panel, DIN-rail, Machine Tool mounting track mounting case with screw terminals.
Weight: 5.5 oz. (156g) approximately.

Ordering Information

SSF	R	90	A
Series SSF Universal Timer	**R** = UL Recognized Component	**Operating Mode 90** Multiple modes - On-Delay Off-Delay Interval Latching Interval	**Operating Voltage** (+10%, –15%) A = 120VAC, 50/60 Hz. B = 240VAC, 50/60 Hz. E = 24VAC, 50/60 Hz. F = 48VAC, 50/60 Hz. N = 48VDC O =24VDC P = 125VDC X = No factory-installed relay.†

† Voltage determined by customer-supplied relay. Only relays that operate on the above-listed voltages should be used. Timer operation using other relay voltages is not recommended.

Authorized distributors are likely to stock the following:

SSFR90A
SSFR90X



SCF series

Programmable Time Delay Relay

- 4 user-programmable timing modes
- 0.1 sec. to 10 hr. programmable timing range
- Parameters set with recessed dials
- Narrow width saves panel space
- 10A DPDT output relay
- Socket can be DIN-rail or back panel mounted

File E15631(relay) and E140494 (socket)

File LR29186 (relay) and LR29513M7 (socket)

Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Timing Modes

Modes are user selectable via screwdriver adjustment of recessed 4-position selector dial.
Modes offered are: On-Delay, Off-Delay, Interval and Latching Interval.

Timing Specifications

Timing Ranges: 0.1 to 3 / 0.33 to 10 / 1 to 30 / 4 to 120 sec.; 0.33 to 10 / 1 to 30 / 2 to 60 min.; 0.33 to 10 hr.
Timing Range Selection: Screwdriver select via recessed 8-position selector dial.
Timing Adjustment: External knob potentiometer adjustment with reference calibrations.
Accuracy: **Repeat Accuracy:** ±1% ±0.01 sec.
Overall Accuracy: ±3% ±0.01 sec.
Reset Time: 30 ms.
Relay Operate Time: On-Delay and Interval mode: 55 ms.
Relay Release Time: Off-Delay, Interval and Latching Interval: 40 ms.

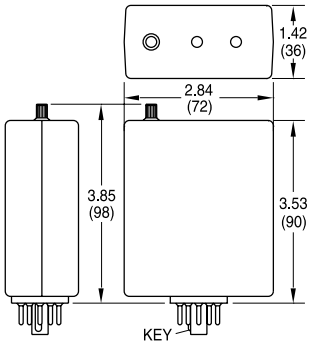
Contact Data @ 25°C

Arrangements: 2 Form C (DPDT).
Rating: 10A @ 28VDC or 120VAC, resistive; 1/3 HP @ 120/240VAC; 345VA.
Expected Mechanical Life: 10 million operations.
Expected Electrical Life: 500,000 operations, min., at rated resistive load.

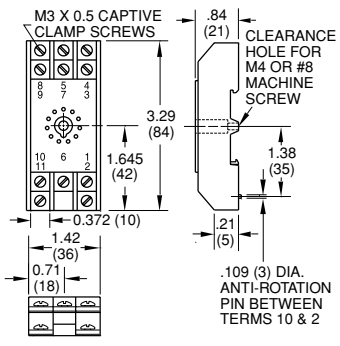
Initial Dielectric Strength

Between Terminals and Case: 1,000VAC plus twice the nominal voltage for one minute.

Outline Dimensions

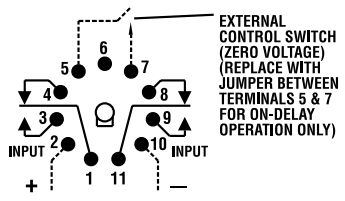


SCF TIMER



BCSF11SC SOCKET

Wiring Diagram (Bottom View)



NOTE: External wiring illustrated by broken lines

Input Data @ 25°C

Voltage: See Ordering Information section for details.
Power Requirement: 2W, max.

Transient Protection: Non-repetitive transients of the following magnitudes will not cause spurious operation of affect function and accuracy.

Operating Voltage	<0.1 ms	<1 ms
12VDC	1,000V	240V*
24VAC/VDC	1,000V	240V*
48 VAC/VDC	1,000V	480V*
120 VAC, 125VDC	3,000V	2,500V*
240VAC/VDC	3,000V	2,500V*

* Minimum source impedance of 100 ohm.

Environmental Data

Temperature Range: **Storage:** -40°C to +85°C.
Operating: -30°C to +65°C.

Mechanical Data

Mounting/Termination: 11-pin octal-type plug for use with mating socket. Mount relay in horizontal position (pins horizontal, knob down, LEDs up).
Status Indication: Power On LED and Output Contacts LED.
Weight: Relay: 3.5 oz. (156g) approx.; Socket: 1.7 oz. (48.3g) approx.

Ordering Information

SCF	RX	90	2	A	A
Series SCF		**Operating Mode**		**Output Rating**	
Plug-In Programmable Timer		90 = Multiple Modes On-Delay Off-Delay Interval Latching Interval		A = 10 Amp B = 5 Amp	
	Mounting		**Output**		**Operating Voltage (+10%, –15%)**
	RX = Without Socket RF = With Socket		2 = DPDT Relay		A = 120VAC, 50/60 Hz. / 125VDC B = 240VAC, 50/60 Hz. § E = 24VAC, 50/60 Hz. / 24VDC F = 48VAC, 50/60 Hz. / 24VDC Q = 12VDC

§ Voltage Option B is only available with 5 Amp output option.

Authorized distributors are likely to stock the following:

None at present.

Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.
www.tycoelectronics.com
Technical support:
Refer to inside back cover.



CN1 series

On Delay, Time Delay Relay For Plug-In or Panel Mounting

- 0.1 sec. to 9,990 hr. timing range
- Fixed input type (120VAC ± 15%)
- 10A output relay with DPDT contacts
- 1/16 DIN style enclosure with 8-pin plug-in base
- Thumbwheel switches for programming delay time

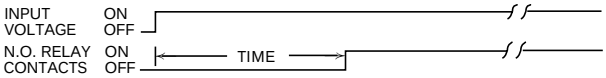
File E22575

File LR15734

Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Timing Function

On Delay – Output relay turns on at the end of a programmed time interval which is started by applying input voltage. LED flashes when output relay is off and is on continuously when the output relay is on. Removal of input voltage turns off output relay. Reapplying input voltage resets the unit.



Timing Specifications

Timing Ranges: 0.1 to 99.9 / 1 to 999 sec.;
0.1 to 99.9 / 1 to 999 min.;
0.1 to 99.9 / 1 to 999 / 10 to 9,990 hr.
Timing Adjustment: Digital adjustment via thumbwheel switches.
Tolerance: ± 0.05% ± 0.04 sec.*
Repeatability (Including first cycle of operation.): < ± .05% ± 0.04 sec.*
Reset Time (power interruption): 45 ms, typ.; 60 ms, max.

* Timing is synchronized with input voltage frequency. Accuracy is dependent on input voltage frequency. Tolerance shows maximum variation from utility companies.

Contact Data @ 25°C

Arrangement: 2 Form C (DPDT).
Material: Silver-cadmium oxide alloy.
Rating: 10A @ 30VDC or 277VAC, resistive;
1/2 HP @ 250VAC; 1/3 HP @ 120VAC.
Expected Mechanical Life: 10 million operations.
Expected Electrical Life: 100,000 operations, min., at rated load.

Initial Dielectric Strength

Between Output Poles: 1,500V rms, 60 Hz.
Between Input and Output: 1,500V rms, 60Hz.

Input Data @ 25°C

Voltage: 120VAC ±15%, 60 Hz.
Power Requirement: 3VA @ 120VAC.
Transient Protection: 13 Joule MOV.

Input Voltage & Limits

Nominal Voltage	Minimum Voltage	Maximum Voltage
120VAC	102VAC	138VAC

Environmental Data

Temperature Range: **Storage:** -40°C to +85°C.
Operating: -10°C to +55°C.
Humidity: 85% relative humidity, non-condensing.

Mechanical Data

Termination: 8-pin octal style plug.
Enclosure: Black plastic 1/16 DIN (48mm x 48mm) case.
Sockets: Fits either 27E122 or 27E891 (snap-on) screw terminal sockets.
Weight: 4.3 oz. (122g) approximate.

Ordering Information – Authorized distributors are more likely to stock boldface items listed below.

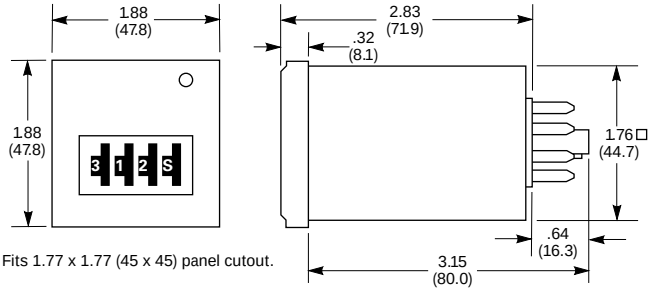
Time Delay Relay

Input Voltage	Part Number
120VAC	**CN1**

Accessory

Part Number	Name	Description
SSA-24C667	Mounting Clip	Ratchet-fit clip slides onto CN1 from behind to secure CN1 in panel mount applications.

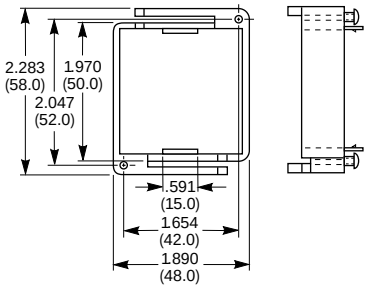
Outline Dimensions



Fits 1.77 x 1.77 (45 x 45) panel cutout.

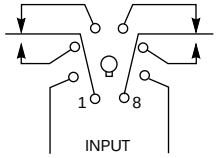
Mounting Clip Dimensions

SSA-24C667
Mounting Clip



Wiring Diagram (Bottom View)

(pins numbered clockwise from keyway)



Time Base

.1 S	= 1/10 Seconds	Timing Range 0.1 to 99.9 Seconds
S	= Seconds	Timing Range 1 to 999 Seconds
.1 M	= 1/10 Minutes	Timing Range 0.1 to 99.9 Minutes
M	= Minutes	Timing Range 1 to 999 Minutes
.1 H	= 1/10 Hours	Timing Range 0.1 to 99.9 Hours
H	= Hours	Timing Range 1 to 999 Hours
10 H	= 10 Hours	Timing Range 10 to 9990 Hours

CG series

CMOS IC Time Delay Relay

- Repeatability to .05%
- Choice of timing modes
  - – Delay on operate
  - – Delay on release
  - – Interval on
- Knob adjustable
- 10A output relay with DPDT contacts
- Various models time from 0.5 sec. to 100 min.



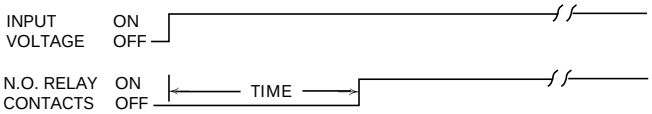
File E22575

File LR15734

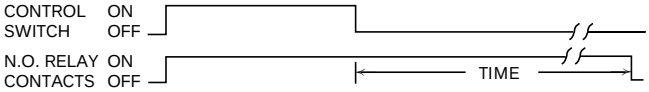
Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Timing Modes

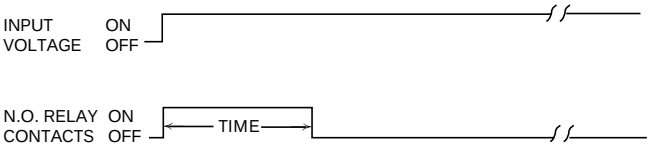
Delay on operate – Delay period begins when input voltage is applied. At the end of the delay period, the relay will operate and will not release until input voltage is removed. Reset occurs when input voltage is reapplied.



Delay on release – Input voltage must be applied continuously to operate the internal relay. When the control switch is closed, the relay energizes. When the control switch is opened, timing begins. When timing is complete, the relay will de-energize. Time may be reset to zero during timing by closing the control switch.



Interval on – The relay energizes and timing begins when input voltage is applied. At the end of the time delay period the relay will de-energize. Reset is accomplished by removing, then reapplying, the input voltage.



Timing Specifications

Timing Ranges: From 0.5 to 5.0 sec. through 10 to 100 min.
Timing Adjustment: Knob adjustable.
Tolerance (for AC units add ±1/2 cycle 60 Hz.):
Knob Adj. Types:–0, +10% of max. specified at high end of timing range; +0, –10% of min. specified at low end.
Delta Time (for AC units add ±1 cycle 60 Hz.): ±2%, typ.; ±5%, max.
Repeatability (including first cycle of operation):
AC: ±0.1%, typ.; ±0.5%, max.; but not less than ±16 ms.
DC: ±0.05% typ.; ±0.1% max.; but not less than ±3 ms.
Release Time: 30 ms, typ.; 45 ms, max.
Recycle Time: **AC:** 40 ms, typ.; 60 ms, max.
DC: 30 ms, typ.; 45 ms, max.

Contact Data @ 25°C

Arrangements: 2 Form C (DPDT).
Material: Silver-cadmium oxide alloy.
Rating: 10A @ 30VDC or 277VAC, resistive; 1/2 HP @ 250VAC; 1/3 HP @ 120VAC.
Expected Mechanical Life: 10 million operations.
Expected Electrical Life: 100,000 operations, min., at rated load.

Initial Dielectric Strength

Between Open Contacts: 500V rms, 60 Hz.
Between All Other Conductors: 500V rms, 60 Hz.

Input Data @ 25°C

Voltage: 120VAC and 24VDC.
Power Requirement: **AC Types:** Typically less than 3 VA.
DC Types: Typically less than 3 W.
Transient Protection: Yes.
Reverse Voltage Protection: Yes.

Input Voltages & Limits @25°C

Voltage Type	Nominal Voltage	Minimum Voltage	Maximum Voltage
AC	120	105	130
DC	24	20	32

Note: DC voltage must be filtered (5% p-p ripple max. at nom. voltage). AC models will operate on 50 or 60 Hz.

Environmental Data

Temperature Range: **Storage:** -40°C to +85°C.
Operating: -10°C to +55°C.

Mechanical Data

Termination: 8- or 11-pin octal style plug.
Enclosure: Yellow plastic case. Knob adjustable types have dial scale for reference only.
Sockets: Models with 8-pin base fit either 27E122 or 27E891 (snap-on) screw terminal sockets. 11-pin types fit either 27E123 or 27E892 (snap-on) screw terminal sockets.
Weight: 8 oz. (227g) approximately.

Ordering Information – Authorized distributors are more likely to stock boldface items listed below.

Delay on Operate Models

Voltage	Time	Adjustment	Wiring Dia.	Part Number
120VAC	0.5 to 5 Min.	Knob	1	CGB-38-70005M
	1 to 10 Min.			**CGB-38-70010M**
	5 to 50 Min.			**CGB-38-70050M**
	10 to 100 Min.			CGB-38-70100M
24VDC	5 to 50 Min.	Knob	1	CGD-38-30050M

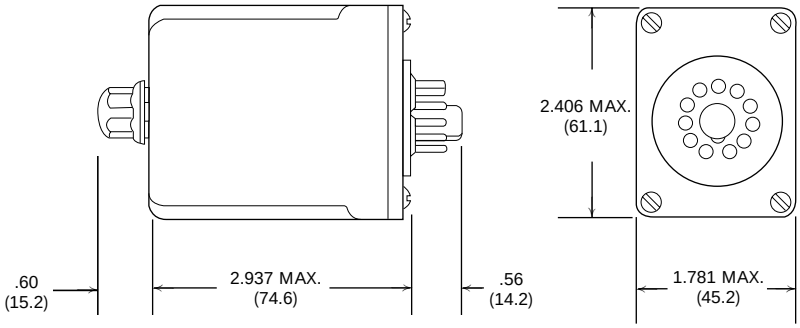
Delay on Release Models

Voltage	Time	Adjustment	Wiring Dia.	Part Number
120VAC	1 to 10 Min.	Knob	2	**CGB-38-78010M**
	5 to 50 Min.			**CGB-38-78050M**

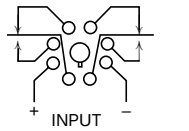
Interval on Models

Voltage	Time	Adjustment	Wiring Dia.	Part Number
120VAC	0.5 to 5 Sec.	Knob	1	CGB-38-79005S
	1 to 10 Min.			**CGB-38-79010M**
24VDC	1 to 10 Min.	Knob	1	**CGD-38-39010M**

Outline Dimensions

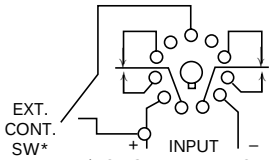


Wiring Diagrams – Bottom Views (pins numbered clockwise from keyway)



(DC POLARITY INDICATED)

Fig.1
8 Pin



(DC POLARITY INDICATED)

Fig.2
11 Pin

* If control switch is closed when power is applied, relay will immediately energize. A 50 millisecond minimum switch closure is required. IMPORTANT: a dry circuit switch is recommemded. A "dry circuit" switch is one rated to reliably switch currents of less than 50mA. Use of a switch rated for other than dry circuit may result in failure of the time delay relay to function properly.
** **Note:** input polarity for DC operation. For most reliable operation on AC, connect high side to "+" and low side to "–".



CD series

CMOS IC Time Delay Relay

- 1% Repeatability
- Operates from -40°C to +55°C
- Delay on operate or delay on release timing modes
- Fixed, knob or resistor adjustable types
  - Calibrated dial on knob adjustable types
- 10A output relay with SPDT or DPDT contacts
- Various models time from 0.1 to 180 sec.

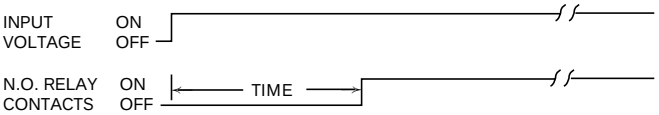
File E22575

File LR15734

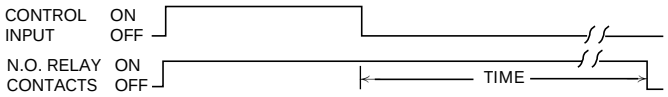
Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Timing Modes

Delay on operate – Delay period begins when input voltage is applied. At the end of the delay period, the relay will operate and will not release until input voltage is removed. Reset occurs when input voltage is reapplied.



Delay on release – Input voltage must be applied continuously to operate the internal relay. When control Input is applied, the relay energizes. When control input is removed, timing begins. When timing is complete, the relay will de-energize. Time may be reset to zero during timing by reapplying control input.



Timing Specifications

Timing Ranges: From 0.1 to 180 sec.
Timing Adjustment: Fixed, external resistor and knob adjustable.
Tolerance (for AC units add ±1/2 cycle 60 Hz.):
Knob Adj. Types: ±5% of max. specified at high end of timing range; min. specified, or less, at low end; ±10% full scale.
Fixed Types: ±5%.
Res. Adj. Types: ±5% at high end of timing range; min. specified, or less, at low end.
Delta Time (for AC units add ±1 cycle 60 Hz.): ±5%.
Repeatability (for AC units add ±1 cycle 60 Hz.): ±1%.
Release Time: 45 ms, typ.; 60 ms, max.
Recycle Time: 45 ms, typ.; 60 ms, max.

Contact Data @ 25°C

Arrangements: 2 Form C (DPDT).
Material: Silver-cadmium oxide alloy.
Rating: 10A @ 30VDC or 277VAC, resistive; 1/2 HP @ 250VAC; 1/3 HP @ 120VAC.
Expected Mechanical Life: 10 million operations.
Expected Electrical Life: 100,000 operations, min., at rated load.

Initial Dielectric Strength

Between Open Contacts: 500V rms, 60 Hz.
Between All Other Conductors: 500V rms, 60 Hz.

Input Data @ 25°C

Voltage: 24 & 120VAC and 12 through 110VDC.
Power Requirement: **AC Types:** Typically less than 3 VA.
DC Types: Typically less than 3 W.
Transient Protection: Yes.
Reverse Voltage Protection: Yes.

Input Voltages & Limits @ 25°C

Voltage Type	Nominal Voltage	Minimum Voltage	Maximum Voltage
AC	24	20	28
	120	105	130
DC	12	11	13
	24	20	32
	48	41	55
	110	95	125

Note: DC voltage must be filtered (5% p-p ripple max. at nom. voltage).
AC models will operate on 50 or 60 Hz.

Environmental Data

Temperature Range: **Storage:** -55°C to +85°C.
Operating: -40°C to +55°C.

Mechanical Data

Termination: 8- or 11-pin octal style plug.
Enclosure: Yellow plastic case. Knob adjustable types have dial scale calibrated in seconds ±5%.
Sockets: Models with 8-pin base fit either 27E122 or 27E891 (snap-on) screw terminal sockets. 11-pin types fit either 27E123 or 27E892 (snap-on) screw terminal sockets.
Weight: 8 oz. (227g) approximately.

Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.

Ordering Information – Authorized distributors are more likely to stock boldface items listed below.

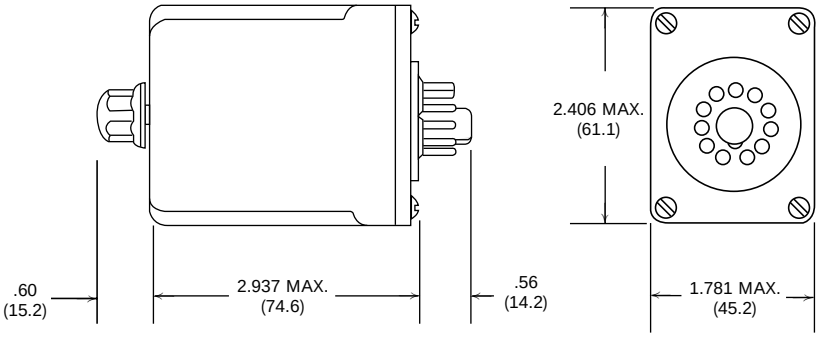
Delay on Operate Models

Voltage	Time	Adjustment	Wiring Dia.	Part Number
120VAC	0.1 to 1 Sec.	Knob	1	**CDB-38-70001**
	0.1 to 5 Sec.			**CDB-38-70002**
	0.1 to 10 Sec.			**CDB-38-70003**
	0.3 to 30 Sec.			**CDB-38-70006**
	0.6 to 60 Sec.			**CDB-38-70004**
	1.8 to 180 Sec.			**CDB-38-70005**
120VAC	1 Sec.	Fixed		**CDA-38-70012**
120VAC	0.1 to 1 Sec.	Resistor	2	CDF-38-70001
	0.1 to 5 Sec.			**CDF-38-70002**
	0.1 to 10 Sec.			CDF-38-70003
24VDC	0.1 to 10 Sec.	Knob	1	**CDD-38-30003**
	0.6 to 60 Sec.			**CDD-38-30004**
	1.8 to 180 Sec.			**CDD-38-30005**
48VDC	0.6 to 60 Sec.	Knob	1	CDD-38-40002
110VDC	0.1 to 1 Sec.	Knob	1	CDD-38-60004
	0.1 to 10 Sec.			CDD-38-60001
	0.6 to 60 Sec.			CDD-38-60002
	1.8 to 180 Sec.			CDD-38-60003

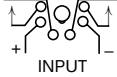
Delay on Release Models

Voltage	Time	Adjustment	Wiring Dia.	Part Number
120VAC	0.1 to 1 Sec.	Knob	3	**CDB-38-70016**
	0.1 to 5 Sec.			**CDB-38-70091**
	0.1 to 10 Sec.			**CDB-38-70014**
	0.3 to 30 Sec.			**CDB-38-70092**
	0.6 to 60 Sec.			**CDB-38-70012**
	1.8 to 180 Sec.			**CDB-38-70015**
120VAC	1 Sec.	Fixed	3	CDA-38-70025
12VDC	180 Sec.	Fixed	3	CDC-38-20026
24VDC	0.1 to 10 Sec.	Knob	3	**CDD-38-30014**
	0.6 to 60 Sec.			**CDD-38-30012**
	1.8 to 180 Sec.			**CDD-38-30008**

Outline Dimensions

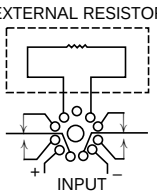


Wiring Diagrams – Bottom Views (pins numbered clockwise from keyway)



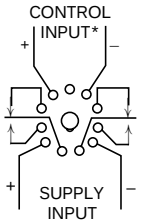
INPUT
(DC POLARITY INDICATED)**

Fig. 1
8 Pin



INPUT
(DC POLARITY INDICATED)**

Fig. 2
11 Pin



(DC POLARITY INDICATED)**

Fig. 3
11 Pin

* If control input is applied when supply input is applied, relay will immediately energize. A 50 millisecond minimum control pulse is required.
** **Note** Input polarity for DC operation. For most reliable operation on AC, connect high side to "+" and low side to "–".

External Resistor Selection Chart

See External Resistor Selection Charts at beginning of Time Delay Relay section of this Databook.

CK series

Mid-Priced CMOS IC Time Delay Relay

- Choice of timing modes
  - Delay on operate
  - Delay on release
  - Delay on dropout (no input required during timing)
  - Interval on
- Knob or resistor adjustable types
- 10A output relay with DPDT contacts
- Various models time from 0.1 to 180 sec.



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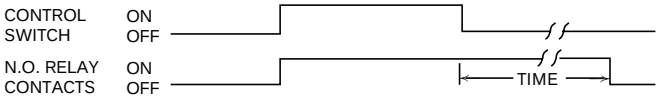
Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Timing Modes

Delay on operate – Delay period begins when input voltage is applied. At the end of the delay period, the relay will operate and will not release until input voltage is removed. Reset occurs when input voltage is reapplied.



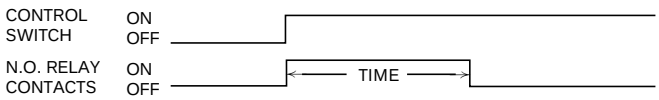
Delay on release – Input voltage must be applied continuously to operate the internal relay. When the control switch is closed, the relay energizes. When the control switch is opened, timing begins. When timing is complete, the relay will de-energize. Time may be reset to zero during timing by closing the control switch.



Delay on dropout – The relay operates immediately upon application of input voltage. Timing begins when input voltage is removed. When timing is complete, the relay will de-energize. Reset occurs when input voltage is reapplied.



Interval on (with control switch) – Input voltage must be applied continuously to operate the internal relay. The relay energizes and timing begins when the external switch is closed. At the end of the time delay period the relay will de-energize. Reset is accomplished by opening and reclosing the control switch.



Timing Specifications

Timing Ranges: From 0.1 to 180 sec.
Timing Adjustment: External resistor and knob adjustable.
Tolerance (for AC units add ±1/2 cycle 60 Hz.):
Knob Adj. Types: –0, +20% of max. specified at high end of timing range; min. specified, or less, at low end.
Fixed Types: ±5%.
Res. Adj. Types: ±5% at high end of timing range; min. specified, or less, at low end.
Delta Time (for AC units add ±1 cycle 60 Hz.): ±10%.
Repeatability (for AC units add ±1 cycle 60 Hz.): ±2%.
Release Time: 60 ms, typ.; 100 ms, max.
Recycle Time: 60 ms, typ.; 100 ms, max.

Contact Data @ 25°C

Arrangements: 2 Form C (DPDT).
Material: Silver-cadmium oxide alloy.
Rating: 10A @ 30VDC or 277VAC, resistive; 1/2 HP @ 250VAC; 1/3 HP @ 120VAC.
Expected Mechanical Life: 10 million operations.
Expected Electrical Life: 100,000 operations, min., at rated load.

Initial Dielectric Strength

Between Open Contacts: 500V rms, 60 Hz.
Between All Other Conductors: 500V rms, 60 Hz.

Input Data @ 25°C

Voltage: 24 & 120VAC and 12 & 24VDC.
Power Requirement: **AC Types:** Typically less than 3 VA.
DC Types: Typically less than 3 W.
Initiate Time: Delay on dropout timers must have input voltage applied for a minimum of three seconds for dropout function to be guaranteed.
Transient Protection: Yes.
Reverse Voltage Protection: Yes.

Input Voltages & Limits @ 25°C

Voltage Type	Nominal Voltage	Minimum Voltage	Maximum Voltage
AC	24 120	20 105	28 130
DC	12 24	11 20	13 32

Note: DC voltage must be filtered (5% p-p ripple max. at nom. voltage).
AC models will operate on 50 or 60 Hz.

Environmental Data

Temperature Range: **Storage:** -55°C to +85°C.
Operating: -10°C to +55°C.

Mechanical Data

Termination: 8- or 11-pin octal style plug.
Enclosure: White plastic case. Knob adjustable types have dial scale for reference only.
Sockets: Models with 8-pin base fit either 27E122 or 27E891 (snap-on) screw terminal sockets. 11-pin types fit either 27E123 or 27E892 (snap-on) screw terminal sockets.
Weight: 6 oz. (170g) approximately.

Ordering Information – Authorized distributors are more likely to stock boldface items listed below.

Delay On Operate Models

Voltage	Time	Adjustment	Wiring Dia.	Part Number
24VAC	0.1 to 10 Sec.	Knob	1	**CKB-38-30010**
120VAC	0.1 to 10 Sec. 0.6 to 60 Sec. 1.2 to 120 Sec. 1.8 to 180 Sec.	Knob	1	**CKB-38-70010** **CKB-38-70060** **CKB-38-70120** CKB-38-70180
120VAC	0.1 to 10 Sec.	Resistor	2	**CKF-38-70010**
12VDC	0.1 to 10 Sec.	Knob	1	**CKD-38-20010**

Delay On Release Models

Voltage	Time	Adjustment	Wiring Dia.	Part Number
120VAC	0.1 to 10 Sec. 0.6 to 60 Sec. 1.8 to 180 Sec.	Knob	3	**CKB-38-78010** CKB-38-78060 CKB-38-78180
120VAC	0.1 to 10 Sec.	Resistor	4	**CKF-38-78010**
24VDC	0.1 to 10 Sec.	Resistor	4	CKH-38-38010

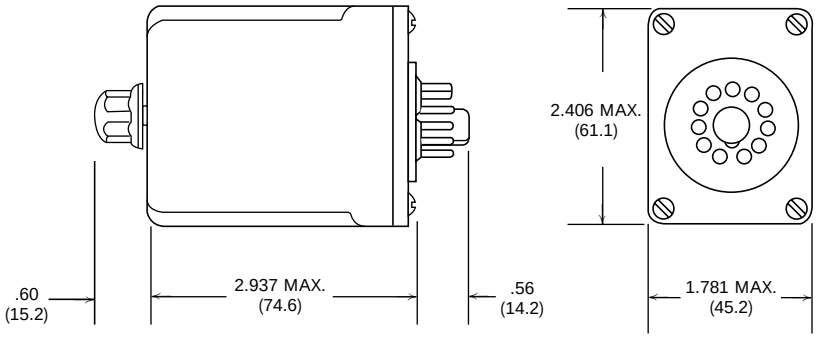
Delay On Dropout Models

Voltage	Time	Adjustment	Wiring Dia.	Part Number
24VAC	0.1 to 10 Sec. 0.6 to 60 Sec.	Knob	1	**CKB-38-37010** CKB-38-37060
120VAC	0.1 to 10 Sec. 0.6 to 60 Sec. 1.2 to 120 Sec.	Knob	1	**CKB-38-77010** **CKB-38-77060** **CKB-38-77120**

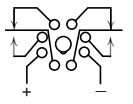
Interval On Models

Voltage	Time	Adjustment	Wiring Dia.	Part Number
120VAC	0.1 to 10 Sec.	Knob	3	**CKB-38-79010**

Outline Dimensions

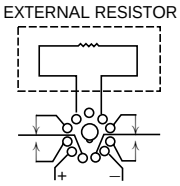


Wiring Diagrams – Bottom Views (pins numbered clockwise from keyway)



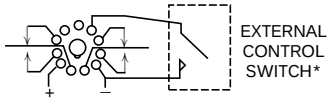
INPUT
(DC POLARITY INDICATED)**

Fig.1
8 Pin



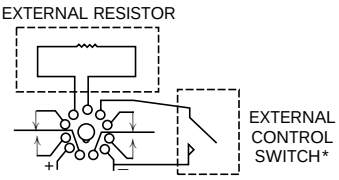
INPUT
(DC POLARITY INDICATED)**

Fig. 2
11 Pin



CONTINUOUS
SUPPLY
INPUT
(DC POLARITY INDICATED)**

Fig. 3
11 Pin



CONTINUOUS
SUPPLY
INPUT
(DC POLARITY INDICATED)**

Fig. 4
11 Pin

* If control switch is closed when power is applied, relay will immediately energize. A 50 millisecond minimum switch closure is required. IMPORTANT: A dry circuit switch is recommended. A "dry circuit" switch is one rated to reliably switch currents of less than 50mA. Use of a switch rated for other than dry circuit may result in failure of the time delay relay to function properly.

** **Note:** Input polarity for DC operation. For most reliable operation on AC, connect high side to "+" and low side to "–".

External Resistor Chart

See External Resistor Selection Charts at beginning of Time Delay Relay section of this Databook.

CH series

Mid- To Low-Priced CMOS IC Time Delay Relay

- Choice of timing modes
  - Delay on operate
  - Delay on release
  - Interval on
- Fixed or knob adjustable types
- 10A output relay with DPDT contacts
- Various models time from 1 to 180 sec.

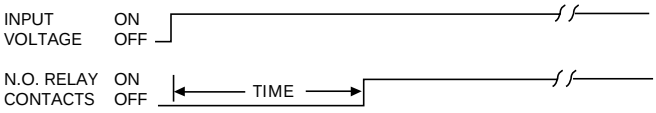


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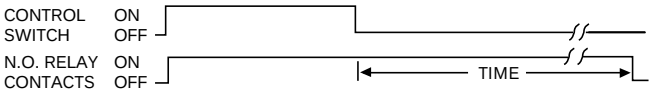
Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Timing Modes

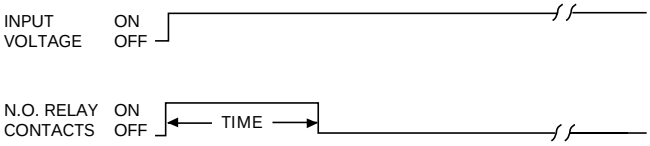
Delay on operate – Delay period begins when input voltage is applied. At the end of the delay period, the relay will operate and will not release until input voltage is removed. Reset occurs when input voltage is reapplied.



Delay on release – Input voltage must be applied continuously to operate the internal relay. When the control switch is closed, the relay energizes. When the control switch is opened, timing begins. When timing is complete, the relay will de-energize. Time may be reset to zero during timing by closing the control switch.



Interval on – The relay energizes and timing begins when input voltage is applied. At the end of the time delay period the relay will de-energize. Reset is accomplished by removing, then reapplying, the input voltage.



Timing Specifications

Timing Ranges: From 1 to 180 sec.
Timing Adjustment: Fixed and knob adjustable.
Tolerance (for AC units add ±1/2 cycle 60 Hz.):
Knob Adj. Types: –0, +20% of max. specified at high end of timing range; min. specified, or less, at low end.
Fixed Types: ±5%.
Res. Adj. Types: ±5% at high end of timing range; min. specified, or less, at low end.
Delta Time (for AC units add ±1 cycle 60 Hz.): ±10%.
Repeatability (for AC units add ±1 cycle 60 Hz.): ±2%.
Release Time: 125 ms, typ.; 200 ms, max.
Recycle Time: 125 ms, typ.; 200 ms, max.

Contact Data @ 25°C

Arrangements: 2 Form C (DPDT).
Material: Silver-cadmium oxide alloy.
Rating: 10A @ 30VDC or 277VAC, resistive; 1/2 HP @ 250VAC; 1/3 HP @ 120VAC.
Expected Mechanical Life: 10 million operations.
Expected Electrical Life: 100,000 operations, min., at rated load.

Initial Dielectric Strength

Between Open Contacts: 500V rms, 60 Hz.
Between All Other Conductors: 500V rms, 60 Hz.

Input Data @ 25°C

Voltage: 24 through 240VAC and 24VDC.
Power Requirement: **AC Types:** Typically less than 3 VA.
DC Types: Typically less than 3 W.
Transient Protection: Yes.
Reverse Voltage Protection: Yes.

Input Voltages & Limits @ 25°C

Voltage Type	Nominal Voltage	Minimum Voltage	Maximum Voltage
AC	24 120 240	20 105 210	28 130 260
DC	24	20	32

Note: DC voltage must be filtered (5% p-p ripple max. at nom. voltage). AC models will operate on 50 or 60 Hz.

Environmental Data

Temperature Range: **Storage:** -55°C to +85°C.
Operating: -10°C to +55°C.

