



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 (10/160 μ s).
- 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: 10 μ A, 10mVDC.

Rated Load: 500mA at 125VAC.

Initial Contact Resistance: 50 milliohms.**Expected Mechanical Life:** 15,000,000 ops at 36,000 ops/hr.

Coil Data @ 23°C

Nominal Voltage (VDC)	Current $\pm 10\%$ (mA)	Maximum Voltage (VDC)	Resistance $\pm 10\%$ (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

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 μ s):**

Between Open Contacts: 1,500V.

Between Coil and Contacts: 1,500V.

Between Poles: 1,500V.

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.

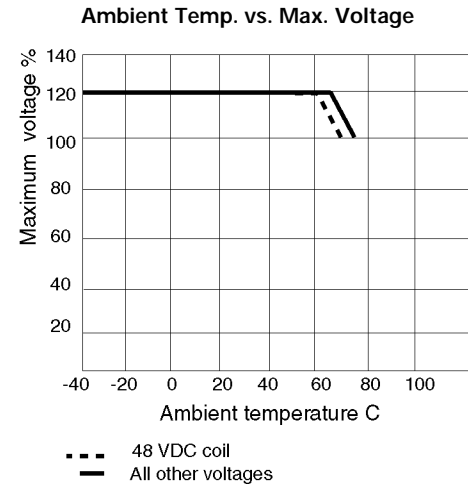
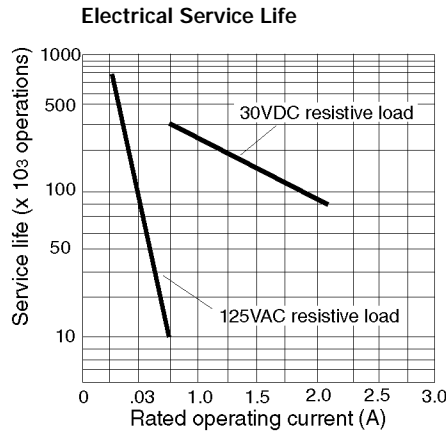
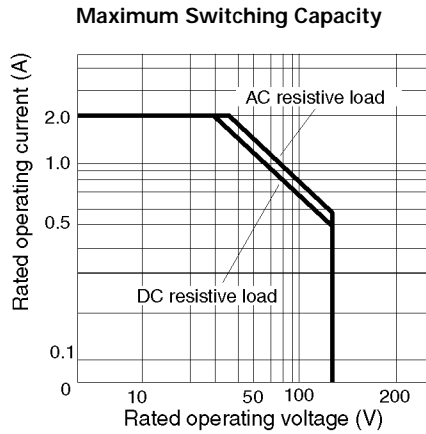
Coil Data @ 23°C

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

Mechanical Data

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

Operational Performance Curves



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)

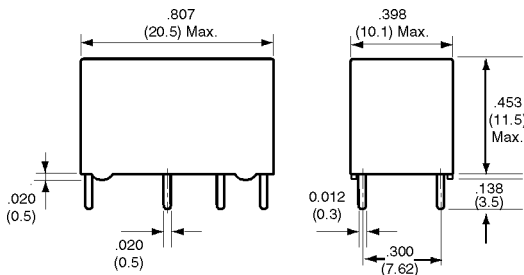
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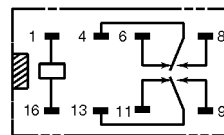
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190-22E2UO

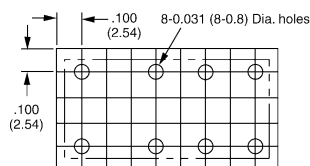
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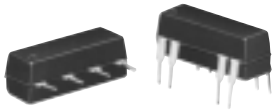


Wiring Diagram (Bottom View)



PC Board Layout (Bottom View)





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	500mV Loss	1 x 10 ⁶
	20VDC, 250mA	500mV Loss	20 x 10 ⁶
	Low Level (5VDC, 1mA)	50 Ohms	100 x 10 ⁶
Form C	12VDC, 500mA	500mV Loss	1 x 10 ⁶
	10VDC, 10mA	50 Ohms	25 x 10 ⁶
	Low Level (5VDC, 1mA)	50 Ohms	100 x 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: 10¹⁰ 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.

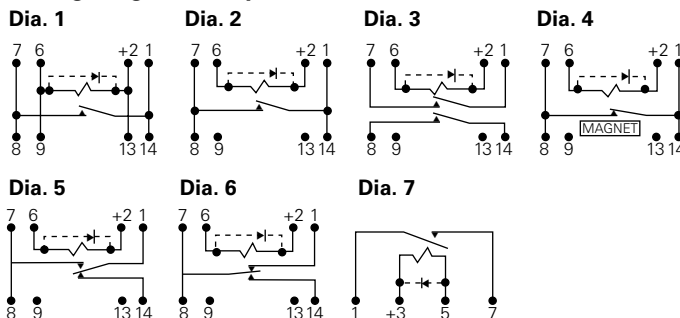
Mechanical Data

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)



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.

Dimensions are shown for reference purposes only.

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

JWD/JWS series

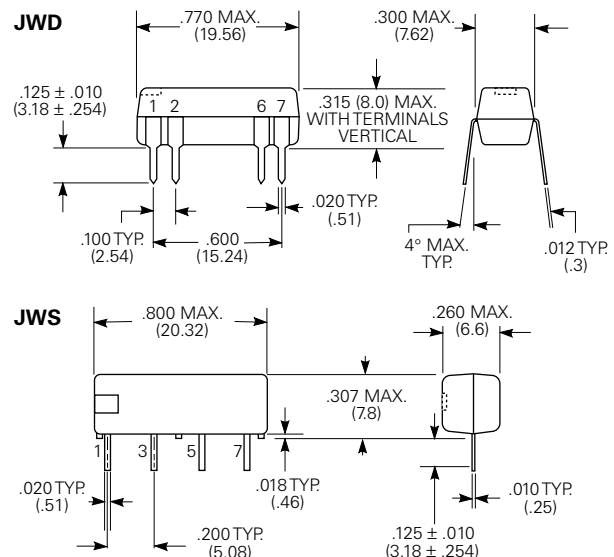
Dual In-Line Package & Single In-Line Package Dry Reed Relays

File E29244 File LR81479

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



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

Specifications and availability subject to change.

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



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: 10⁸ 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.

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.

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

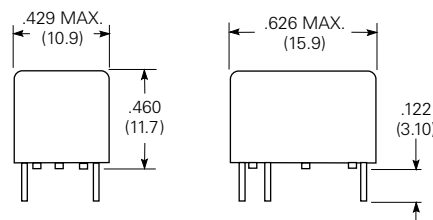
09 = 9VDC

24 = 24VDC

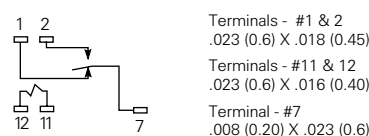
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T81H5D312-05 T81H5D312-12 T81N5D312-05 T81N5D312-24
T81H5D312-06 T81H5D312-24 T81N5D312-12

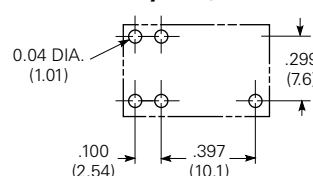
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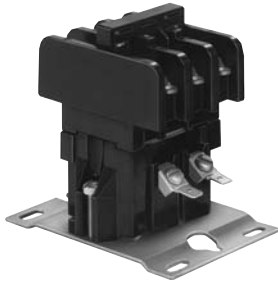


Wiring Diagram (Bottom View)

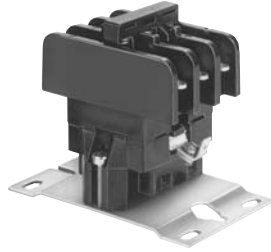


PC Board Layout (Bottom View)





P25 with DC coil



P25 with AC coil

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: 200,000 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) @ 600V
	Full Load @ 600V	Locked Rotor			
		@ 240V	@ 480V	@ 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.

P25 series

Definite Purpose Magnetic Contactor 25 Ampere Full Load 30 Ampere Resistive AC & DC Coils

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.

Coil Data

Nominal VDC	Resistance (Ohms \pm 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: .187" (4.75mm) quick connect.

Weight: 14 oz. (397g).

Ordering Information

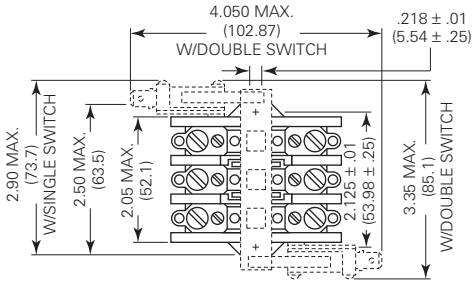
Typical Part No. ▶	P25	P	42	A	1	4	P	1	-240
1. Type: P25 Definite Purpose Contactor									
2. Auxiliary Switch: P = No Aux Switch C = 1 Form C (SPDT), silver contacts F = 2 Form C (DPDT), silver contacts Double pole contact forms require two switches.									
3. Main Contact Arrangement: 42 = 3 Form 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 C = .187" (4.75mm) 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.