Mechanical Data

Termination: 8- or 11-pin octal style plug.
Enclosure: White plastic case. Knob adjustable types have dial scale for reference only.
Sockets: Models with 8-pin base fit either 27E122 or 27E891 (snap-on) screw terminal sockets. 11-pin types fit either 27E123 or 27E892 (snap-on) screw terminal sockets.
Weight: 6 oz. (170g) approximately.

Ordering Information – Authorized distributors are more likely to stock boldface items listed below.

Delay on Operate Models

Voltage	Time	Adjustment	Wiring Dia.	Part Number
24VAC	1 to 10 Sec. 1 to 180 Sec.	Knob	1	**CHB-38-30001** **CHB-38-30003**
120VAC	1 to 10 Sec. 1 to 60 Sec. 1 to 180 Sec.	Knob	1	**CHB-38-70001** **CHB-38-70002** **CHB-38-70003**
120VAC	10 Sec.	Fixed	1	**CHA-38-70001**
240VAC	1 to 10 Sec.	Knob	1	**CHB-38-80001**
24VDC	1 to 10 Sec. 1 to 60 Sec. 1 to 180 Sec.	Knob	1	**CHD-38-30001** CHD-38-30002 **CHD-38-30003**

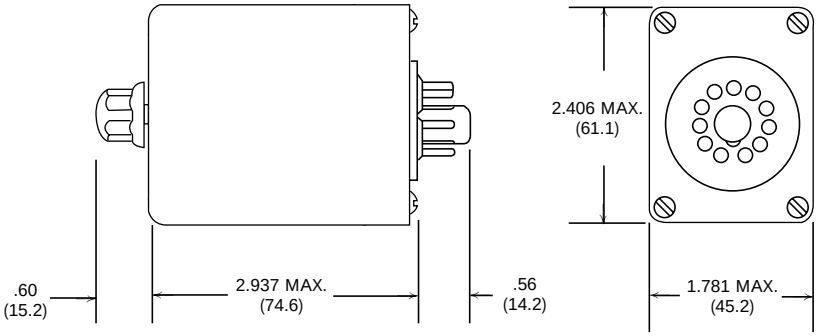
Delay on Release Models

Voltage	Time	Adjustment	Wiring Dia.	Part Number
24VAC	1 to 10 Sec.	Knob	3	CHB-38-30011
120VAC	1 to 10 Sec. 1 to 60 Sec. 1 to 180 Sec.	Knob	3	**CHB-38-70011** **CHB-38-70012** **CHB-38-70013**
24VDC	1 to 10 Sec. 1 to 180 Sec.	Knob	3	CHD-38-30011 CHD-38-30013

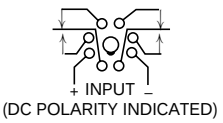
Interval on Models

Voltage	Time	Adjustment	Wiring Dia.	Part Number
120VAC	1 to 10 Sec. 1 to 60 Sec. 1 to 180 Sec.	Knob	1	**CHB-38-70021** **CHB-38-70022** **CHB-38-70023**
24VDC	1 to 10 Sec.	Knob	1	**CHD-38-30021**

Outline Dimensions

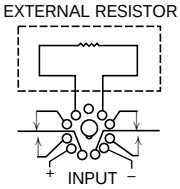


Wiring Diagrams – Bottom Views (pins numbered clockwise from keyway)



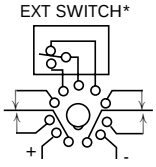
(DC POLARITY INDICATED)

Fig. 1
8 Pin



(DC POLARITY INDICATED)

Fig. 2
11 Pin



AC INPUT

Fig. 3
11 Pin

* If control switch is closed when power is applied, relay will immediately energize. A 50 millisecond minimum switch closure is required. IMPORTANT: A dry circuit switch is recommended. A "dry circuit" switch is one rated to reliably switch currents of less than 50mA. Use of a switch rated for other than dry circuit may result in failure of the time delay relay to function properly.
**** Note:** Input polarity for DC operation. For most reliable operation on AC, connect high side to "+" and low side to "–".

CB series

CMOS IC Time Delay Relay

- Choice of timing modes
  - Delay on operate
  - Delay on release
  - Interval on with or without control switch
- Knob adjustable
- 10A output relay with SPDT or DPDT contacts
- Various models time from 0.1 sec. to 100 min.



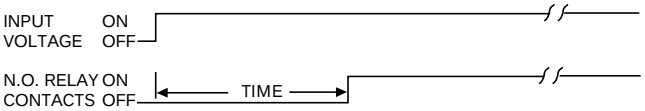
File E22575

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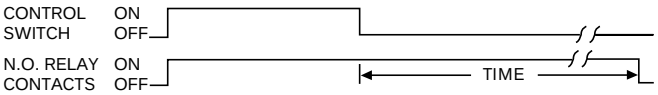
Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Timing Modes

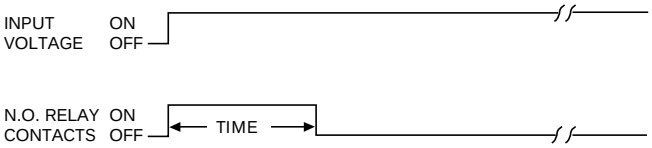
Delay on operate – Delay period begins when input voltage is applied. At the end of the delay period, the relay will operate and will not release until input voltage is removed. Reset occurs when input voltage is reapplied.



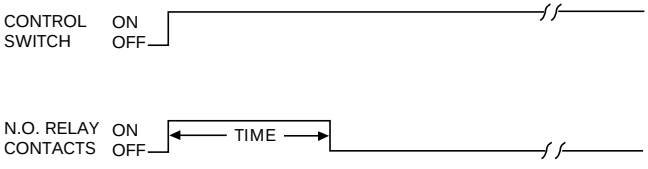
Delay on release – Input voltage must be applied continuously to operate the internal relay. When the control switch is closed, the relay energizes. When the control switch is opened, timing begins. When timing is complete, the relay will de-energize. Time may be reset to zero during timing by closing the control switch.



Interval on (without control switch) – The relay energizes and timing begins when input voltage is applied. At the end of the time delay period the relay will de-energize. Reset is accomplished by removing, then reapplying, the input voltage.



Interval on (with control switch) – Input voltage must be applied continuously to operate the internal relay. The relay energizes and timing begins when the external switch is closed. At the end of the time delay period the relay will de-energize. Reset is accomplished by opening and reclosing the control switch.



Timing Specifications

Timing Ranges: From 0.1 to 1.0 sec. through 10 to 100 min.
Timing Adjustment: Knob adjustable.
Tolerance (for AC units add ±1/2 cycle 60 Hz.):
Knob Adj. Types: –0, +30% of max. specified at high end of timing range; min. specified, or less, at low end.
Fixed Types: ±10%.
Res. Adj. Types: ±10% at high end of timing range; min. specified, or less, at low end.
Delta Time (for AC units add ±1 cycle 60 Hz.): ±10%.
Repeatability (for AC units add ±1 cycle 60 Hz.): ±2%.
Release Time: 60 ms, typ.; 100 ms, max.
Recycle Time: 60 ms, typ.; 100 ms, max.

Contact Data @ 25°C

Arrangements: 2 Form C (DPDT), except 8-pin delay on release model has 1 Form C (SPDT).
Material: Silver-cadmium oxide alloy.
Rating: 10A @ 30VDC or 277VAC, resistive; 1/2 HP @ 250VAC; 1/3 HP @ 120VAC.
Expected Mechanical Life: 10 million operations.
Expected Electrical Life: 100,000 operations, min., at rated load.

Initial Dielectric Strength

Between Open Contacts: 500V rms, 60 Hz.
Between All Other Conductors: 500V rms, 60 Hz.

Input Data @ 25°C

Voltage: 24 and 120VAC, and 12 and 24VDC.
Power Requirement: **AC Types:** Typically less than 3 VA.
DC Types: Typically less than 3 W.
Transient Protection: Yes.
Reverse Voltage Protection: Yes.

Input Voltages & Limits @ 25°C

Voltage Type	Nominal Voltage	Minimum Voltage	Maximum Voltage
AC	24 120	20 105	28 130
DC	12 24	11 20	13 32

Note: DC voltage must be filtered (5% p-p ripple max. at nom. voltage). AC models will operate on 50 or 60 Hz.

Environmental Data

Temperature Range: **Storage:** -55°C to +85°C.
Operating: -10°C to +55°C.

Mechanical Data

Termination: 8- or 11-pin octal style plug.
Enclosure: White plastic case. Knob adjustable types have dial scale for reference only.
Sockets: Models with 8-pin base fit either 27E122 or 27E891 (snap-on) screw terminal sockets. 11-pin types fit either 27E123 or 27E892 (snap-on) screw terminal sockets.
Weight: 6 oz. (170g) approximately.

Ordering Information – Authorized distributors are more likely to stock boldface items listed below.

Delay on Operate Models

Voltage	Time	Adjustment	Wiring Dia.	Part Number
24VAC	0.1 to 10 Sec. 1.8 to 180 Sec	Knob	1	**CB-1041B-30** **CB-1042B-30**
120VAC	0.1 to 1 Sec. 0.1 to 5 Sec. 0.1 to 10 Sec. 0.6 to 60 Sec. 1.8 to 180 Sec. 1 to 10 Min. 10 to 100 Min.	Knob	1	**CB-1001B-70** **CB-1002B-70** **CB-1003B-70** **CB-1004B-70** **CB-1005B-70** **CB-1006B-70** **CB-1007B-70**
12VDC	0.1 to 10 Sec.	Knob	1	**CB-1047D-20**
24VDC	0.1 to 1 Sec. 0.1 to 10 Sec. 0.6 to 60 Sec. 1.8 to 180 Sec.	Knob	1	CB-1026D-30 **CB-1028D-30** CB-1029D-30 CB-1030D-30

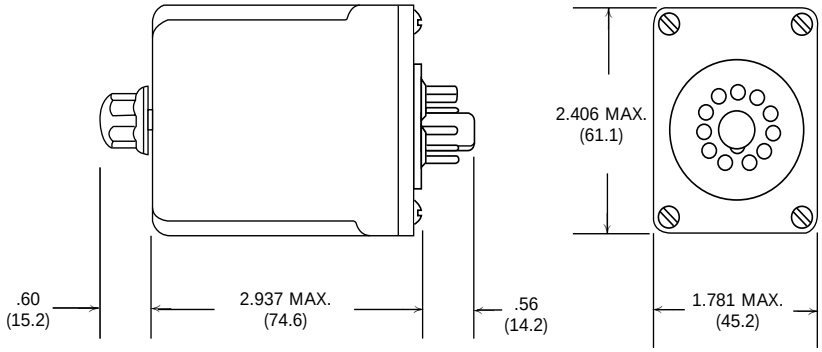
Delay on Release Models

Voltage	Time	Adjustment	Wiring Dia.	Part Number
24VAC	0.1 to 10 Sec. 1.8 to 180 Sec	Knob	3	CB-1045B-38 **CB-1046B-38**
120VAC	0.1 to 10 Sec. 0.1 to 10 Sec. 0.6 to 60 Sec. 1.8 to 180 Sec.	Knob	3 5 3 3	**CB-1021B-78** **CB-1022B-78** **CB-1023B-78** **CB-1024B-78**
24VDC	0.1 to 10 Sec. 1.8 to 180 Sec.	Knob	3	**CB-1038D-38** **CB-1039D-38**

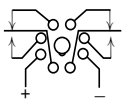
Interval on Models

Voltage	Time	Adjustment	Wiring Dia.	Part Number
24VAC	0.1 to 10 Sec.	Knob	1	**CB-1043B-39**
120VAC	0.1 to 5 Sec. 0.1 to 10 Sec. 1 to 10 Min.	Knob	1 1 1	CB-1011B-79 CB-1014B-79 CB-1018B-79
24VDC	0.1 to 5 Sec. 1.8 to 180 Sec.	Knob	1	CB-1034D-39 CB-1036D-39

Outline Dimensions

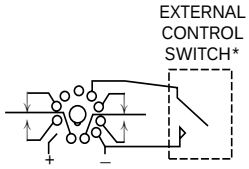


Wiring Diagrams - Bottom Views (pins numbered clockwise from keyway)



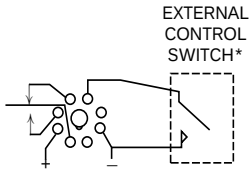
INPUT (DC POLARITY INDICATED)**

Fig. 1
8 Pin



CONTINUOUS SUPPLY INPUT (DC POLARITY INDICATED)**

Fig. 3
11 Pin



CONTINUOUS SUPPLY INPUT (DC POLARITY INDICATED)**

Fig. 5
8 Pin

* If control switch is closed when power is applied, relay will immediately energize. A 50 millisecond minimum switch closure is required. IMPORTANT: A dry circuit switch is recommended. A "dry circuit" switch is one rated to reliably switch currents of less than 50mA. Use of a switch rated for other than dry circuit may result in failure of the time delay relay to function properly.
** **Note:** Input polarity for DC operation. For most reliable operation on AC, connect high side to "+" and low side to "–".



CR series

Recycle Time Delay Relay

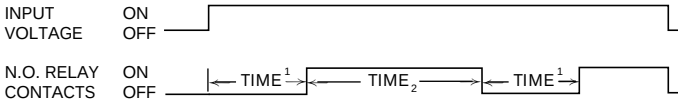
- Individual ON and OFF time adjustment knobs
- 10A output relay with DPDT contacts
- Various models time from 0.1 to 180 sec.

File E22575
File LR15734

Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Timing Mode

Recycle timing – First delay period begins when input voltage is applied. At the end of the first delay, or "off" period, the relay will operate and the second delay, or "on" period, begins. When the second delay period ends, the relay de-energizes. This recycling sequence will continue until input voltage is removed. When input voltage is removed, the relay will de-energize.



Timing Specifications

Timing Ranges: From 0.1 to 180 sec.
Timing Adjustment: Knob adjustable.
Tolerance (for AC units add ±1/2 cycle 60 Hz.): -0%, +20% of max. specified at high end of timing range; min. specified, or less, at low end.
Delta Time (for AC units add ±1 cycle 60 Hz.): ±10%.
Repeatability (for AC units add ±1 cycle 60 Hz.): ±2%.
Release Time: 60ms, typ.; 100 ms, max.

Contact Data @ 25°C

Arrangements: 2 Form C (DPDT).
Material: Silver-cadmium oxide alloy.
Rating: 10 A @ 30VDC or 277VAC, resistive; 1/2 HP @ 250VAC; 1/3 HP @ 120VAC.
Expected Mechanical Life: 10 million operations.
Expected Electrical Life: 100,000 operations, min., at rated load.

Initial Dielectric Strength

Between Open Contacts: 500V rms, 60 Hz.
Between All Other Conductors: 500V rms, 60 Hz.

Input Data @ 25°C

Voltage: 120VAC and 24VDC.
Power Requirement: **AC Types:** Typically less than 3 VA.
DC Types: Typically less than 3 W.
Transient Protection: Yes.
Reverse Voltage Protection: Yes.
Input Voltages & Limits @ 25°C

Voltage Type	Nominal Voltage	Minimum Voltage	Maximum Voltage
AC	120	105	130
DC	24	20	32

Note: DC voltage must be filtered (5% p-p ripple max. at nom. voltage). AC models will operate on 50 or 60 Hz.

Environmental Data

Temperature Range: **Storage:** -55°C to +85°C.
Operating: -10°C to +55°C.

Mechanical Data

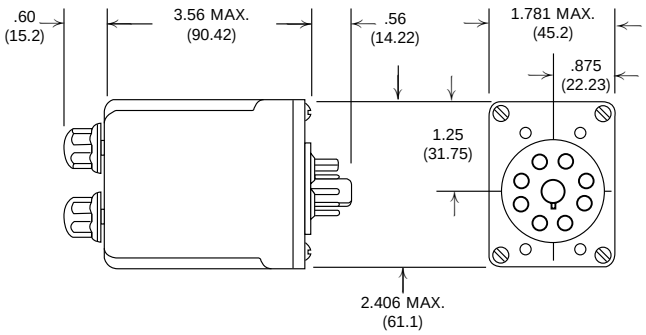
Termination: Octal plug.
Enclosure: White plastic case with dial scales for reference only.
Sockets: Fits either 27E122 or 27E891 (snap-on) 8-pin screw terminal sockets.
Weight: 6 oz. (170g) approximately.

Ordering Information – Authorized distributors are more likely to stock boldface items listed below.

	Voltage	Time	Part Number
AC Types	120VAC	0.1 to 10 Sec.	**CRB-48-70010**
		0.3 to 30 Sec.	**CRB-48-70030**
		0.6 to 60 Sec.	**CRB-48-70060**
		1.8 to 180 Sec.	**CRB-48-70180**

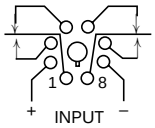
	Voltage	Time	Part Number
DC Type	24VDC	1.8 to 180 Sec.	**CRD-48-30180**

Outline Dimensions



Wiring Diagram – Bottom View

(pins numbered clockwise form keyway)



(DC POLARITY INDICATED)

Fig.1
8 Pin

** **Note:** Input polarity for DC operation. For most reliable operation on AC, connect high side to "+" and low side to "–".

CL-CU series

Compact Time Delay Relay



- Delay on operate timing mode
- Fixed, knob or resistor adjustable types
- 10A output relay with DPDT contacts
- Variety of mounting options
- Various models time from 0.1 to 120 sec.
- No timing cycle interrupt transfer (CL only)

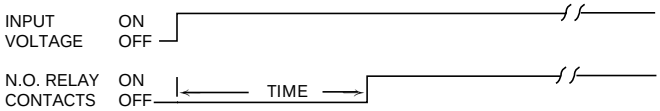
File E22575

File LR15734

Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Timing Mode

Delay on operate – Delay period begins when input voltage is applied. At the end of the delay period, the relay will operate and will not release until input voltage is removed. Reset occurs when input voltage is reapplied.



CL Timing Specifications

Timing Ranges: From 0.1 to 1.0 sec. through 1.2 to 120 sec.
Timing Adjustment: Fixed, external resistor and knob adjustable.
Tolerance (for AC units add ±1/2 cycle 60 Hz.):
Knob Adj. Types:–0, +20% of max. specified at high end of timing range; min. specified, or less, at low end.
Fixed Types: ±5%.
Res. Adj. Types: ±10% at high end of timing range; min. specified, or less, at low end.
Repeatability (for AC units add ±1 cycle 60 Hz.): ±3%.
Release Time: 100 ms, typ.; 150 ms, max.
Recycle Time: 100 ms, typ.; 150 ms, max.

CU Timing Specifications

Timing Ranges: From 1.0 to 10 sec. through 1.0 to 120 sec.
Timing Adjustment: Fixed, external resistor and knob adjustable.
Tolerance (for AC units add ±1/2 cycle 60 Hz.):
Knob Adj. Types:–0, +20% of max. specified at high end of timing range; min. specified, or less, at low end.
Fixed Types: ±5%.
Res. Adj. Types: ±10% at high end of timing range; min. specified, or less, at low end.
Repeatability (for AC units add ±1 cycle 60 Hz.): ±3%.
Release Time: 150 ms, typ.; 225 ms, max.
Recycle Time: 150 ms, typ.; 225 ms, max.

Note: On CU types the switching contact may momentarily transfer if the timing interval is interrupted. CL types have no timing cycle interrupt transfer.

Contact Data @ 25°C

Arrangements: 2 Form C (DPDT).
Material: Silver-cadmium oxide alloy.
Rating: 10A @ 30VDC or 277VAC, resistive; 1/2 HP @ 250VAC; 1/3 HP @ 120VAC.
Expected Mechanical Life: 10 million operations.
Expected Electrical Life: 100,000 operations, min., at rated load.

Initial Dielectric Strength

Between Open Contacts: 500V rms, 60 Hz.
Between All Other Conductors: 500V rms, 60 Hz.

Input Data @ 25°C

Voltage: 24 & 120VAC and 12 & 24VDC.
Power Requirement: **AC Types:** Typically less than 3 VA.
DC Types: Typically less than 3 W.
Transient Protection: Yes.
Reverse Voltage Protection: Yes.

Input Voltages & Limits @ 25°C

Voltage Type	Nominal Voltage	Minimum Voltage	Maximum Voltage
AC	24 120	20 105	28 130
DC	12 24	11 20	13 32

Note: DC voltage must be filtered (5% p-p ripple max. at nom. voltage). AC models will operate on 50 or 60 Hz.

Environmental Data

Temperature Range: **Storage:** -55°C to +85°C.
Operating: -10°C to +55°C.

Mechanical Data

Termination: 0.187 in. (4.75mm) quick-connect.
Enclosure: Yellow plastic case (see outline drawings for various options). Knob adjustable types have dial scale for reference only.
Sockets: Solder, printed circuit and screw terminal sockets available.
Weight: 3.5 oz. (99g) approximately.

CL Ordering Information – Authorized distributors are more likely to stock boldface items listed below.

Voltage	Time	Adjustment	Wiring Dia.	Part Number
24VAC	0.1 to 10 Sec.	Knob	1	**CLB-51-30010**
24VAC	0.1 to 10 Sec.	Resistor	2	CLF-42-30010
120VAC	0.1 to 10 Sec. 0.3 to 30 Sec. 1.2 to 120 Sec.	Knob	1	**CLB-51-70010** **CLB-51-70030** **CLB-51-70120**
120VAC	3 Sec. 30 Sec.	Fixed	1	CLA-41-70003 CLA-41-70030
120VAC	0.1 to 10 Sec. 0.1 to 10 Sec. 1.2 to 120 Sec.	Resistor	2	**CLF-41-70010** **CLF-42-70010** CLF-41-70120

Voltage	Time	Adjustment	Wiring Dia.	Part Number
12VDC	0.1 to 10 Sec.	Knob	1	CLD-51-20010
12VDC	10 Sec.	Fixed	1	CLC-41-20010
12VDC	1.2 to 120 Sec.	Resistor	2	CLH-41-20120
24VDC	5 Sec.	Fixed	1	CLC-41-30005
24VDC	0.1 to 10 Sec. 0.3 to 30 Sec. 0.1 to 10 Sec.	Resistor	2	**CLH-41-30010** CLH-41-30030 CLH-45-30010

41 style models (e.g. CLA-**41**-70010) have plain case.
42 style models (e.g. CLF-**42**-70010) have bracket mount case.
45 style models (e.g. CLH-**45**-30010) have bracket mount case with test button.
51 style models (e.g. CLB-**51**-30010) have plain case with knob.

CU Ordering Information – Authorized distributors are more likely to stock boldface items listed below.

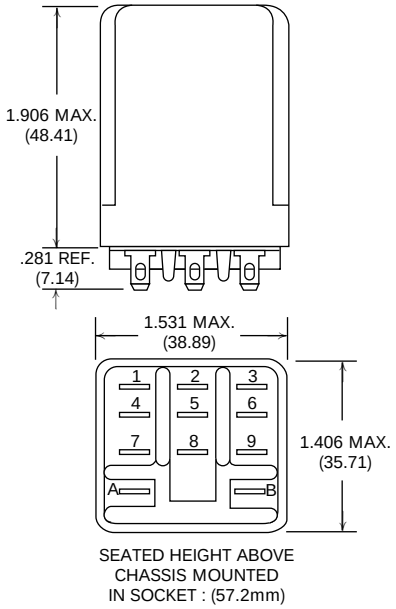
Voltage	Time	Adjustment	Wiring Dia.	Part Number
24VAC	10 Sec.	Fixed	1	**CUA-41-30010**
24VAC	1 to 10 Sec.	Resistor	2	**CUF-41-30010**
	1 to 10 Sec.			CUF-42-30010
120VAC	1 to 10 Sec.	Knob	1	**CUB-51-70010**
	1 to 30 Sec.			**CUB-51-70030**
	1 to 60 Sec.			**CUB-51-70060**
	1 to 120 Sec.			**CUB-51-70120**
120VAC	1 Sec.	Fixed	1	**CUA-41-70001**
	3 Sec.			**CUA-41-70003**
	3 Sec.			CUA-42-70003
	5 Sec.			**CUA-41-70005**
	10 Sec.			**CUA-41-70010**
	10 Sec.			CUA-42-70010
	30 Sec.			CUA-42-70030
	120 Sec.			CUA-41-70120

Voltage	Time	Adjustment	Wiring Dia.	Part Number
120VAC	1 to 10 Sec.	Resistor	2	**CUF-41-70010**
	1 to 10 Sec.			**CUF-42-70010**
	1 to 30 Sec.			**CUF-41-70030**
	1 to 120 Sec.			**CUF-41-70120**
	1 to 120 Sec.			**CUF-42-70120**
24VDC	1 to 10 Sec.	Resistor	2	**CUH-41-30010**
	1 to 10 Sec.			**CUH-42-30010**
	1 to 120 Sec.			**CUH-41-30120**
	1 to 120 Sec.			CUH-42-30120

41 style models (e.g. CUA-**41**-70010) have plain case.
42 style models (e.g. CUA-**42**-70010) have bracket mount case.
51 style models (e.g. CUB-**51**-70010) have plain case with knob.

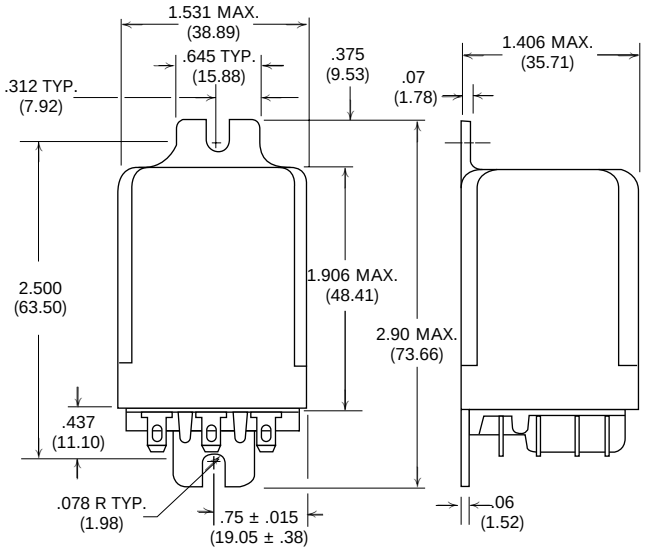
Outline Dimensions

41 Style

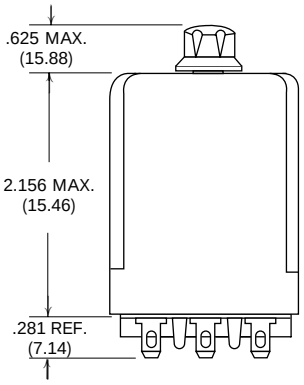


SEATED HEIGHT ABOVE
CHASSIS MOUNTED
IN SOCKET : (57.2mm)

42 & 45 Style

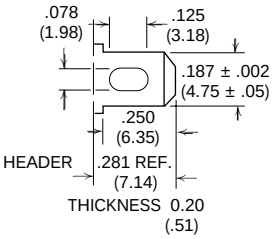


51 Style

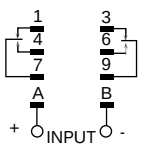


Terminal Dimensions

.187" (4.74mm)
Quick Connect/Solder

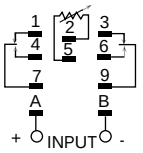


Wiring Diagrams – Bottom Views



(DC DC POLARITY INDICATED) **

Fig. 1



(DC POLARITY INDICATED) **

Fig. 2

** **Note:** Input polarity for DC operation. For most reliable operation on AC, connect high side to "+" and low side to "–".

External Resistor Selection Chart

See External Resistor Selection Charts at beginning of Time Delay Relay section of this Databook.

Dimensions are shown for reference purposes only.

Dimensions are in inches over (millimeters) unless otherwise specified.

Specifications and availability subject to change.



MD0 series

Subminiature, On-Delay Time Delay Relay

- On-delay timing mode
- Seven user-selectable timing ranges (0.1 sec. to 10 hr.)
- High accuracy and reliability
- Exceptional transient protection (ANSI C37.90)
- 5A DPDT or 4PDT output contacts
- Universal voltage

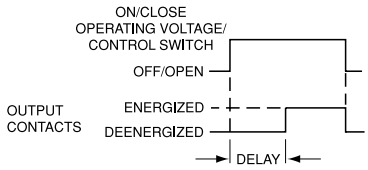
File E60363

File LR51332

Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Timing Mode

On-Delay.



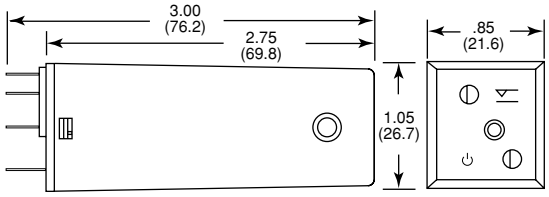
Timing Specifications

Timing Ranges: Instantaneous; 0.1 to 1 / 1 to 10 / 10 to 100 sec.; 1 to 10 / 10 to 100 min.; 1 to 10 hr.
Timing Range Selection: Screwdriver select via recessed dial on side.
Timing Adjustment: Screwdriver adjust via recessed dial with reference calibrations on top.
Accuracy: **Repeat Accuracy:** ±0.5%
Overall Accuracy: ±1% ±0.02 sec.
Reset Time: 25 ms.

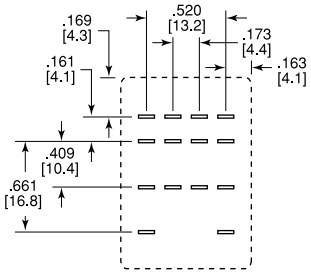
Contact Data @ 25°C

Arrangements: 2 Form C (DPDT) or 4 Form C (4PDT).
Rating: 5A @ 30VDC or 240VAC, resistive.
Expected Electrical Life: 100,000 operations, min., at rated resistive load.

Outline Dimensions



Terminal Base Diagram



NOTE: Only necessary terminals are present on DPDT models.

Input Data @ 25°C

Voltage: Universal: 24-240VAC, 50/60 Hz. or 24-125VDC.
Power Requirement: 2W, max.
Transient Protection: Meets ANSI C37.90 Transient Specification.

Environmental Data

Temperature Range: **Storage:** -25°C to +85°C.
Operating: -25°C to +60°C.

Mechanical Data

Mounting/Termination: MD0 series time delay relays can be socket mounted horizontally or vertically and will operate within repeat accuracy of ±0.5%.
Sockets: Fits either 27E166 or 27E894 (snap-on) screw terminal sockets.
Status Indication: Power On LED and Output Contacts LED.
Weight: 4 oz. (96g) approximately.

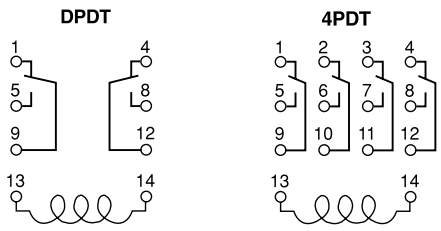
Ordering Information

Part Number	Contacts	Input Voltage
MD012AU	DPDT	Universal
MD014AU	4PDT	24-240VAC, 50/60 Hz. or 24-125VDC

Authorized distributors are likely to stock the following:

MD014AU

Wiring Diagrams (Bottom Views)



SSC series

Specification Grade Discrete Plug-in Time Delay Relay

- On-Delay, Off-Delay and Interval timing modes
- 13 timing ranges from 0.1 sec. to 60 min.
- 10A DPDT output contacts
- Escellent repeatability of ±1% or better.
- Exceptional immunity to transients and noise.
- Wide operating temperature range.



FM APPROVED File 3520 CE

SP File LR29186

Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Timing Modes

On-Delay, Off-Delay and Interval.

Timing Specifications

Timing Ranges: 6 to 180 cycles; 0.1 to 3 / 0.1 to 10 / 0.33 to 10 / 1 to 30 / 4 to 120 sec.; 0.33 to 10 / 1 to 30 / 2 to 60 min.; 0.33 to 10 hr. (All are +10%, –1% of maximum values).

Timing Adjustment: Knob or fixed time (internal fixed resistor) – all models; customer supplied external potentiometer or resistor – On-Delay and Interval models only.

Accuracy:
Repeat Accuracy: ±1% ±0.004 sec. at any combination of operating temperature and voltage.
Overall Accuracy: ±5.25% throughout operating temperature and voltage ranges.

Reset Time: 25 ms. (minimum deenergized interval for on-delay or off-delay models, or minimum required closure interval for interval models without affecting accuracy.)

Relay Operate Time: Off-Delay mode only: 35 ms.

Relay Release Time: On-Delay mode only: 20 ms.

Contact Data @ 25°C

Arrangements: 2 Form C (DPDT).

Rating: 10A @ 28VDC or 120VAC, resistive; 1/3 HP @ 120/240VAC.

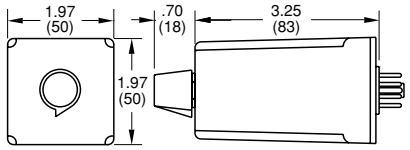
Expected Mechanical Life: 10 million operations.

Expected Electrical Life: 500,000 operations, min., at rated resistive load.

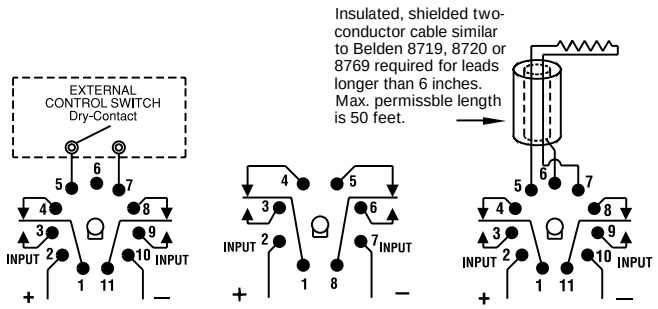
Initial Dielectric Strength

Between Terminals and Case: 1,000VAC plus twice the nominal voltage for one minute.

Outline Dimensions



Wiring Diagrams (Bottom Views)



Off-Delay Fixed or Knob Adjust

On-Delay & Interval Fixed or Knob Adjust

On-Delay & Interval External Potentiomer or Resistor Adjust

Input Data @ 25°C

Voltage: See Ordering Information section for details.

Power Requirement: 3W, max.

Transient Protection: Non-repetitive transients of the following magnitudes will not cause spurious operation of affect function and accuracy.

Operating Voltage	<0.1 ms	<1 ms
12VDC	1,000V	240V*
24VAC/VDC	1,000V	240V*
48 VAC/VDC	1,000V	480V*
120 VAC/VDC	3,000V	2,500V*
240VAC	3,000V	2,500V*

* Minimum source impedance of 100 ohm.

Environmental Data

Temperature Range: **Storage:** -40°C to +85°C.
Operating: -30°C to +65°C.

Mechanical Data

Mounting/Termination: 8- or 11-pin octal type plug. 8-pin types fit either 27E122 or 27E891, while 11-pin types fit 27E123 or 27E892.

Weight: 4 oz. (112g) approximately.

Ordering Information

SSC	01	2	A	A	A

Series SSC
Discrete Industrial Timer

Operating Mode
01 = On-Delay
02 = Off-Delay
03 = Interval

Output
2 = DPDT Relay

Timing Range
A =0 .1 to 3 sec.
B = 0.5 to 15 sec.
C = 1 to 30 sec.
D = 2 to 60 sec.
E = 4 to 120 sec.
F = 6 to 180 sec.
G = 10 to 300 sec.
I = 2 to 60 min.
K = 3 to 180 cycles
L = 0.33 to 10 min.
M = 0.5 to 15 min.
N = 1 to 30 min.
P = 0.1 to 10 min.

Operating Voltage (+10%, –15%)
A = 120VAC, 50/60 Hz. / 120VDC
B = 240VAC, 50/60 Hz.
E = 24VAC, 50/60 Hz. / 24VDC
F = 48VAC, 50/60 Hz. / 48VDC
Q = 12VDC (±10%)

Timing Adjustment
A = Knob Adjust
B = External Potentiometer or resistor (Operating modes 1 and 3 only).
F = Fixed Times – Specify time delay in seconds per the following examples:
F9.000 = 9 sec.
F99.00 = 99 sec.
F999.0 = 9999 sec.
F1000 = 1000 sec.

Authorized distributors are likely to stock the following:

SSC12AAA	SSC12ACA	SSC12AGA
SSC12ABA	SSC12ADA	SSC12ALA.

Dimensions are shown for reference purposes only.

Dimensions are in inches over (millimeters) unless otherwise specified.

Specifications and availability subject to change.



SCB/SCC series

Specification Grade Discrete Plug-in Time Delay Relay

- On-Delay, Off-Delay and Interval timing modes
- 13 timing ranges from 0.1 sec. to 60 min.
- 10A DPDT output contacts
- Knob, fixed or external timing adjustment.
- Rated for pilot duty
- Premium components

File 3520 File E60363
File LR51332 File E60363 (SCC only)

Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Timing Modes

On-Delay, Off-Delay and Interval.

Timing Specifications

Timing Ranges: 6 to 180 cycles; 0.1 to 3 / 0.1 to 10 / 0.33 to 10 / 1 to 30 / 4 to 120 sec.; 0.33 to 10 / 1 to 30 / 2 to 60 min.; 0.33 to 10 hr. (All are +5%, –0% of maximum values).
Timing Adjustment: Knob or fixed time (internal fixed resistor) – all models; customer supplied external potentiometer or resistor – On-Delay and Interval models only.
Accuracy: **Repeat Accuracy:** ±0.5% ±0.004 sec.
Overall Accuracy: ±2% max.
Reset Time: 25 ms.
Relay Operate Time: Off-Delay mode: 30 ms; Interval mode: 20 ms..
Relay Release Time: On-Delay mode only: 15 ms.

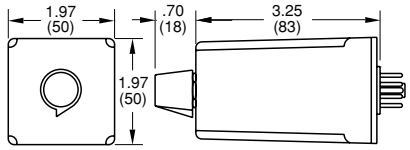
Contact Data @ 25°C

Arrangements: 2 Form C (DPDT).
Rating: 10A @ 28VDC or 120VAC, resistive; 1/3 HP @ 120/240VAC; 345VA. Same polarity.
Expected Mechanical Life: 10 million operations.
Expected Electrical Life: 500,000 operations, min., at rated resistive load.

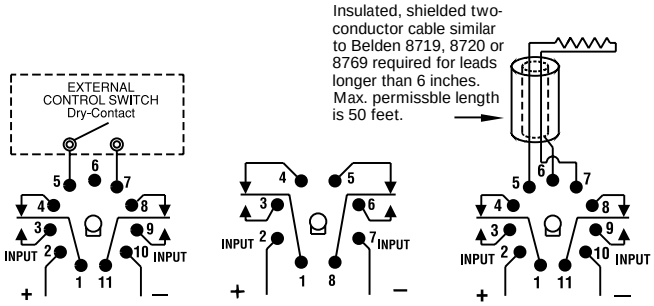
Initial Dielectric Strength

Between Terminals and Case: 1,000VAC plus twice the nominal voltage for one minute.

Outline Dimensions



Wiring Diagrams (Bottom Views)



Off-Delay Fixed or Knob Adjust | **On-Delay & Interval Fixed or Knob Adjust** | **On-Delay & Interval External Potentiomer or Resistor Adjust**

Input Data @ 25°C

Voltage: See Ordering Information section for details.
Power Requirement: 3W, max.
Transient Protection: Non-repetitive transients of the following magnitudes will not cause spurious operation of affect function and accuracy.

Operating Voltage	<0.1 ms	<1 ms
All except 12 & 24	3,000V	2,500
12 & 24	Consult Factory	

Environmental Data

Temperature Range:
Storage: SCB and SCC: -40°C to +85°C.
Operating: SCB: -30°C to +65°C; SCC: -30°C to +50°C.

Mechanical Data

Mounting/Termination:
SCB: UL recognized. Optional 8- or 11-pin octal-type sockets may be ordered separately.
SCC: 8- or 11-pin octal type sockets supplied with timer. (Must be used to qualify as "UL Listed" device.)
Weight: SCB: 5.3 oz. (149g) approx.; SCC: 7.5 oz. (210g) approx.

Ordering Information

(All "X's" must be included to complete part number)

SCB RX 01 2XX A A XA

Series SCB
Series SCC
Discrete
Industrial
Timer

Mounting Series SCB
RX = 8- or 11-pin socket (order separately)
Mounting Series SCC
LA = 8-pin socket p/n BCSA08SC for operating mode 01 or 03 with knob adjust or fixed time.
LC = 11-pin socket p/n BCSA11SC for operating mode 02; or 01 or 03 with external potentiometer or resistor.

Operating Mode
01 = On-Delay
02 = Off-Delay
03 = Interval

Output
2XX = DPDT Relay

Operating Voltage (+10%, –15%)
A = 120VAC, 50/60 Hz. / 120VDC
B = 240VAC, 50/60 Hz.
E = 24VAC, 50/60 Hz. / 24VDC
F = 48VAC, 50/60 Hz. / 48VDC
Q = 12VDC

Timing Range
A =0 .1 to 3 sec.
B = 0.5 to 15 sec.
C = 1 to 30 sec.
D = 2 to 60 sec.
E = 4 to 120 sec.
F = 6 to 180 sec.
G = 10 to 300 sec.
I = 2 to 60 min.
K = 3 to 180 cycles
L = 0.33 to 10 min.
M = 0.5 to 15 min.
N = 1 to 30 min.
P = 0.1 to 10 min.

Timing Adjustment
XA = Knob Adjust
XB = External Potentiometer or resistor (Operating modes 1 and 3 only).
XF =Fixed Times – Specify time delay in seconds per the following examples:
XF9.000 = 9 sec.
XF99.00 = 99 sec.
XF999.0 = 9999 sec.
XF1000 = 1000 sec.

Authorized distributors are likely to stock the following:

None at present.



STA series

Specification Grade Discrete Plug-in Time Delay Relay With QC Terminals

- On-Delay, Off-Delay, Interval and Accumulating On-Delay timing modes
- 13 timing ranges from 0.1 sec. to 48 hr.
- 10A DPDT output contacts
- Knob, fixed or external timing adjustment.
- QC plug-in terminals save space, two LEDs show status

File 3520 File E60363
File LR51332

Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Timing Modes

On-Delay, Off-Delay, Interval and Accumulating On-Delay.

Timing Specifications

Timing Ranges: 6 to 180 cycles; 0.1 to 3 / 0.5 to 15 / 1 to 30 / 2 to 60 / 4 to 120 / 6 to 180 / 10 to 300 sec.; 0.33 to 10 / 0.5 to 15 / 1 to 30 min.; 1 to 6 / 2 to 48 hr. (All are +5%, –0% of maximum values).
Timing Adjustment: Knob or fixed time (internal fixed resistor) – all models; customer supplied external potentiometer or resistor – On-Delay and Interval models only.
Accuracy: **Repeat Accuracy:** ±.5% ±0.004 sec..
Overall Accuracy: ±2% throughout operating temperature and voltage ranges.
Reset Time: 30 ms. min. (between deenergization and reenergization without affecting accuracy.)
Relay Operate Time: Off-Delay mode: 35 ms.; Interval mode: 20 ms.
Relay Release Time: On-Delay and Accumulating On-Delay modes: 20 ms.

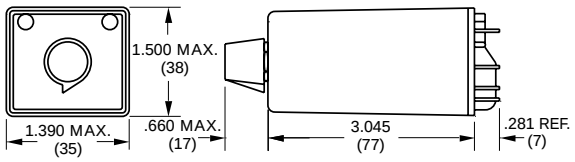
Contact Data @ 25°C

Arrangements: 2 Form C (DPDT).
Rating: 10A @ 28VDC or 120VAC, resistive; 1/3 HP @ 120/240VAC; 345VA. Same polarity.
Expected Mechanical Life: 10 million operations.
Expected Electrical Life: 500,000 operations, min., at rated resistive load.

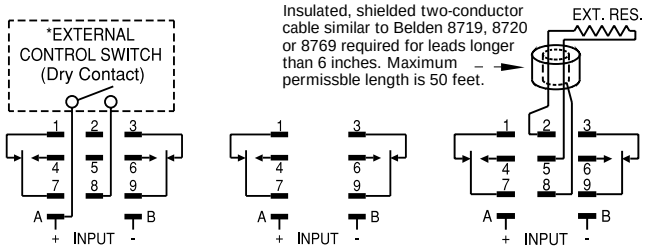
Initial Dielectric Strength

Between Terminals and Case: 1,000VAC plus twice the nominal voltage for one minute.

Outline Dimensions



Wiring Diagrams (Bottom Views)



Off-Delay & Accumulating On-Delay
Fixed or Knob Adjust

On-Delay & Interval
Fixed or Knob Adjust

On-Delay & Interval
External Potentiomer or Resistor Adjust

Input Data @ 25°C

Voltage: See Ordering Information section for details.
Power Requirement: 3W, max.
Transient Protection: Non-repetitive transients of the following magnitudes will not cause spurious operation of affect function and accuracy.

Operating Voltage	<0.1 ms	<1 ms
All except 12 & 24	3,000V	2,500
12 & 24	Consult Factory	

Environmental Data

Temperature Range: **Storage:** -40°C to +85°C.
Operating: -30°C to +65°C.

Mechanical Data

Mounting/Termination: Quick connect terminals fit either 27E121 or 27E893 (snap-on) socket (order separately).
Status Indication: Power On LED and Output Contacts LED (optional).
Weight: 4.2 oz. (119g) approximately.

Ordering Information

(All "X's" must be included to complete part number)

STA RX 01 2X S A A XA

Series STA
Discrete Industrial Timer With Tab-type Terms.

Mounting Series
RX = 11-pin tab-type header (order socket separately)

Operating Mode
01 = On-Delay
02 = Off-Delay
03 = Interval
09 = Accumulating On-Delay

Output
2X = DPDT Relay

Status Indication
S = LEDs
X = No LEDs

Timing Range
A = 0 .1 to 3 sec.
B = 0.5 to 15 sec.
C = 1 to 30 sec.
D = 2 to 60 sec.
E = 4 to 120 sec.
F = 6 to 180 sec.
G = 10 to 300 sec.
I = 2 to 60 min.
J = 1 to 6 hr.
K = 3 to 180 cycles
L = 0.33 to 10 min.
M = 0.5 to 15 min.
N = 1 to 30 min.
R = 2 to 48 hr.

Operating Voltage (+10%, –15%)
A = 120VAC, 50/60 Hz. / 120VDC
E = 24VAC, 50/60 Hz. / 24VDC
F = 48VAC, 50/60 Hz. / 48VDC
Q = 12VDC

Timing Adjustment
XA = Knob Adjust
XB = External Potentiometer or resistor (Operating modes 1 and 3 only).
XF = Fixed Times – Specify time delay in seconds per the following examples:
XF9.000 = 9 sec.
XF99.00 = 99 sec.
XF999.0 = 9999 sec.
XF1000 = 1000 sec.

Authorized distributors are likely to stock the following:

None at present.

Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.
www.tycoelectronics.com
Technical support:
Refer to inside back cover.

SRC series

Specification Grade Repeat Cycle Plug-in Time Delay Relay

- Repeat Cycle timing mode
- Dual knobs for user adjustment of on and off times.
- 13 timing ranges from 0.1 sec. to 60 min.
- 10A DPDT output contacts
- Exceptional immunity to line transients and noise
- Premium components enhance reliability
- Superior reset time of 24 msec.

CE

Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.



Timing Modes

Repeat Cycle: Application of line voltage starts the pre-set OFF-time period Upon expiration of the period, the output relay is energized, its contacts transfer, and the pre-set ON-time period begins. At the end of this period the output relay is deenergized, and a new cycle begins. The OFF and ON cycles continue until power is removed. To reset the timer, input voltage must be removed for at least 25 ms.

Timing Specifications

Timing Ranges: OFF time and ON time ranges need not be the same. 6 to 180 cycles; 0.1 to 3 / 1 to 10 / 0.5 to 15 / 1 to 30 / 2 to 60 / 4 to 120 / 6 to 180 / 10 to 300 sec.; 0.33 to 10 / 0.5 to 15 / 1 to 30 / 2 to 60 min. (All are +10%, –1% of maximum values).
Timing Adjustment: Two internal potentiometers with external knobs.
Accuracy: **Repeat Accuracy:** ±1% ±0.004 sec..
Overall Accuracy: ±2.25% max.
Reset Time: 25 ms. max. (between deenergization and reenergization without affecting accuracy.)
Relay Operate Time: 20 ms.
Relay Release Time: 15 ms.

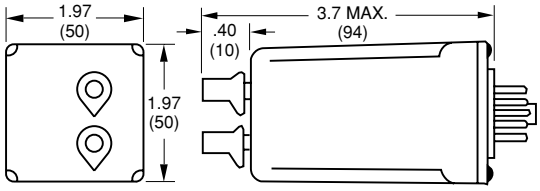
Contact Data @ 25°C

Arrangements: 2 Form C (DPDT).
Rating: 10A @ 28VDC or 120VAC, resistive; 1/3 HP @ 120/240VAC.
Expected Mechanical Life: 10 million operations.
Expected Electrical Life: 500,000 operations, min., at rated resistive load.

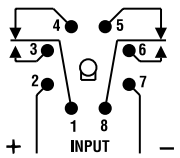
Initial Dielectric Strength

Between Terminals & Case and Mutually Isolated Contacts: 1,480VAC.

Outline Dimensions



Wiring Diagram (Bottom View)



Input Data @ 25°C

Voltage: See Ordering Information section for details.
Power Requirement: 3W, max.
Transient Protection: Non-repetitive transients of the following magnitudes will not cause spurious operation of affect function and accuracy.

Operating Voltage	<0.1 ms	<1 ms
12VDC	1,000V	240V*
24VAC/VDC	1,000V	240V*
48 VAC/VDC	1,000V	480V*
120 VAC/VDC	3,000V	2,500V*
240VAC	3,000V	2,500V*

* Minimum source impedance of 100 ohm.

Environmental Data

Temperature Range: **Storage:** -40°C to +85°C.
Operating: -30°C to +65°C.

Mechanical Data

Mounting/Termination: Quick connect terminals fit either 27E121 or 27E893 (snap-on) socket (order separately).
Weight: 5.3 oz. (149g) approximately.

Ordering Information

SRC 7 2 A C C A

Series SRC
Repeat Cycle Timer.

Operating Mode
7= Repeat Cycle

Output
2 = DPDT Relay

Operating Voltage (+10%, –15%)
A = 120VAC, 50/60 Hz. / 120VDC
B = 240VAC, 50/60 Hz.
E = 24VAC, 50/60 Hz. / 24VDC
F = 48VAC, 50/60 Hz. / 48VDC
Q = 12VDC

Timing Range Off-Time
A =0 .1 to 3 sec.
B = 0.5 to 15 sec.
C = 1 to 30 sec.
D = 2 to 60 sec.
E = 4 to 120 sec.
F = 6 to 180 sec.
G = 10 to 300 sec.
I = 2 to 60 min.
K = 3 to 180 cycles
L = 0.33 to 10 min.
M = 0.5 to 15 min.
N = 1 to 30 min.
P = 0.1 to 10 sec.

Timing Range On-Time
A =0 .1 to 3 sec.
B = 0.5 to 15 sec.
C = 1 to 30 sec.
D = 2 to 60 sec.
E = 4 to 120 sec.
F = 6 to 180 sec.
G = 10 to 300 sec.
I = 2 to 60 min.
K = 3 to 180 cycles
L = 0.33 to 10 min.
M = 0.5 to 15 min.
N = 1 to 30 min.
P = 0.1 to 10 sec.

Timing Adjustment
A = Dual Knob Adjust

Authorized distributors are likely to stock the following:

None at present.



SST series

Industrial Grade Discrete Plug-in Time Delay Relay

- On-Delay, Off-Delay, Interval, One Shot & Repeat modes
- Time delays to 120 min.
- Fast setting with time calibrated knobs.
- Superior transient protection.
- Rugged construction with 8- or 11-pin plug.
- Flame retardant housing.

File E15631

File LR33434

Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Timing Modes

On-Delay, Off-Delay, Interval, One Shot (Latching Interval) or Repeat Cycle.

Timing Specifications

Timing Ranges: Nine ranges spanning 0.1 sec. to 120 min.
Timing Adjustment: Knob adjust.
Accuracy: **Repeat Accuracy:** ±1%.
Overall Accuracy: ±5%.
Reset Time: 50 ms., max., (25 ms typ.) for on-delay and interval; 300 ms, max., for off-delay and one shot; 500 ms, max., for repeat type.
Relay Operate Time: 50 ms.
Relay Release Time: 30 ms.

Contact Data @ 25°C

Arrangements: 2 Form C (DPDT).
Rating: 10A @ 120/240VAC, resistive; 1/3 HP @ 120/240VAC, 50/60 Hz.
Expected Mechanical Life: 10 million operations.
Expected Electrical Life: 500,000 operations, min., at rated resistive load.

Initial Dielectric Strength

Between Contacts, Line Inputs and Control Circuits:
1,500V RMS, minimum, at 60 Hz.

Input Data @ 25°C

Voltage: See Ordering Information section for details.
Power Requirement: 3W, max.
Transient Protection: Non-repetitive transients of the following magnitudes will not cause spurious operation of affect function and accuracy.

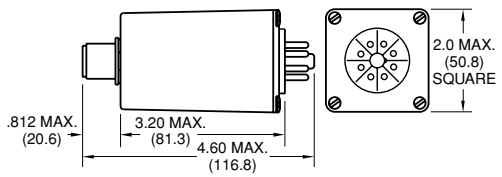
Operating Voltage	<0.1 ms	<1 ms
12 & 24 VAC/VDC	860V	208V*
120 VAC	2,580V	2,150V*

* Minimum source impedance of 100 ohm.

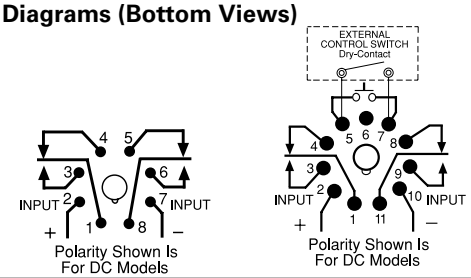
Environmental Data

Temperature Range: **Storage:** -23°C to +71°C.
Operating: -23°C to +54°C.

Outline Dimensions



Wiring Diagrams (Bottom Views)



Mechanical Data

Mounting/Termination: On-Delay, Interval and Repeat types have 8- pin octal plug that fits either 27E122 or 27E891 socket. Off-Delay and One Shot types have 11-pin octal-type plug that fits 27E123 or 27E892. Sockets must be orderd separately.
Weight: 4 oz. (112g) approximately.

Ordering Information

SST1 – On Delay Types

Input	Time Range	Part No.
120 VAC	0.1 - 10 sec.	SST12AAA
	0.6 - 60 sec.	SST12ACA
	1.8 - 180 sec.	SST12ADA
	3 - 300 sec.	SST12AEA
	18 sec. - 30 min.	SST12AGA
	36 sec. - 60 min.	SST12AHA
24 VAC	0.1 - 10 sec.	SST12EAA
	1.8 - 180 sec.	SST12EDA
	3 - 300 sec.	SST12EEA
24 VDC	0.1 - 10 sec.	SST12OAA
	1.8 - 180 sec.	SST12ODA
	3 - 300 sec.	SST12OEA
12 VDC	0.1 - 10 sec.	SST12QAA
	1.8 - 180 sec.	SST12QDA
	3 - 300 sec.	SST12QEA

SST2 – Off Delay Types

Input	Time Range	Part No.
120 VDC	0.1 - 10 sec.	SST22AAA
	1.8 - 180 sec.	SST22ADA
	3 - 300 sec.	SST22AEA
	18 sec. - 30 min.	SST22AGA
	36 sec. - 60 min.	SST22AHA
24 VDC	0.1 - 10 sec.	SST22EAA
	1.8 - 180 sec.	SST22EDA
24 VDC	0.1 - 10 sec.	SST22OAA
	1.8 - 180 sec.	SST22ODA
12 VDC	0.1 - 10 sec.	SST22QAA
	1.8 - 180 sec.	SST22QDA

SST3 – Interval Types

Input	Time Range	Part No.
120 VAC	0.1 - 10 sec.	SST32AAA
	1.8 - 180 sec.	SST32ADA
	3 - 300 sec.	SST32AEA
	36 sec. - 60 min.	SST32AHA
24 VAC	0.1 - 10 sec.	SST32EAA
	1.8 - 180 sec.	SST32EDA
24 VDC	0.1 - 10 sec.	SST32OAA
	1.8 - 180 sec.	SST32ODA
12 VDC	0.1 - 10 sec.	SST32QAA
	1.8 - 180 sec.	SST32QDA

SST4 – One Shot* Types

Input	Time Range	Part No.
120 VDC	0.1 - 10 sec.	SST42AAA
	1.8 - 180 sec.	SST42ADA
	3 - 300 sec.	SST42AEA
	18 sec. - 30 min.	SST42AGA
	36 sec. - 60 min.	SST42AHA
24 VDC	0.1 - 10 sec.	SST42EAA
	1.8 - 180 sec.	SST42EDA
24 VDC	0.1 - 10 sec.	SST42OAA
	1.8 - 180 sec.	SST42ODA
12 VDC	0.1 - 10 sec.	SST42QAA
	1.8 - 180 sec.	SST42QDA

* Also known as Latching Interval

SST7 – Repeat Cycle Types

Input	Time Range	Part No.
120 VDC	0.1 - 10 sec.	SST72AAA
	1.8 - 180 sec.	SST72ADA
	3 - 300 sec.	SST72AEA
	18 sec. - 30 min.	SST72AGA
	36 sec. - 60 min.	SST72AHA
24 VDC	0.1 - 10 sec.	SST72EAA
	1.8 - 180 sec.	SST72EDA
24 VDC	0.1 - 10 sec.	SST72OAA
	1.8 - 180 sec.	SST72ODA
12 VDC	0.1 - 10 sec.	SST72QAA
	1.8 - 180 sec.	SST72QDA

Authorized distributors are likely to stock the following:

None at present.

Dimensions are shown for reference purposes only.

Dimensions are in inches over (millimeters) unless otherwise specified.

Specifications and availability subject to change.



CAUTION:
If unit has not been energized for several months, apply operating voltage for 20 minutes prior to initial time delay.

Timing Modes

True Off-Delay – Upon application of operating voltage (min. 100ms), output relay contacts transfer. When operating voltage is removed, the time delay period is initiated. At the end of the delay period, output relay contacts release. If operating voltage is reapplied prior to expiration of the delay period, the delay will be cancelled and output relay contacts will remain transferred.

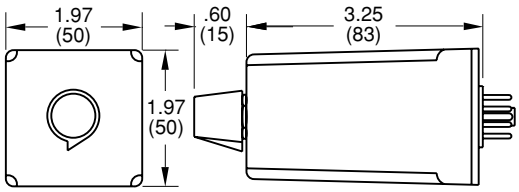
Timing Specifications

Timing Ranges: 0.1 to 3 / 0.5 to 15 / 1 to 30 / 4 to 120 / 10 to 300 sec.; 0.33 to 10 min.
Timing Adjustment: Knob adjustment - Internal potentiometer with external knob adjustment. Maximum time calibrated with +10%, –0% of values shown below at rated voltage, at 68°F. Fixed time – internal fixed resistor.
Accuracy: **Repeat Accuracy:** ±1.
Overall Accuracy: ±5%.
Reset Time: 30 ms. min.
Relay Operate Time: 30 ms.

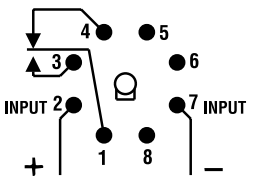
Contact Data @ 25°C

Arrangements: 1 Form C (SPDT) and 2 Form C (DPDT).
Rating: 1 Form C: 10A @ 120/240VAC, resistive; 1/3 HP @ 120VAC; 345VA @ 120VAC; 1/4 HP @ 240VAC; 275VA @ 240VAC. Same polarity.
2 Form C: 5A @ 28VDC or 120/240VAC, resistive; 1/6 HP @ 120/240VAC; 200VA @ 120/240VAC. Same polarity.
Expected Mechanical Life: 10 million operations.
Expected Electrical Life: 200,000 operations, min., at rated resistive load.

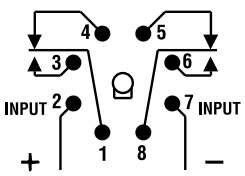
Outline Dimensions



Wiring Diagrams (Bottom Views)



Fixed Time
Or Knob Adjust



Fixed Time
Or Knob Adjust

SCE series

Specification Grade Discrete Plug-in True Off-Delay Time Delay Relay

- True Off-Delay timing modes
- Six time delays from 0.1 sec. to 10 min.
- 10A SPDT or 5A DPDT output contacts.
- Excellent repeat accuracy – typically better than ±1%.
- 8--pin octal plug.

File E15631
File LR51332 CE

Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Initial Dielectric Strength

Between Terminals and Case and relay contacts and active circuitry: 1,480VAC for one minute.

Input Data @ 25°C

Voltage: See Ordering Information section for details.
Power Requirement: 750mw.
Transient Protection: 1,000V plus twice rated voltage for 0.1 ms.

Environmental Data

Temperature Range: **Storage:** -40°C to +85°C.
Operating: -30°C to +65°C.

Mechanical Data

Mounting/Termination: 8-pin octal plug fits either 27E122 or 27E891 (snap-on) socket (order separately).
Weight: 4 oz. (112g) approximately.

Ordering Information

SCE	R	X	2	2	A	C	A
Series SCE True Off-delay Timer	**Agency Recognition** R = UL recognized	**Output Rating** W = 10A (SPDT) X = 5A (DPDT)	**Operating Mode** 2 = True Off-Delay	**Output** 1 = SPDT (W) 2 = DPDT (W)	**Operating Voltage (+10%, –15%)** A = 120VAC, 50/60 Hz. / 125VDC E = 24VAC, 50/60 Hz. / 24VDC F = 48VAC, 50/60 Hz. / 48VDC	**Timing Range** A =0 .1 to 3 sec. B = 0.5 to 15 sec. C = 1 to 30 sec. E = 4 to 120 sec. G = 10 to 300 sec. L = 0.33 to 10 min.	**Timing Adjustment** A = Knob Adjust F = Fixed Times – Specify time delay in seconds per the following examples: XF9.000 = 9 sec. XF99.00 = 99 sec. XF999.0 = 9999 sec. XF1000 = 1000 sec.

Authorized distributors are likely to stock the following:

None at present.

VTM-1 series

Specification Grade, On-Delay Timing Module

- On-delay timing mode
- Timing from 1 to 1000 sec.
- 1A solid state SPST-NO output
- 0.25" (6.35) quick connect terminals
- Universal voltage: 24 to 240VAC/VDC
- Rated to 10 million operations

File E60363

File LR51332

Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.



Timing Mode

On-Delay – VTM-1 in-line timing module is wired in series with the load circuit. Time delay is initiated when power is applied to the series network. Connecting a resistor across the center terminals provides tamper-proof setting of time delay from 1-1000 sec.

Timing Specifications

Timing Ranges: 1 to 1,000 sec.
Timing Adjustment: Time delay is set by connecting an appropriately rated resistor or potentiometer between the center two terminals. As supplied, the unit provides a nominal 1 second delay. Add 10k ohm of resistance for every additional second of delay required. For example: 5 seconds = 40k ohms; 10 seconds = 90k ohms.
Accuracy: Repeat Accuracy: ±2%
Reset Time: 100 ms, max., in the timing or time-out condition.

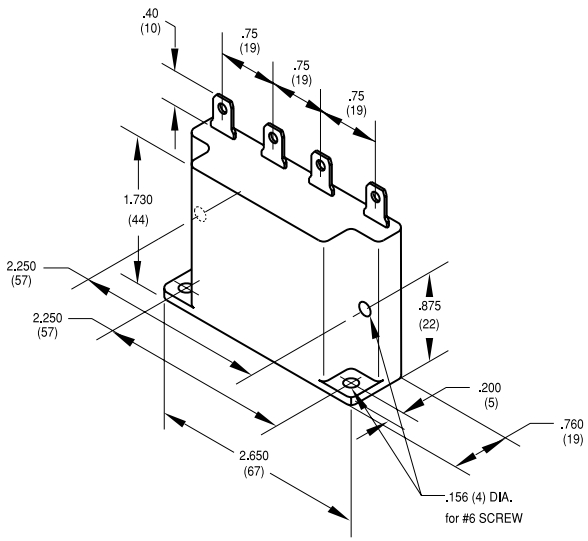
Output Switch Data

Arrangement: 1 Form A (SPST-NO).
Rating: 5A, inductive, at nominal operating voltage.
Inrush: Not to exceed 10A for one cycle.
Max. Leakage Current: 4mA rms.
Expected Electrical Life: 10,000,000 operations at rated load.

Initial Dielectric Strength

Between Active Terminals and Outside of Case: 1,480VAC for one min.

Outline Dimensions



Input Data @ 25°C

Operating Voltage: Universal: 24-240VAC/VDC (19-288VAC/VDC).
Current: 2mA (max.) required to operate timer regardless of output state.
Power Requirement: 3W, max.
Transient Protection: MOV across input 2,000V for 11µs on line side of load.

Environmental Data

Temperature Range: **Storage:** -40°C to +85°C.
Operating: -30°C to +65°C.

Mechanical Data

Mounting: Screw mount in horizontal or vertical position through built-in mounting ears.
Termination: 0.250 in (6.35) quick connect terminals for input line, load output and timing resistor connection.
Weight: 3 oz. (84g) approximately.

Ordering Information

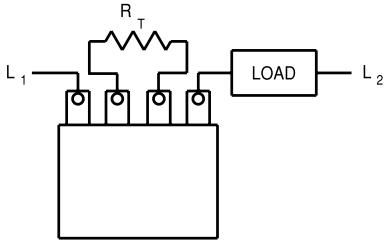
Part Number	Mode	Input Voltage
VTM-1	On-Delay	24-240VAC or VDC

Authorized distributors are likely to stock the following:

VTM-1

Wiring Diagram

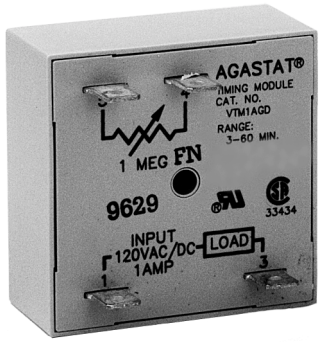
Notes:
1. Do not operate timer without connecting load in series with line voltage.
2. For a time delay of 1 second, connect a jumper across the center two terminals.



VTM1 series

On-Delay Timing Module

- On-delay timing mode
- Reliable solid state timing circuitry.
- Excellent transient protection.
- Compact design.
- Flame retardant, solvent resistant housing.



File E60363

File LR33434

Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Timing Mode

On-Delay.

Timing Specifications

Timing Ranges: 0.5 to 10 / 3 to 60 sec.; 0.5 to 10 / 3 to 60 min.
Timing Adjustment: External resistor or potentiometer. An external resistance of 1 megohm is required to obtain the maximum time for all ranges. To determine the actual resistance needed to obtain the required time delay, use the following formula:

$$R_t = \left(\frac{T_{req} - T_{min}}{T_{max} - T_{min}}\right) \text{ x } 1{,}000{,}000 \text{ ohms}$$

Accuracy: **Repeat Accuracy:** ±1%
Overall Accuracy: ±2% at R = 1 megohm.
Reset Time: 100 ms, max., before time-out; 10 ms, max., after time-out.

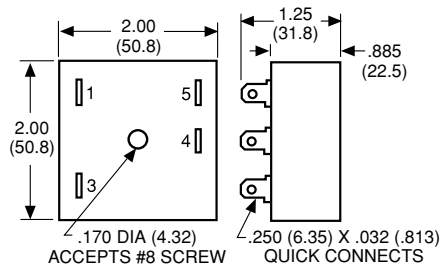
Output Switch Data

Arrangement: Solid state 1 Form A (SPST-NO).
Rating: 1A, inductive, at nominal operating voltage.
Expected Electrical Life: 10,000,000 operations at rated load.

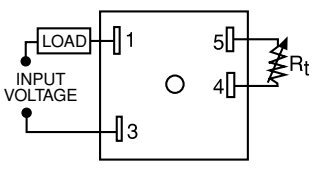
Initial Dielectric Strength

Between Terminals and Mounting: 3,000VAC rms.
Between Input and Output: 1,500VAC rms.

Outline Dimensions



Wiring Diagram



An external resistance of 1 megohm is required to obtain the maximum time for all ranges. To determine the actual resistance needed to obtain the required time delay, use the following formula:

$$R_t = \left(\frac{T_{req} - T_{min}}{T_{max} - T_{min}}\right) \text{ x } 1{,}000{,}000 \text{ ohms}$$

Input Data @ 25°C

Voltage: 12 VAC/VDC, 24VAC/VDC, 120 VAC/VDC.
Power Requirement: 3W, max.

Transient Protection: Non-repetitive transients of the following magnitudes will not cause spurious operation of affect function and accuracy.

Operating Voltage	<0.1 ms	<1 ms
12, 24 VAC/VDC	860V*	208V*
120 VAC/VDC	2,580V	2,150V*

* Min. source impedance of 100 ohm.

Environmental Data

Temperature Range: **Storage:** -40°C to +85°C.
Operating: -40°C to +65°C.

Mechanical Data

Mounting: Panel mount with one #8 screw.
Termination: 0.250 in (6.35) quick connect terminals.
Weight: 3 oz. (84g) approximately.

Ordering Information

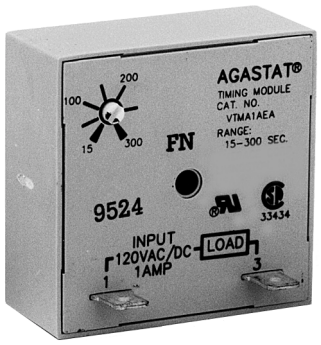
VTM1	A	CD
Series VTM1 On-Delay Timing Module	**Input Voltage** A = 120VAC/VDC E = 24VAC/VDC Q = 12VAC/VDC	**Time Range** CD = 0.5 - 10 sec. DD = 3 - 60 sec. FD = 0.5 - 10 sec. GD = 3 - 60 sec.

Authorized distributors are likely to stock the following:

VTM1ECD
VTM1EDD

VTMA1 series

On-Delay Timing Module With Internal Potentiometer



- On-delay timing mode
- Discrete voltage or universal type.
- Internal potentiometer for timing adjustment.
- Reliable solid state timing circuitry.
- Excellent transient protection.
- Flame retardant, solvent resistant housing.

File E60363

File LR33434

Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Timing Mode

On-Delay.

Timing Specifications

Timing Ranges: VMTA1ULA only: 24 to 480 sec.
All others: 0.5 to 10 / 3 to 60 /15 to 300 sec.; 3 to 60 min.
Timing Adjustment: Internal potentiometer.
Accuracy: **Repeat Accuracy:** ±5%
Overall Accuracy: Max. Time: –0%, +10%.
Min. Time: –30%, +10%.
Reset Time: 250 ms, max., before time-out; 10 ms, max., after time-out.

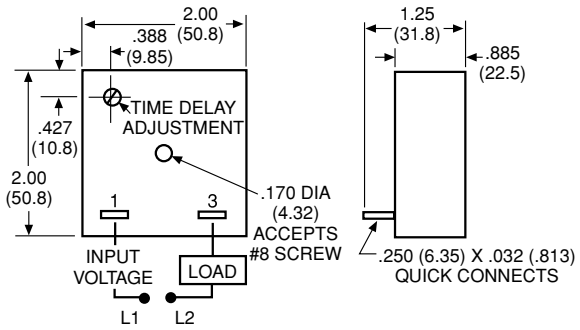
Output Switch Data

Arrangement: Solid state 1 Form A (SPST-NO).
Rating: 1A, inductive, at nominal operating voltage.
Expected Electrical Life: 10,000,000 operations at rated load.

Initial Dielectric Strength

Between Terminals and Mounting: 3,000VAC rms.
Between Input and Output: 1,500VAC rms.

Outline Dimensions amd Wiring Diagram



Input Data @ 25°C

Voltage: ±10% 120VAC/VDC (unfiltered DC must be full-wave rectified) or 24 to 240 VAC/VDC.
Power Requirement: 250mW during timing; 3W, max. after time out.
Transient Protection: Non-repetitive transients of the following magnitudes will not cause spurious operation of affect function and accuracy.

Operating Voltage	<0.1 ms	<1 ms
24 VAC/VDC	860V*	208V*
120/240 VAC/VDC	2,580V	2,150V*

* Min. source impedance of 100 ohms.

Current Drain: 2mA, Max.

Environmental Data

Temperature Range: **Storage:** -40°C to +85°C.
Operating: -40°C to +65°C.

Mechanical Data

Mounting: Panel mount with one #8 screw.
Termination: 0.250 in (6.35) quick connect terminals.
Weight: 4 oz. (112g) approximately.

Ordering Information

Part Number	Time Range	Input Voltage
VTMA1ACA	0.5 to 10 sec.	120VAC or VDC
VTMA1ADA	3 to 60 sec.	
VTMA1ACA	24 to 480 sec.	24-240VAC or VDC

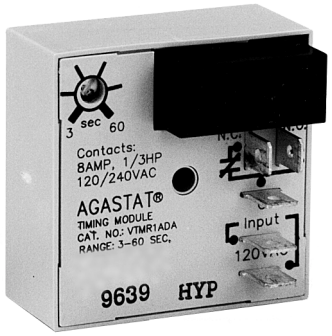
Authorized distributors are likely to stock the following:

None at present.