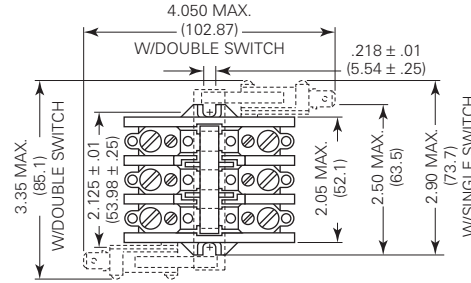
P25P42A12P1-120
 P25P42A12P1-240
 P25P42A22P1-120
 P25P42A22P1-240
 P25P42D22P1-12
 P25P42D22P1-24

Outline Dimensions

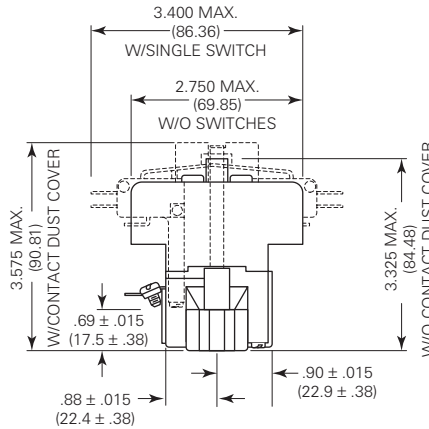
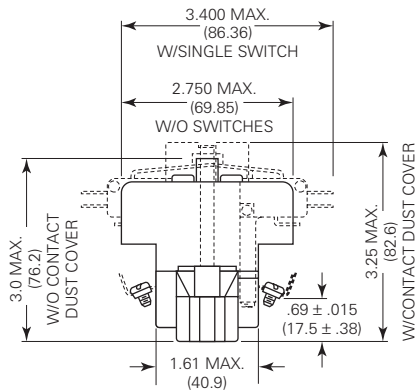
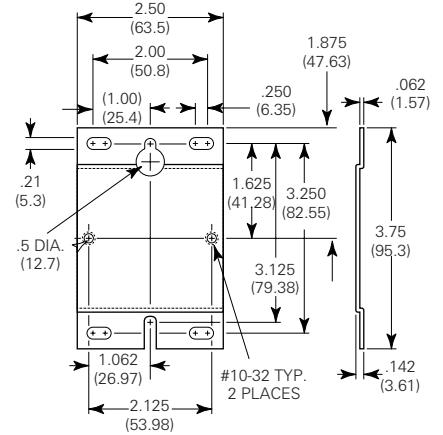
P25 With AC Coil



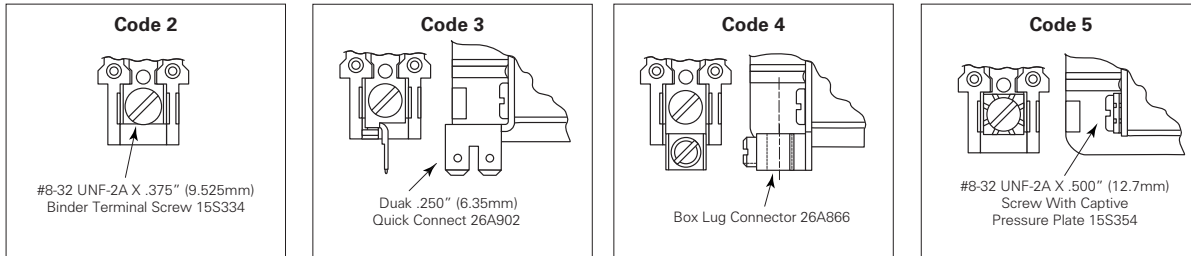
P25 With DC Coil



Mounting Plate Footprint



Contact Terminal Options



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

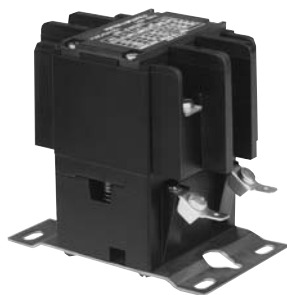
This auxiliary switch kit includes one plastic actuator and one auxiliary switch assembly. It contains no screw. One assembly screw must be removed from the P25 contactor and used to mount the auxiliary switch.

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

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 @ 600V	Tungsten Rating @277V
	Full Load @ 600V	Locked Rotor				
		@ 240V	@480V	@ 600V		
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: 2,200 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 \pm 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, particularly 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: .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) 47 = 4 Form X (4PST-NO-DM) 43 = 2 Form X (DPST-NO-DM) 48 = 2 Form X (DPST-NO-DM) & 1 Form Y (SPST-NC-DB) & 2 Form Y (DPST-NC-DB) 45 = 1 Form X (SPST-NO-DB) 49 = 4 Form Y (4PST-NC-DB) & 2 Form Y (DPST-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 5 = Captive Pressure Plate 3 = Screw Terminals & Dual .250" (6.35mm) Quick Connect 6 = Box Lug & Dual .250" (6.35mm) Quick Connect 4 = Box Lug									
7. Auxiliary Contact Terminals: P = No Auxiliary Switch C = .187" (4.75mm) 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									

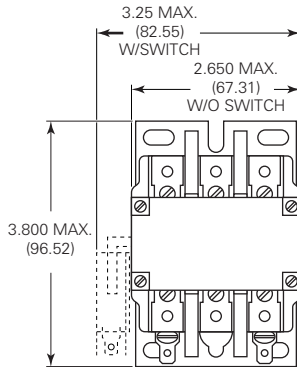
Our authorized distributors are more likely to maintain the following items in stock for immediate delivery.

P30P42A12P1-120	P40P42A12P1-24
P30P42D12P1-24	P40P42A12P1-120
P30P47A12P1-120	P40P42A12P1-240
P30P47D12P1-24	P40P42D12P1-24

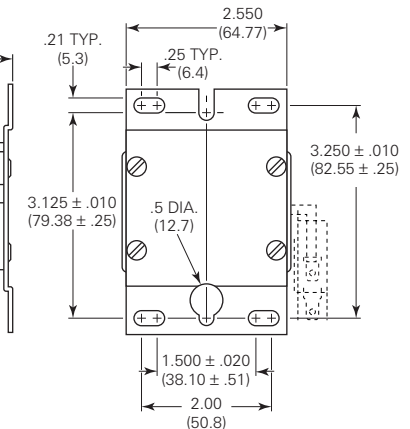
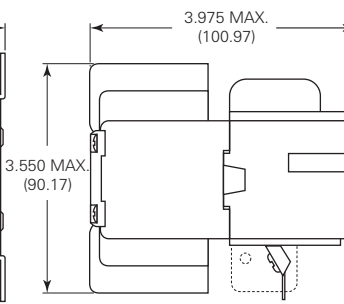
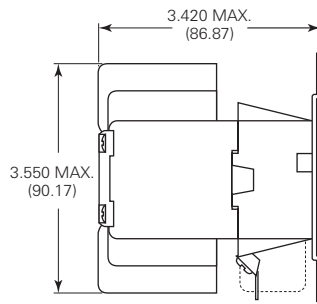
Outline Dimensions

3 Pole Models

AC Coil

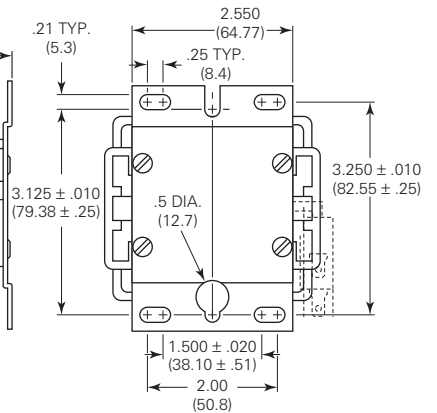
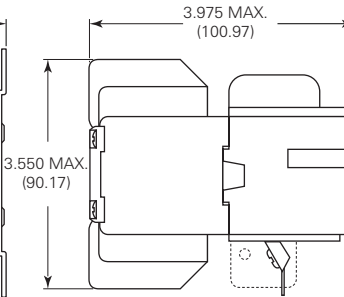
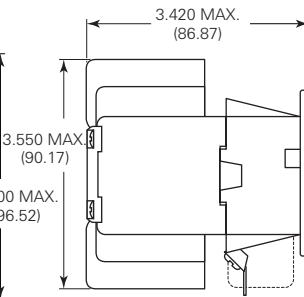
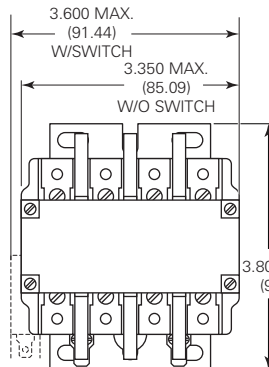


DC Coil



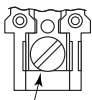
4 Pole Models

AC Coil



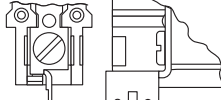
Contact Terminal Options

Code 2



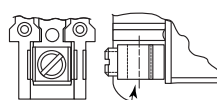
#10-32 UNF-2A X .375" (9.525mm)
Binder Terminal Screw 15S365
accepts the following
wire size: Solid, Single — 8 AWG

Code 3



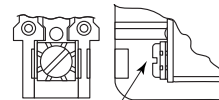
Dual .250" (6.35mm)
Quick Connect 26A945
#10-32 UNF-2A X .375" (9.525mm)
Binder Terminal Screw 15S365
accepts the following
wire size: Solid, Single — 8 AWG

Code 4



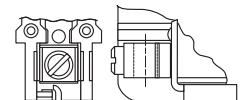
Box Lug (Keyed) 24C540 with
15S361 & 15S364 Screws
Accepts the following wire sizes:
Solid, Single — 14-4 AWG

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:

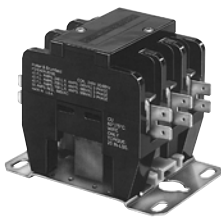
- 3 Form X models - Kit No. 9P30X1
- 4 Form X models - Kit No. 9P30X2

Kits for P40 contactors:

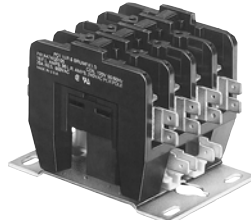
- 3 Form X models - Kit No. 9P40X1
- 4 Form X models - Kit No. 9P40X2

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

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

- 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

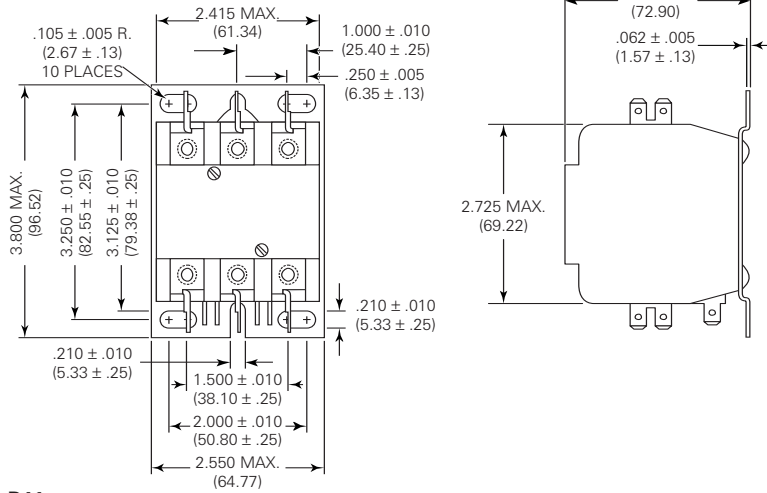
Typical Part No. ►				P41	C	47	D	HO	1	03
1. Type: P31 = 3 Pole P41 = 4 Pole										
2. Contact Rating C = 25 Amp E = 40 Amp (40A rating only offered on P31)										
3. Contact Arrangement: 42 = 3 Form X (3PST-NO-DM) 47 = 4 Form X (4PST-NO-DM) P41 only										
4. Coil Input: D = Direct Current (Direct 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.