Dimensions are shown for reference purposes only.

Dimensions are in inches over (millimeters) unless otherwise specified.

Specifications and availability subject to change.



VTMR1 series

On-Delay Timing Module With Internal Potentiometer, Relay Output

- On-delay timing mode
- 8A SPDT relay output.
- Internal potentiometer for timing adjustment.
- Reliable solid state timing circuitry.
- Excellent transient protection.
- Flame retardant, solvent resistant housing.

File E60363

File LR33434

Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Timing Mode

On-Delay.

Timing Specifications

Timing Ranges: 15 to 300 sec.
Timing Adjustment: Internal potentiometer.
Accuracy: **Repeat Accuracy:** ±5% max. (0.25% typ.)
Overall Accuracy: Max. Time: –0%, +10%.
Min. Time: –30%, +10%.
Reset Time: 250 ms, max.

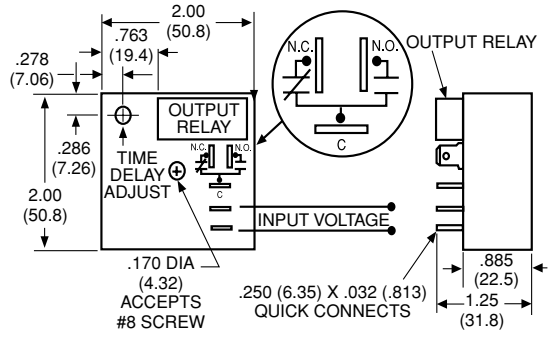
Output Contact Data

Arrangement: 1 Form C (SPDT).
Rating: 8A, resistive, at nominal operating voltage.
Expected Mechanical Life: 10,000,000 operations.
Expected Electrical Life: 100,000 operations.

Initial Dielectric Strength

Between Terminals and Mounting: 3,000VAC rms.
Between Input and Output: 1,500VAC rms.

Outline Dimensions and Wiring Diagram



Input Data @ 25°C

Voltage: ±10% 120VAC/VDC.
Power Requirement: 3.5VA, max.

Transient Protection: Non-repetitive transients of the following magnitudes will not cause spurious operation of affect function and accuracy.

Operating Voltage	<0.1 ms	<1 ms
120 VAC/VDC	2,580V	2,150V*

* Min. source impedance of 100 ohms.

Current Drain: 30mA, Max.

Environmental Data

Temperature Range: **Storage:** -40°C to +70°C.
Operating: -40°C to +70°C.

Mechanical Data

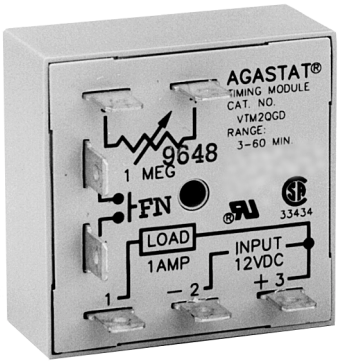
Mounting: Panel mount with one #8 screw.
Termination: 0.250 in (6.35) quick connect terminals.
Weight: 4 oz. (112g) approximately.

Ordering Information

Part Number	Time Range	Input Voltage
VTMR1AEA	15 to 300 sec.	120VAC

Authorized distributors are likely to stock the following:

None at present.



VTM2 series

Off-Delay Timing Module

- Off-delay timing mode
- Reliable solid state timing circuitry.
- Excellent transient protection.
- Compact design.
- Flame retardant, solvent resistant housing.

File E60363

File LR33434

Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Timing Mode

Off-Delay.

Timing Specifications

Timing Ranges: 0.5 to 10 / 3 to 60 sec.; 3 to 60 min.
Timing Adjustment: External resistor or potentiometer. An external resistance of 1 megohm is required to obtain the maximum time for all ranges. To determine the actual resistance needed to obtain the required time delay, use the following formula:

$$R_t = \left(\frac{T_{req} - T_{min}}{T_{max} - T_{min}}\right) \times 1{,}000{,}000 \text{ ohms}$$

Accuracy: **Repeat Accuracy:** ±1%
Overall Accuracy: ±2% at R = 1 megohm.
Reset Time: 50 ms, max.

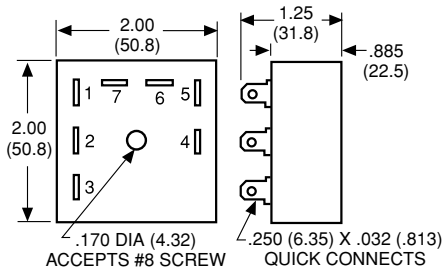
Output Switch Data

Arrangement: Solid state 1 Form A (SPST-NO).
Rating: 1A, inductive, at nominal operating voltage.
Expected Electrical Life: 10,000,000 operations at rated load.

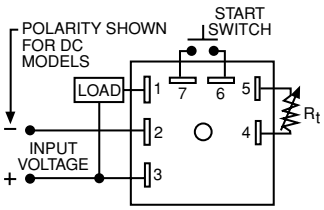
Initial Dielectric Strength

Between Terminals and Mounting: 3,000VAC rms.
Between Input and Output: 1,500VAC rms.

Outline Dimensions



Wiring Diagram



An external resistance of 1 megohm is required to obtain the maximum time for all ranges. To determine the actual resistance needed to obtain the required time delay, use the following formula:

$$R_t = \left(\frac{T_{req} - T_{min}}{T_{max} - T_{min}}\right) \times 1{,}000{,}000 \text{ ohms}$$

Input Data @ 25°C

Voltage:(±10%): 12 VAC/VDC, 24VAC/VDC, 120 VAC/VDC.
Power Requirement: 4W, with rated load.
Transient Protection: Non-repetitive transients of the following magnitudes will not cause spurious operation of affect function and accuracy.

Operating Voltage	<0.1 ms	<1 ms
12, 24 VAC/VDC	860V*	208V*
120 VAC/VDC	2,580V	2,150V*

* Min. source impedance of 100 ohms.

Current Drain: Less than 5mA.

Environmental Data

Temperature Range: **Storage:** -40°C to +85°C.
Operating: -40°C to +65°C.

Mechanical Data

Mounting: Panel mount with one #8 screw.
Termination: 0.250 in (6.35) quick connect terminals.
Weight: 4 oz. (112g) approximately.

Ordering Information

VTM2	A	CD
Series VTM2 Off-Delay Timing Module	**Input Voltage** A = 120VAC/VDC E = 24VAC/VDC Q = 12VAC/VDC	**Time Range** CD = 0.5 - 10 sec. DD = 3 - 60 sec. GD = 3 - 60 min.

Authorized distributors are likely to stock the following:

None at present.

Dimensions are shown for reference purposes only.

Dimensions are in inches over (millimeters) unless otherwise specified.

Specifications and availability subject to change.



VTM3 series

Interval Timing Module

- Interval timing mode
- Reliable solid state timing circuitry.
- Excellent transient protection.
- Compact design.
- Flame retardant, solvent resistant housing.

File E60363

File LR33434

Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Timing Mode

Interval.

Timing Specifications

Timing Ranges: 0.5 to 10 / 3 to 60 sec.; 3 to 60 min.
Timing Adjustment: External resistor or potentiometer. An external resistance of 1 megohm is required to obtain the maximum time for all ranges. To determine the actual resistance needed to obtain the required time delay, use the following formula:

$$R_t = \left(\frac{T_{req} - T_{min}}{T_{max} - T_{min}}\right) \times 1{,}000{,}000 \text{ ohms}$$

Accuracy: **Repeat Accuracy:** ±1%
Overall Accuracy: ±2% at R = 1 megohm.
Reset Time: 50 ms, max.

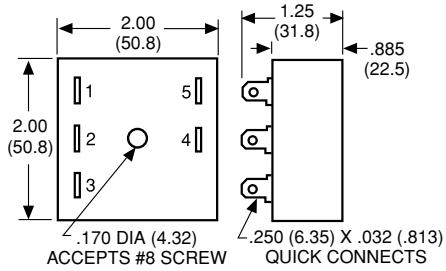
Output Switch Data

Arrangement: Solid state 1 Form A (SPST-NO).
Rating: 1A, inductive, at nominal operating voltage.
Expected Electrical Life: 100,000,000 operations at rated load.

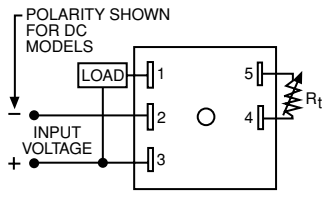
Initial Dielectric Strength

Between Terminals and Mounting: 3,000VAC rms.
Between Input and Output: 1,500VAC rms.

Outline Dimensions



Wiring Diagram



An external resistance of 1 megohm is required to obtain the maximum time for all ranges. To determine the actual resistance needed to obtain the required time delay, use the following formula:

$$R_t = \left(\frac{T_{req} - T_{min}}{T_{max} - T_{min}}\right) \times 1{,}000{,}000 \text{ ohms}$$

Input Data @ 25°C

Voltage:(±10%): 12 VAC/VDC, 24VAC/VDC, 120 VAC/VDC.
Power Requirement: 4W, with rated load.
Transient Protection: Non-repetitive transients of the following magnitudes will not cause spurious operation of affect function and accuracy.

Operating Voltage	<0.1 ms	<1 ms
12, 24 VAC/VDC	860V*	208V*
120 VAC/VDC	2,580V	2,150V*

* Min. source impedance of 100 ohms.

Current Drain: Less than 5mA.

Environmental Data

Temperature Range: **Storage:** -40°C to +85°C.
Operating: -40°C to +65°C.

Mechanical Data

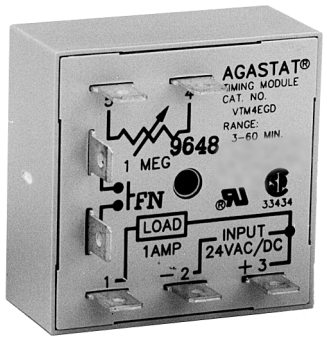
Mounting: Panel mount with one #8 screw.
Termination: 0.250 in (6.35) quick connect terminals.
Weight: 4 oz. (112g) approximately.

Ordering Information

VTM3	A	CD
Series VTM3	**Input Voltage**	**Time Range**
Interval Timing Module	A = 120VAC/VDC	CD = 0.5 - 10 sec.
	E = 24VAC/VDC	DD = 3 - 60 sec.
	Q = 12VAC/VDC	GD = 3 - 60 min.

Authorized distributors are likely to stock the following:

None at present.



VTM4 series

One Shot (Latching Interval) Timing Module

- One shot (latching interval) timing mode
- Reliable solid state timing circuitry.
- Excellent transient protection.
- Compact design.
- Flame retardant, solvent resistant housing.

File E60363

File LR33434

Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Timing Mode

One Shot (Latching Interval).

Timing Specifications

Timing Ranges: 0.5 to 10 / 3 to 60 sec.; 0.5 to 10 / 3 to 60 min.
Timing Adjustment: External resistor or potentiometer. An external resistance of 1 megohm is required to obtain the maximum time for all ranges. To determine the actual resistance needed to obtain the required time delay, use the following formula:

$$R_t = \left(\frac{T_{req} - T_{min}}{T_{max} - T_{min}}\right) \times 1{,}000{,}000 \text{ ohms}$$

Accuracy: **Repeat Accuracy:** ±1%
Overall Accuracy: ±2% at R = 1 megohm.
Reset Time: 50 ms, max.

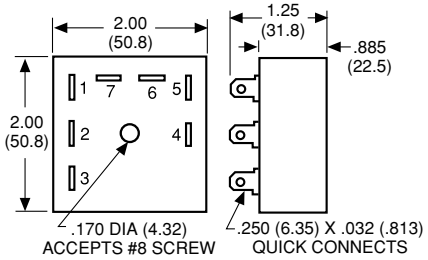
Output Switch Data

Arrangement: Solid state 1 Form A (SPST-NO).
Rating: 1A, inductive, at nominal operating voltage.
Expected Electrical Life: 100,000,000 operations at rated load.

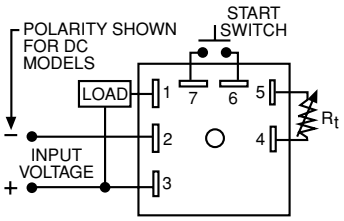
Initial Dielectric Strength

Between Terminals and Mounting: 3,000VAC rms.
Between Input and Output: 1,500VAC rms.

Outline Dimensions



Wiring Diagram



An external resistance of 1 megohm is required to obtain the maximum time for all ranges. To determine the actual resistance needed to obtain the required time delay, use the following formula:

$$R_t = \left(\frac{T_{req} - T_{min}}{T_{max} - T_{min}}\right) \times 1{,}000{,}000 \text{ ohms}$$

Input Data @ 25°C

Voltage:(±10%): 12 VAC/VDC, 24VAC/VDC, 120 VAC/VDC.
Power Requirement: 4W, with rated load.
Transient Protection: Non-repetitive transients of the following magnitudes will not cause spurious operation of affect function and accuracy.

Operating Voltage	<0.1 ms	<1 ms
12, 24 VAC/VDC	860V*	208V*
120 VAC/VDC	2,580V	2,150V*

* Min. source impedance of 100 ohms.

Current Drain: Less than 5mA.

Environmental Data

Temperature Range: **Storage:** -40°C to +85°C.
Operating: -40°C to +65°C.

Mechanical Data

Mounting: Panel mount with one #8 screw.
Termination: 0.250 in (6.35) quick connect terminals.
Weight: 4 oz. (112g) approximately.

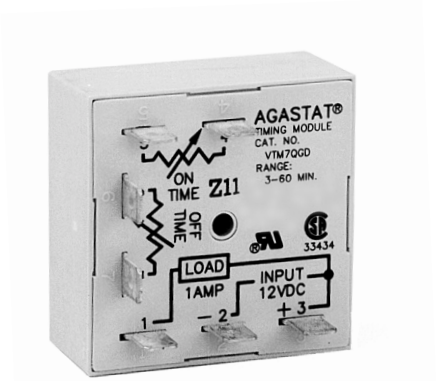
Ordering Information

VTM4	A	CD
Series VTM4	**Input Voltage**	**Time Range**
One Shot	A = 120VAC/VDC	CD = 0.5 - 10 sec.
(Latching Interval)	E = 24VAC/VDC	DD = 3 - 60 sec.
Timing Module	Q = 12VAC/VDC	FD = 0.5 - 10 min.
		GD = 3 - 60 min.

Authorized distributors are likely to stock the following:

None at present.

Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.



VTM7 series

Repeat Cycle Timing Module

- Repeat cycle timing mode
- Independently adjustable On and Off times.
- Reliable solid state timing circuitry.
- Excellent transient protection.
- Compact design.
- Flame retardant, solvent resistant housing.

File E60363

File LR33434

Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Timing Mode

Repeat Cycle.

Timing Specifications

Timing Ranges: 0.5 to 10 / 3 to 60 sec.; 3 to 60 min.
Timing Adjustment: External resistor or potentiometer. An external resistance of 1 megohm is required to obtain the maximum time for all ranges. To determine the actual resistance needed to obtain the required time delay, use the following formula:

$$R_t = \left(\frac{T_{req} - T_{min}}{T_{max} - T_{min}}\right) \times 1{,}000{,}000 \text{ ohms}$$

Accuracy: **Repeat Accuracy:** ±1%
Overall Accuracy: ±2% at R = 1 megohm.
Reset Time: 500 ms.

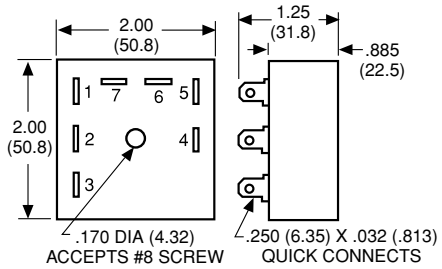
Output Switch Data

Arrangement: Solid state 1 Form A (SPST-NO).
Rating: 1A, inductive, at nominal operating voltage.
Expected Electrical Life: 100,000,000 operations at rated load.

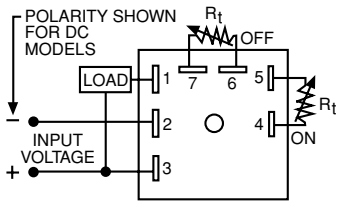
Initial Dielectric Strength

Between Terminals and Mounting: 3,000VAC rms.
Between Input and Output: 1,500VAC rms.

Outline Dimensions



Wiring Diagram



An external resistance of 1 megohm is required to obtain the maximum time for all ranges. To determine the actual resistance needed to obtain the required time delay, use the following formula:

$$R_t = \left(\frac{T_{req} - T_{min}}{T_{max} - T_{min}}\right) \times 1{,}000{,}000 \text{ ohms}$$

Input Data @ 25°C

Voltage:(±10%): 12 VAC/VDC, 24VAC/VDC, 120 VAC/VDC.
Power Requirement: 4W, with rated load.
Transient Protection: Non-repetitive transients of the following magnitudes will not cause spurious operation of affect function and accuracy.

Operating Voltage	<0.1 ms	<1 ms
12, 24 VAC/VDC	860V*	208V*
120 VAC/VDC	2,580V	2,150V*

* Min. source impedance of 100 ohms.

Current Drain: Less than 5mA.

Environmental Data

Temperature Range: **Storage:** -40°C to +85°C.
Operating: -40°C to +65°C.

Mechanical Data

Mounting: Panel mount with one #8 screw.
Termination: 0.250 in (6.35) quick connect terminals.
Weight: 4 oz. (112g) approximately.

Ordering Information

VTM7	A	CD
Series VTM7 Repat Cycle Timing Module	**Input Voltage** A = 120VAC/VDC E = 24VAC/VDC Q = 12VAC/VDC	**Time Range** CD = 0.5 - 10 sec. DD = 3 - 60 sec. GD = 3 - 60 min.

Authorized distributors are likely to stock the following:

None at present.



7000 series

Industrial Electropneumatic Timing Relay

File E15631 File LR29186

Series 7000 Timing Relays are also manufactured to MIL-SPEC requirements, conforming to requirements of MIL-C-2212F (SHIPS) with the exception of MIL-S-901. Consult factory for ordering information.

Note:7032 types and certain models with accessories are not agency approved.

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Design Features

- Available in on-delay, true off-delay, and on/off-delay.
- Timing from 0.1 seconds to 60 minutes, fully calibrated in linear increments.
- Oversize time-calibrated adjustment knobs, serrated with high-resolution markings visible from all angles makes the timer easy to set timers.
- Inherent transient immunity.
- Standard voltages from 6-550VAC and 12-550VDC (special voltages available.)
- Available in 2-pole or 4-pole models.
- Numerous enclosure options: explosion proof, dust tight, watertight, hermetically-sealed, NEMA 1.
- Auxiliary timed and instantaneous switches can be added for greater switching flexibility.
- Many mounting options: Surface mount, Panel mount, Octal plug-in mounting.
- Options: quick-connect terminals, dial stops, and transient protection module.
- Easy-to-reach screw terminals, all on the face of the unit, clearly identified.
- Modular assembly - timing head, coil assembly and switchblock are all individual modules, with switches field-replaceable.

Design & Construction

There are three main components of Series 7000 Timing Relays:

Calibrated Timing Head uses no needle valve, recirculates air under controlled pressure through a variable orifice to provide linearly adjustable timing. Patented design provides instant recycling, easy adjustment and long service life under severe operating conditions.

Precision-Wound Potted Coil module supplies the initial motive force with minimum current drain. Total sealing without external leads eliminates moisture problems, gives maximum insulation value.

Snap-Action Switch Assembly - custom-designed over-center mechanism provides greater contact pressure up to transfer time for positive, no flutter action. Standard switches are DPDT arrangement, with flexible beryllium copper blades and silver-cadmium oxide contacts. Special "timing-duty" design assures positive wiping action, sustained contact pressure and greater heat dissipation during long delay periods.

Each of these subassemblies forms a self-contained module which is then assembled at the factory with the other two to afford a wide choice of operating types, coil voltages, and timing ranges.

The squared design with front terminals and rear mounting permits the grouping of Series 7000 units side-by-side in minimum panel space. Auxiliary switches may be added in the base of the unit, without affecting the overall width or depth.

Operation

Two basic operating types are available.

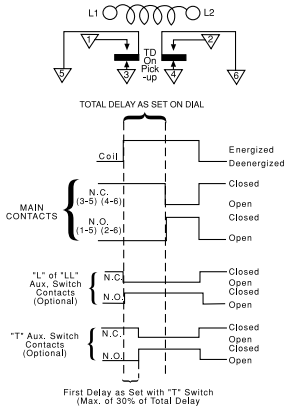
"On-Delay" models provide a delay period on energization, at the end of which the switch transfers the load from one set of contacts to another. De-energizing the unit during the delay period immediately recycles the unit, readying it for another full delay period on re-energization.

In "Off-Delay" models the switch transfers the load immediately upon energization, and the delay period does not begin until the unit is de-energized. At the end of the delay period the switch returns to its original position. Re-energizing the unit during the delay period immediately resets the timing, readying it for another full delay period on de-energization. No power is required during the timing period.

In addition to these basic operating types, "Double-Head" models offer sequential delays on pull-in and drop-out in one unit. With the addition of auxiliary switches the basic models provide two-step timing, pulse actuation for interlock circuits, or added circuit capacity.

NOTE: Seismic & radiation tested E7000 models are available. Consult factory for detailed information.

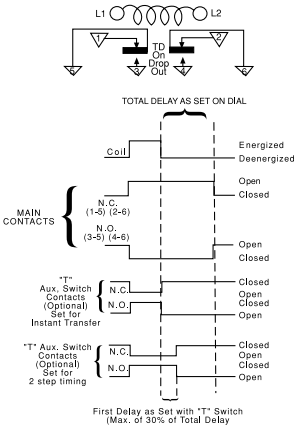
On-delay model 7012 (delay on pickup)



Applying continuous voltage to the coil (L1-L2) starts a time delay lasting for the preset time. During this period the normally closed contacts (3-5 and 4-6) remain closed. At the end of the delay period the normally closed contacts break and the normally open contacts (1-5 and 2-6) make. The contacts remain in this transferred position until the coil is deenergized, at which time the switch instantaneously returns to its original position.

De-energizing the coil, either during or after the delay period, will recycle the unit within 50 msec.
It will then provide a full delay period upon re-energization, regardless of how often the coil voltage is interrupted before the unit has been permitted to "time-out" to its full delay setting.

Off-delay model 7022 (delay on dropout)



Applying voltage to the coil (for at least 50 msec) will instantaneously transfer the switch, breaking the normally closed contacts (1-5 and 2-6), and making the normally open contacts (3-5 and 4-6). Contacts remain in this transferred position as long as the coil is energized. The time delay begins immediately upon de-energization. At the end of the delay period the switch returns to its normal position.

Re-energizing the coil during the delay period will immediately return the timing mechanism to a point where it will provide a full delay period upon subsequent de-energization. The switch remains in the transferred position.

To increase the versatility of the basic timer models, auxiliary switches may be added to either on-delay or off-delay types. They switch additional circuits, provide two-step timing action, or furnish electrical interlock for sustained coil energization from a momentary impulse, depending on the type selected and its adjustment. Because of their simple attachment and adjustment features, they can be installed at the factory or in the field, by any competent mechanic. All auxiliary switches are SPDT with UL listings of 10A @ 125, 250, or 480 VAC. A maximum of one Code T or two Code L auxiliary switches may be added to each relay. The L or LL switch is available with on-delay relays only. The T switch is available with both the on-delay and off-delay relays.

Auxiliary Switch Options for On-Delay
Instant Transfer (Auxiliary Switch Code L,
maximum of 2 per relay.)

1. Energizing coil begins time delay and transfers auxiliary switch.
2. Main switch transfers after total preset delay.
3. De-energizing coil resets both switches instantly.

Auxiliary switch is nonadjustable.
Two-Step Timing (Auxiliary Switch Code T,
maximum of 1 per relay.)

Dimensions are shown for reference purposes only.

Dimensions are in inches over (millimeters) unless otherwise specified.

Specifications and availability subject to change.

Auxiliary switch options

To increase the versatility of the basic timer models, auxiliary switches may be added to either on-delay or off-delay types. They switch additional circuits, provide two-step timing action, or furnish electrical interlock for sustained coil energization from a momentary impulse, depending on the type selected and its adjustment. Because of their simple attachment and adjustment features, they can be installed at the factory or in the field, by any competent mechanic. All auxiliary switches are SPDT with UL listings of 10A @ 125, 250, or 480 VAC. A maximum of one Code T or two Code L auxiliary switches may be added to each relay. The L or LL switch is available with on-delay relays only. The T switch is available with both the on-delay and off-delay relays.

Auxiliary Switch Options for On-Delay

Instant Transfer (Auxiliary Switch Code L, maximum of 2 per relay.)

1. Energizing coil begins time delay and transfers auxiliary switch.
2. Main switch transfers after total preset delay.
3. De-energizing coil resets both switches instantly.

Auxiliary switch is nonadjustable.

Two-Step Timing (Auxiliary Switch Code T, maximum of 1 per relay.)

1. Energizing coil begins time delay.
2. After first delay auxiliary switch transfers.
3. Main switch transfers after total preset delay.
4. De-energizing coil resets both switches instantly. First delay is independently adjustable, up to 30% of overall delay. (Recommended maximum 100 seconds.)

Auxiliary Switch Options for Off-Delay

In these models the same auxiliary switch provides either two-step timing or instant transfer action, depending on the adjustment of the actuator.

Two-Step Timing (Auxiliary Switch Code T, maximum of 1 per relay.)

1. Energizing coil transfers main and auxiliary switches instantly.
2. De-energizing coil begins time delay.
3. After first delay auxiliary switch transfers.
4. Main switch transfers after total preset delay. First delay is independently adjustable, up to 30% of overall delay. (Recommended maximum 100 seconds.)

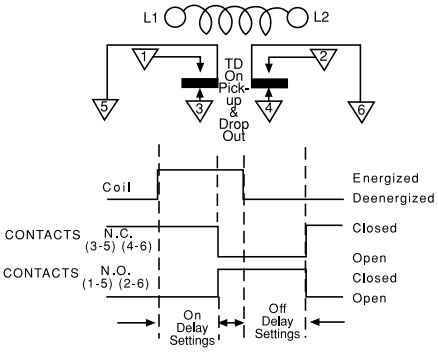
Instant Transfer (Auxiliary Switch Code L, maximum of 1 per relay.)

1. Energizing coil transfers main and auxiliary switches instantly.
2. De-energizing coil resets auxiliary switch and begins time delay.
3. Main switch transfers after total preset delay.

Auxiliary switch is factory adjusted to give instant transfer operation, but may be easily adjusted in the field to provide two-step timing.

On-delay, off-delay model 7032 (double head)





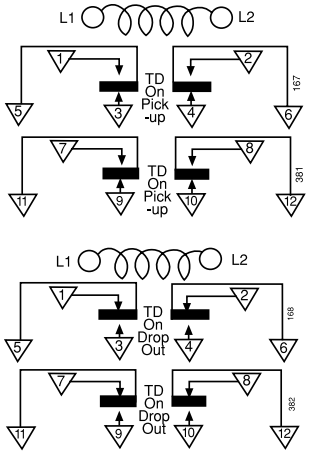
The Double Head model provides delayed switch transfer on energization of its coil, followed by delayed resetting upon coil de-energization. Each delay period is independently adjustable.

In new circuit designs or the improvement of existing controls now using two or more conventional timers, the Double Head unit offers distinct advantages.

Its compact design saves precious panel space, while the simplified wiring reduces costly interconnection.

On-delay, off-delay model 7032 (double head)





With the addition of an extra switch block at the bottom of the basic unit, this version of the Series 7000 offers four pole switch capacity with simultaneous timing or two-step timing. The two-step operation is achieved by factory adjustment to your specifications.

For two-step operation, a maximum timing ratio between upper and lower switches of 3:2 is recommended. Once adjusted at the factory, this ratio remains constant regardless of changes in dial settings. (Ex: If upper switch transfer is set on dial at 60 sec., minimum time on lower switch should be 40 sec.)

This Series 7000 unit offers many of the performance features found in basic models - voltage ranges, timing and switch capacities are virtually identical.

Four pole models add approximately 1-1/4" to the maximum height of the basic model, approximately 1/8" to the depth. They are designed for vertical operation only.

Surge/transient protection option



Transient Suppressor Option "V"

Features

- Protect electronic control circuits from voltage transients generated by the timer coil.
- Fast response to the rapidly rising back E.M.F.
- High performance clamping voltage characteristics.
- UL recognized, (except varistor and coil together).
- Timer NOT polarity sensitive.

The Surge/Transient Protection Option protects electronic control circuits from transients and surges which are generated when the timer coil is activated. Built with a minimum of moving parts, the unit provides a fast response to rapidly rising voltage transients. The accurate, precision-made device is not polarity sensitive and permits the user to initiate, delay, sequence and program equipment actions over a wide range of applications under the most severe operating conditions.

It consists of a specially modified coil case, varistor, varistor cover, terminal extensions and cup washers so that normal terminations can be used. The varistor will not affect the operating characteristics of the 7000 Timer. The varistor has bilateral and symmetrical voltage and current characteristics and therefore can be used in place of the back-to-back zener diodes. This characteristic also means that the coil will not be polarity sensitive.

Timing Specifications (All values shown are at nominal voltage and 25°C unless otherwise specified).

Operating Modes:
Model 7012/7014: On-delay (delay on pick-up).
Model 7022/7024: Off-delay (delay on drop-out).
Model 7032: On-delay, off-delay (double head).

Timing Adjustment: Timing is set by simply turning the calibrated dial to the desired time value. In the zone of approximately 25° separating the high and low end of timing ranges A,D,E, and K, instantaneous operation (no time delay) will occur. All other ranges produce an infinite time delay when the dial is set in this zone.

Models 7014 and 7032 are available with letter-calibrated dials only. The upper end of the time ranges in these models may be twice the values shown.

Linear Timing Ranges:

Code	Models 7012, 7022, 7024	Models 7014, 7032
A	.1 to 1 Sec.	.2 to 2 Sec.
B	.5 to 5 Sec.	.7 to 7 Sec.
C	1.5 to 15 Sec	2 to 20 Sec.
D	5 to 50 Sec.	10 to 100 Sec.
E	20 to 200 Sec.	30 to 300 Sec.
F	1 to 10 Min.	1.5 to 15 Min.
H	3 to 30 Min.	3 to 30 Min.
I	6 to 60 Min.	Not Avail.
J	3 to 120 Cyc.	Not Avail.
K	1 to 300 Sec.	Not Avail.

Repeat Accuracy:

For delays of 200 seconds or less:	7012*, 7022, 7024:	±5%
	7014*:	±10%
	7032:	±15%
For delays greater than 200 seconds:	7012*, 7022, 7014*, 7024:	±10%
	7032:	±15%

* The first time delay afforded by Model 7012 with H (3 to 30 min.) and I (6 to 60 min.) time ranges or Model 7014 with H time range will be approx. 15% longer than subsequent delays due to coil temperature rise.

Reset Time: 50 msec. (except model 7032)
Relay Release Time: 50 msec. for on-delay models (7012/7014)
Relay Operate Time: 50 msec. for off-delay models (7022/7024)

Operating Voltage Coil Data (for DPDT)

Coil Part #	Code Letter	Rated Voltage	Operating* Voltage Range @ 60Hz	Rated Voltage	Operating Voltage Range @50Hz
7000	A	120	102-132	110	93.5-121
	B	240	204-264	220	187-242
	C	480	408-528		
	D	550	468-605		
	E	24	20.5-26.5		
AC	F			127	108-140
	G			240	204-264
	H	12	10.2-13.2		
	I	6	5.1-6.6		
	J	208	178-229		
	K		Dual Voltage Coil (Combines A&B)		
	L		Special AC Coils (L1, L2, etc.)		
7010	M	28	22.4-30.8		
	N	48	38.4-52.8		
	O	24	19.2-26.4		
	P	125	100-137.5		
	Q	12	9.6-13.2		
	R	60	48-66		
DC	S	250	200-275		
	T	550	440-605		
	U	16	12.8-17.6		
	V	32	25.8-35.2		
	W	96	76.8-105.6		
	Y	6	4.8-6.6		
	Z	220	176-242		
	X		Special DC Coils (X1, X2, etc.)		

*Four pole Models: Operational voltage range 90% to 110% for AC units; 85% to 110% for DC units.

See next column for more coil data.

Minimum operating voltages are based on vertically mounted 7012 units. 7012 horizontally mounted or 7022 vertically or horizontally mounted units will operate satisfactorily at minimum voltages approximately 5% lower than those listed.
AC units drop out at approximately 50% of rated voltage. DC units drop out at approximately 10% of rated voltage.
All units may be operated on intermittent duty cycles at voltages 10% above the listed maximums (intermittent duty - maximum 50% duty cycle and 30 minutes "on" time.)

Surge/Transient Protection Option Characteristics (DC Timers Only)

Coil Voltage Nominal (DC)	Max Excess Energy Capacity (Joule)	Max De-energization Transient Voltage
12 V	0.4 J	48 V
24 V	1.8 J	93 V
28 V	1.8 J	93 V
32 V	2.5 J	135 V
48 V	3.57 J	145 V
60 V	6 J	250 V
96 V	10 J	340 V
110 V	10 J	340 V
125 V	10 J	340 V
220 V	17 J	366 V
250 V	17 J	366 V

Surge Life
Applied 100,000 times continuously with the interval of 10 seconds at room temperature. Below 68 VAC: 12A; Above 68 VAC: 35A
Temperature Range
Operating: -22°F to +167°F (-30°C to + 75°C)
Storage: -40°F to +167°F (-40°C to +75°C)

Output/Life Contact Ratings: Contact Capacity in Amps (Resistive Load)

Contact Voltage	Min. 100,000 Operations	Min. 1,000,000 Operations
30 VDC	15.0	7.0
110 VDC	1.0	0.5
120 V 60Hz	20.0	15.0
240 V 60Hz	20.0	15.0
480 V 60Hz	12.0	10.0

10 Amps Resistive, 240 VAC
1/4 Horsepower, 120 VAC/240VAC (per pole)
15 Amps 30 VDC (per pole)
5 Amps, General Purpose, 600VAC (per pole)
Dielectric: Withstands 1500 volts RMS 60Hz between terminals and ground. 1,000 volts RMS 60 Hz between non-connected terminals. For dielectric specification on hermetically sealed models consult factory.
Insulation Resistance: 500 Megohms with 500VDC applied.
Temperature Range: Operating: -20°F to +165°F (-29°C to 74°C)
Storage: -67°F to +165°F (-55°C to 74°C)
Temperature Variation: Using a fixed time delay which was set and measured when the ambient temperature was 77°F (25°C), the maximum observed shift in the average of three consecutive time delays was -20% at -20°F (-29°C) and +20% at 165°F (74°C).
Mounting/Terminals: Normal mounting of the basic unit is in a vertical position, from the back of the panel. A front mounting bracket is also supplied with each basic unit, for installation from the front of the panel. **All units are calibrated for vertical operation.** Basic models (7012, 7022) may also be horizontally mounted, and will be adjusted accordingly **when Accessory Y1 is specified in your order.**

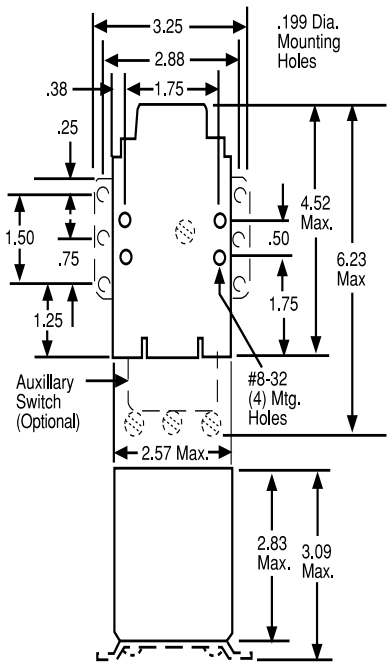
Standard screw terminals (8-32 truss head screws supplied) are located on the front of the unit, with permanent schematic markings. Barrier isolation is designed to accommodate spade or ring tongue terminals, with spacing to meet all industrial control specifications.

The basic Series 7000 may also be panel mounted with the addition of a panelmount kit that includes all necessary hardware and faceplate. This offers the convenience of "out-front" adjustment, with large calibrated dial skirt knob. The faceplate and knob blend with advanced equipment and console designs, while the body of the unit and its wiring are protected behind the panel.

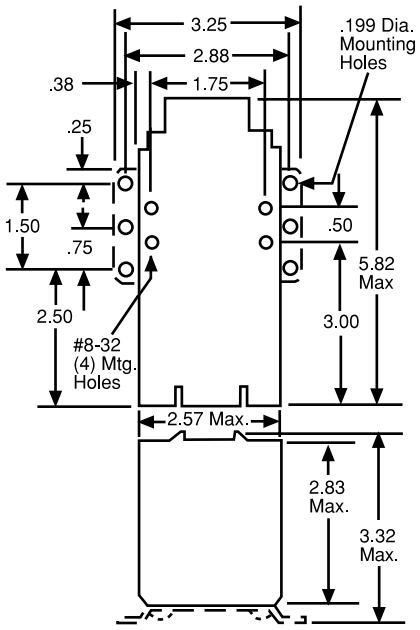
Other mounting options include plug-in styles and special configurations to meet unusual installation requirements. Contact factory for details.
Power Consumption: Approximately 8 watts power at rated voltage .
Approximate Weights:
Models 7012, 7022 . . . . . 2 lbs. 4 ozs.
7014, 7024 . . . . . 2 lbs. 10 ozs.
7032 . . . . . 3 lbs. 5 ozs.
Weight may vary slightly with coil voltage.

Outline Dimensions (Dimensions in inches).

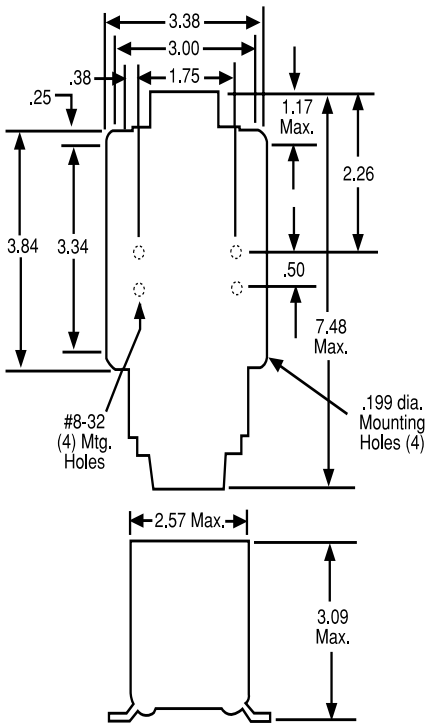
Models 7012, 7022



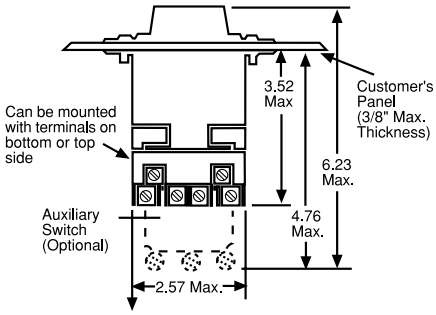
Models 7014, 7024



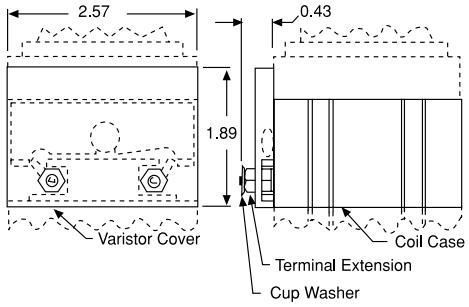
Model 7032

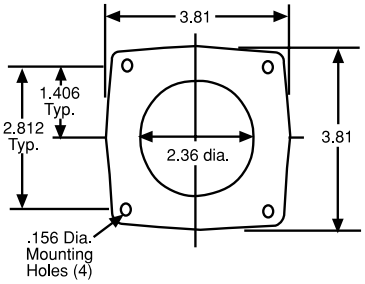


Panel mount Option "X"



Surge/Transient Protection Option





Ordering Information

Typical Part No. ➤	70	1	2	A	D	GZ

1. Basic Series:
70 = 7000 series electropneumatic timing relay

2. Operation:
1 = On-delay
2 = Off-delay
3 = On-delay, off-delay (double head)

3. Contact Arrangement:
2 = 2PDT (2 form C)
**4 = 4PDT (4 form C)

4. Coil Voltage:

AC Coils
A = 120VAC, 60 Hz.; 110VAC, 50Hz.
B = 240VAC, 60 Hz.; 220VAC, 50Hz.
C = 480VAC, 60 Hz.
D = 550VAC, 60 Hz.
E = 24VAC, 60 Hz.
F = 127VAC, 50 Hz.
G = 240VAC, 50Hz.
H = 12VAC, 60 Hz.
K = Dual voltage (combines A & B)
L = Special AC coils (L1, L2, etc.)

DC Coils
M = 28VDC
N = 48VDC
O = 24VDC
P = 125VDC
Q = 12VDC
R = 60VDC
S = 250VDC
T = 550VDC
U = 16VDC
V = 32VDC
W = 96VDC
Y = 6VDC
Z = 220VDC
X = Special DC coils (X1, X2, etc.)

5. Timing Range:

Models 7012, 7022 & 7024
A = .15 to 3 sec.
B = .5 to 5 sec.
C = 1.5 to 15 sec.
D = 5 to 50 sec.
E = 20 to 200 sec.
F = 1 to 10 min.
H = 3 to 30 min.
I = 6 to 60 min.
J = 3 to 120 cyc.
K = 1 to 300 sec.

†Models 7014 & 7032
For model 7032 specify separate time range code for each head. Example: AB. Any two ranges may be selected.
A = .2 to 2 sec.
B = .7 to 7 sec.
C = 2 to 20 sec.
D = 10 to 100 sec.
E = 30 to 300 sec.
F = 1.5 to 15 min.
H = 3 to 30 min.

6. Options:
A1 = Single quick-connect terminals (note 4).
A2 = Double quick-connect terminals (note 4).
B = Plug-in connectors (note 4).
GZ = Enclosure with bottom knockouts (note 1).
H2 = Hermetically sealed enclosure, 8 pin solder (notes 1 & 4).
H3 = Hermetically sealed enclosure, 8 pin octal (notes 1 & 4).
H4 = Hermetically sealed enclosure, 8 screw terminal block (notes 1 & 4).
*H6 = Hermetically sealed enclosure, 11 pin solder (notes 1 & 4).
*H7 = Hermetically sealed enclosure, 11 pin octal (notes 1 & 4).
*H8 = Hermetically sealed enclosure, 11 screw terminal block (notes 1 & 4).
I1 = Tamper-proof Cap, opaque black (Cannot be combined with Option X).
I2 = Tamper-proof Cap, transparent (Cannot be combined with Option X).
K = Explosion-proof Enclosure (note 1).
L = Auxiliary Switch, instant transfer. 7012 only (notes 2 & 6).
LL = Two Aux. Switches, instant transfer. On Model 7014 Factory Installed Only. (notes 2 & 6)
M = Dust-tight Gasketing (notes 4 & 5).
P = Octal Plug Adapter. Can be combined only with options I1,I2. M, S, X, or Y1. (note 4).
S = Dial Stops.
T = Auxiliary Switch, two-step timing (notes 2 & 6).
V = Transient/Surge Protection (for DC coil voltage only).
W = Watertight Enclosure (note 1).
X = Panelmount includes hardware and adjustment for horizontal operation (note 4)
Y1 = Horizontal calibration, for horizontal operation without panelmounting (note 4).
Y2 = Horizontal calibration, with Compensating Spring for vertical operation (note 4).

Notes:
1. Cannot be combined with B, P or X Options
2. Cannot be combined with B, P or Y2 Options
3. Cannot be combined with GZ, H, I1, I2, K, W or Y1 Options
4. Not Avail. on 4-Pole Models
5. Not Available with L, T or LL options.
6. Not Available on hermetically sealed units.

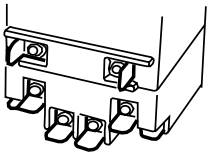
* Sized to accommodate one L or T Auxiliary Switch
** Not available on On-Delay, Off-Delay (Double Head) model.
† Available with letter calibrated dials only. Upper end of time range may be twice the value shown
†† 120 cycles = 2 sec.

Our authorized distributors are more likely to maintain the following items in stock for immediate delivery..

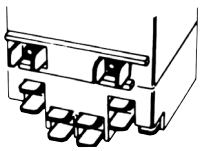
7012AA	7012BC	7012PKX	7022AI
7012AB	7012NC	7012PJX	7022AJ
7012AC	7012PA	7022AA	7022AKT
7012AD	7012PB	7022AB	7022BC
7012AE	7012PC	7022AC	7022BK
7012AF	7012PD	7022AD	7022PA
7012AH	7012PF	7022AE	7022PB
7012AK	7012PJ	7022AF	7022PC
7012ACL	7012PK	7022AH	7022PK

Ordering options – can only be orderd as factory installed options (Dimensions, where shown, are in inches.)

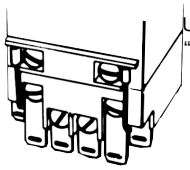
A1 – Single Quick-Connect Terminals



A2 – Double Quick-Connect Terminals

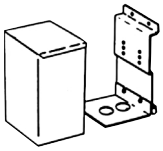


B – Plug-In Connectors



Use with Accessory "C" or "D" below.

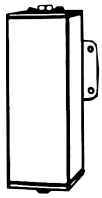
GZ – Total Enclosure



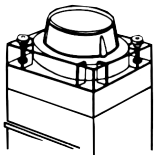
With knockouts for bottom connection.

3.16" W x 3.84" D x 7.63"H

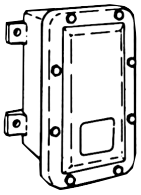
H – Hermetically Sealed Enclosure



I – Tamper-Proof Cover



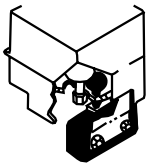
K – Explosion proof Enclosure



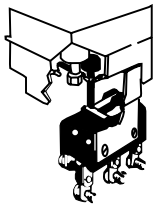
(Meets requirements for Class I, Groups C&D locations).

7.50"W x 6.00" D x 10.38" H

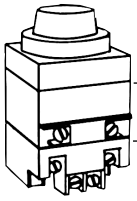
L – Auxiliary Switch



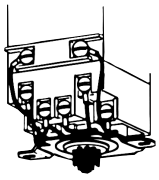
LL – Auxiliary Switch



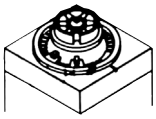
M – Dustight



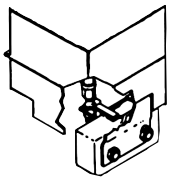
P – Octal Plug Adapter



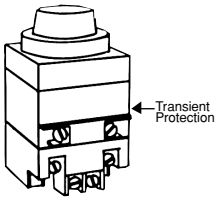
S – Dial Stops



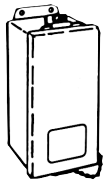
T – Auxiliary Switch



V – Transient/Surge Protection

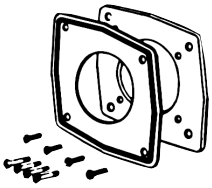


W – Watertight Enclosure (NEMA-4)



4.75" W x 4.44" D x 9.75" H

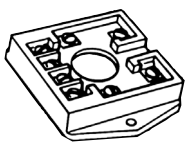
X – Panelmount Kit



Mounting hardware included.

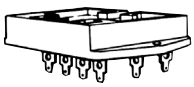
Accessories (Not available for 7032 models)

Plug-In Receptacle (Accessory C)



Screw Terminals **Catalog No. 700137.** For use with "B" Option

Plug-In Receptacle (Accessory D)



Quick Connect Terminals **Catalog No. 700141.** For use with "B" Option.

Ordering options can only be ordered as factory installed options.



2100 series

Miniature Electropneumatic Timing Relay

CE

Users should thoroughly review the technical data before selecting a product part number. It is recommended that users also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Design Features

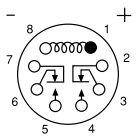
- High Repeat Accuracy over voltage and temperature extremes
- Hermetically sealed units are designed for high shock and vibration applications
- Instant recycling – easy linear adjustment
- Exclusive Dial Head adjustment – no needle valves
- Delay ranges from milliseconds to 3 minutes
- DPDT contacts

Design & Construction

Sealed patented timing head circulates air under controlled pressure through a variable orifice to provide adjustable timing. Circular-path Dial Head principle replaces traditional needle valve.
Snap-action switch assembly provides sustained contact pressure during timing cycles. Specially designed over center mechanism assures flutter-free load transfer after extended delay periods.
Precision-wound solenoid assembly supplies the basic motive force when the control circuit is closed.
These assemblies are mounted in a rigid self-supporting framework within a steel enclosure. This rugged construction assures permanent alignment of all operating members, the key to this unit's long trouble-free operation.

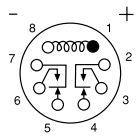
Operation

Series 2112 (On-Delay) - Applying rated voltage to the solenoid coil starts the preset time delay. At the end of the delay period the NC contacts break and the NO contacts make. Contacts remain in this position until the coil is de-energized, when the switch instantaneously returns to its original position. De-energizing the coil, either during or after the delay period, will immediately (within 25 msec.) re-cycle the unit. It will then provide another full delay period on re-energization.



Series 2112

Series 2122 (Off-Delay) - Applying rated voltage to the coil for at least 75 msec. (for accurate timing) will instantaneously transfer the switch, breaking the NC contacts and making the NO contacts. Contacts remain in this position as long as the coil is energized. The preset time delay period begins as soon as the coil is de-energized, at the end of which the switch returns to its original position.
No power is required during the timing period. Re-energizing the coil, either during or after the delay period, will immediately start a new cycle with full delay period.



Series 2122

Operation (Listed values at nom. voltage, 25°C unless noted).

Operating Mode:
2112: On-delay (delay on pull-in); **2122:** Off-delay (delay on drop-out)
Timing Adjustment: All standard models offer easy linear adjustment over one of nine timing ranges listed below. For applications requiring frequent readjustment, the external knob model with calibrated dial is recommended. For tamper-proof installation or where readjustment is infrequent, the internal key model may be preferred. This model requires removal of the cover plate for timing adjustment. Hermetically sealed models provide a slotted adjusting screw under the cap nut on the top cover.

Timing Ranges:

Code	Range	Code	Range
A	.03 to .1 sec.	G	2.0 to 60.0 sec.
B	.1 to .3 sec.	H	5.0 to 120.0 sec.
C	.15 to 1.0 sec.	J	5.0 to 180.0 sec.
D	.375 to 3.0 sec.	K	1.5 to 30.0 cycles
E	.75 to 10.0 sec.	L	3.0 to 120.0 cycles
F	1.0 to 30.0 sec.		

Repeat Accuracy: NORMAL VERTICAL POSITION
±5% at 25°C; ±7% at 85°C; ±8% at -55°C.
The average time between -55°C and 85°C will be within ±20% of the average @ 25°C with a proportionally reduced effect at lesser extremes.

In extremely short delay settings an additional 8 msec. variation may result on AC models due to "half cycle" alternating current effect.
Setting Tolerance: Factory time setting, when specified, subject to additional +5% tolerance.
Position Sensitivity:
HORIZONTAL POSITION: Approximately 5% increase from the initial time in the vertical position.
INVERTED POSITION: Approximately 10% increase from the initial time in the vertical position.
Reset Time: 2112 Series: 25 msec.; 2122 Series: 75 msec.
Relay Release Time: 25 msec. (2112 Series)
Relay Operate Time: 75 msec. (2122 Series)

Operating Voltage: Coil Data

Code	Nominal Operating Voltage	Resistance Ohms ±10%	Code	Nominal Operating Voltage	Resistance Ohms ±10%
M	12VDC	30	S	120V 60 Hz	190 (2112 Series)
N	28VDC	131	S	120V 60Hz	285 (2122 Series)
P	48VDC	500	T	240V 60Hz	765
R	110VDC	3200	U	115V 400Hz	2600
Y	125VDC	3380			

Transients: Insensitive to transients of ±1500 VAC for 10 milliseconds
Dielectric: 1000V RMS @ 60Hz between non-connected terminals.

Contact Rating (DPDT Contacts):

	30V DC	110V DC	120V 60Hz	120V 400Hz	240V 60Hz
Inductive (Amps)	2	.75	3	2	1.5
Resistive (Amps)	10	1	10	10	5

Based on 100,000 operations electrical, 1,000,000 mechanical. Inductive and capacitive load should not have inrush currents that exceed five times normal operating load.
Ambient Temperature Range: -55°C to +85°C
Weight: Maximum, any unit - 17 ozs.
Mounting/Terminals: Chassis mounting tabs, octal plugs and external (-4) or internal (-5) adjustment. Panel mounting back plate, internal adjustment, and solder hook terminals (-9).


--4

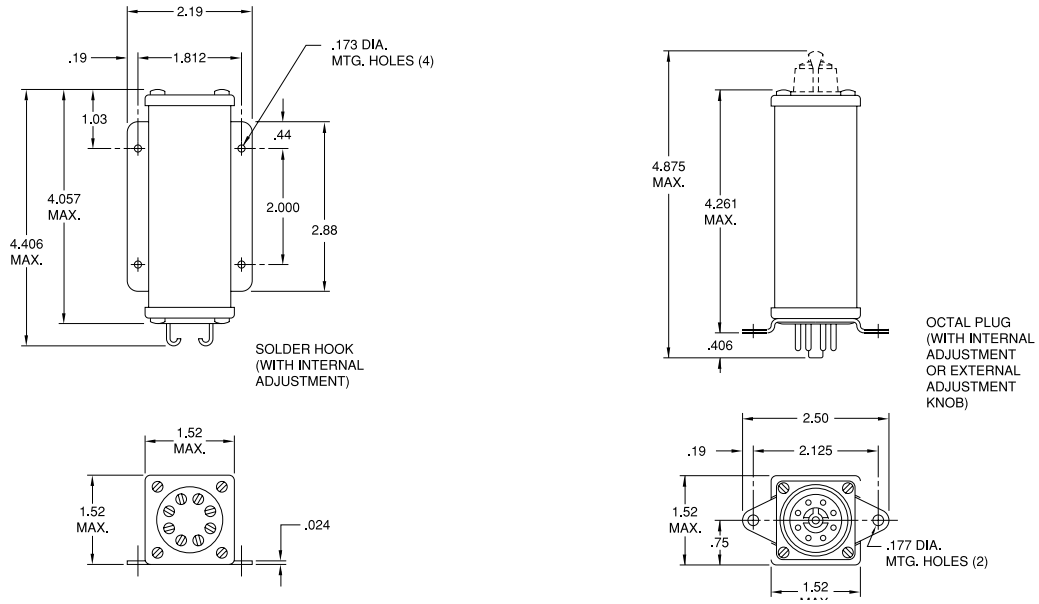

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--9

These are minimum standards; where more severe environmental conditions must be met, please consult the factory.

Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.
www.tycoelectronics.com
Technical support:
Refer to inside back cover.

Outline Dimensions for Industrial Models (Dimensions in inches. Multiply by 25.4 to obtain millimeters.)



Ordering Information for Industrial Models

				Typical Part No. ➤	21	1	2	D	4	N	B

1. Basic Series:
21 = 2100 Miniature electropneumatic timing relay

2. Operation:
1 = On-delay 2 = Off-delay

3. Contact Arrangement:
2 = DPDT (2 form C)

4. Operating Voltage:
A = AC D = DC

5. Physical Characteristics:

Code	Enclosure	Adjustment	Connector	Mounting
4 =	Unsealed	External Knob	Octal Plug	Chassis Mount
5 =	Unsealed	Internal Key	Octal Plug	Chassis Mount
9 =	Unsealed	Internal Key	Solder Hook	Panel Mount Plate

6. Coil Voltage:

M = 12VDC	N = 28VDC	P = 48VDC	R = 110VDC	Y = 125VDC
S = 120VAC, 50/60 Hz.	T = 240VAC, 60 Hz.			

7. Timing Range:

A = .03 to .1 sec.	C = .15 to 1.0 sec.	E = .75 to 10.0 sec.	H = 5.0 to 120.0 sec.	K = 1.5 to 30.0 cycles
B = .1 to .3 sec.	D = .375 to 3.0 sec.	F = 1.0 to 30.0 sec.	J = 5.0 to 180.0 sec.	L = 3.0 to 120.0 cycles

Our authorized distributors are more likely to maintain the following items in stock for immediate delivery..

None at present.

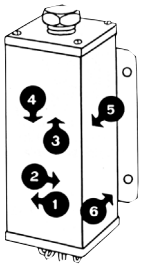
Specifications for MIL-Spec and Hermetically Sealed Models



Dielectric: In accordance with specification MIL-R-6106E (ASG). Also withstands 1,000 Volts RMS at 60 Hz between non-connected terminals.

Other: Agastat Miniature Timing Relays also conform to applicable Mil-Spec. requirements covering:

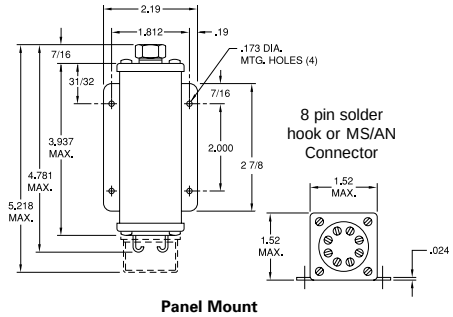
Moisture	Ozone
Humidity	Sunshine
Sand/Dust	Acoustic Noise
Salt Spray	Prolonged Storage



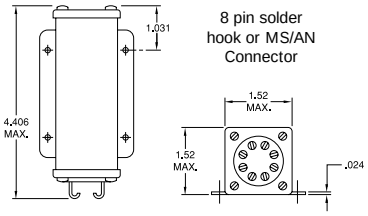


Agastat timing relays perform to military specifications in Patriot missiles.

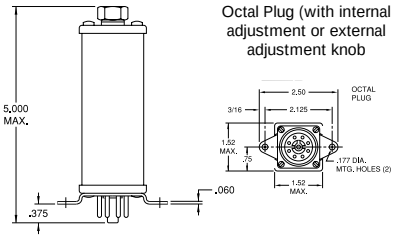
Outline Dimensions for MIL-Spec and Hermetically Sealed Models (In inches. Multiply by 25.4 for millimeters).



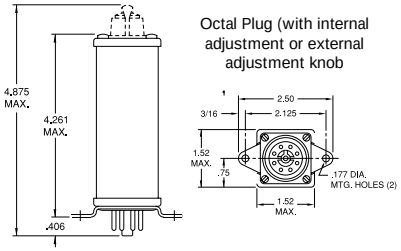
Panel Mount —H1, —H3



Panel Mount —9



Chassis Mount —H2



Chassis Mount —4, —5

Ordering Information for MIL-Spec and Hermetically Sealed Models

Typical Part No. ➤	21	1	2	D	H1	N	B

1. Basic Series:
21 = 2100 Miniature electropneumatic timing relay

2. Operation:
1 = On-delay 2 = Off-delay

3. Contact Arrangement:
2 = DPDT (2 form C)

4. Operating Voltage:
A = AC D = DC

5. Physical Characteristics:

Code	Enclosure	Adjustment	Connector	Mounting
H1 =	Hermetically Sealed	External Screw	Solder Hook	Panel Mount Plate
H2 =	Hermetically Sealed	External Screw	Octal Plug	Chassis Mount
H3 =	Hermetically Sealed	External Screw	"AN" Connector	Panel Mount Plate
4 =	Unsealed	External Knob	Octal Plug	Chassis Mount
5 =	Unsealed	Internal Key	Octal Plug	Chassis Mount
9 =	Unsealed	Internal Key	Solder Hook	Panel Mount Plate

6. Coil Voltage:
M = 12VDC N = 28VDC P = 48VDC R = 110VDC Y = 125VDC
S = 120VAC, 50/60 Hz. T = 240VAC, 60 Hz. U = 115VAC, 400 Hz.

7. Timing Range:
A = .03 to .1 sec. C = .15 to 1.0 sec. E = .75 to 10.0 sec. H = 5.0 to 120.0 sec. K = 1.5 to 30.0 cycles
B = .1 to .3 sec. D = .375 to 3.0 sec. F = 1.0 to 30.0 sec. J = 5.0 to 180.0 sec. L = 3.0 to 120.0 cycles

Our authorized distributors are more likely to maintain the following items in stock for immediate delivery..

None at present.

Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.

Alphanumeric Index

Series	Type	Page
CS	Voltage Sensor	1302
PMA/PMB	Three Phase Power Quality Monitor	1305
SDAS-01	Current Monitor	1307
VCA	Single Phase Undervoltage Relay	1303
VMA	Single Phase Undervoltage Relay	1304
WD25	Paralleling (Synch Check) Relay	1308
WD2759	Over/Undervoltage Relay	1308
WD32	Reverse Power Relay	1308
WD47	Phase Sequence Relay	1308
WD5051	1 or 3-Phase Overcurrent Relay	1308
WD81OU	Over/Underfrequency Relay	1308

Steel-Cased Protective Relays

Our KILOVAC steel-cased protective relays (listed below) are not described in this technical databook, as they do not represent the most cost effective solution for many new design requirements. Most customers find our plastic-cased KILOVAC WD... series products are more appropriate for many new industrial applications. However,we still offer our steel-cased protective relays. For details on KILOVAC steel-cased protective relays consult your Tyco Electronics sales engineer or visit our website at www.tycoelectronics.com.

1000 ..... Loss of Phase, Undervoltage Relay
1800 ..... Paralleling (volt) Relay
20-000 ..... Frequency, 56-66 Hz Relay
20-050-19 ..... Voltage/Frequency Relay
25-000 ..... Over/Underfrequency Relay
250 ..... Over/Undervoltage Relay
700 ..... 1 & 3 Phase
700 ..... 1 & 3 Phase, Adjustable Time Delay Relay
900 ..... Phase Sequence Relay
D100X ..... Close Differential, 1 Phase Relay
D101X ..... Series Close Differential, 3 Phase
WC1 & WCT1 ..... Overcurrent, Time Delay, 1 Phase Relay
WC1G ..... Power Factor & Ground Fault Detector
WC3 & WCT3 ..... Overcurrent, Time Delay, 3 Phase Relay
WCB ..... Current Balance Relay
WCD ..... Current Differential Relay
WGD ..... Power Factor & Ground Fault Detector
WOF & WUF ..... Overfrequency & Underfrequency Relay
WOUF ..... Over/Underfrequency, Time Delay Option Relay
WOUV ..... DC Over/Undervoltage DC Relay
WOUVT ..... Over/Undervoltage, Time Delay Relay
WUV/WOV ..... Under- & Overvoltage Relay
WUV/WOV ..... DC Under- & Overvoltage DC Relay
WUVT/WOVT ..... Under- & Overvoltage with Time Delay Relay
WSYN ..... Voltage Frequency, Phase Angle Relay

NOTE: KILOVAC protective relays were previously sold under the WILMAR brand name.

Sensors, Monitors & Protective Relays 1301-1314

13



Fixed Pick-up and Adjustable Drop-out



Adjustable Pick-up and Drop-out

CS series

Solid State Hybrid Voltage Sensor

- Close differential
- Choice of two types
  - – Fixed pick-up and knob adjustable drop-out
  - – Knob adjustable pick-up and drop-out
- Internal 2 Form C (DPDT) output relay

File E22575

File LR15734

Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Sensing Modes

The CS can be used as an over or undervoltage sensor, depending upon whether the load is connected to the normally closed (NC) or normally open (NO) contacts of the sensor's output relay.

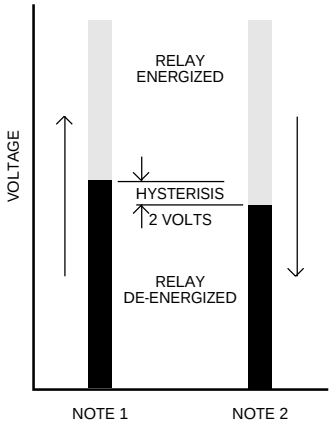
Overvoltage sensor – The NC contacts are used. The relay remains de-energized until an overvoltage is sensed.

Undervoltage sensor – The NO contacts are used. The relay remains energized until the voltage decreases to the preset level, where the sensor de-energizes the relay.

Engineering Data

Power Requirement: Typically less than 3VA or 3W.
Duty Cycle: Continuous.
Repeatability: ±1%, max.
Response Time: 10-25 ms, typ.
Internal Relay Contact Arrangement: 2 Form C (DPDT).
Internal Relay Contact Rating: 10A @ 28VDC , res., or 120VAC, 80% p.f.
Reverse Polarity Protection: On DC types.
Temperature Range: -10°C to +55°C.
Temperature Coefficient: 0.2%/°C, max.
Enclosure: Plastic dust cover.
Mounting: 8-pin octal style plug. Fits either 27E122 or 27E891 (snap-on) screw terminal sockets.
Weight: 8 oz. (227g) approximately.

Adjustable Voltage Sensor Operation



Note 1 – As voltage increases, the relay will pick-up at its selected point and remain energized while voltage is maintained at that level or higher.

Note 2 – As voltage decreases, after pick-up, the relay will drop-out at its selected point.

Note 3 – Minimum hysterisis, the voltage differential between pick-up and drop-out, is typically 2% of pick-up.

Ordering Information – Distributors are more likely to stock boldface items.

Fixed Pick-Up and Adjustable Drop-Out

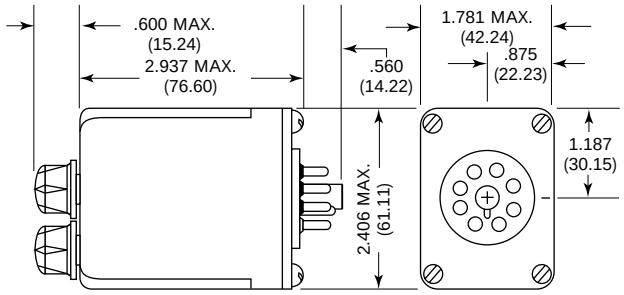
Part Number	Pick-Up (Volts)	Drop-Out Range (Volts)	Maximum Voltage
CSJ-38-71010	105	90-103	140VAC (50/60 Hz.)
CSL-38-31010	22	16-21	32VDC

Adjustable Pick-Up and Adjustable Drop-Out

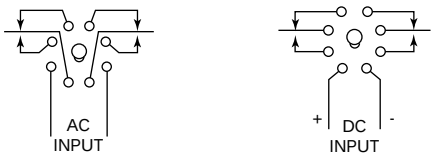
Part Number	Pick-Up Range (Volts)	Drop-Out Range* (Volts)	Maximum Voltage
CSJ-38-70010	92-140	90-138	150VAC (50/60 Hz.)
CSL-38-30010	20-30	18-28	32VDC
CSL-38-40010	40-58	38-56	60VDC
CSL-38-60010	92-140	90-138	150VDC

* Actual maximum drop-out voltage is the selected pick-up voltage less the hysterisis voltage.

Outline Dimensions



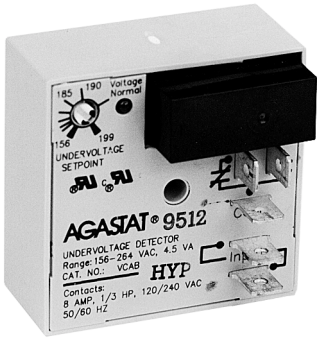
Wiring Diagrams – Bottom Views (pins numbered clockwise from keyway)



Dimensions are shown for reference purposes only.

Dimensions are in inches over (millimeters) unless otherwise specified.

Specifications and availability subject to change.



VCA series

Single Phase Undervoltage Relay

- Automatic reset minimizes equipment downtime.
- Fixed pickup point prevents low voltage start-up.
- Adjustable dropout point protects against undervoltage operation.
- Delayed dropout prevents nuisance tripping.
- Compact, inexpensive design saves space, reduces cost.
- Solid state circuitry for enhanced accuracy and long life.
- LED indicates normal voltage condition.

File E60363

Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Function

Single phase undervoltage relay.

Sensing Specifications

Voltage Set-Point Adjustment: Internal potentiometer (screwdriver adjustable) with linear calibrated dial.
Response Time: Depending on severity of undervoltage: 0.1 - 1 sec.
Accuracy: **Repeat Accuracy:** ±0.2%
Overall Accuracy: ±1%.

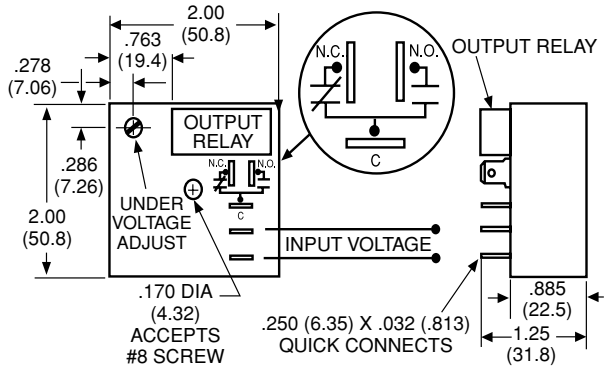
Output Data

Arrangement: 1 Form C (SPDT).
Rating: 7A @ 250VAC; 1/6 HP @ 250VAC; 300VA @ 120/240VAC; 3A @ 30VDC.
Expected Mechcanical Life: 10,000,000 operations.
Expected Electrical Life: 100,000 operations at rated resistive load.

Initial Dielectric Strength

Between Terminals and Case: 1,480V.
Between Relay Contacts and Active Circuitry: 1,480V.

Outline Dimensions and Wiring Diagram



Input Data

Voltage: 120VAC, 240VAC.
Power Requirement: 4W, max.
Transient Protection: 120VAC ..... 30 joules
240VDC ..... 30 joules
120VAC ..... 10 joules
120VDC ..... 10 joules

Environmental Data

Temperature Range: **Storage:** -40°C to +85°C.
Operating: -23°C to +55°C.

Mechanical Data

Mounting: Panel mount with one #8 screw.
Termination: 0.250 in (6.35) quick connect terminals.
Status Indication: LED indicates normal voltage condition.
Weight: 3.2 oz. (90.7g) approximately.

Ordering Information

Part Number	Operating Voltage
VCAA	120VAC
VCAB	240VAC

Authorized distributors are likely to stock the following:

None at present.



VMA series

Single Phase, Plug-in Undervoltage Relay

- Automatic reset minimizes equipment downtime.
- Fixed pickup point prevents low voltage start-up.
- Adjustable dropout point protects against undervoltage operation.
- Locking potentiometer maintains selected set point.
- Delayed dropout prevents nuisance tripping.
- Plug-in mounting for easier installation.
- Built-in protection against polarity reversal.
- LED indicates normal voltage condition.

File E60363

Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Function

Single phase undervoltage relay.

Sensing Specifications

Voltage Set-Point Adjustment: Locking potentiometer with calibrated dial.
Response Time: Standard 0.5 sec. delay on dropout.
Accuracy: **Repeat Accuracy:** ±0.5% under fixed conditions.
Overall Accuracy: ±1%.
Temperature Coefficient: ±0.02%/°C (Max.).

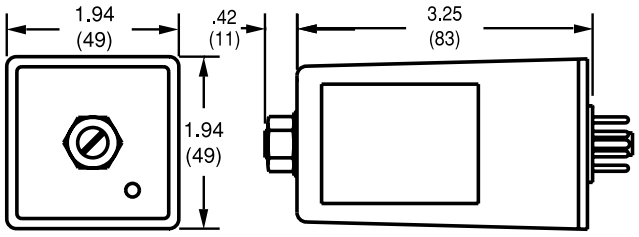
Output Data

Arrangement: 2 Form C (DPDT).
Rating: 7A @ 250VAC; 1/6 HP @ 250VAC; 300VA @ 120/240VAC; 3A @ 30VDC.
Expected Mechcanical Life: 10,000,000 operations.
Expected Electrical Life: 100,000 operations at rated resistive load.

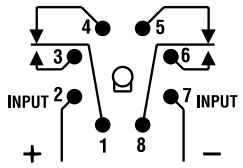
Initial Dielectric Strength

Between Terminals and Case: 1,480V.
Between Relay Contacts and Active Circuitry: 1,480V.

Outline Dimensions



Wiring Diagram (Bottom View)



Input Data

Voltage: See ordering information.
Power Requirement: 4W, max.
Transient Protection:
24VAC ..... 1.5 joules
24VDC ..... 1.5 joules
48VDC ..... 10 joules
120VAC ..... 10 joules
125VDC ..... 10 joules
240VDC ..... 20 joules
Reverse Polarity Protection: On DC models.
Duty Cycle: Continuous.

Environmental Data

Temperature Range: **Storage:** -30°C to +60°C.
Operating: -10°C to +55°C.

Mechanical Data

Mounting: Octal plug. Fits 27E122 or 27E891 (snap-on) screw terminal socket. Order socket separately.
Enclosure: Nylon cover protects against particles.
Status Indication: LED indicates normal voltage condition.
Weight: 6 oz. (168g) approximately.

Ordering Information

Part Number	Nominal Voltage	Pick-Up (V)	Drop-Out Range (V)
VMAXEA	24VAC	21	15 to 20
VMAXAA	120VAC	104	78 to 99
VMAXBA	240VAC	209	156 to 199
VMAXOA	24VDC	21	15 to 20
VMAXEA	48VDC	42	31 to 40
VMAXEA	125VDC	109	81 to 103

Authorized distributors are likely to stock the following:

None at present.

Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.
www.tycoelectronics.com
Technical support:
Refer to inside back cover.

PMA/PMB series

Three Phase Power Quality Monitor

- Monitors deviation from nominal system voltage, phase imbalance, phase sequence and phase loss.
- Locking potentiometer prevents tampering (PMA only).
- Start-up delay permits staggered restarting (PMB only).
- Four LEDs show nature of temporary/sustained faults.
- 3-wire wye or delta connections for simple installation.
- Calibrated nominal voltage potentiometer assures precise monitoring.
- Superior transient immunity per ANSI C37.40.
- Not fooled by back EMF.
- 8 user-selectable thresholds – 4 undervoltage and 4 phase imbalance – match protection to load.
- Manual or automatic reset for application flexibility.
- Suitable for commonly used grounded or ungrounded three-phase systems.



PMA



PMB

File E60363

File LR29186

Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Function

Three phase power quality monitor.

Monitoring Specifications

Threshold Accuracy: ±0.2% of the average of 10 consecutive measurements of the threshold point at any fixed temperature within the operating temperature range.
±2% of the average of 10 consecutive measurements of the threshold point over the operating temperature range.

Response Time: Phase loss and phase reversal: 2 line cycles +5 ms.
Undervoltage and phase imbalance: See Figures 1 and 2 on the following page.

Input Data

Nominal Voltage: 110 to 120VAC; 208 to 240VAC; 380 to 440VAC; 440 to 480VAC; 550 to 600VAC..

Maximum Voltage: 132VAC for the 110 to 120VAC model;
264VAC for the 208 to 240VAC model;
484VAC for the 380 to 440VAC model;
528VAC for the 440 to 480VAC model;
650VAC for the 550 to 600VAC model.

Frequency: 50/60 Hz.
Power Requirement: 750mW.
Transient Noise Immunity: ICS 2-230, ANSI C37.40.

Output Data

Arrangement: 1 Form A (SPST-NO) + 1 Form B (SPST-NC).
Rating: 8A @ 250VAC, resistive; 3A @ 30VDC, resistive;
1/4 HP @ 125/250VAC; 275VAC pilot duty.
Expected Mechcanical Life: 10,000,000 operations.
Expected Electrical Life: 100,000 operations at rated resistive load.

Initial Dielectric Strength

Between Input Terminals and Case or Active Circuitry: 2,200V.
Between Relay Contacts and Active Circuitry: 1,500V.

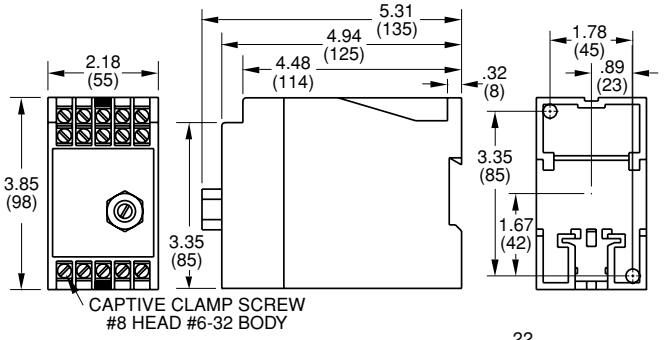
Environmental Data

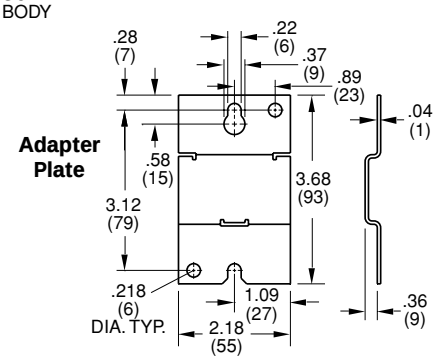
Temperature Range: **Storage:** -40°C to +75°C.
Operating: -10°C to +60°C.

Mechanical Data

Mounting: Can be mounted on a flat surface with two screws or snapped on/off a furnished adapter plate which has been pre-mounted on a flat surface. Can also be mounted on a 300-volt machine tool relay channel using the adapter plate. Direct mounting (no adapter plate used) on a symmetrical DIN track is also possible.
Termination: Screw terminals.
Connections: 3 wire wye or delta.
Vibration: Chatterless operation 5 to 60 Hz., 0.030 in.(0.762 mm) amplitude, 1 minute sweep.
Status Indication: "Contacts Transferred" LED plus four additional LEDs to designate the specific fault that released the relay.
Weight: 24 oz. (625g) approximately.

Outline Dimensions





Ordering Information

PMA	LB	S	L
Series	**Nominal Operating Voltage**		**Phase Imbalance Threshold**
PMA = Power Quality Monitor with Locking Potentiometer	LA = 110 to 120VAC, 50/60 Hz. LB = 208 to 240VAC, 50/60 Hz. LG = 380 to 440VAC, 50/60 Hz. LC = 440 to 480VAC, 50/60 Hz. LD = 550 to 600VAC, 50/60 Hz.	**Status Indicators** S = "Contacts Transferred" and four fault status indicators	L = Low (2-4%) H = High (5-10%)
PMB = Power Quality Monitor with Start-Up Delay			

Authorized distributors are likely to stock the following:

None at present.

Operation

Monitor Operation: When the input voltage parameters are normal, the "Contacts Transferred" LED will be on and relay is energized. Once the unit has responded to a fault by releasing the output relay and simultaneously extinguishing the "Contacts Transferred" LED, the nature of the fault that caused the release will be identified by one of the four fault status indicators. In the automatic reset mode, the status indicator will extinguish and the "Contacts Transferred" LED will re-light once all faults are corrected and restart delay period has expired. In the manual reset mode, the fault indicator will flash when all faults have been corrected, thus indicating that the unit is ready for manual reset. When manually reset, the flashing fault status indicator will extinguish and the "Contacts Transferred" LED will re-light. Series PMA has a fixed start-up delay of approximately 375 milliseconds. Series PMB has a start-up delay, adjustable from 0 to 5 minutes, which permits staggered restarting of motors, etc., affected by a common power outage. If the unit is wired for manual reset, the external reset switch must also be opened.

The output relay will remain in the transferred state until one of the fault conditions occur. (See Figures 1 and 2)

Phase Loss Condition: If the voltage of any phase drops below 68% of the nominal voltage setting for more than two line cycles, the output relay will release. If back EMF accompanies the loss of a phase, the unit will sense the loss as a phase imbalance and the relay will drop out.

Phase Reversal Condition: If any two phases become reversed for more than two line cycles, the output relay will release.

Undervoltage Condition: By strapping, the user can select one of four undervoltage thresholds: 10%, 14%, 17% or 20% below the nominal voltage, which is entered by means of a calibrated potentiometer located on the front panel. When the average voltage drops below the selected threshold, a time delay shown in Fig. 1 is initiated. The unit then continues to monitor the severity of the fault and modifies the time delay accordingly. If the undervoltage condition persists, the time delay will expire and the output relay will release.

Phase Imbalance Condition: The unit continuously averages the three phase voltages and recognizes individual deviations from the average. By strapping, the user can select one of four imbalance thresholds: Either 2.0%, 3.0%, 3.5%, 4.0%, or 5.0%, 7.0%, 8.5%, 10.0% depending on model. When any phase voltage deviates more than the selected percentage from the three phase average, a time delay as shown in Fig. 2 is initiated. The unit then continues to monitor the severity of the fault and modifies the time delay accordingly. If the phase imbalance condition persists, the time delay will expire and the output relay will release.

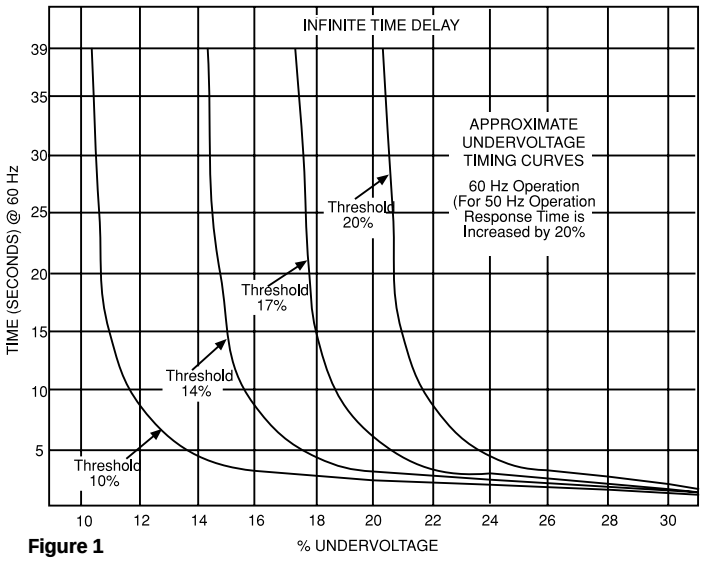


Figure 1

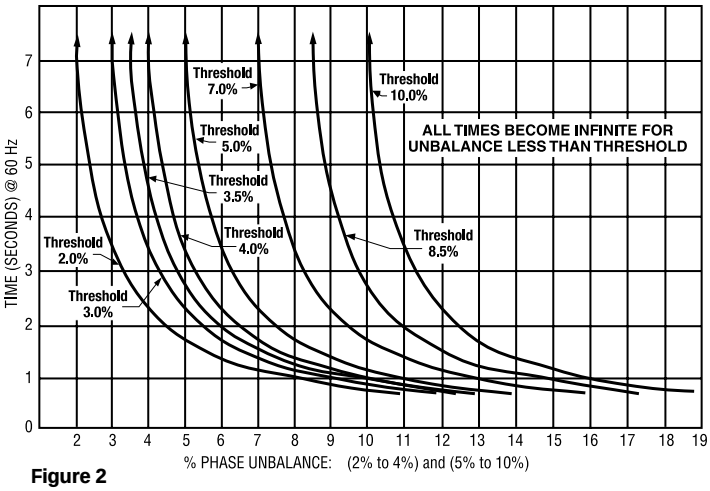
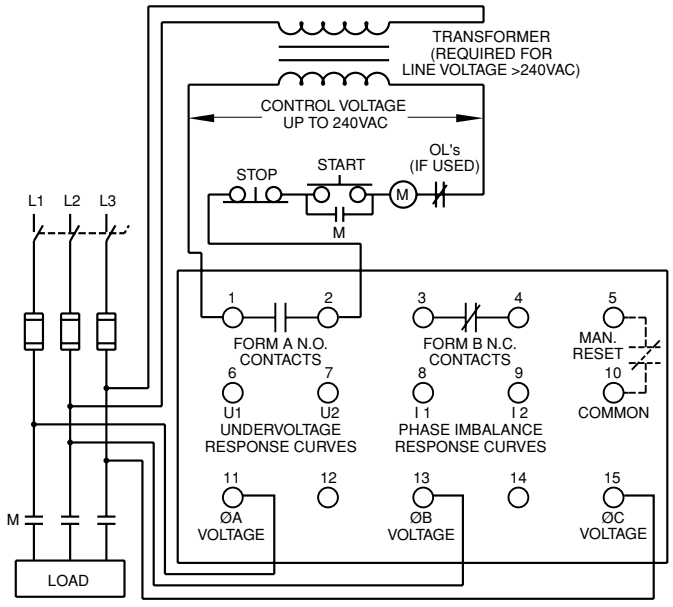


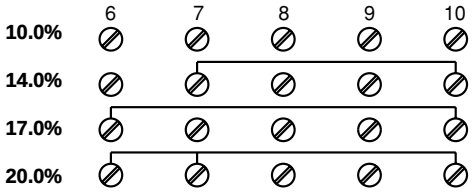
Figure 2

Typical Connection Diagram



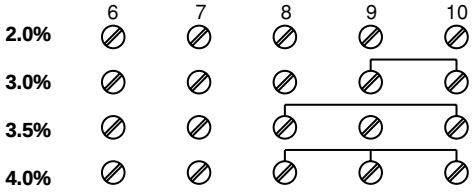
Strapping Diagrams

Undervoltage Threshold



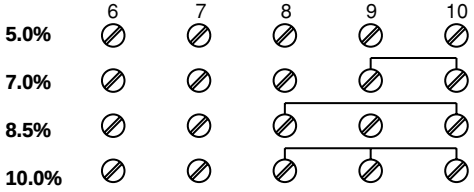
Low Phase Imbalance Threshold

Model PMAL*SL or PMBL*SL



High Phase Imbalance Threshold

Model PMAL*SH or PMBL*SH



SDAS-01 series



1.5 To 15 Amp AC Current Sensor

- Zero insertion loss
- Inductive coupling to power line
- Choice of modes
  - – Adjustable overcurrent sensor
  - – Adjustable undercurrent sensor
- Solid state sensing circuit
- 1 Form C (SPDT) or 2 Form C (DPDT) internal relay

Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Sensing Modes

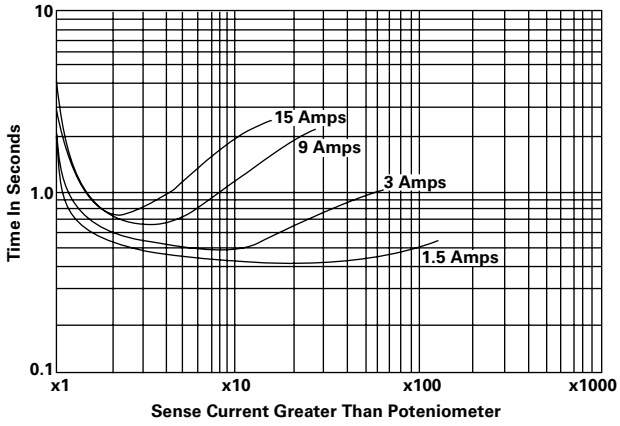
Overcurrent sensor – Detects a current in excess of the value determined by the potentiometer setting. A built-in time delay, 200 ms, minimum, allows for normal starting and surge currents. Actual time delay is dependent upon potentiometer setting and magnitude of overcurrent. Any overcurrent lasting longer than this causes the internal relay of the SDAS-01 to energize. The relay will remain energized until sensor control voltage is removed, even if the overcurrent ceases to exist.

Undercurrent sensor – Reacts to a complete loss of sense current, or any current of less than the potentiometer setting. Upon application of sensor control voltage, there is a nominal 350ms delay during which time power line current must begin. This delay gives line components time to turn on. If, at the end of the delay, sense current should decrease to less than the potentiometer setting of the SDAS-01 and remain there for approximately 350 ms, the internal relay of the SDAS-01 will energize. It will remain energized until either sense control current again exceeds the potentiometer setting, or until sensor control voltage is removed.

Engineering Data

Control Voltage: 24VAC 50/60 Hz./DC ± 10%.
Sense-Current Range: 1.5 to 15 amps AC.
Internal Relay Contact Data:
1 Form C (SPDT) type (code X1): 5A @ 28VDC or 2.5A @ 120VAC, res.
2 Form C (DPDT) type (code Y2): 2A @ 28VDC or 1A @ 120VAC, res.
Set Point Variation: ±25% over operating temperature range.
Time Delay:
Overcurrent sensor: 200 ms, min., after beginning of overcurrent. Actual delay is dependent upon potentiometer setting and magnitude of overcurrent (see Figure 1).
Undercurrent sensor: 350 ms, typ.; 200 ms, min., from beginning of undercurrent after control voltage is applied.
Power Requirement: 1.7W or 1.7VA @ 24VAC.
Temperature Range: **Storage:** -40°C to +85°C.
Operating: -25°C to +70°C.
Enclosure: Plastic dust cover.
Mounting: Socket. For sockets see KUP 3 pole sockets.
Weight: 3.17 oz. (90g) approximately.

Figure 1 – Typical Overcurrent Time Delay Curves



Ordering Information – Distributors are more likely to stock boldface items.

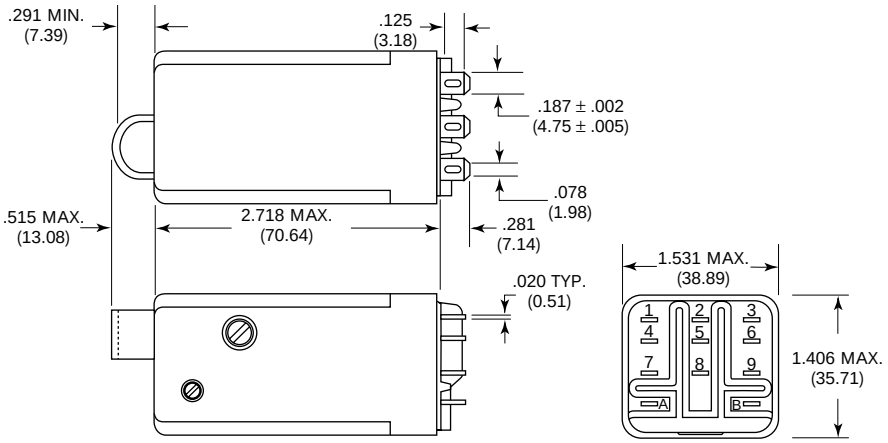
Undercurrent Sensors

Part Number	Contacts	Mounting
SDAS-01-7Y2S1024	DPDT, 2A DC/1A AC	Socket
SDAS-01-7X1S1024	SPDT, 5A DC/2.5A AC	Socket

Overcurrent Sensors

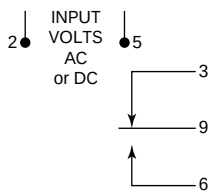
Part Number	Contacts	Mounting
SDAS-01-8Y2S1024	DPDT, 2A DC/1A AC	Socket

Outline Dimensions

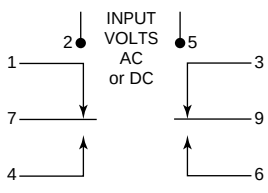


Wiring Diagrams – Bottom Views

1 Form C



2 Form C





WD series

DIN Rail or Screw Mounted Protective Relays

- WD25 Paralleling (Synch Check) Relays
- WD2759 Over/undervoltage Relays
- WD32 Reverse Power Relays
- WD47 Phase Sequence Relays
- WD5051 Single- or Three-Phase Overcurrent Relays
- WD81OU Over/Underfrequency Relays

File E58048 DIN EN50022-35

Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Overview

The WD series offers several different models of protective relays in a common package that is suitable for either DIN rail or screw mounting. These flexible, multifunction devices offer user selectable voltages, sense currents and frequencies. Adjustable time delays are standard. This allows a single part number to be suitable for multiple applications, thereby reducing inventory costs.

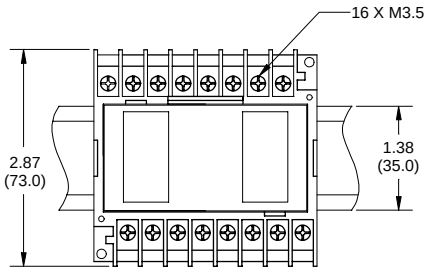
Specifications common to all models

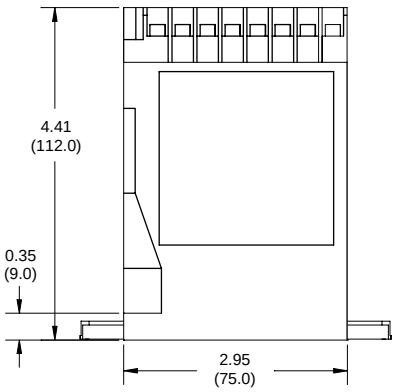
Power Consumption: 2.5VA, maximum.
Contact Ratings: 5 amps, resistive, at 120VAC.
5 amps, resistive, at 30VDC.
Isolation from Control to Sense Inputs: 2,500VAC.
Mechanical Life: 10 million operations.
Shock: 10g.
Vibration: 0.062 (1.57) double amplitude at 10-55 Hz.
Terminals: M3.5 screws.
Maximum Wire Size: 2 x 24 AWG (2.5mm^2) solid to DIN 46288 or 2 x 16 AWG (1.5mm^2) stranded w/end sleeves.
Operating Temperature Range: -40°C to +60°C.
Enclosure: Plastic case (not sealed).
Mounting Options: Snap mounts on standard DIN rail (DIN-EN 50022-35) or panel mounts with M4, M5, #8 or #10 screws.
Weight: 14.4 oz. (400g) approximately.

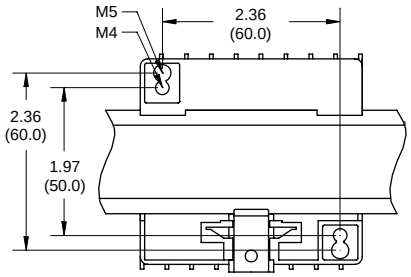
Installation and Maintenance Information

Installation: To mount the WD series protective relay on a DIN rail, hook the top edge of the cutout on the base of the case over one edge of the DIN rail, then press the opposite side of the cutout containing the release clip over the opposite side of the DIN rail. To remove or reposition the relay, lever the release clip and move the relay as required. WD series relays should be installed in a dry location where the ambient temperature will be within the operating temperature range.
Maintenance: WD series protective relays are solid state devices that require no maintenance. They are not designed to be serviced by the user. Consult KILOVAC customer service at 805-220-2023 if repairs should be necessary.

Outline Dimensions







WD25 Paralleling Relays

- Function 25
- ANSI/IEEE C37.90-1978

WD25 Operation

WD25 paralleling relays are used to ensure that two circuits are synchronized. When voltage, phase relationship and frequency are within the selected synchronizing limits, the output relay will energize. The WD25 paralleling relay allows for a generator to be brought online without damage or system disturbance. WD25 series with a "dead bus" feature will energize for a synchronized condition or an "on line" generator, "dead bus" condition. This "dead bus" feature allows the generator to energize a dead bus. The "double dead bus" feature permits paralleling of two buses when: (a) both the line voltages are equal and in phase, or (b) when either bus is "hot" and the other bus is "dead."

WD25 Specifications

Nominal Operating Range: 120, 208, 277 or 480 VAC, selectable.
Maximum Sensing Range: 575VAC.
Nominal Frequency Range: 40-400.
Contact Form: 2 form C (DPDT).
Sense Voltage:

Voltage (nominal)	120	208	277	480
Synch Voltage (% of nom.)	6 - 30% (≈ 4°- 20° electrical degree)			
Dead Bus Voltage (% of nom.)	10 - 70% (Dead Bus)			

Control Voltage:

Model WD25	-0X1	-0X2	-0X3
Input Voltage (VDC)	18 to 54	13.5 to 32	100 to 200
Input Voltage (VAC)	–	–	100 to 140

Ordering Information

Typical Part Number ▶	WD	25	-00	2

1. Basic Series:
WD = DIN mount Protective Relay.

2. Type:
25 = Paralleling Relay.

3. Dead Bus:
00 = Double Dead Bus
01 = Single Dead Bus
02 = Generator to Generator

4. Control Voltage:
1 = 18 to 54VDC
2 = 13.5 to 32 VDC
3 = 100-200VDC or 100-140VAC.

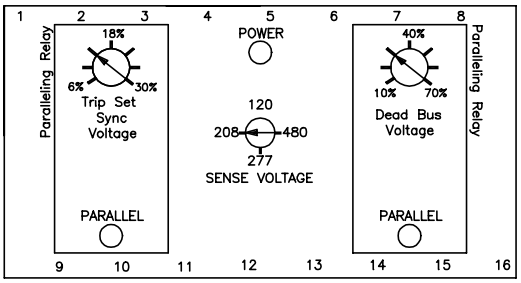
Our authorized distributor is more likely to stock these items.
WD25-001
WD25-013

WD25 Calibration

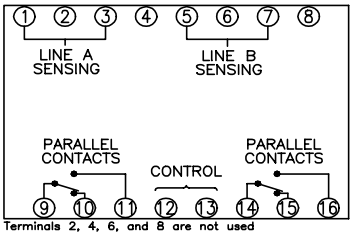
The calibration marks on the faceplate are provided only as guides. Proper calibration requires using an accurate voltmeter. Use the following procedure to calibrate the WD25:

1. Remove the cover.
2. Adjust the SYNC VOLTAGE control fully counterclockwise (CCW). Apply nominal voltage to the LINE B (bus) sensing terminals.
3. Apply the maximum desired synchronization voltage to the LINE A (generator) terminals. This voltage should be in phase with LINE B (bus) voltage and have the same frequency.
4. Slowly adjust the SYNC VOLTAGE control clockwise (CW) until the relay energizes.

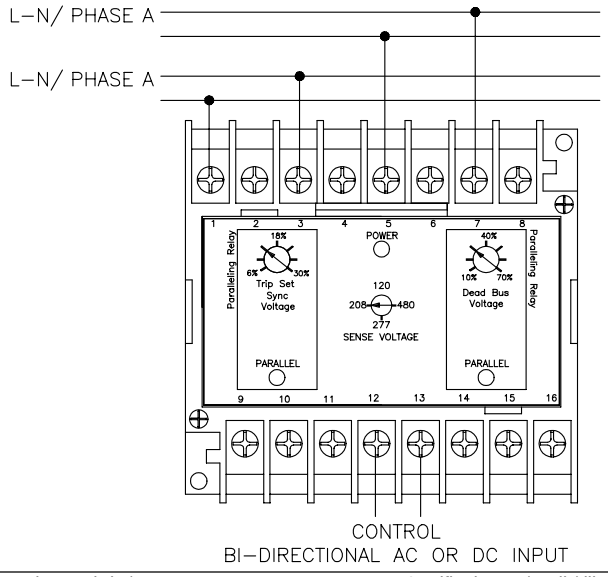
WD25 Controls



WD25 Connections



WD25 Typical Hookup



NOTE:
For single dead bus option, connect the generator to 1 & 2 and the bus to 4 & 5.

WD2759 Over/Undervoltage Relays

- Function 27/59
- ANSI/IEEE C37.90-1978

WD2759 Operation

WD2759 AC voltage sensing relays provide voltage monitoring and protection in AC systems from 50 to 400 Hz. Sensing voltages, number of phases, over and undervoltage setpoint, and time delays are user configured. WD2759 voltage relays operate when the externally adjustable trip point is reached. An external time delay control is provided with an adjustment of .5 to 10 seconds. This time delay may be used to prevent false tripping when there are slight variations in the voltage supply. On overvoltage (OV) the output relay energizes when the input signal exceeds the trip point. On undervoltage (UV) the output relay de-energizes when the input signal goes below the trip point. A green LED indicates power to the relay. Red LED lights indicate the state of the undervoltage and overvoltage trips.

WD2759 Specifications

Nominal Operating Range: 120, 208, 277 or 480 VAC, selectable.
Maximum Sensing Range: 700VAC.
Nominal Frequency Range: 50-400 Hz.
Contact Form: 1 form C (SPDT) for undervoltage and 1 form C (SPDT) for overvoltage.
Time Delay Adjustment: 0.5 to 10 sec.
Sense Voltage:

Voltage (nominal)	120	208	277	480
UV Adjustment Range	72-120	125-208	166-277	288-480
OV Adjustment Range	120-168	208-291	277-388	480-672

Control Voltage:

Model WD2759	-001	-002	-003
Input Voltage (VDC)	18 to 54	13.5 to 32	100 to 200
Input Voltage (VAC)	–	–	100 to 140

Ordering Information

Typical Part Number ▶	WD	2759	-002

1. Basic Series:
WD = DIN mount Protective Relay.

2. Type:
2759 = Over/Undervoltage Relay.

3. Control Voltage:
001 = 18 to 54VDC
002 = 13.5 to 32 VDC
003 = 100-200VDC or 100-140VAC.

Our authorized distributor is more likely to stock these items.
WD2759-003.

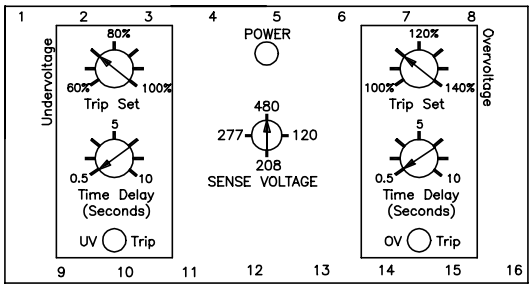
WD2759 Calibration

The calibration marks on the faceplate have a maximum error of 10% and are provided only as guides. Proper calibration requires using an accurate voltmeter in parallel with the input signal. Use the following procedure to calibrate your relay.

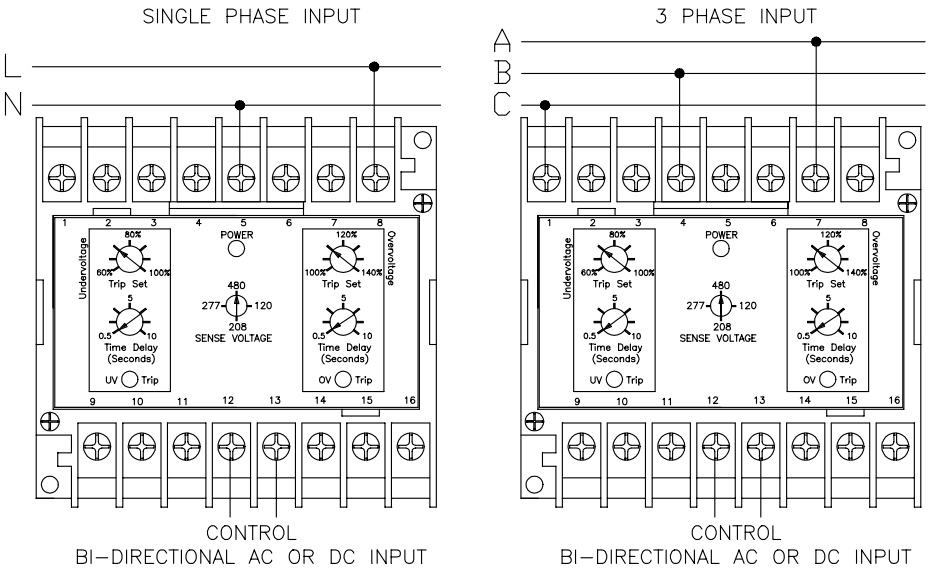
OVER VOLTAGE
1. Remove cover.
2. Adjust the TRIP SET control fully clockwise (CW) and the TIME DELAY control fully counterclockwise (CCW).
3. Apply the desired trip voltage to the relay.
4. Slowly adjust the TRIP SET control CCW until the relay trips.
5. Remove the applied voltage (do not change the voltage level) and set the TIME DELAY control to the desired time delay.
6. Apply the trip voltage to the relay and measure the time to trip.
7. Adjust the TIME DELAY and repeat steps 4 and 5 until you have the desired time delay.

UNDER VOLTAGE
1. Remove cover.
2. Adjust the TRIP SET control fully CCW and the TIME DELAY control fully CCW.
3. Decrease the applied sensing voltage from the nominal value until the desired tripping voltage is reached.
4. Slowly adjust the TRIP SET control CW until the relay trips.
5. Set the TIME DELAY control to the desired time delay and apply nominal voltage to the relay.
6. Step down the applied voltage from nominal to a level jest below the trip level set in Step 3 and measure the time delay.
7. Adjust the TIME DELAY and repeat steps 4 and 5 until the desired time delay is achieved.

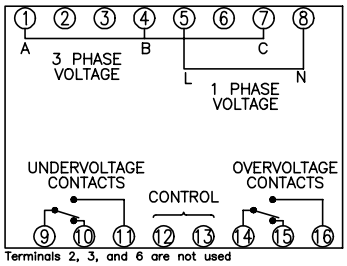
WD2759 Controls



WD2759 Typical Hookup



WD2759 Connections



WD32 Reverse Power Relays

- Function 32

WD32 Operation

WD32 reverse power relays are used to monitor the direction of power from AC generators. This is accomplished by measuring I cos q. If current from the generator is reversed and exceeds the adjustable setting, the relay will trip. A 0.5 to 20 second time delay is provided. A correct setting of the trip point and time delay will prevent motorizing the generator and prevent tripping during transients that occur while synchronizing. A POWER LED indicates the condition of the power supply and a REVERSE POWER TRIP LED indicates the output status of the relay.

WD32 Specifications

Nominal Operating Range: 120 to 480 VAC, 1 or 3 phase.
Maximum Sensing Range: 575VAC.
Nominal Sensing Current: 5A.
Nominal Frequency Range: WD32-00X: 40-400 Hz.; WD32-01X: 60 Hz.
Contact Form: 2 form C (DPDT).
Time Delay Adjustment: 0.5 to 20 sec.
Sense Current:

Reverse Power Trip: 0.2 to 1.0A (4-20% of nominal sense current).

Control Voltage:

Model WD32	-001	-002	-003
Input Voltage (VDC)	18 to 54	13.5 to 32	100 to 200
Input Voltage (VAC)	–	–	100 to 140

Ordering Information

Typical Part Number ▶	WD	32	-00	2

1. Basic Series:
WD = DIN mount Protective Relay.

2. Type:
32 = Reverse Power Relay.

3. Load:
00 = Resistive (power)
01 = Inductive (Kvar, 60 Hz.)

4. Control Voltage:
1 = 18 to 54VDC
2 = 13.5 to 32 VDC
3 = 100-200VDC or 100-140VAC.

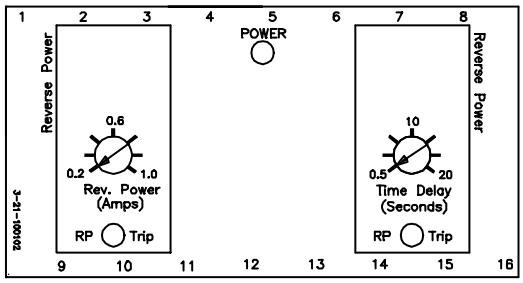
Our authorized distributor is more likely to stock these items.
WD32-003
WD32-011

WD32 Calibration

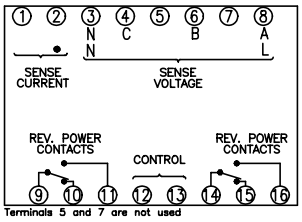
The calibration marks on the faceplate have a maximum error of 10% and are provided only as guides. Proper calibration requires using an accurate Current Meter in series with the input current. Use the following procedure to calibrate your relay.
REVERSE POWER

1. Remove cover.
2. Adjust the TRIP SET control fully clockwise (CW) and the TIME DELAY control fully counterclockwise (CCW).
3. Apply the desired trip current to the relay. NOTE: for the Reverse Power (WD32-00X) a resistive load must be used and for the Reverse KVAR (WD32-01X) an inductive load must be used.
4. Slowly adjust the TRIP SET control CCW until the relay trips.
5. Remove the applied Current and set the TIME DELAY control to the desired time delay.
6. Re-apply the Current (10% more than the trip current) to the relay and measure the time to trip.
7. Adjust the TIME DELAY and repeat steps 4 and 5 until you have the desired time delay.

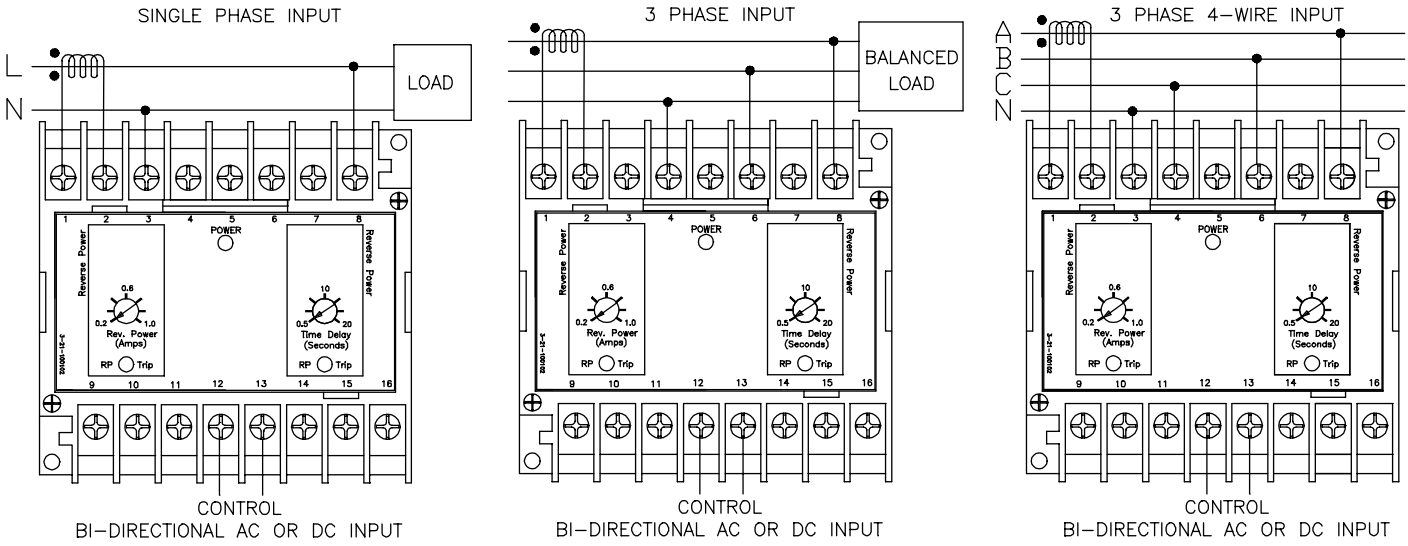
WD32 Controls



WD32 Connections



WD32 Typical Hookup



WD47 Phase Sequence Relays

- Function 47
- ANSI/IEEE C37.90-1978

WD47 Operation

WD47 phase sequence relays are designed to monitor the correct phase rotation and loss of phase of three phase ac systems from 50 to 400 Hz. An incorrect phase sequence or loss of any phase will cause the WD47 to pickup. When the phase sequence is corrected or the lost phase is restored the contacts dropout. Red LED's light to indicate a fault condition. A green LED indicates power to the relay. The WD47 is often used to detect reverse phase rotation or loss of phase to generators, busses, motors, and transformers.