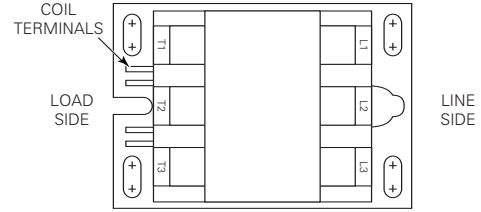
None at present.

Outline Dimensions

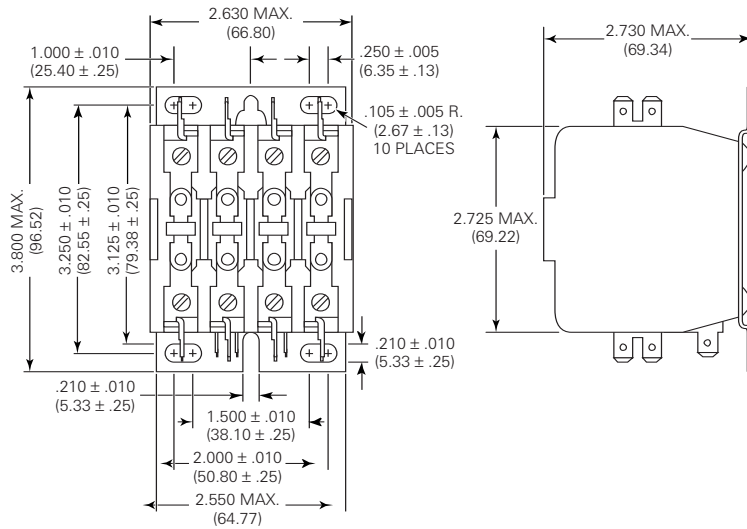
P31



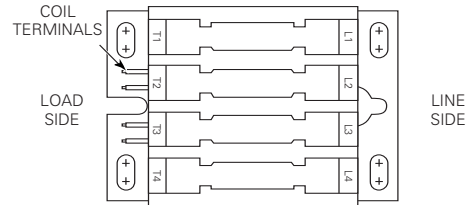
Top View



P41



Top View



Contact Terminal Options

Figure 02

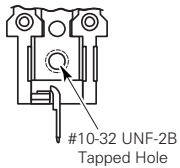


Figure 03

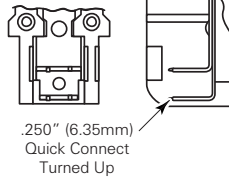


Figure 05

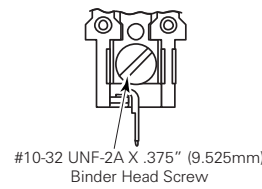


Figure 06

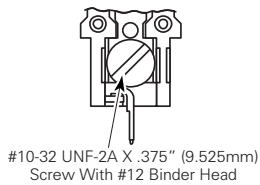


Figure 07

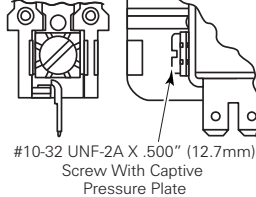
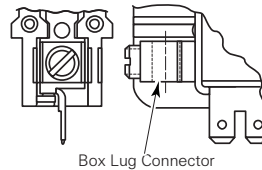


Figure 08



RoHS
Ready



Features

- Three pole switching (main contacts) plus integral auxiliary contacts.
- Designed to snap onto DIN rail or mount directly to a panel with screws.
- Efficient 50/60 Hz coils (50 Hz or 60 Hz coils optional).
- Finger-safe (IP 20) terminals.
- Modular design allows contactors and accessories to snap together.
- Comply with IEC EN60947-4-1 & EN60947-5-1; UL508; CSA22.2 No. 14.

Main Contact Data

Arrangements: 3 Form X (3PST-NO-DM).

Ratings: Insulation Voltage (U_i): 690V
See Main Contact Ratings table below.

Auxiliary Contact Data

Arrangements: 1 Form A (SPST-NO), 1 Form B (SPST-NC) or 1 Form A + 1 Form B (SPST-NO + SPST-NC).

Ratings: Insulation Voltage (U_i): 690V.
AC-15: 360VA.
DC-13: 33W.
Conventional Thermal Current (I_{th}): 10A.

Initial Dielectric Strength

Between Contacts and Coil: 2,500V for 1 minute.

Between Open Contacts: 2,500V for 1 minute.

Between Poles: 2,500V for 1 minute.

Electrical Life

Contactor Rating Code	AC-3 ($6I_e, I_e$)		AC-4 ($6I_e, I_e$)			
	Cycles	Cycles/Hr	Rated Operating Current (I_e A)		Cycles	Cycles/hr
			380V	660V		
009	1,000,000	1200	3.5	1.5	200,000	300
012	1,000,000	1200	5	2	200,000	300
018	1,000,000	1200	7.7	3.8	200,000	150
025	1,000,000	1200	8.5	4.4	200,000	150
032	800,000	600	12	7.5	200,000	150
040	800,000	600	18.5	9	150,000	150
050	600,000	600	24	12	150,000	150
065	600,000	600	28	14	150,000	150
080	600,000	600	37	17.3	100,000	150

Main Contact Ratings

Rating Code	Contact Material	Maximum Current			Maximum Horsepower						Three Phase				Control Power				
		Inductive AC3		Resistive AC1	Single Phase		Three Phase				FLA				kW				
		Amp (I_e)		Amp (I_{th})															
		380VAC	660VAC	690VAC	115VAC	230VAC	220VAC	380VAC	440VAC	600VAC	220VAC	415VAC	440VAC	600VAC	220VAC	380VAC	415VAC	440VAC	660VAC
009	Cu-AgNi 90/10	9	6.6	25	0.5	1	3	5	5	7.5	9.6	9.7	7.6	9	2.2	4	4	4	5.5
012	Cu-AgNi 90/10	12	8.9	25	1	2	5	7.5	7.5	10	15.2	14	11	11	3	5.5	5.5	5.5	7.5
018	AgNi	18	12	32	1	3	5	10	10	10	15.2	18	14	17	4	7.5	9	9	10
025	AgCd012	25	18	40	2	3	7.5	10	15	20	22	18	21	22	5.5	11	11	11	15
032	AgCd012	32	21	50	2	5	10	15	20	25	28	27	27	27	7.5	15	15	15	18.5
040	AgCd012	40	34	60	3	7.5	15	25	30	40	42	44	40	41	11	18.5	22	22	30
050	AgCd012	50	39	80	3	10	20	30	40	50	54	54	54	54	15	22	25	30	33
065	AgCd012	65	42	80	5	15	25	40	50	60	68	66	65	62	18.5	30	37	37	37
080	AgCd012	80	49	125	7.5	15	30	50	60	75	80	83	77	77	22	37	45	45	45

PBC series

IEC-Type Contactors & Accessories 9-80 Amp AC-3, 25-125 Amp AC-1 AC Coils

c(UL)us File E38802 (PBC)

CE

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

Coil Data

Voltage: From 24 to 415VAC. See Ordering Information chart for specifics.

Must-Operate Voltage: 85 to 110% of nominal (U_s).

Must-Release Voltage: 20 to 75% of nominal (U_s).

Coil Data

Contactor Rating Code	Maximum VA		Operate & Release Times (ms)	
	Inrush	Sealed	Operate	Release
009	80	9.4	12-22	4-12
012	80	9.4	12-22	4-12
018	80	9.4	12-22	4-12
025	110	11	15-24	5-19
032	110	11	15-24	5-19
040	230	32	20-26	8-12
050	230	32	20-26	8-12
065	230	32	20-26	8-12
080	230	32	20-35	6-20

Environmental Data

Temperature Range:

Operating: -5°C to +40°C at RH or 50% or less. Higher humidity is permissible at lower temperatures.

Storage: -25°C to +55°C

Maximum Altitude: 2000m

Pollution Class: 3

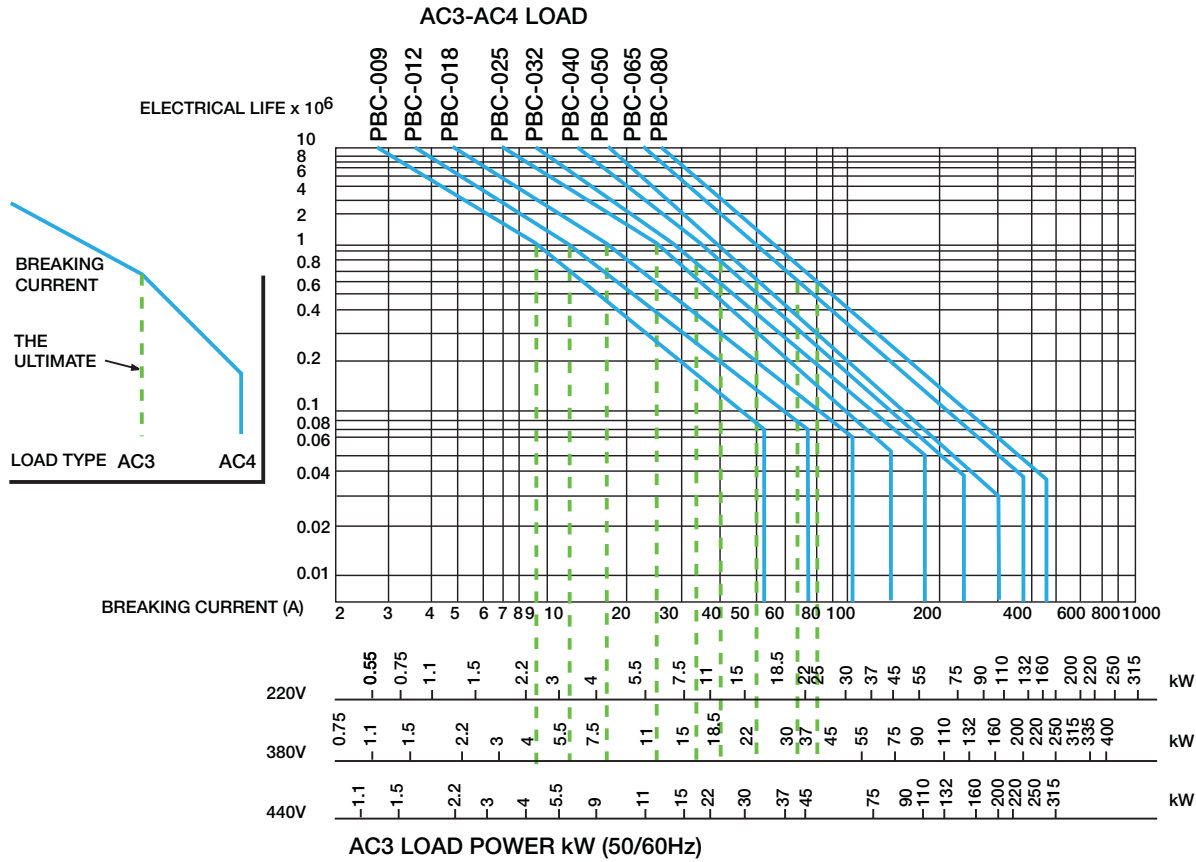
Vibration: 2-13.2 Hz, ± 1 mm

Shock Resistance: 13.2-100 Hz, ± 7 m/s²

Short Circuit

Contactor Rating Code	009	012	018	025	032	040	050	065	080
Type of Coord. Main Circuit	Type "2"								
Main Circuit Fuse Type	RT16-16	RT16-20	RT16-25	RT16-32	RT16-50	RT16-63	RT16-80	RT16-100	
Aux. Circuit Fuse Type	RT16-10								
Short Circuit Current A	1,000								
Aux. Circuit									

Load/Life Curves

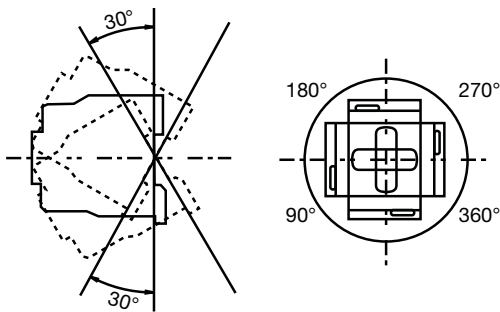


Mechanical Data

Mounting: 009-032 models: 35mm DIN rail or two mounting screws.

040-080 models: 75mm DIN rail or two mounting screws.

Mounting Orientation: Contactor must be mounted to vertical surface ($\pm 30^\circ$); however, the contactor may be rotated 360° about its axis.



Termination: Finger-safe (IP 20) screw clamps.

Approximate Weight: 009 & 012 models: 0.77 lb (0.35 kg).
018 models: 0.82 lb (0.37 kg).
025 & 032 models: 1.23 lb (0.56 kg).
040, 050 & 065 models: 3.11 lb (1.41 kg).
080 models: 3.55 lb (1.61 kg).

Ordering Information

Typical Part No. **PBC**

-009 A 1 B7

1. Type:

PBC = IEC Contactors

2. Main Contact Rating Code (AC-3):

009 = 9A 012 = 12A 018 = 18A
025 = 25A 032 = 32A 040 = 40A
050 = 50A 065 = 65A 080 = 80A

3. Main Contact Arrangement & Termination:

A = 3 Form X (3PST-NO-DM) with screw clamps.

4. Integral Auxiliary Contact Form:

1 = 1 NO (9-32A models only)
2 = 1 NC (9-32A models only)
3 = 1 NO + 1 NC (40-80A models only)

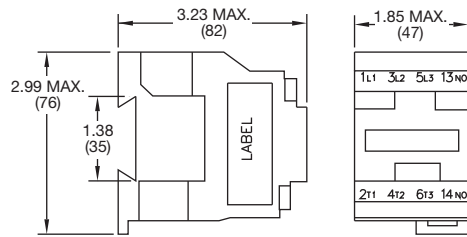
5. Coil Voltage:

B7 = 24VAC 50/60 Hz
E7 = 48VAC 50/60 Hz
F = 110VAC 50 Hz / 120VAC 60 Hz (40-80A models only)
F7 = 110-120VAC 50/60 Hz (9-32A models only)
M = 220VAC 50 Hz / 240VAC 60 Hz (40-80A models only)
M7 = 220-240VAC 50/60 Hz (9-32A models only)
Q = 380VAC 50 Hz / 415VAC 60 Hz

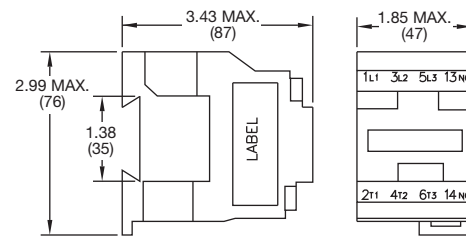
NOTES: All part numbers are RoHS compliant.

PBC-018 is still to be submitted for UL testing. This model is not UL Listed.

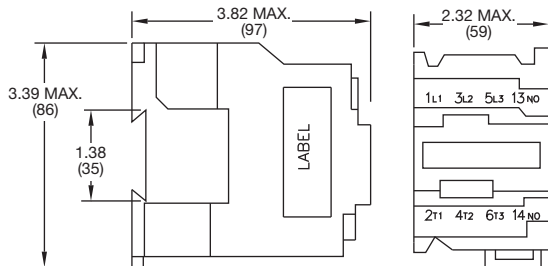
Outline Dimensions



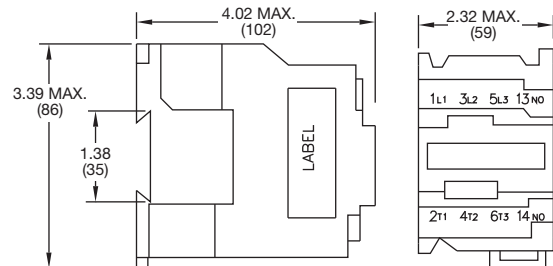
PBC-009 & PBC-012



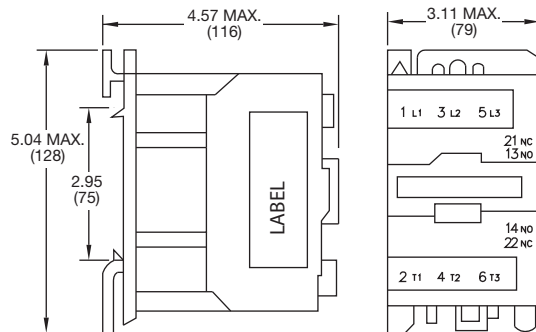
PBC-018



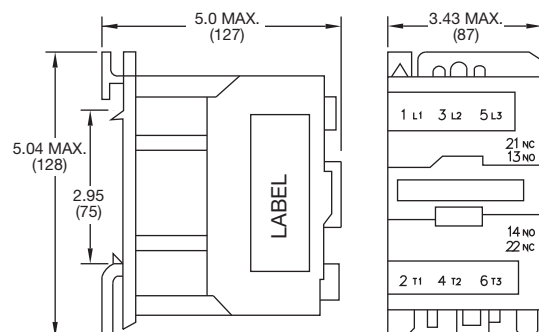
PBC-025



PBC-032

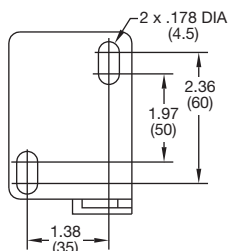


PBC-040, PBC-050 & PBC-065

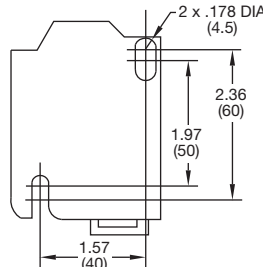


PBC-080

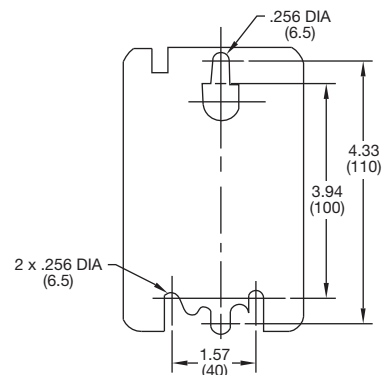
Mounting Dimensions



PBC-009, PBC-012 & PBC-018



PBC-025 & PBC-032

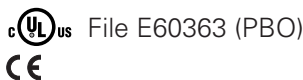


PBC-040, PBC-050, PBC-065 & PBC-080



PBO series

Bimetallic Thermal Overload Relay for PBC series IEC-Type Contactors



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 confirm the product meets the requirements for a given application.

Features

- 1 NO & 1 NC auxiliary contacts
- Manual/automatic reset
- Trip indicator
- Stop button
- Test function
- Tamper resistant cover
- Mounts directly on contactor

Auxiliary Contact Data

Arrangements: 1 Form A + 1 Form B (SPST-NO + SPST-NC).

Ratings: Insulation Voltage (U_i): 690V.

AC-14/AC-15: 1.72A / 230V, 1A / 400V.

DC-13: 0.3A / 110V, 0.15A / 220V.

Conventional Thermal Current (I_{th}): 5A.

Electrical Specifications

Trip Class (per IEC 60947-4-1): Class 10.

Rated Insulation Voltage U_i (pollution degree 3): 690V.

Rated Inpulse Withstand Voltage U_{imp} : 6,500V.

Temperature Compensation: Up to 60°C.

Permissible Rated Current: At 60°C: 100%; At 70°C: 87%.

Operating Durability

Expected Life: 3000 cycles.