WD47 Calibration

The WD47 has no adjustments and no calibration is necessary. Proper operation may be verified as follows:

1. Apply a nominal, three-phase input with the correct phase sequence. The output relay should dropout and the green LED should light.
2. Apply a nominal, three-phase input with an incorrect phase sequence. The output relay should pickup and the red LED should light.
3. Apply only one or two phases with the correct phase sequence. The output relay should pickup and the red LED should light.

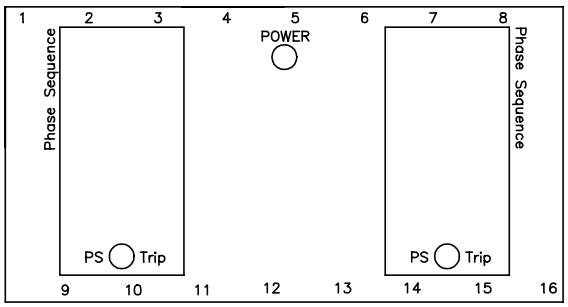
WD47 Specifications

Nominal Operating Range: 120 to 480 VAC.
Maximum Sensing Range: 575VAC.
Nominal Frequency Range: 40-400 Hz.
Contact Form: 2 form C (DPDT).

Control Voltage:

Model WD47	-001	-002	-003
Input Voltage (VDC)	18 to 54	13.5 to 32	100 to 200
Input Voltage (VAC)	–	–	100 to 140

WD47 Controls



Ordering Information

Typical Part Number ▶	WD	47	-002

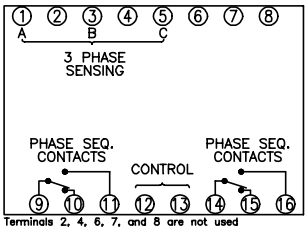
1. Basic Series:
WD = DIN mount Protective Relay.

2. Type:
47= Phase Sequence Relay.

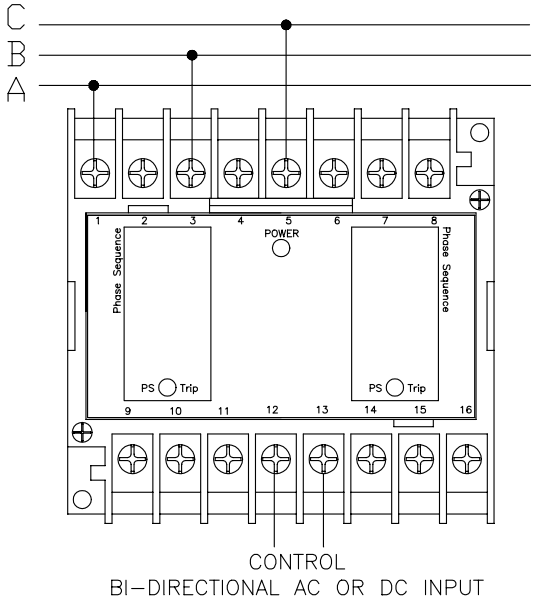
3. Control Voltage:
001 = 18 to 54VDC
002 = 13.5 to 32 VDC
003 = 100-200VDC or 100-140VAC.

Our authorized distributor is more likely to stock these items.
WD47-001

WD47 Connections



WD47 Typical Hookup



WD5051 1Ø and 3Ø Overcurrent Relays

- Function 5051

WD5051 Operation

WD5051 AC current sensing relays provide current monitoring and protection in AC systems from 50 to 400 Hz. Nominal Sensing Current, Instantaneous Over Current setpoint, Time Over Current setpoint, and Time Over Current time delay are user configured. WD5051 current relays operate when the externally adjustable trip point is reached. An external time over current time delay control is provided with an adjustment of .5 to 20 seconds. This time delay may be used to prevent false tripping when there are slight variations in the sensed current. With control power applied, the Instantaneous Over Current (IOC) contacts pick-up when the input signal exceeds the IOC trip setpoint. Similarly, with control power applied, the Time Over Current (TOC) contacts pick-up after the preset time delay when the Sense Current rises above the TOC trip setpoint. The IOC contacts may also be configured to function as an under current relay. A green LED indicates power to the relay. Red LED lights indicate the state of the IOC and TOC trips.

WD5051 Specifications

Sense Current Full Scale: 1, 3, 6 or 8A, selectable.
Maximum Sensing Current: 10A continuous; 30A for 10 sec.; 60A for 2.5 sec.; 100A for 0.9 sec..
Nominal Frequency Range: 50-400 Hz.
Contact Form: 1 form C (SPDT) for IOC and 1 form C (SPDT) for TOC.
TOC Time Delay Adjustment: 0.5 to 20 sec.
IOC Operate Time (max.): 0.2 sec.
Sense Current:

Current (nominal)	1	3	6	8
IOC	0.2 to 1.2	0.6 to 3.6	1.2 to 7.2	1.6 to 9.6
TOC	0.2 to 1.2	0.6 to 3.6	1.2 to 7.2	1.6 to 9.6

Control Voltage:

Model WD5051	-001	-002	-003
Input Voltage (VDC)	18 to 54	13.5 to 32	100 to 200
Input Voltage (VAC)	–	–	100 to 140

Ordering Information

Typical Part Number ▶	WD	5051	-002

1. Basic Series:
WD = DIN mount Protective Relay.

2. Type:
5051 = Single Phase Overcurrent Relay.
5051-3 = Three Phase Overcurrent Relay.

3. Control Voltage:
001 = 18 to 54VDC
002 = 13.5 to 32 VDC
003 = 100-200VDC 0r 100-140VAC.

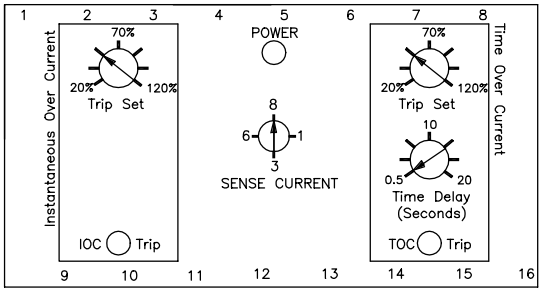
Our authorized distributors are more likely to stock these items.
WD5051-001 WD5051-003 WD5051-3-001

WD5051 Calibration

The calibration marks on the faceplate are provided only as guides. Proper calibration requires using an accurate ammeter in series with the current source. Use the following procedure to calibrate your relay:
OVERCURRENT

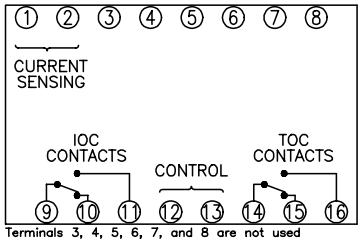
1. Remove the cover.
2. Adjust the TRIP SET control fully clockwise (CW) and the TIME DELAY control (TOC only) fully counterclockwise (CCW).
3. Apply the desired trip current to the relay.
4. Slowly adjust the TRIP SET control CCW until the relay trips.
5. Remove the applied current (do not change the current level). Set the TIME DELAY (TOC only) control to the desired time delay.

WD5051 Controls

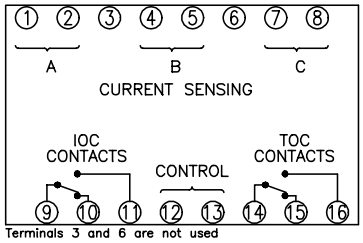


WD5051 Connections

WD5051 Single Phase Model

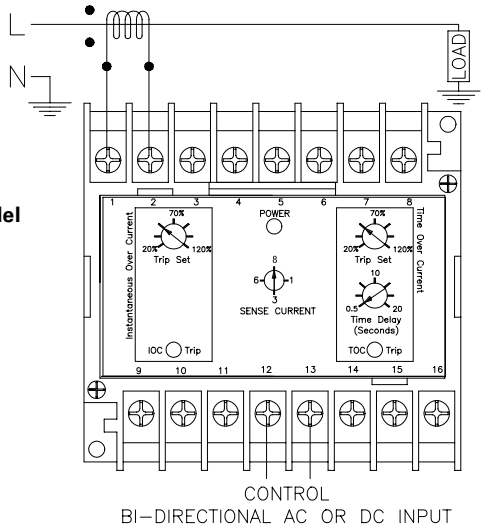


WD5051-3 Three Phase Model

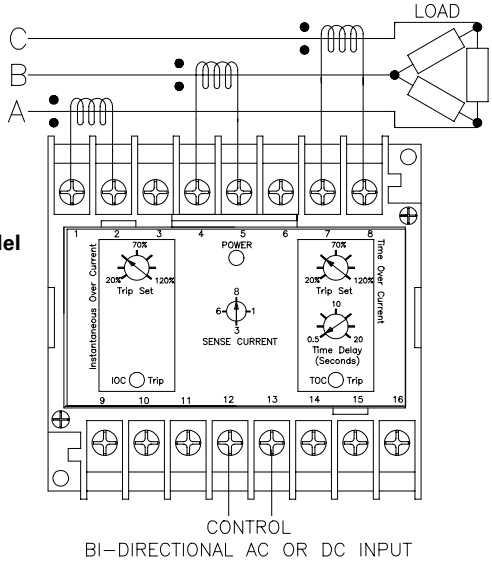


WD5051 Typical Hookup

WD5051 Single Phase Model



WD5051-3 Three Phase Model



WD81OU Over/Underfrequency Relays

- Function 81 OU
- ANSI/IEEE C37.90-1978

WD81OU Operation

WD81OU frequency relays are used to provide frequency monitoring and protection to generators, buses, power supplies, and other equipment. The relay operates at voltages from 120 to 480 Vac and at nominal frequencies of 50, 60, and 400 Hz. External controls include nominal frequency selection, under frequency (UF) trip set, over frequency (OF) trip set, UF time delay, and OF time delay. A green LED indicates power to the relay. Red LED's indicate the status of the UF and OF trips.

WD81OU Specifications

Nominal Operating Frequency: 50, 60 or 400 Hz., selectable.
Maximum Frequency @ 400Hz. Nominal: 1000 Hz.
Nominal Sensing Voltage: 20-480VAC.
Maximum Sensing Voltage: 575VAC.
Contact Form: 1 form C (SPDT) for underfrequency and 1 form C (SPDT) for overfrequency.
Time Delay Adjustment: 0.5 to 10 sec.
Sense Frequency:

Frequency (nominal)	50	60	400
UF Adjustment Range	40-50	48-60	360-400
OF Adjustment Range	50-60	60-72	400-480

Control Voltage:

Model WD81OU	-001	-002	-003
Input Voltage (VDC)	18 to 54	13.5 to 32	100 to 200
Input Voltage (VAC)	–	–	100 to 140

Ordering Information

Typical Part Number ▶	WD	81OU	-002

1. Basic Series:
WD = DIN mount Protective Relay.

2. Type:
81OU = Over/Underfrequency Relay.

3. Control Voltage:
001 = 18 to 54VDC
002 = 13.5 to 32 VDC
003 = 100-200VDC or 100-140VAC.

Our authorized distributors are more likely to stock these items.
None at present.

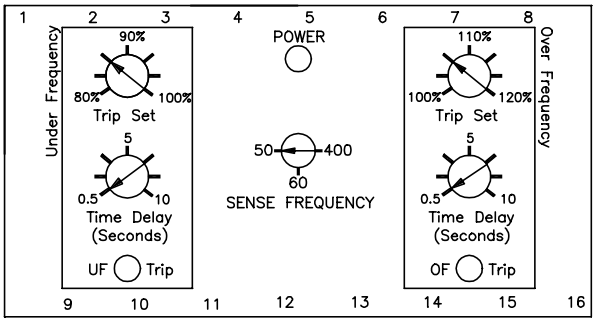
WD81OU Calibration

The calibration marks on the faceplate are provided only as guides. Proper calibration requires using an accurate frequency meter in parallel with the input signal.

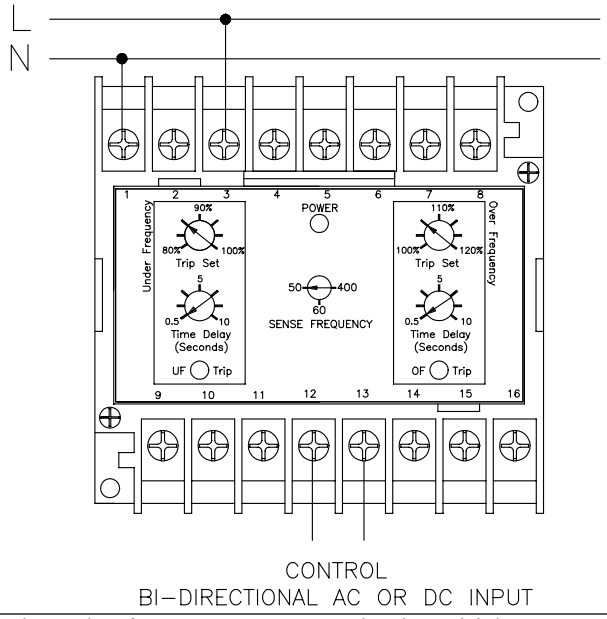
UNDER FREQUENCY
1. Remove the cover.
2. Set the SENSE FREQUENCY to the nominal system frequency. Adjust the Under Frequency TRIP SET fully clockwise (CW) and the TIME DELAY control fully counterclockwise (CCW).
3. Apply the desired trip frequency to the relay.
4. Slowly adjust the TRIP SET control CCW until the relay trips.
5. Set the TIME DELAY control to the desired time delay and apply nominal frequency to the relay.
6. Step down the applied frequency from nominal to just below the trip level set in Step 4 and measure the time delay.
7. Adjust the TIME DELAY and repeat steps 5 and 6 until the desired time delay is set.

OVER FREQUENCY
1. Remove the cover.
2. Set the SENSE FREQUENCY to the nominal system frequency. Adjust the OF TRIP SET and TIME DELAY controls fully counterclockwise (CCW).
3. Apply the desired trip frequency to the relay.
4. Slowly adjust the TRIP SET control clockwise (CW) until the relay trips.
5. Set the TIME DELAY control to the desired time delay and apply nominal frequency to the relay.
6. Step down the applied frequency from nominal to just below the trip level set in Step 4 and measure the time delay.
7. Adjust the TIME DELAY and repeat steps 5 and 6 until the desired time delay is set.

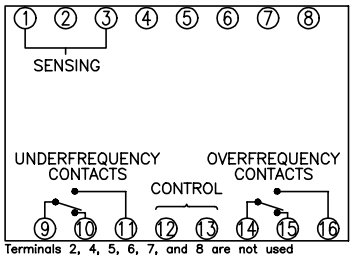
WD81OU Controls



WD81OU Typical Hookup



WD81OU Connections



Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.
www.tycoelectronics.com
Technical support:
Refer to inside back cover.

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AC and DC High Voltage Contactors		1409
DC Automatic Dropout Contactors		1409
DC Contactors		1407
DC Reverse Current Contactors		1408
Full Size Relays		1404
Half Size Relays		1404
High-Frequency Relays		1403
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NOTE: This section of the databook provides only a brief overview of our CII, HARTMAN and KILOVAC high performance relay products. For more detailed specifications on these products, visit our website at www.tycoelectronics.com.

High Performance Relays and Contactors (overview) ... 1401-1412

14

High Performance Signal Level Relays

T0-5 Relays

- Hermetically Sealed
- Standard or Sensitive Coils
- Optional Diodes/Transistors


Sensitive Version


Standard Version


Standard Version

P/N Series	Contact Form	Contact Rating	Coil Voltage	Temperature Rating	Vibration	Shock	Mil-Spec	Standard Coil	Sensitive Coil	Diode Version	Dual Diode Version	Transistor Version	Long Life Version	Spreader Pads	RF Performance (GHz)
HM	2 Form C	Up to 1A	5 to 30 Vdc	-55° to +85°C	10 G's	30 G's	Commercial	●						●	1
HMD	2 Form C	Up to 1A	5 to 30 Vdc	-55° to +85°C	10 G's	30 G's	Commercial	●		●				●	1
HS	2 Form C	Up to 1A	5 to 48 Vdc	-55° to +85°C	10 G's	30 G's	Commercial		●					●	1
HSD	2 Form C	Up to 1A	5 to 48 Vdc	-55° to +85°C	10 G's	30 G's	Commercial		●	●				●	1
MA	2 Form C	Up to 1A	5 to 30 Vdc	-65° to +125°C	30 G's	75 G's	M39016/9	●						●	1.5
1MA	1 Form C	Up to 1A	5 to 26.5 Vdc	-65° to +125°C	30 G's	75 G's	M39016/7	●						●	1.5
MAD	2 Form C	Up to 1A	5 to 26.5 Vdc	-65° to +125°C	30 G's	75 G's	M39016/15	●		●				●	1.5
1MAD	1 Form C	Up to 1A	5 to 26.5 Vdc	-65° to +125°C	30 G's	75 G's	M39016/23	●		●				●	1.5
MADD	2 Form C	Up to 1A	5 to 26.5 Vdc	-65° to +125°C	30 G's	75 G's	M39016/20	●			●			●	1.5
1MADD	1 Form C	Up to 1A	5 to 26.5 Vdc	-65° to +125°C	30 G's	75 G's	M39016/24	●			●			●	1.5
MAT	2 Form C	Up to 1A	5 to 26.5 Vdc	-65° to +125°C	30 G's	75 G's	M28776/1	●				●		●	1.5
1MAT	1 Form C	Up to 1A	5 to 26.5 Vdc	-65° to +125°C	30 G's	75 G's	M28776/5	●				●		●	1.5
MAV	2 Form C	Up to 1A	5 to 30 Vdc	-65° to +125°C	380 G's	150 G's	M39016/9 Design	●						●	
MAVD	2 Form C	Up to 1A	5 to 26.5 Vdc	-65° to +125°C	380 G's	150 G's	M39016/15 Design	●		●				●	
MAVDD	2 Form C	Up to 1A	5 to 26.5 Vdc	-65° to +125°C	380 G's	150 G's	M39016/20 Design	●			●			●	
MS	2 Form C	Up to 1A	5 to 48 Vdc	-65° to +125°C	30 G's	75 G's	M39016/11		●					●	1.5
1MS	1 Form C	Up to 1A	5 to 40 Vdc	-65° to +125°C	30 G's	75 G's	M39016/10		●					●	1.5
MSD	2 Form C	Up to 1A	5 to 48 Vdc	-65° to +125°C	30 G's	75 G's	M39016/16		●	●				●	1.5
1MSD	1 Form C	Up to 1A	5 to 40 Vdc	-65° to +125°C	30 G's	75 G's	M39016/25		●	●				●	1.5
MSDD	2 Form C	Up to 1A	5 to 48 Vdc	-65° to +125°C	30 G's	75 G's	M39016/21		●		●			●	1.5
1MSDD	1 Form C	Up to 1A	5 to 40 Vdc	-65° to +125°C	30 G's	75 G's	M39016/26		●		●			●	1.5
MST	2 Form C	Up to 1A	5 to 48 Vdc	-65° to +125°C	30 G's	75 G's	M28776/3		●			●		●	1.5
1MST	1 Form C	Up to 1A	5 to 40 Vdc	-65° to +125°C	30 G's	75 G's	M28776/4		●			●		●	1.5
MSV	2 Form C	Up to 1A	5 to 48 Vdc	-65° to +125°C	380 G's	150 G's	M39016/11 Design		●					●	
MSVD	2 Form C	Up to 1A	5 to 48 Vdc	-65° to +125°C	380 G's	150 G's	M39016/16 Design		●	●				●	
MSVDD	2 Form C	Up to 1A	5 to 48 Vdc	-65° to +125°C	380 G's	150 G's	M39016/21 Design		●		●			●	
PRMA	2 Form C	Up to 1A	5 to 30 Vdc	-65° to +125°C	30 G's	75 G's	COTS Version*	●						●	1.5
PR1MA	1 Form C	Up to 1A	5 to 26.5 Vdc	-65° to +125°C	30 G's	75 G's	COTS Version*	●						●	1.5
PRMAD	2 Form C	Up to 1A	5 to 26.5 Vdc	-65° to +125°C	30 G's	75 G's	COTS Version*	●		●				●	1.5
PR1MAD	1 Form C	Up to 1A	5 to 26.5 Vdc	-65° to +125°C	30 G's	75 G's	COTS Version*	●		●				●	1.5
PRMADD	2 Form C	Up to 1A	5 to 26.5 Vdc	-65° to +125°C	30 G's	75 G's	COTS Version*	●			●			●	1.5
PR1MADD	1 Form C	Up to 1A	5 to 26.5 Vdc	-65° to +125°C	30 G's	75 G's	COTS Version*	●			●			●	1.5
PRMAT	2 Form C	Up to 1A	5 to 26.5 Vdc	-65° to +125°C	30 G's	75 G's	COTS Version*	●				●		●	1.5
PR1MAT	1 Form C	Up to 1A	5 to 26.5 Vdc	-65° to +125°C	30 G's	75 G's	COTS Version*	●				●		●	1.5
PRMS	2 Form C	Up to 1A	5 to 48 Vdc	-65° to +125°C	30 G's	75 G's	COTS Version*		●					●	1.5
PR1MS	1 Form C	Up to 1A	5 to 40 Vdc	-65° to +125°C	30 G's	75 G's	COTS Version*		●					●	1.5
PRMSD	2 Form C	Up to 1A	5 to 48 Vdc	-65° to +125°C	30 G's	75 G's	COTS Version*		●	●				●	1.5
PR1MSD	1 Form C	Up to 1A	5 to 40 Vdc	-65° to +125°C	30 G's	75 G's	COTS Version*		●	●				●	1.5
PRMSDD	2 Form C	Up to 1A	5 to 48 Vdc	-65° to +125°C	30 G's	75 G's	COTS Version*		●		●			●	1.5
PR1MSDD	1 Form C	Up to 1A	5 to 40 Vdc	-65° to +125°C	30 G's	75 G's	COTS Version*		●		●			●	1.5
PRMST	2 Form C	Up to 1A	5 to 48 Vdc	-65° to +125°C	30 G's	75 G's	COTS Version*		●			●		●	1.5
PR1MST	1 Form C	Up to 1A	5 to 40 Vdc	-65° to +125°C	30 G's	75 G's	COTS Version*		●			●		●	1.5

* Commercial-Off-The-Shelf

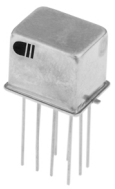
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Technical support:
Refer to inside back cover.

High Performance Signal Level Relays

.100 Grid Relays

- Hermetically Sealed
- Standard or Sensitive Coils
- Optional Diodes/MOSFETs


Sensitive Version


MOSFET Version


Surface Mount Version

P/N Series	Contact Form	Contact Rating	Coil Voltage	Temperature Rating	Vibration	Shock	Mil-Spec	Standard Coil	Sensitive Coil	Diode Version	Dual Diode Version	MOSFET Version	Surface Mount Version	Mounting Pads	RF Performance (GHz)
								Features/Options							
HC	2 Form C	Up to 1A	5 to 26.5 Vdc	-55° to +85°C	10 G's	30 G's	Commercial	●						●	1
HCD	2 Form C	Up to 1A	5 to 26.5 Vdc	-55° to +85°C	10 G's	30 G's	Commercial	●		●				●	1
HCS	2 Form C	Up to 1A	5 to 48 Vdc	-55° to +85°C	10 G's	30 G's	Commercial		●					●	1
HCSD	2 Form C	Up to 1A	5 to 48 Vdc	-55° to +85°C	10 G's	30 G's	Commercial		●	●				●	1
SHC	2 Form C	Up to 1A	5 to 26.5 Vdc	-55° to +85°C	10 G's	30 G's	Commercial	●					●		1
SHCD	2 Form C	Up to 1A	5 to 26.5 Vdc	-55° to +85°C	10 G's	30 G's	Commercial	●		●			●		1
SHCS	2 Form C	Up to 1A	5 to 48 Vdc	-55° to +85°C	10 G's	30 G's	Commercial		●				●		1
SHCSD	2 Form C	Up to 1A	5 to 48 Vdc	-55° to +85°C	10 G's	30 G's	Commercial		●	●			●		1
MGA	2 Form C	Up to 1A	5 to 26.5 Vdc	-65° to +125°C	30 G's	75 G's	M39016/17	●						●	1.5
MGAD	2 Form C	Up to 1A	5 to 26.5 Vdc	-65° to +125°C	30 G's	75 G's	M39016/18	●		●				●	1.5
MGADD	2 Form C	Up to 1A	5 to 26.5 Vdc	-65° to +125°C	30 G's	75 G's	M39016/19	●			●			●	1.5
MGAT	2 Form C	Up to 1A	5 to 26.5 Vdc	-65° to +125°C	30 G's	75 G's	M28776/6	●				●		●	1.5
SMGA	2 Form C	Up to 1A	5 to 26.5 Vdc	-65° to +125°C	30 G's	75 G's	M39016/17 Design	●					●		1.5
SMGAD	2 Form C	Up to 1A	5 to 26.5 Vdc	-65° to +125°C	30 G's	75 G's	M39016/18 Design	●		●			●		1.5
SMGADD	2 Form C	Up to 1A	5 to 26.5 Vdc	-65° to +125°C	30 G's	75 G's	M39016/19 Design	●			●		●		1.5
MGS	2 Form C	Up to 1A	5 to 48 Vdc	-65° to +125°C	30 G's	75 G's	M39016/41		●					●	1.5
MGSD	2 Form C	Up to 1A	5 to 48 Vdc	-65° to +125°C	30 G's	75 G's	M39016/42		●	●				●	1.5
MGSDD	2 Form C	Up to 1A	5 to 48 Vdc	-65° to +125°C	30 G's	75 G's	M39016/43		●		●			●	1.5
MGST	2 Form C	Up to 1A	5 to 26.5 Vdc	-65° to +125°C	30 G's	75 G's	M28776/7		●			●		●	1.5
SMGS	2 Form C	Up to 1A	5 to 48 Vdc	-65° to +125°C	30 G's	75 G's	M39016/41 Design		●				●		1.5
SMGSD	2 Form C	Up to 1A	5 to 48 Vdc	-65° to +125°C	30 G's	75 G's	M39016/42 Design		●	●			●		1.5
SMGSDD	2 Form C	Up to 1A	5 to 48 Vdc	-65° to +125°C	30 G's	75 G's	M39016/43 Design		●		●		●		1.5
PRMGA	2 Form C	Up to 1A	5 to 26.5 Vdc	-65° to +125°C	30 G's	75 G's	COTS Version*	●						●	1.5
PRMGAD	2 Form C	Up to 1A	5 to 26.5 Vdc	-65° to +125°C	30 G's	75 G's	COTS Version*	●		●				●	1.5
PRMGADD	2 Form C	Up to 1A	5 to 26.5 Vdc	-65° to +125°C	30 G's	75 G's	COTS Version*	●			●			●	1.5
PRMGAT	2 Form C	Up to 1A	5 to 26.5 Vdc	-65° to +125°C	30 G's	75 G's	COTS Version*	●				●		●	1.5
PRMGS	2 Form C	Up to 1A	5 to 48 Vdc	-65° to +125°C	30 G's	75 G's	COTS Version*		●					●	1.5
PRMGSD	2 Form C	Up to 1A	5 to 48 Vdc	-65° to +125°C	30 G's	75 G's	COTS Version*		●	●				●	1.5
PRMGSDD	2 Form C	Up to 1A	5 to 48 Vdc	-65° to +125°C	30 G's	75 G's	COTS Version*		●		●			●	1.5
PRMGST	2 Form C	Up to 1A	5 to 26.5 Vdc	-65° to +125°C	30 G's	75 G's	COTS Version*		●			●		●	1.5

* Commercial-Off-The-Shelf

High Frequency Relays

- Hermetically Sealed
- Standard or Sensitive Coils
- Standard or High Performance Versions
- Excellent RF Performance


Standard T0-5 Package


Sensitive Grid Package

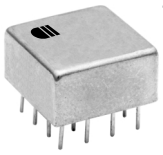
P/N Series	Contact Form	Contact Rating	Coil Voltage	Temperature Rating	Vibration	Shock	Mil-Spec	Standard Coil	Sensitive Coil	Ground Pins	T0-5 Package	Grid Package	RF Performance (GHz)
								Features/Options					
MW3	2 Form C	Up to 1A	5 to 26.5 Vdc	-55° to +85°C	10 G's	30 G's	Commercial		●	●	●		3
MW3S	2 Form C	Up to 1A	5 to 26.5 Vdc	-55° to +85°C	10 G's	30 G's	Commercial			●	●	●	3
MW4	2 Form C	Up to 1A	5 to 26.5 Vdc	-55° to +85°C	10 G's	30 G's	Commercial		●			●	4
MW4S	2 Form C	Up to 1A	5 to 26.5 Vdc	-55° to +85°C	10 G's	30 G's	Commercial			●		●	4
MW6	2 Form C	Up to 1A	5 to 26.5 Vdc	-55° to +85°C	10 G's	30 G's	Commercial		●			●	6
MW6S	2 Form C	Up to 1A	5 to 26.5 Vdc	-55° to +85°C	10 G's	30 G's	Commercial			●		●	6
MW3HP	2 Form C	Up to 1A	5 to 26.5 Vdc	-65° to +125°C	30 G's	100 G's	Commercial		●	●	●		3
MW3HPS	2 Form C	Up to 1A	5 to 26.5 Vdc	-65° to +125°C	30 G's	100 G's	Commercial			●	●		3
MW4HP	2 Form C	Up to 1A	5 to 26.5 Vdc	-65° to +125°C	30 G's	100 G's	Commercial		●			●	4
MW4HPS	2 Form C	Up to 1A	5 to 26.5 Vdc	-65° to +125°C	30 G's	100 G's	Commercial			●		●	4
MW6	2 Form C	Up to 1A	5 to 26.5 Vdc	-65° to +125°C	30 G's	100 G's	Commercial		●			●	6
MW6HPS	2 Form C	Up to 1A	5 to 26.5 Vdc	-65° to +125°C	30 G's	100 G's	Commercial			●		●	6

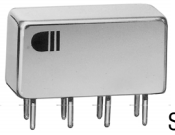
RF Performance Excellence - MW series high frequency relays are designed to provide excellent insertion loss repeatability over the frequency range from DC to 6 GHz. Exceptional isolation performance makes the MW series relays the logical choices for high performance RF applications.

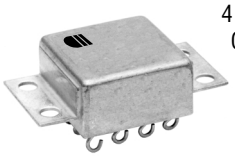
High Performance Subminiature Relays

1/5 Size Relays

- Hermetically Sealed
- Optional Terminals
- Optional Mounting Styles


4 Pole Grid

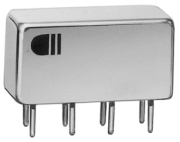

2 Pole Standard

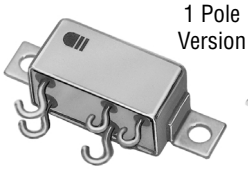

4 Pole Grid

P/N Series	Contact Form	Contact Rating	Coil Voltage	Temperature Rating	Vibration	Shock	Mil-Spec	Standard Coil	Grid Version	Latching Design	Low Profile	Optional Diode	Optional Dual Diode	Long Life Version	Excellent RF Switching
								Features/Options							
3SBC	2 Form C	Up to 2A	5 to 36 Vdc	-65° to +125°C	30 G's	100 G's	M39016/13, 37, 38	●			●	●	●		●
3SBH	4 Form C	Up to 2A	6 to 36 Vdc	-65° to +125°C	30 G's	100 G's	M39016/14, 53, 54	●	●		●	●	●		
3SBM	4 Form C	Up to 2A	6 to 26.5 Vdc	-65° to +125°C	30 G's	150 G's	M39016/31, 35, 36	●	●	●	●	●	●		
3SCC	2 Form C	Up to 2A	5 to 36 Vdc	-40° to +125°C	30 G's	100 G's	Commercial	●			●			●	●
3SDH	4 Form C	Up to 2A	6 to 36 Vdc	-40° to +125°C	30 G's	100 G's	Commercial	●	●		●			●	

Half Size Relays

- Hermetically Sealed
- Optional Terminals
- Optional Mounting Styles


2 Pole Version

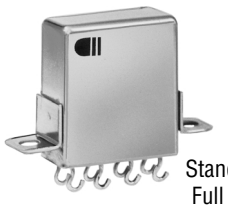

1 Pole Version


Coaxial Cables Version

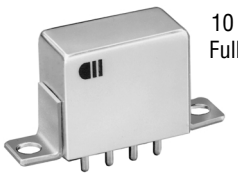
P/N Series	Contact Form	Contact Rating	Coil Voltage	Temperature Rating	Vibration	Shock	Mil-Spec	Standard Coil	Bifilar Coil	Sensitive Coil	Latching Design	Optional Diode	Long Life Version	Coaxial Cables	Excellent RF Switching
								Features/Options							
C	1 Form C	Up to 10A	6 to 26.5 Vdc	-65° to +125°C	20 G's	100 G's	M39016 Design	●							
HFC	2 Form C	Up to 2A	5 to 26.5 Vdc	-55° to +85°C	10 G's	30 G's	Commercial	●							
HFC4A	2 Form C	Up to 4A	5 to 26.5 Vdc	-55° to +85°C	10 G's	30 G's	Commercial	●							
HFC5A	2 Form C	Up to 5A	5 to 26.5 Vdc	-55° to +85°C	10 G's	30 G's	Commercial	●							
HFW	2 Form C	Up to 2A	5 to 48 Vdc	-65° to +125°C	30 G's	100 G's	M39016/6	●							●
HFW4A	2 Form C	Up to 4A	5 to 48 Vdc	-65° to +125°C	30 G's	100 G's	M39016/6 Design	●							●
HFW5A	2 Form C	Up to 5A	5 to 26.5 Vdc	-65° to +125°C	30 G's	100 G's	M39016/6 Design	●							●
HMB	2 Form C	Up to 2A	6 to 26.5 Vdc	-65° to +125°C	30 G's	100 G's	M39016/22		●						●
HMS	2 Form C	Up to 2A	5 to 36 Vdc	-65° to +125°C	20 G's	100 G's	M39016/44			●					●
LR	4 Form C	Up to 2A	5 to 48 Vdc	-65° to +125°C	30 G's	100 G's	M39016 Design	●			●				
LS	2 Form C	Up to 2A	5 to 48 Vdc	-65° to +125°C	30 G's	100 G's	Commercial	●			●				
RFK	1 or 2 Form C	Up to 2A	6 to 26.5 Vdc	-65° to +85°C	20 G's	100 G's	Commercial	●						●	●
SR	4 Form C	Up to 2A	6 to 26.5 Vdc	-65° to +125°C	20 G's	100 G's	M39016/40	●							
SS	6 Form C	Up to 2A	6 to 26.5 Vdc	-65° to +125°C	20 G's	100 G's	M39016 Design	●							

Full Size Relays

- Hermetically Sealed
- Optional Terminals
- Optional Mounting Styles


Standard Full Size


Tall Full Size


10 Amp Full Size

** 07 relay is also qualified to MS 27245 & MS27247

P/N Series	Contact Form	Contact Rating	Coil Voltage	Temperature Rating	Vibration	Shock	Mil-Spec	Standard Coil	Bifilar Coil	Special Wiring Available	Latching Design	Optional Diode	Multi-pole Configurations	Coaxial Cables	Excellent RF Switching
								Features/Options							
02	2 Form C	Up to 2A	6 to 26.5 Vdc	-65° to +125°C	20 G's	100 G's	M5757/8	●					●		
07	2 Form C	Up to 10A	6-120 Vdc, 115 Vac	-65° to +125°C	30 G's	100 G's	M5757/23**	●				●			
3SAM	2 Form C	Up to 2A	6 to 24 Vdc	-65° to +125°C	30 G's	150 G's	M39016/32	●	●	●	●				
3SDM	2 Form C	Up to 2A	6 to 24 Vdc	-65° to +125°C	30 G's	150 G's	M39016 Design	●		●	●				
FW	2 Form C	Up to 3A	6.3 to 110 Vdc	-65° to +125°C	20 G's	100 G's	M5757/10	●							●
FW5A	2 Form C	Up to 5A	6.3 to 110 Vdc	-65° to +125°C	20 G's	100 G's	M5757/10 Design	●							●
RD4	4 Form C	Up to 2A	6 to 26.5 Vdc	-65° to +125°C	20 G's	100 G's	M5757/7	●					●		
RD6	6 Form C	Up to 2A	6 to 26.5 Vdc	-65° to +125°C	20 G's	100 G's	M5757/1	●					●		
RFB	1 or 2 Form C	Up to 2A	6 to 26.5 Vdc	-65° to +85°C	20 G's	100 G's	M5757 Design	●						●	●
SF	2 Form C	Up to 2A	1.8 to 40 Vdc	-65° to +125°C	15 G's	100 G's	M5757/13 Design	●							●
SF5A	2 Form C	Up to 5A	1.8 to 40 Vdc	-65° to +125°C	15 G's	100 G's	M5757/13 Design	●							●

Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.
www.tycoelectronics.com
Technical support:
Refer to inside back cover.