Current Setting Range

Model Number	Current Setting Range RC (A)	Controlled Power (AC-3) (kW)					For Contactor Type	Fuse for Short Protection (A)	
		220V	380V	415V	440V	660V		aM	gG
PBO-09P1016	0.1 - 0.16						09 - 32A	0.25	2
PBO-09P1625	0.16 - 0.25						09 - 32A	0.5	2
PBO-09P2540	0.25 - 0.40						09 - 32A	1	2
PBO-09P4063	0.40 - 0.63				0.37		09 - 32A	1	2
PBO-09P6310	0.63 - 1.0				0.55		09 - 32A	2	4
PBO-09D1016	1.0 - 1.6		.37		0.55	0.75 1.11	09 - 32A	2	4
PBO-09D1625	1.6 - 2.5	.37	0.55 0.75	1.1	0.75 1.1	1.5	09 - 32A	4	6
PBO-09D2540	2.5 - 4	0.55 0.75	1.1 1.5	1.5	1.5	2.2 3	09 - 32A	6	10
PBO-09D4060	4.0 - 6	1.1	2.2	2.2	2.2	4	09 - 32A	8	16
PBO-09D5580	5.5 - 8	1.5	3	3 3.7	3 3.7	5.5	09 - 32A	12	20
PBO-09A0710	7 - 10	2.2	4	4	4	7.5	09 - 32A	12	20
PBO-12A0913	9 - 13	3	5.5	5.5	5.5	10	12 - 32A	16	25
PBO-18A1218	12 - 18	4	7.5	9	9	15	18 - 32A	20	35
PBO-25A1725	17 - 25	5.5	11	11	11	18.5	25 - 32A	25	50
PBO-32A2332	23 - 32	7.5	15	15	15	22	32A	40	63
PBO-32A2836	28 - 36	10	18.5	22	22	30	32A	40	80
PBO-40A2332	23 - 32	7.5	15	15	15	22	40 - 80A	40	63
PBO-40A3040	30 - 40	10	18.5	22	22	30	40 - 80A	40	80
PBO-50A3750	37 - 50	11	22	25	25	37	50 - 80A	63	10
PBO-65A4865	48 - 65	15	25	30	30	45	65 - 80A	63	10
PBO-65A5570	55 - 70	18.5	30	37	37	55	65 - 80A	80	125
PBO-80A6380	63 - 80	22	37	45	45	75	80A	80	125

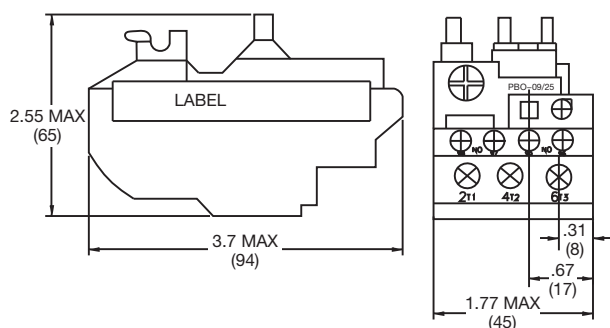
Ordering Information

Typical Part No. ►		PBO	-09	A0710
1. Type: PBO = Bimetallic Thermal Overload Relay for use with PBC series IEC Contactors				
2. Contactor Size For Which Overload Relay is Designed (AC-3 Main Contact Rating of Contactor): 09 = 9-32A 12 = 12-32A 18 = 18-32A 25 = 25-32A 32 = 32A 40 = 40-80A 50 = 50-80A 65 = 65-80A 80 = 80A				
3. Overload Relay Rating (Amps): For this size... These rating ranges are available...				
9-32A contactors:	P1016 = 0.1 to 0.16A	P4063 = 0.4 to 0.63A	D1625 = 1.6 to 2.5A	D5580 = 5.5 to 8.0A
	P1625 = 0.16 to 0.5A	P6310 = 0.63 to 1.0A	D2540 = 2.5 to 4.0A	A0710 = 7.0 to 10.0A
	P2540 = 0.25 to 0.4A	D1016 = 1.0 to 1.6A	D4060 = 4.0 to 6.0A	A0913 = 9.0 to 13.0A
12-32A contactors:	A0913 = 9.0 to 13.0A			
18-32A contactors:	A1218 = 12.0 to 18.0A			
25-32A contactors:	A1725 = 17.0 to 25.0A			
32A contactors:	A2332 = 23.0 to 32.0A	A2836 = 28.0 to 36.0A		
40-80A contactors:	A2332 = 23.0 to 32.0A	A3040 = 30.0 to 40.0A		
50-80A contactors:	A3750 = 37.0 to 50.0A			
65-80A contactors:	A4865 = 48.0 to 65.0A	A5570 = 55.0 to 70.0A		
80A contactors:	A6380 = 63.0 to 80.0A			

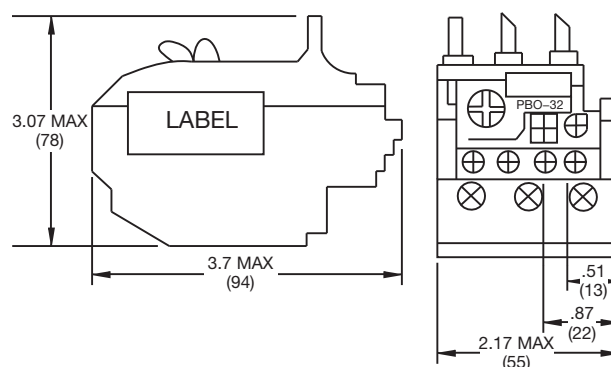
NOTES: All models are RoHS compliant.

PBO-32A2836, PBO-65A4865, PBO-65A5570 and PBO-80A6380 are still to be submitted for UL testing. These models are not UL Listed.

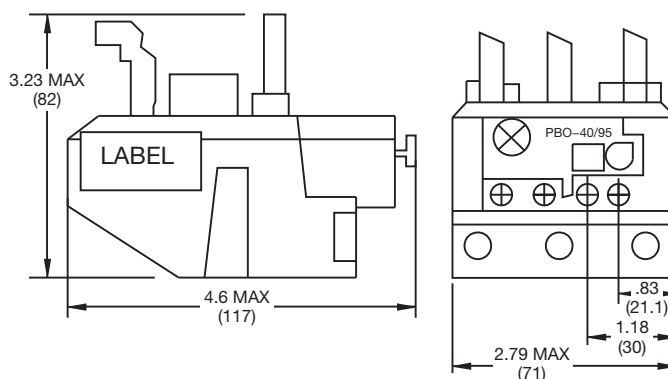
Outline Dimensions



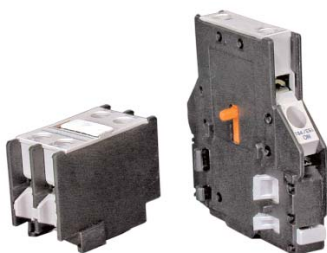
PBO-09, PBO-12, PBO-18 & PBO-25



PBO-32



PBO-40, PBO-50, PBO-65 & PBO-80



PBA series

Auxiliary Contact Blocks for use with PBC series IEC-Type Contactors



Features

- One, two and four pole models
- Snap mount directly to front or side of contactor.

Auxiliary Contact Data

Arrangements: 1 Form A (SPST-NO), 1 Form B (SPST-NC), 1 Form A + 1 Form B (SPST-NO + SPST-NC), 2 Form A (DPST-NO), 2 Form B (DPST-NC), 2 Form A + 2 Form B (DPST-NO + DPST-NC), 4 Form A (4PST-NO), 4 Form B (4PST-NC), 3 Form A + 1 Form B (3PST-NO + SPST-NC).

Material: Cu-AgNi 90/10.

Maximum Rated Load: AC-15, 360VA; DC-13, 33W.

Rated Operating Voltage (U_i): AC, 380V; DC, 220V.

Rated Insulation Voltage (U_i): 690V.

Minimum Making Load: 24V - 10mA.

Conventional Thermal Current: 10A.

Electrical Specifications

Insulation Resistance: 10 megohms.

Electrical Life: 1,200,000 cycles (2400 cycles/hr).

Mechanical Specifications

Termination: Finger safe (IP 20) screw clamps.

Mounting: Mount directly to contactor.

Mechanical Life: 10,000,000 cycles (2400 cycles/hr).

Environmental Data

Temperature Range:

Operating: -5°C to +40°C at RH of 50% or less. Higher humidity is permissible at lower temperatures.

Storage: -25°C to +55°C

Maximum Altitude: 2000m

Pollution Class: 3

Vibration: 2-13.2 Hz, ± 1 mm

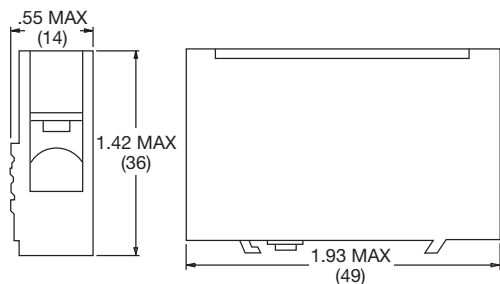
Shock Resistance: 13.2-100 Hz, ± 7 m/s²

Ordering Information

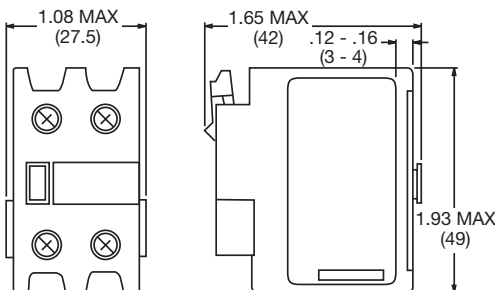
Part Number	Number of Auxiliary Contact Sets		Mounting Location	For Use on These PBC- Contactors...
	NO	NC		
PBA-01A	0	1	Front	025 - 080 (not 009, 012, 018)
PBA-10A	1	0	Front	025 - 080 (not 009, 012, 018)
PBA-11A	1	1	Front	009 - 080 (all models)
PBA-02A	0	2	Front	009 - 080 (all models)
PBA-20A	2	0	Front	009 - 080 (all models)
PBA-22A	2	2	Front	009 - 080 (all models)
PBA-31A	3	1	Front	009 - 080 (all models)
PBA-13A	1	3	Front	009 - 080 (all models)
PBA-40A	4	0	Front	009 - 080 (all models)
PBA-04A	0	4	Front	009 - 080 (all models)
PBA-11B	1	1	Side	009 - 080 (all models)
PBA-20B	2	0	Side	009 - 080 (all models)

NOTE: All models are RoHS compliant.

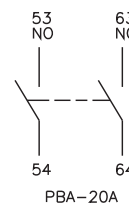
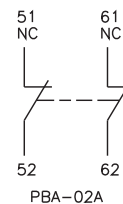
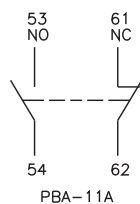
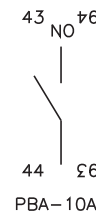
Outline Dimensions & Wiring Diagrams



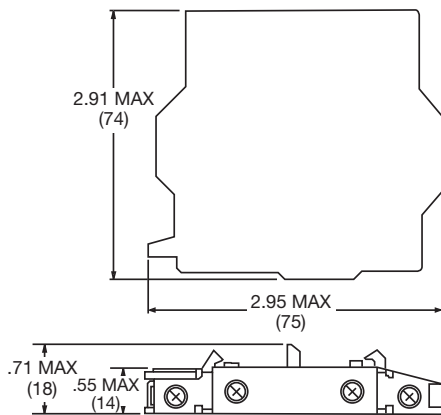
PBA-01A & PBA-10A Front Mount Auxiliary Contact Blocks



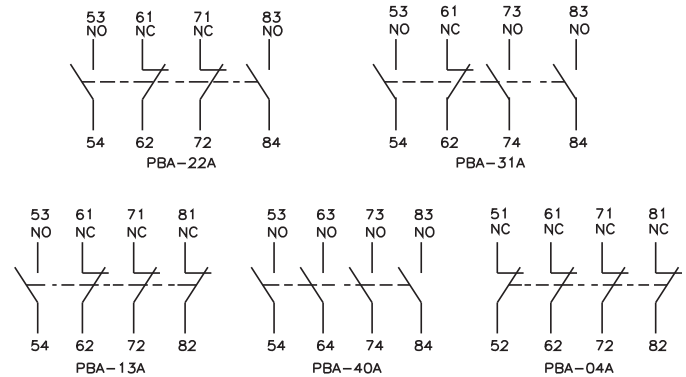
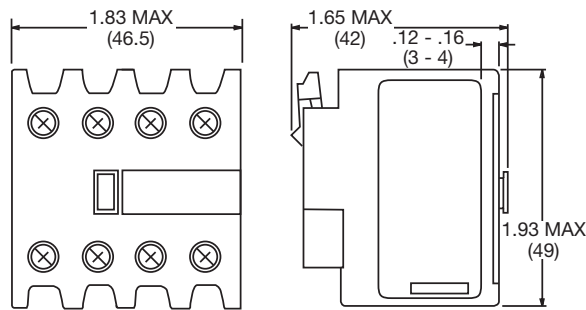
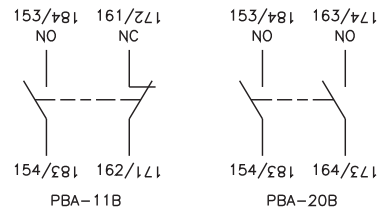
PBA-11A, PBA-02A & PBA-20A Front Mount Auxiliary Contact Blocks



Outline Dimensions & Wiring Diagrams

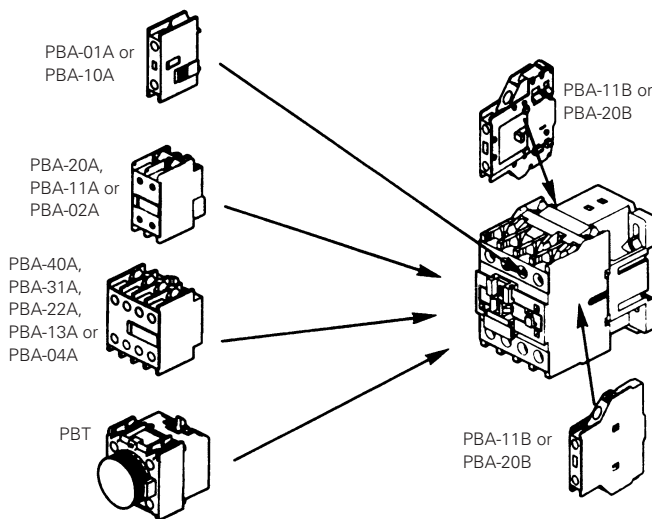


PBA-11B & PBA-20B Side Mount Auxiliary Contact Blocks

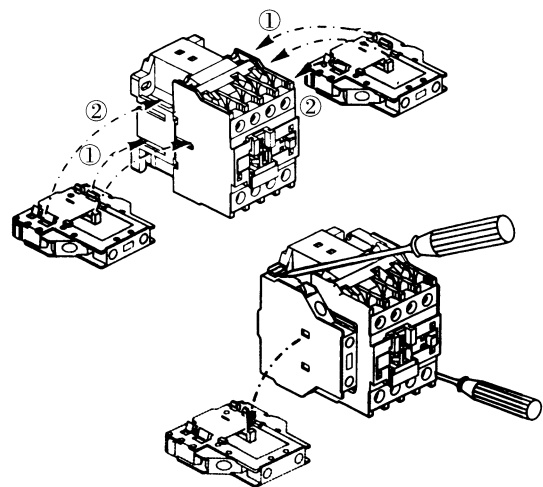


PBA-22A, PBA-31A, PBA-13A, PBA-40A & PBA-04A Front Mount Auxiliary Contact Blocks

Mounting Diagrams



NOTE: PBC contactors of different sizes will physically accommodate varying numbers of auxiliary contact blocks; however, no more than two blocks of auxiliary contacts (timed or non-timed) should be used with any PBC contactor at a given time.



NOTE: PBA auxiliary contact blocks are designed to snap onto PBC series contactors without the use of tools. A screwdriver or similar tool may be useful in removing side-mount versions of the PBA.



PBT series

Pneumatic Timer Blocks for use with PBC series IEC-Type Contactors



Features

- Delay on make or delay on break models
- Snap mount directly to front of contactor.

Auxiliary Contact Data

Arrangement: 1 Form A + 1 Form B (SPST-NO + SPST-NC).

Material: Cu-AgNi 90/10.

Maximum Rated Load: AC-15, 360VA; DC-13, 33W.

Rated Operating Voltage (U_i): AC, 380V; DC, 220V.

Rated Insulation Voltage (U_i): 690V.

Minimum Making Load: 24V - 10mA.

Conventional Thermal Current: 10A.

Timing Specifications

Time Delay Repetitive Error: ±5%.

Time Delay Stability Error: ±15%.

Time Delay Temperature Error: ±0.3%.

Electrical Specifications

Insulation Resistance: 10 megohms.

Electrical Life: 500,000 cycles (1200 cycles/hr).

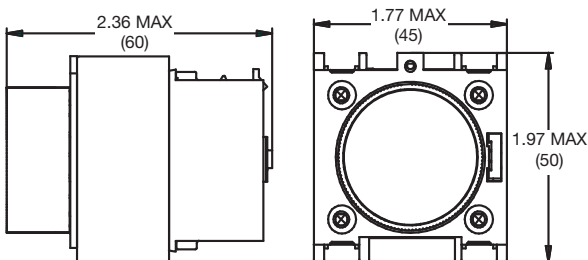
Mechanical Specifications

Termination: Finger safe (IP 20) screw clamps.

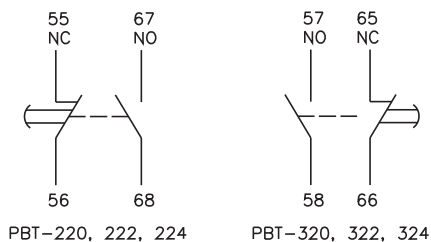
Mounting: Mount directly to contactor.

Mechanical Life: 3,000,000 cycles (1200 cycles/hr).

Outline Dimensions



Wiring Diagrams



Environmental Data

Temperature Range:

Operating: -5°C to +40°C at RH of 50% or less. Higher humidity is permissible at lower temperatures.

Storage: -25°C to +55°C

Maximum Altitude: 2000m

Pollution Class: 3

Vibration: 2-13.2 Hz, ±1mm

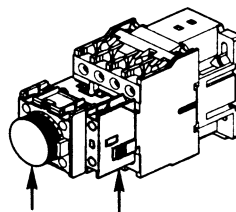
Shock Resistance: 13.2-100 Hz, ±7m/s²

Ordering Information

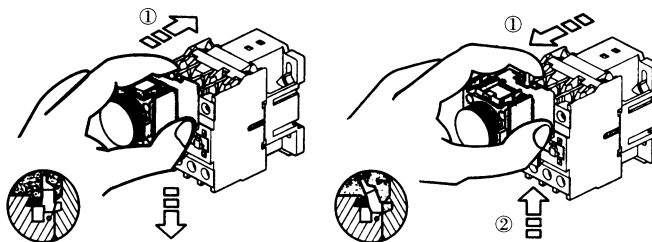
Part Number	Number of Auxiliary Contact Sets		Delay Range Seconds	Delay Method (Timing Function)
	NO	NC		
PBT-220	1	1	0.1 - 3.0	Delay on Make
PBT-222	1	1	0.1 - 30.0	Delay on Make
PBT-224	1	1	10.0 - 30.0	Delay on Make
PBT-320	1	1	0.1 - 3.0	Delay on Break
PBT-322	1	1	0.1 - 30.0	Delay on Break
PBT-324	1	1	10.0 - 30.0	Delay on Break

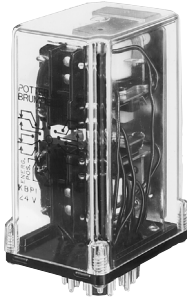
NOTE: All PBT models may be used with any PBC series contactor. All models are RoHS compliant.

Mounting Diagrams



PBT PBA-01A or PBA-10A may also be mounted to some PBC models along with the PBT. Other PBC models will only accept the side-mount PBA-11B or PBA-20B when the PBT is used.





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.

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.

Initial Dielectric Strength

Between Open Contacts: 500V rms.

Between Adjacent Contacts: 1,000V rms.

Between Contacts and Coil: 1,000V rms.

Environmental Data

Temperature Range:

Storage: 105°C.

Operating: -45°C to +85°C.

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.

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.

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.