High Reliability Space Relays

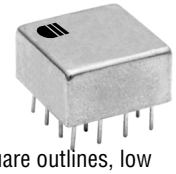
Products

Half Size Non-Latching
1, 2, 4, 6 Form C configurations, low level to 10 amps switching

Half Size Latching
2 and 4 Form C configurations, low level to 2 amps switching

1/5 Size Non-Latching
2 and 4 Form C configurations, low level to 2 amps switching

1/5 Size Latching
4 Form C, low level to 2 amps switching



T0-5/.100 Grid
2 Form C, round and square outlines, low level to 1 amp switching

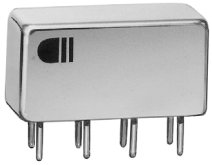
Services



CII Hi-Rel products from Tyco Electronics are extensively tested to assure that your reliability standards and requirements are met or exceeded. Our services include:

- Precision cleaning
- Small particle inspection
- Particle impact noise detection
- Serialized test data
- High shock testing
- Test profiles can be tailored to individual customer requirements.





- High vibration testing
- X-ray testing
- Qualification testing

Features

- High shock ratings
- High vibration ratings
- Latching versions
- Class 100 cleanroom
- Welded assemblies

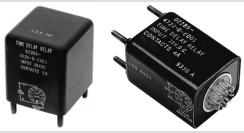
Applications

- Space satellites (telecommunications)
- Weather tracking
- Surveillance
- Infrared observation instrumentation
- Missile systems
- Torpedo guidance circuits

High Performance Solid State Relays

DS11 Series	DS13 Series	JDS9-1Y	JPS10 Series	PS12-1Y
				
DESC 88062 Qualified	DESC 90091 Qualified	M28750/9 Qualified	M28750/10 Qualified	DESC 86031Qualified
60 Vdc Output Voltage	60 Vdc Output Voltage	250 Vrms Output Voltage	250 Vrms Output Voltage	250 Vrms Output Voltage
2 Adc Output Current	2 Adc Output Current	2 Arms Output Current	25 Arms Output Current	10 Arms Output Current
• Hermetically sealed DIP package • Thick film hybrid construction • Optically isolated • Low on-resistance (MOSFET output) • Optional switch status, short circuit protection, trip status	• Hermetically sealed DIP package • Thick film hybrid construction • Optically isolated • Low on-resistance (MOSFET output) • Optional switch status, short circuit protection, trip status	• Hermetically sealed DIP package • Thick film hybrid construction • Optically isolated • Zero voltage turn-on • High transient immunity • 3.8-32 Vdc current regulated input	• Rugged encapsulated module • Optically isolated • Zero voltage turn-on • High transient immunity • 3.8-32 Vdc current regulated input	• Rugged encapsulated module • Optically isolated • Zero voltage turn-on • High transient immunity • 3.8-32 Vdc current regulated input

High Performance Timers and Sensors

Timers - Solid State Output	Timers - Relay Output	Sensors
		
1800/1900 Series Delay on operate, adjustable or fixed time delay, optional mounting styles	1600/1700 Series Delay on operate, adjustable or fixed, AC or DC input, optional mounting styles	1300/1350 Series Voltage sensors, DC and AC input, optional mounting styles
4800 Series Interval timers, fixed time delay, optional mounting styles	4600/4700 Series Interval timers, adjustable or fixed, AC or DC input, optional mounting styles	1400 Series Phase sensors, 60 or 400 Hz, optional mounting styles
6001/6155 Series Delay on operate, fixed time delay, 14 pin metal DIP, thick film hybrid, meets Mil-R-83726/13	5600/5700 Series Delay on release, adjustable or fixed, optional mounting styles	7000 Series Frequency sensors, 50 to 440 Hz, digital logic design, optional mounting styles
	2400 Series Delay on operate, miniature package, fixed, optional mounting styles	

High Performance DC Solid State Relay / Power Controller

NEW PRODUCT



PC2.5D10-2B

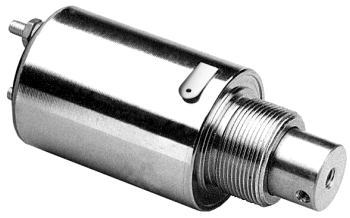
60 Vdc Output Voltage

2.5 Adc Output Current

Built-in Circuit Protection

- Combines isolated load switching and circuit protection capabilities
- Fast acting, bounce free switching
- Carries full rated current (2.5A) without heat sinking to 90°C
- Low output on-resistance and voltage drop
- Meets surge requirement of MIL-STD-1275 & MIL-STD-740A
- Nuclear tolerance tested
- Hermetically sealed package
- Thick film hybrid construction

High Performance DC Tubular Solenoids – Series 3000



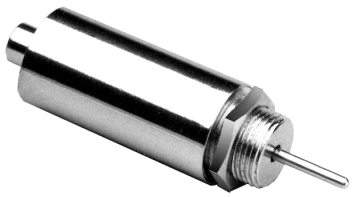
Pull-Type Solenoid

Custom configurations available

DC tubular pull-type solenoids are designed to provide up to 90 lbs of force with a maximum stroke of .500 inches.

Actual usable force will depend on the stroke and power level.

Coils are available from 6 to 115 Vdc with a continuous duty power level of 2.2 to 54 watts and an intermittent duty power level of 12 to 585 watts.



Push-Type Solenoid

Custom configurations available

DC tubular push-type solenoids provide up to 50 lbs of force with a maximum stroke of .562 inches.

Actual usable force will depend on the stroke and power level.

Coils are available from 6 to 115 Vdc with a continuous duty power level of 3 to 36 watts and an intermittent duty power level of 9 to 240 watts.



Switch-Type Solenoid

Custom configurations available

DC tubular switch-type solenoids provide up to 120 lbs of force with a maximum stroke of 1 inch.

Actual usable force will depend on the stroke and power level.

Coils are available from 12 to 115 Vdc. Two coils are utilized, one energized at pull-in for extra force and a holding coil for continuous operation. Intermittent duty power level of 112 to 700 watts and a continuous power level of 3 to 14 watts.

High Performance Custom Solenoids – Series 7000



Tyco Electronics can provide customized solenoids with many of the following features :

Solenoid Styles	Connector Styles	Mounting Styles	Plunger Styles
High Temperature	Flexible Leads	Round Flanges	Internal Threads
400Hz AC	Connector Assemblies	Square Flanges	External Threads
Commercial AC	Right Angle AN Connectors	Threaded Flanges	Clevice Plungers
Airframe	Square Flange AN Connectors	Shaped Flanges	Extension Plungers
Heavy Duty	Quick-Connects		Captive Plungers
Two Coil Designs	Screw, Solder & Stud Terminals		
Pressure Sealed			

Dimensions are shown for reference purposes only.
Dimensions are in inches over (millimeters) unless otherwise specified.
Specifications and availability subject to change.

High Performance AC Contactors

Side Stable Contactors
Latching Contactors
Center Off Contactors



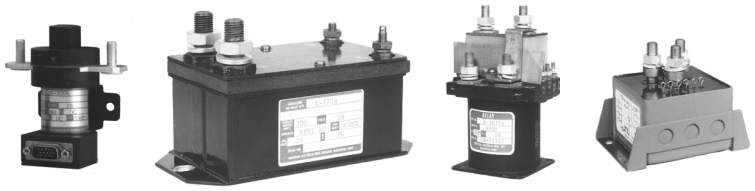
FEATURES:
- High reliability
- Meets requirements of Mil-R-6106
- Hermetic or gasket seal available
- Repairable
- Easily tailored to customer requirements

P/N	Current Rating	Description
DH-7YC	25 Amps	4PST N.O., 115/208 VAC, 400 Hz
B-347A	25 Amps	3PDT, Double Break, 115/220 VAC, 400 Hz
DH-14B-3	25 Amps	3PDT, 115/200 VAC, 400 Hz
B-252	30 Amps	3PDT, Center Off, 115/200 VAC, 400 Hz
B-140C	30 Amps	3PDT, Center Off, 120 VAC, 60 Hz
N-415A-1	30 Amps	3PDT, Double Break, 115/200 VAC, 400 Hz
SA106E	30 Amps	3PDT, 115 VAC, 400/60 Hz
DH-7ZAB	50 Amps	3PDT, 115/200 VAC, 400 Hz
D-7GRZ	50 Amps	3PDT, 115/200 VAC, 400 Hz
NN-301	50 Amps	SPDT w/Time Delay on Pickup, 115 VAC, 400 Hz
D-7GR	50 Amps	3PDT, 115/200 VAC, 400 Hz
N-421A	50 Amps	3PST N.C., 115/200 VAC, 400 Hz
D-18F	50 Amps	3PDT, Center Off, 115/200 VAC, 400 Hz
DR-18E-5	50 Amps	2SPST, Center Off, 115/208 VAC, 400 Hz
B-227	60 Amps	3PDT, Center Off, 115/200 VAC, 400 Hz
B-138S	60 Amps	3PST N.O., 115/200 VAC, 300-600 Hz
DH-7BC	60 Amps	3PDT, 115/208 VAC, 400 Hz
BR-329BC	60 Amps	2PST N.O., 115 VAC, 60 Hz
SA120B	60 Amps	3PDT, Side Stable, 115/200 VAC, 400 Hz
NH-505	90 Amps	3PDT, Center Off, 115/200 VAC, 400 Hz
D-25BD	100 Amps	3PDT, 115/200 VAC, 400 Hz

P/N	Current Rating	Description
D-31TFA	100 Amps	3PDT, Center Off, 115/208 VAC, 400 Hz
B-233R	120 Amps	3PDT, 115/200 VAC, 400 Hz
BH-201B	120 Amps	3PST N.O., 115/200 VAC, 400 Hz
D-100A	120 Amps	3PST N.O., 115/200 VAC, 400 Hz
B-435K-3	140 Amps	3PDT, Center Off, 115/200 VAC, 400 Hz
B-233T	160 Amps	3PDT, 115/200 VAC, 400 Hz
B-451	175 Amps	3PST, Magnetic Latch, 115/200 VAC, 400 Hz
B-312D-1	175 Amps	3PST N.O., 120/208 VAC, 50/60 Hz
B-499	35/200A	3PDT, Double Break, 115 VAC, 400 Hz/28 VDC
BR-301AY	200 Amps	3PST N.O., 115/200 VAC, 400 Hz
B-393P	200 Amps	3PDT, Center Off, 120/208 VAC, 50/60/400 Hz
B-345LS	225 Amps	3PDT, Center Off, 115/200 VAC, 400 Hz
B-394	250 Amps	3PDT, 115/200 VAC, 400 Hz
BH-124AA	250 Amps	3PDT, Center Off, 115/200 VAC, 400 Hz
BH-360A	250 Amps	3PDT, 115/200 VAC, 400 Hz
B-430-1	275 Amps	3PST, Magnetic Latch, 115/200 VAC, 400 Hz
B-429A-1	300 Amps	3PST N.O., 115/200 VAC, 400 Hz
B-874L	335 Amps	3PST, 200 VAC, 400 Hz
B-429CA	350 Amps	3PST N.O., 120/208 VAC, 400 Hz
B-479A-1	350 Amps	3PST, Magnetic Latch, 120/208 VAC, 400 Hz
B-484	500 Amps	3PST, Magnetic Latch, 115/200 VAC, 400 Hz

High Performance DC Contactors

Side Stable Contactors
Latching Contactors
Center Off Contactors



FEATURES:
- High reliability
- Meets requirements of Mil-R-6106
- Hermetic or gasket seal available
- Repairable
- Easily tailored to customer requirements

P/N	Current Rating	Description
A-837D	15/3A	Latching Armature Relay, 28 VDC
C-28	25 Amps	2PST N.O., Latching, 40 VDC
D-7TD	50 Amps	2SPST 1 N.O. 1 N.C., 28 VDC
D-7AC	50 Amps	2SPST 1 N.O. 1 N.C., 28 VDC
DH-7KC-1	50 Amps	4PST 2 N.O. 1 N.C., 28 VDC
N-208	50 Amps	SPDT, Double Break, Magnetic Latch, 28 VDC
NN-233C	60 Amps	SPDT, Double Break, 28 VDC
SD167A	100 Amps	SPST, Side Stable, 28 VDC
D-32AB	100 Amps	2SPST, Center Off, Double Break, 28 VDC
N-417E	100 Amps	SPDT, Double Break, 28 VDC
A-885Y	100 Amps	SPDT N.O. & N.C., 28 VDC
NN-307	100 Amps	SPST, Double Break, 28 VDC
SDH128	100 Amps	SPDT, Side Stable, 28 VDC
NN-449B	100 Amps	SPDT, Double Break, 28 VDC
DH-16CH	131 Amps	SPST, Latching, 31 VDC
A-1077F	200 Amps	SPST N.O., 28 VDC

P/N	Current Rating	Description
A-871F	200 Amps	SPDT N.O. & N.C., 28 VDC
A-1077B	230 Amps	SPDT, 28 VDC
AH-965H	300 Amps	SPDT N.O. & N.C., 28 VDC
A-1019	300 Amps	2PDT, Center Off, 28 VDC
A-876M	300 Amps	SPDT N.C., 28 VDC
K-300	300 Amps	SPST N.O., 28 VDC
SD130A	400 Amps	SPST N.O., Double Break, 28 VDC
A-400B	400 Amps	SPST N.O., 28 VDC
K-400	400 Amps	SPST N.O., 28 VDC
A-981S	400 Amps	SPDT, 28 VDC
AH-703F	400 Amps	SPST N.O., 28 VDC
A-922F	600 Amps	2PST N.O., 28 VDC
A-712T	600 Amps	SPST N.O., 28 VDC
A-931F	600 Amps	SPST N.O., 28 VDC
A-792ST	1000 Amps	SPST N.O., 28 VDC
A-882	1600 Amps	SPST N.O., 28 VDC

High Performance AC/DC Contactors

Side Stable Contactors






FEATURES:
- High reliability
- Meets requirements of Mil-R-6106
- Hermetic or gasket seal available
- Lightweight construction
- Easily tailored to customer requirements

P/N	Current Rating	Description
C-8B	15 Amps	2PDT N.C., 28 VDC, 60 or 400 Hz
DH-7PF	50 Amps	4PST 2N.O. 2N.C., 28 VDC or 115 VAC, 400 Hz
NN-233A	50 Amps	SPDT, Double Break, 28 VDC or 115 VAC, 400 Hz
D-14D	50 Amps	2SPST 1N.O. 1N.C., 28 VDC or 115 VAC, 400 Hz
BH-316A	50 Amps	3PST, 28 VDC or 115 VAC, 400 Hz
C-21Y	60 Amps	SPST N.O., Dbl. Break, 28 VDC or 115 VAC, 400 Hz

DC Reverse Current Contactors

Specialty Contactors





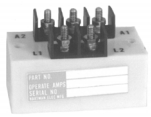
FEATURES:
- High reliability
- Meets requirements of Mil-R-6106
- Gasket sealed
- Repairable
- Easily tailored to customer requirements

P/N	Current Rating	Description
A-718AAP	100 Amps	SPST N.O., 28 VDC, Cutout Reverse Current
A-700AQ-4	200 Amps	SPST N.O., 28 VDC, Cutout Reverse Current
A-700ZF	300 Amps	SPST N.O., 28 VDC, Cutout Reverse Current
A-701D	400 Amps	SPST N.O., 28 VDC, Cutout Reverse Current
A-702AAP	600 Amps	SPST N.O., 28 VDC, Cutout Reverse Current
A-791M	1000 Amps	SPST N.O., 28 VDC, Cutout Reverse Current

Sensors & Monitors

Voltage & Current Sensors
Phase Rotation Sensors
Ground Power Monitors
Frequency Sensors



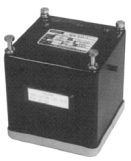


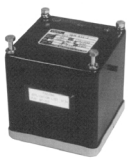
FEATURES:
- High reliability
- Meets requirements of Mil-R-6106
- Hermetic or gasket seal available
- Lightweight construction units available
- Epoxy encapsulated units available

P/N	Current Rating	Description
AVR-869C		SPDT, 28 VDC, 3∅ Sequence Relay
E-312P	5 Amps	SPDT, 28 VDC, 400 Hz, Overvoltage Sensor
E-381	5 Amps	SPDT, 130 VAC, 400 Hz, Undervoltage Sensor
E-308AA	7.5 Amps	SPDT, 120 VDC, 60 Hz, 3∅ Undervoltage Sensor
E-329E	10 Amps	3PDT, 115 VAC, Drop Out Time Delay
E-308AH	10 Amps	3PDT, 115 VAC, Drop Out Time Delay
E-312A-1	10 Amps	2PDT, 440 VAC, 400 Hz, 3∅ Voltage Sensor
E-348	0.25 Amp	SPST N.O., 28 VDC, Overload Relay
E-308	3 Amps	SPDT, 28 VDC, Adjustment Pick-Up Voltage
AVR-834	3 Amps	SPDT, 28 VDC, DC Voltage Sensor
E-311P	10 Amps	2PDT, 28 VDC, Drop Out Time Delay
QR-50AF	0.25 Amp	SPST, 115 VAC, Encapsulated Current Indicator
QR-50DA	0.25 Amp	SPST, 115 VAC, Encapsulated Current Indicator
E-387	1 Amp	SPDT, 115 VAC, 400 Hz, Current Sensor
E-145AK-4	5 Amps	SPST, 115 VAC, 3∅ Current Sensor
BE-500G-1	50 Amps	3PST N.O., 120 VAC, Overload Current Sensor
Q-50B	0.25 Amps	SPDT, 28 VDC, Encapsulated Current Indicator
Q-50AC	0.3 Amp	SPDT, 28 VDC, Encapsulated Current Indicator
CH-27	0.75 Amp	2PDT, 28 VDC, Current Sensor
CH-26	1 Amp	SPST, 28 VDC, Current Sensor
A-848KK	75 Amps	2PST, 28 VDC, Automatic Drop Out
A-772XTB	200 Amps	SPST N.O., 28 VDC, Delayed Drop Out
A-701P-1	400 Amps	SPST N.O., 28 VDC, Remote Reset
A-701P-3	500 Amps	SPST N.O., 28 VDC, Remote Reset
A-792CA	600 Amps	2PST N.O., 28 VDC, Automatic Drop Out
E-326	1 Amp	115 VAC, 400 Hz, 3∅ Rotation Sensor
E-326A	1 Amp	115 VAC, 60 Hz, 3∅ Rotation Sensor
E-341	2 Amps	SPDT, 208 VAC, 400 Hz, 3∅ Rotation Sensor
E-326E	5 Amps	SPDT, 460 VAC, 60 Hz, 3∅ Rotation Sensor
E-145Z	25 Amps	2PST, 120/208 VAC, 400 Hz, Phase Loss Relay
E-145Y	60 Amps	2PST, 120/208 VAC, 400 Hz, Phase Loss Relay
E-327AD	1 Amp	2PST, 115 VAC, Ground Power Monitor
E-384	3 Amps	SPDT, 28 VDC, Under Frequency Sensor

Plug-In Contactors

Side Stable Contactors
Latching Contactors
Center Off Contactors





FEATURES:
- Fast installation/removal time
- Improved maintenance safety
- High reliability
- Meets requirements of Mil-R-6106
- Lightweight construction

P/N	Current Rating	Description
BP-353	50 Amps	3PST N.O., 115/200 VAC, 400 Hz
DP-25BD	100 Amps	3PDT, 115/200 VAC, 400 Hz
DP-31C	100 Amps	3PDT, Center Off, 115/200 VAC, 400 Hz
BPE-494	175 Amps	3PST N.O., ELCU, 115/200 VAC, 400 Hz
BP-494	275 Amps	3PST N.O., 115/200 VAC, 400 Hz
BP-493-1	385 Amps	3PST, Magnetic Latch, 115/200 VAC, 400 Hz

DC Automatic Dropout Contactors

DC Automatic Drop Out

Time Delay Relays
Phase Imbalance Sensors
Automatic Drop Out Contactors





FEATURES:
- High reliability
- Meets requirements of Mil-R-6106
- Hermetic or gasket seal available

P/N	Current Rating	Description
E-55	2 Amps	4PDT, 28 VDC, Time Delay
B-178	60 Amps	3PST, 120/208 VAC, 400 Hz, Phase Sensor

P/N	Current Rating	Description
A-757D	600 Amps	SPST, 28 VDC, Automatic Dropout @ 180 Amps

AC & DC High Voltage Contactors

High Voltage

AC Contactors
DC Contactors
Center Off Contactors
Latching Contactors









FEATURES:
- High reliability
- Meets requirements of Mil-R-6106
- Hermetic or gasket seal available
- Lightweight construction units available
- Repairable

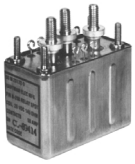
P/N	Current Rating	Description
CR-21A	5 Amps	3PST N.O., 440 VAC, 60 Hz or 380 VAC, 50 Hz
B-329P	20 Amps	3PST N.O., Dbl. Break, 260/450 VAC, 400 Hz
BR-393E	20 Amps	3PDT, Center Off, Dbl. Break, 380 VAC, 50 Hz
B-138DL	50 Amps	3PST N.O., 200 VAC, 400 Hz
B-140AA	60 Amps	3PDT, Center Off, 200 VAC, 400 Hz
B-138XAH	60 Amps	3PDT, 200 VAC, 400 Hz
B-312CS	100 Amps	3PST N.O., 380 VAC, 50 Hz
B-125N	150 Amps	3PST N.O., 208 VAC, 400 Hz
B-493E	160 Amps	3PST, Magnetic Latch, 230 VAC, 400 Hz

P/N	Current Rating	Description
B-459	250 Amps	3PDT, Center Off, 208 VAC, 400 Hz
B-460	250 Amps	6PST, 208 VAC, 400 Hz
B-461	250 Amps	3PDT, Center Off, 120/208 VAC, 400 Hz
BH-125TH	250 Amps	3PST N.O., 208 VAC, 400 Hz
B-124GL	250 Amps	3PDT, Center Off, Dbl. Break, 208 VAC, 400 Hz
AV-875	60 Amps	SPST N.O., 270 VDC
A-751D-1	150 Amps	SPST N.O., 110 VDC
A-754JD	150 Amps	SPST N.O., 120 VDC
A-751YC	650 Amps	SPST N.O., 340 VDC

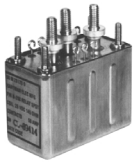
Space Contactors

Space Relays

DC Latching Contactors







FEATURES:
- High reliability
- Meets requirements of Mil-R-6106
- Hermetically sealed
- Lightweight construction
- High shock, vibration, and acceleration levels

P/N	Current Rating	Description
N-409D	50 Amps	2PDT, Double Break, Magnetic Latch, 28 VDC

P/N	Current Rating	Description
N-208H	50 Amps	SPDT, Double Break, Magnetic Latch, 40 VDC

Power Distribution Systems

Power Distribution Panels

Modular Units
Standard Panels

FEATURES:
- Primary and secondary power distribution
  - Main power contactors
  - Secondary power contactors/relays
  - Current and voltage sensing
  - Logic/control signals
- Contactors/circuit breaker plug-in units
- Power management capabilities
- Value added
- Space saving/weight saving designs
- Custom designs for specific applications

Modular Units

- Utilizes plug-in line replaceable modules installed on a panel mounting system, or back-plane. LRMs may be contactors, circuit breakers, sensing units, ELCUs, etc.
- Designed as a fault-free zone with no moving parts. Intended as a permanent installation on mother vehicle.

FEATURES:
- Weight savings over standard discrete components
- Value added
- Ease of maintenance
- Reduced OEM labor

Standard Panels

- Utilizes actuator and contact assemblies from discrete contactors, bussed together and packaged in one or more enclosures with external power and control connections.
- Optional current/voltage sensing, fuses, circuit breakers, power monitors, etc.

FEATURES:
- Lightest power distribution approach
- Value added
- Ease of maintenance
- Reduced OEM labor

These are just some of the HARTMAN products capabilities from Tyco Electronics:

- Voltage, Current & Power Sensing
- Over & Reverse Current
- Over & Under Voltage
- Over & Under Frequency
- Ground Fault & Detection
- Time Delay
- Phase Sequence, Unbalance & Failure
- Impedance Relays
- Ripple Detection
- Positive, Negative & Zero Sequence Voltage
- Signal Amplification
- Turbine Starting
- Trip-Free, Electrical & Mechanical Interlocking
- Electrical & Magnetic Latching
- Polarization
- Power Switching

High Voltage DC Relays & Contactors

28 Vdc

Aerospace Power Relays
Hi-Rel Satellite Relays
Power Controllers



P/N Series	Carry Current	Power Switching*	RF Ratings	Contact Form
AL50	50 amps	Yes	No	SPST-NO
AL90	90 amps	Yes	No	SPST-NO
AL150	150 amps	Yes	No	SPST-NO
AL350	350 amps	Yes	No	SPST-NO
AL500	500 amps	Yes	No	SPST-NO

270 Vdc

Aerospace Power Relays
Hi-Rel Satellite Relays
Power Controllers



P/N Series	Carry Current	Power Switching*	RF Ratings	Contact Form
AP5A	5 amps	Yes	No	SPST-NO
AP5B	5 amps	Yes	No	SPST-NC
AP5C	5 amps	Yes	No	SPDT
AP5P	5 amps	Yes	No	SPST-Latch
AP5R	5 amps	Yes	No	SPDT-Latch
AP10A	10 amps	Yes	No	SPST-NO
AP10B	10 amps	Yes	No	SPST-NC
AP10P	10 amps	Yes	No	SPST-Latch
AP11A	10 amps	Yes	No	SPST-NO
AP44P	15 amps	Yes	No	SPST-Latch
AP50X	50 amps	Yes	No	SPST-NO
AP90X	90 amps	Yes	No	SPST-NO
AP150X	150 amps	Yes	No	SPST-NO
AP265X	265 amps	Yes	No	SPST-NO
AP265P	265 amps	Yes	No	SPST-NO
AP350X	500 amps	Special	No	SPST-NO
PD5A	5 amps	Yes	No	SPST-NO
PD5B	5 amps	Yes	No	SPST-NC
PD10A	10 amps	Yes	No	SPST-NO
PD10B	10 amps	Yes	No	SPST-NC
PD10P	10 amps	Yes	No	SPST-Latch
PD90X	90 amps	Yes	No	SPST-NO
PD150X	150 amps	Yes	No	SPST-NO

12-1800 Vdc

Electric Vehicle Relays
Specialty DC Power Relays and Contactors
Integrated Sensing



P/N Series	Carry Current	Power Switching*	RF Ratings	Contact Form
EV4	4 amps	Make Only	No	SPST-NO
EV200	200 amps	Yes	No	SPST-NO
EV250A	400 amps	Yes	No	SPST-NO
EV250B	400 amps	Yes	No	SPST-NC
EV500	600 amps	Yes	No	SPST-NO

2.0 kV

High Voltage Reed Relay
Vacuum Relay



P/N Series	Carry Current	Power Switching*	RF Ratings	Contact Form
S06CBA	6 amps	Carry Only	Yes	SPST-NO
K45C	15 amps	Carry Only	Yes	SPDT

3.0 kV

High Voltage Reed Relay



P/N Series	Carry Current	Power Switching*	RF Ratings	Contact Form
S02DNA	2 amps	Carry Only	No	SPST-NO

3.5 kV

Vacuum Relays
Gas Filled Relays



P/N Series	Carry Current	Power Switching*	RF Ratings	Contact Form
HC-5	8 amps	Make Only	No	SPDT
HC-3	15 amps	Yes	Yes	SPDT
HC-1	25 amps	Carry Only	Yes	SPDT

5.0 kV

High Voltage Reed Relays
Vacuum Relays



P/N Series	Carry Current	Power Switching*	RF Ratings	Contact Form
S06FNA	6 amps	Carry Only	Yes	SPST-NO
K41A	30 amps	Yes	Yes	SPST-NO
K41B	30 amps	Yes	Yes	SPST-NC
K41C	30 amps	Yes	Yes	SPDT
K41P	25 amps	Carry Only	Yes	SPST-Latch
K41R	25 amps	Carry Only	Yes	SPDT-Latch
K40P	35 amps	Carry Only	Yes	SPST-Latch

7.5 kV

Medical Relays
Gas Filled Relays



P/N Series	Carry Current	Power Switching*	RF Ratings	Contact Form
KM-13	10 amps	Make Only	No	DPDT
KM-17	10 amps	Make Only	No	DPDT

9 kV

High Voltage Reed Relay



P/N Series	Carry Current	Power Switching*	RF Ratings	Contact Form
S06HBA	6 amps	Carry Only	Yes	SPST-NO

* Consult Factory for Power Switching Level

Dimensions are shown for reference purposes only.

Dimensions are in inches over (millimeters) unless otherwise specified.

Specifications and availability subject to change.

High Voltage DC Relays & Contactors

8 kV

High Voltage Reed Relays
Vacuum Relays
Gas Filled Relays





P/N Series	Carry Current	Power Switching*	RF Ratings	Contact Form
S06JNB	6 amps	Carry Only	Yes	SPST-NC
HC-6	8 amps	Make Only	No	SPDT
H-18	10 amps	Yes	Yes	SPDT
K47A	12 amps	Yes	Yes	SPST-NO
K47B	12 amps	Yes	Yes	SPST-NC
HC-4	15 amps	Yes	No	SPDT
HC-2	25 amps	No	No	SPDT
K44P	50 amps	Yes	Yes	SPST-Latch

10 kV

High Voltage Reed Relays
Vacuum Relays






P/N Series	Carry Current	Power Switching*	RF Ratings	Contact Form
S05LTA	5 amps	Yes	No	SPST-NO
S05LTB	5 amps	Yes	No	SPST-NC
K81A	10 amps	Special	No	SPST-NO
K81B	10 amps	Special	No	SPST-NC
K81C	10 amps	Special	No	SPDT
K43A	25 amps	Special	Yes	SPST-NO
K43B	25 amps	Special	Yes	SPST-NC
K43C	25 amps	Special	Yes	SPDT
K43R	24 amps	Carry Only	Yes	SPDT-Latch
K43P	24 amps	Carry Only	Yes	SPST-Latch

12 kV

Vacuum Relays




P/N Series	Carry Current	Power Switching*	RF Ratings	Contact Form
H-14	30 amps	Carry Only	Yes	DPDT
H-16	30 amps	Carry Only	Yes	DPDT

15 kV

High Voltage Reed Relays
Vacuum Relays
Gas Filled Relays




P/N Series	Carry Current	Power Switching*	RF Ratings	Contact Form
S05MTA	5 amps	Carry Only	No	SPST-NO
KC-15	12 amps	Make Only	No	SPDT
KC-16	12 amps	Make Only	No	SPDT
KC-14	15 amps	Yes	No	SPDT
KC-18	15 amps	Yes	No	SPDT
H-8	15 amps	Yes	No	SPDT
KC-12	30 amps	Yes	Yes	SPDT
H-26	30 amps	Carry Only	Yes	4PDT
KC-8	30 amps	Yes	Yes	SPDT
KC-2	50 amps	Carry Only	Yes	SPDT
KC-11	50 amps	Carry Only	Yes	SPDT

* Consult Factory for Power Switching Level

20 kV

Vacuum Relay



P/N Series	Carry Current	Power Switching*	RF Ratings	Contact Form
H-19	30 amps	Special	Yes	DPDT

25 kV

Vacuum Relays
Gas Filled Relays





P/N Series	Carry Current	Power Switching*	RF Ratings	Contact Form
KC-38	15 amps	Make Only	No	SPST-NC
K62A	18 amps	Special	No	SPST-NO
K62B	18 amps	Special	No	SPST-NC
K62C	18 amps	Special	No	SPDT
H-17	30 amps	Special	Yes	SPDT
KC-28	30 amps	Make Only	No	SPST-NO
KC-32	45 amps	Special	No	SPST-NC
KC-30	55 amps	Carry Only	Yes	SPST-NC
KC-22	65 amps	Special	No	SPST-NO
KC-20	110 amps	Carry Only	Yes	SPST-NO

30 kV

Vacuum Relays



P/N Series	Carry Current	Power Switching*	RF Ratings	Contact Form
H-23	30 amps	Carry Only	Yes	SPST-NC
H-24	30 amps	Carry Only	Yes	SPST-NO

35 kV

Gas Filled Relays




P/N Series	Carry Current	Power Switching*	RF Ratings	Contact Form
K61A	10 amps	Make Only	No	SPST-NO
K61B	10 amps	Make Only	No	SPST-NC
K61C	10 amps	Make Only	No	SPDT
K60C	10 amps	Make Only	No	SPDT

50 kV

Vacuum Relays
Gas Filled Relays




P/N Series	Carry Current	Power Switching*	RF Ratings	Contact Form
K64C	10 amps	Make Only	No	SPDT
H-25	30 amps	Special	No	SPDT

70 kV

Gas Filled Relays



P/N Series	Carry Current	Power Switching*	RF Ratings	Contact Form
K70A	10 amps	Make Only	No	SPST-NO
K70B	10 amps	Make Only	No	SPST-NC
K70C	10 amps	Make Only	No	SPDT

Protective Relays

We offer a broad range of protective relays for use in portable generators, automatic transfer switches, irrigation pumps, industrial facilities, utilities, refineries, oil field, urban rapid transit systems, aircraft, ships and submarines. Some models are qualified by the military for use in ground support equipment, aircraft and Navy ships' high shock applications. These are managed in the DOD supply system under NSN classes 5945 and 6110. KILOVAC protective relays were previously marketed under the WILMAR brand.

Following is a just a partial listing of our protective relay offering:

Voltage Sensitive

WUV/WOV Series .....Undervoltage & Overvoltage
WUVT/WOVT Series .....Undervoltage & Overvoltage with Time Delay
WUV/WOV DC Series .....Undervoltage & Overvoltage DC
WOUV DC Series .....Over/Undervoltage DC
WOUVT Series .....Over/Undervoltage, Time Delay
250 Series .....Over/Undervoltage
D100X Series.....Close Differential, 1 Phase
D101X Series.....Series Close Differential, 3 Phase
WD2759 Series .....AC Over/Undervoltage Sensing Relay, DIN Rail Mounting

Reverse Power

700 Series .....1 & 3 Phase
700 Series .....1 & 3 Phase, Adjustable Time Delay
WD32 Series .....Reverse Power Relay, DIN Rail Mounting

Phase Failure

1000 Series .....Loss of Phase, Undervoltage

Phase Sequence

900 Series .....Phase Sequence
WD47 Series ..... Phase Sequence Relay, DIN Rail Mounting

Current Balance

WCB Series .....Current Balance

Current Sensitive

WC1 & WCT1 Series .....Overcurrent, Time Delay, 1 Phase
WC3 & WCT3 Series .....Overcurrent, Time Delay, 3 Phase
WD5051-3 Series .....AC Over Current Sensing Relay, DIN Rail Mounting

Current Differential

WCD Series.....Current Differential

Paralleling

1800 Series .....Paralleling (volt)
WSYN Series .....Voltage Frequency, Phase Angle
WD25 Series .....Paralleling Relay, DIN Rail Mounting

Frequency Sensitive

WOF & WUF Series .....Overfrequency & Underfrequency
WOUF Series .....Over/Underfrequency, Time Delay Option
25-000 Series .....Over/Underfrequency
20-000 Series .....Frequency, 56-66 Hz
20-050-19 Series .....Voltage/Frequency
WD81OU Series .....Over/Under Frequency Relay, DIN Rail Mounting

Ground Fault

WGD Series.....Power Factor & Ground Fault Detector
WC1G Series.....Power Factor & Ground Fault Detector

NOTE

WD.. Series protective relays are described in section 13 of this databook. For details on other models, please visit our website at www.tycoelectronics.com.

tyco Electronics

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