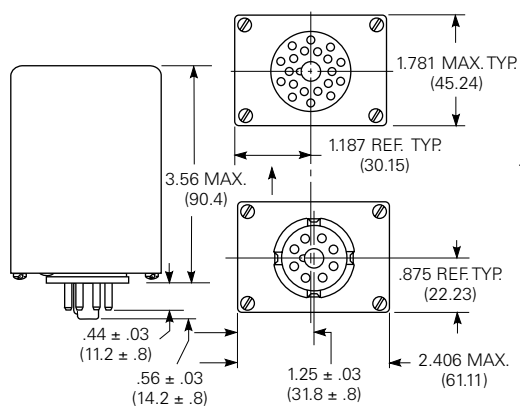
KB-17AG-120
KB-17DG-12

KBP-11AG-120
KBP-11DG-24

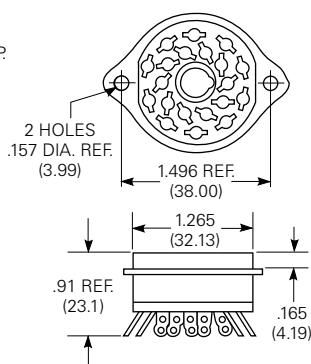
KBP-11DG-110
KBP-20AG-120

Outline Dimensions

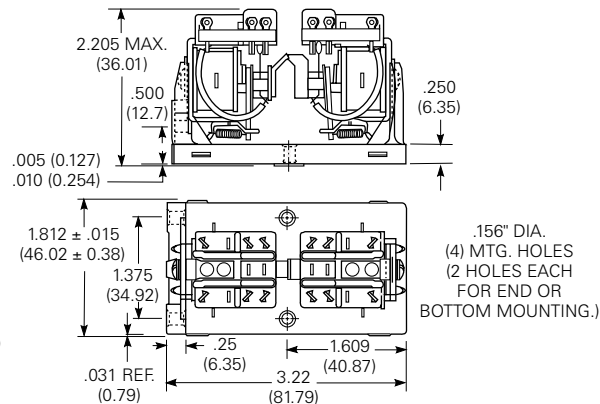
Dust Cover



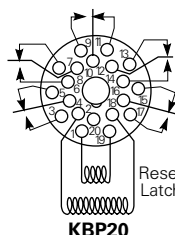
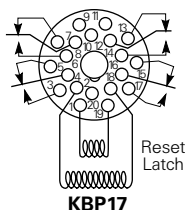
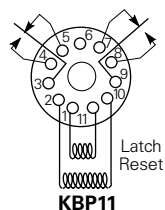
27E928 Socket



KB-Open Style



Wiring Diagrams (Bottom Views)



Note: Shown with reset coil energized last.



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: Silver-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 $\pm 10\% \dagger$	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	—
AC Coils 50/60 Hz.	24	350	18.0	—
	48	1400	36.0	—
	Single Coil with Diodes**			
	24	176	20.4	680 Ω
	120	3,700	102.0	15,000 Ω
	240	17,900	204.0	68,000 Ω
	Dual Coil			
	24	Latch	Reset	20.4
		100	250	
		2525	7800	
	120			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.

\dagger $\pm 15\%$ 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.

Environmental 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.

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

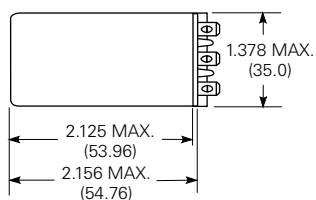
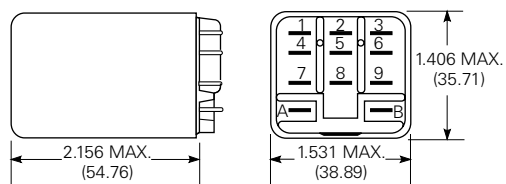
Dual coil—12-48VDC, 24 or 120VAC (to 2 Form C)

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

KUL-5A15S-120
KUL-11A15S-24KUL-11A15S-120
KUL-11D15D-12KUL-11D15D-24
KUL-11D15S-12

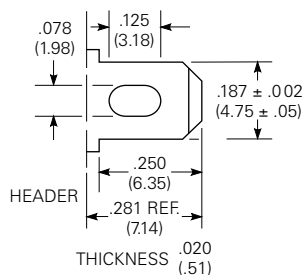
KUL-11D15S-24

Outline Dimensions

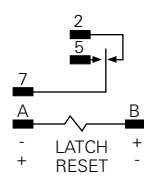
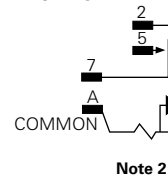
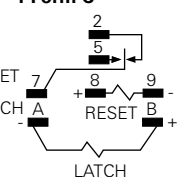
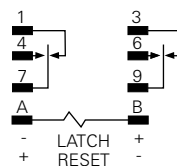
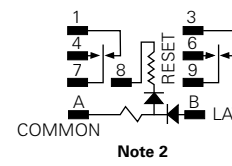
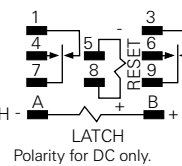
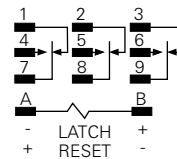
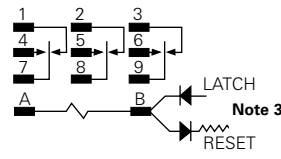


See KU series drawings for bracket mount case.

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.

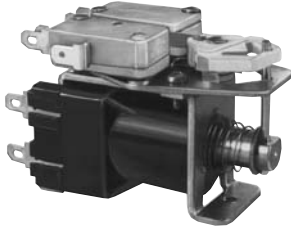
S89R/S90R series

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

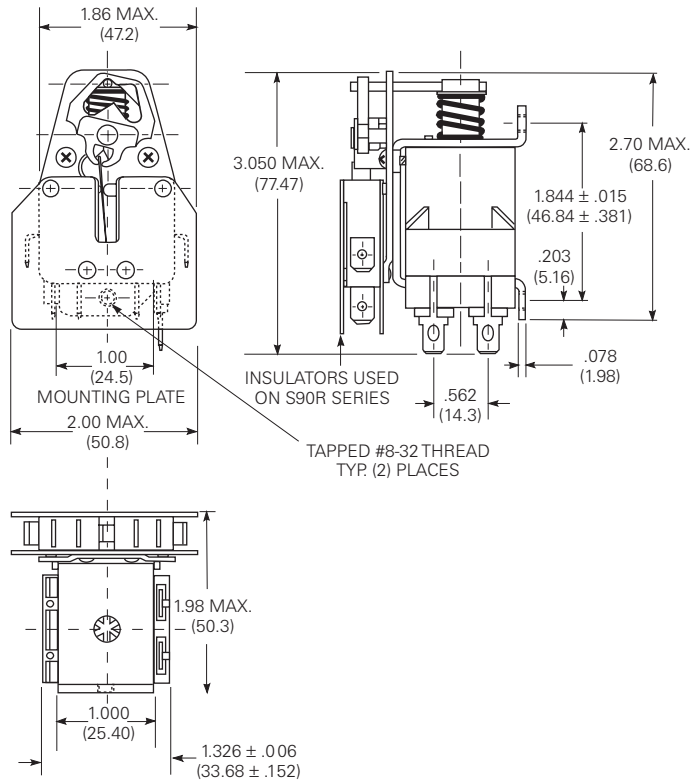
Typical Part No. ▶		S89R	5	A	B	D	1	-24
1. Basic Series: S89R = 15A S90R = 20A								
2. Contact Arrangement: 5 = SPDT 11 = DPDT								
3. Coil Input: A = AC D = DC								
4. Coil Terminal Style: A = .187" (4.75mm) Quick connect/solder. B = .250" (6.35mm) Quick connect/solder. P = Dust cover with octal plug-in base. (S89R only.)								
5. Switch Terminal Style: C = .187" (4.75mm) Quick connect.* D = .250" (6.35mm) Quick connect. (S90 only) 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.

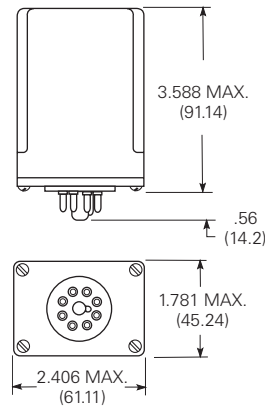
S89R5ABD1-24	S89R11AAC1-24	S89R11ABD1-120	S89R11DAC1-24	S90R5ABD1-120
S89R5ABD1-120	S89R11AAC1-120	S89R11APP1-120	S89R11DBD1-12	S90R11ABD1-24
S89R5DBD1-12	S89R11ABD1-24	S89R11DAC1-12	S89R11DBD1-24	S90R11ABD1-120

Outline Dimensions

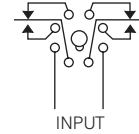
Open Relays



Enclosed Relays S89 Series

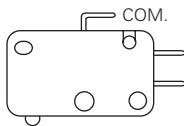


Wiring Diagram



Switch Terminal Configuration

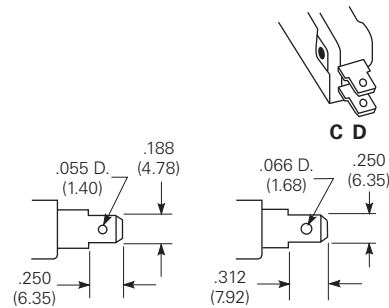
Style 1



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 S90R





600 series

15 Amp Sensitive PC Board Relay

File E38802

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, instrumentation, 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 cadmium oxide, fine 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		
3	82	38	2.25	0.3
6	327	150	4.5	0.6
9	736	338	6.75	0.9
12	1,309	600	9.0	1.2
18	2,945	1,350	13.5	1.8
24	5,236	2,400	18.0	2.4
28	7,127	3,267	21.0	2.8
48	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.

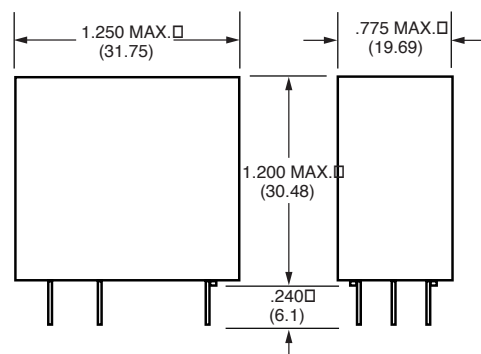
Ordering Information

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: 3 = 3VDC 9 = 9VDC 18 = 18VDC 28 = 28VDC 6 = 6VDC 12 = 12VDC 24 = 24VDC 48 = 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							

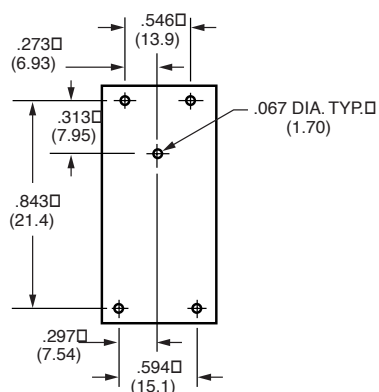
Our authorized distributors are more likely to stock the following items for immediate delivery.

None at present.

Outline Dimensions

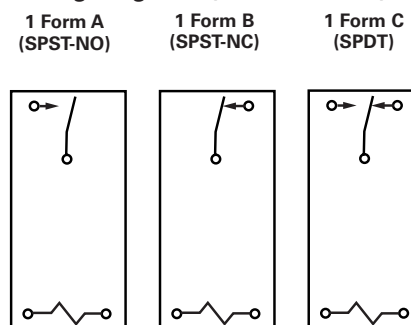


PC Board Layout (Bottom View)



Note: On single throw models, only necessary terminals are present.

Wiring Diagrams (Bottom Views)



Note: On single throw models, only necessary terminals are present.



RT series (DC Coil)

16 Amp PC Board Miniature Relay

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 @ 25°C with relay properly vented. Remove vent nib after soldering and cleaning.

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
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.

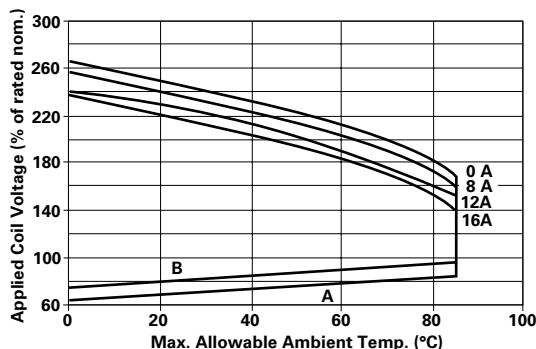
Initial Insulation Resistance: 10,000 megohms, min., at 25°C, 500VDC and 50% rel. humidity.

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.

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). | B = 1 pole 12A, Pinning 3.5mm, sealed (Code 1). |
| 2 = 1 pole 12A, Pinning 5mm, flux-tight (Code 2). | C = 1 pole 12A, Pinning 5mm, sealed (Code 2). |
| 3 = 1 pole 16A, Pinning 5mm, flux-tight (Code 3). | D = 1 pole 16A, Pinning 5mm, sealed (Code 3). |
| 4 = 2 pole 8A, Pinning 5mm, flux-tight (Code 5). | 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	009 = 9VDC	018 = 18VDC	048 = 48VDC	110 = 110VDC
006 = 6VDC	012 = 12VDC	024 = 24VDC	060 = 60VDC	

5. Coil Insulation Classification, Brand and Case Color

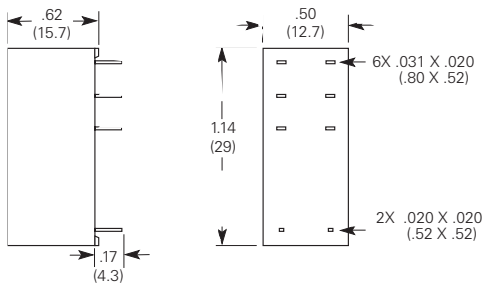
F = UL Class F, Potter & Brumfield Brand, Black Case

Leave Blank = UL Class F, Schrack Brand, Orange Case

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

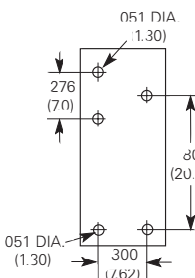
RT114012F	RTB14012F	RTB34024F	RTD14005F	RTD34012F	RTE24005F	RTE44012F
RT114024F	RTB14024F	RT314012F	RTD14012F	RT424012F	RTE24012F	RTE44024F
RTB14005F	RTB34012F	RT314024F	RTD14024F	RT424024F	RTE24024F	

Outline Dimensions



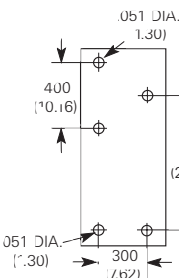
PC Board Layouts (Bottom View)

1 Pole 12A 3.5mm



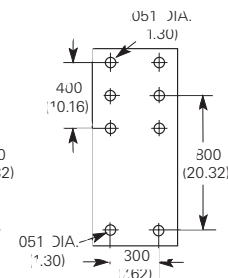
Code 1

1 Pole 12A 5mm



Code 2

1 Pole 16A 2 Pole 8A 5mm

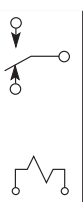


Code 3 & 5

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.

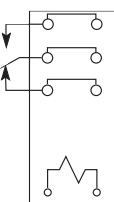
Wiring Diagrams (Bottom View)

1 Pole 12A



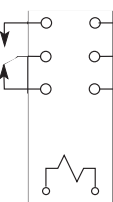
Codes 1 & 2

1 Pole 16A



Code 3

2 Pole 8A



Code 5

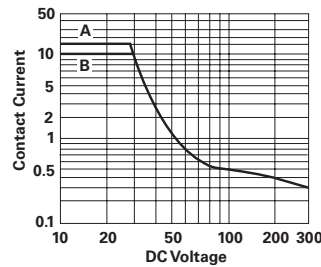
Note: On single throw models, only necessary terminals are present.

Dimensions are shown for reference purposes only.

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

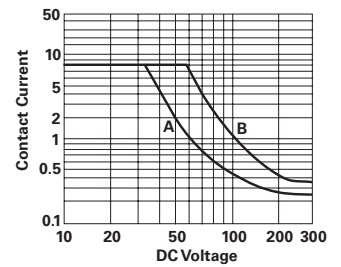
Breaking Capacity

1 Pole



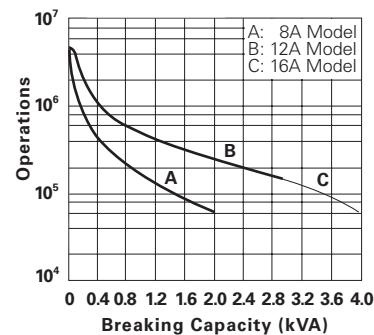
A: 16A Version.
 B: 12A Version.

2 Pole



A: 1 Contact.
 B: 2 Contacts in series.

Contact Life for Resistive AC Load (Typical)



Note: Data from 250VAC @ 70°C.



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: 10⁸ 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: 35°C 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.

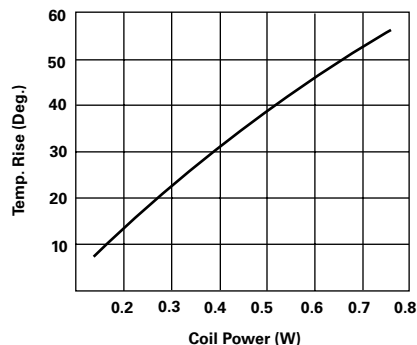
Mechanical Data

Termination: Printed circuit terminals.

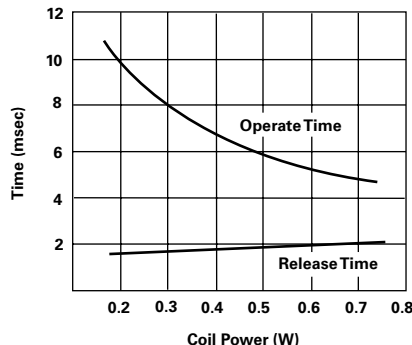
Enclosure (94V-0 Flammability Ratings):

Weight: 0.42 oz. (12g).

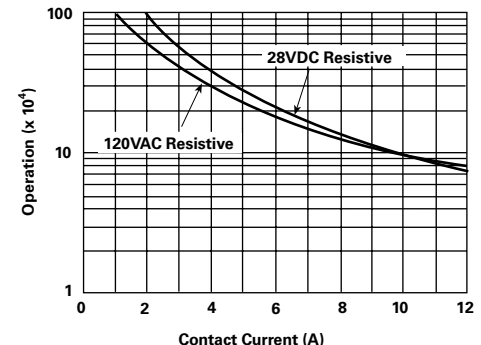
Figure 1 - Coil Temperature Rise



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.

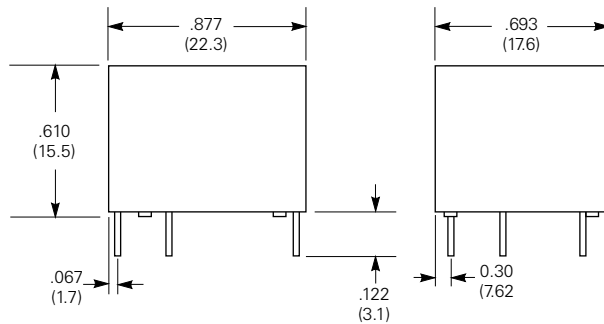
Our authorized distributors are more likely to maintain the following items in stock for immediate delivery.

T73S5D15-05

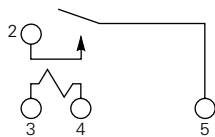
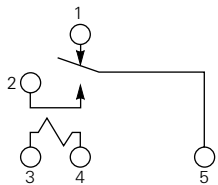
T73S5D15-12

T73S5D15-24

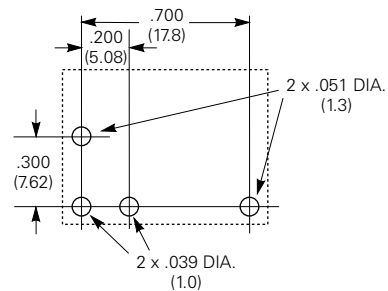
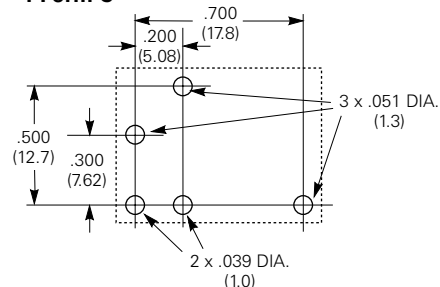
Outline Dimensions



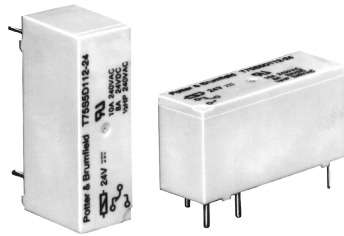
Wiring Diagrams (Bottom Views)

1 Form A**1 Form C**

Suggested PC Board Layouts (Bottom Views)

1 Form A**1 Form C**

Sensitive, Low Profile, Hi-Current Relay Designed to Meet International Standards



Features

- High sensitivity – nominal coil power requirement is as low as 212mW.
- Low profile, .591 in. (15mm) tall case uses only .465 in² (3cm²) 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)

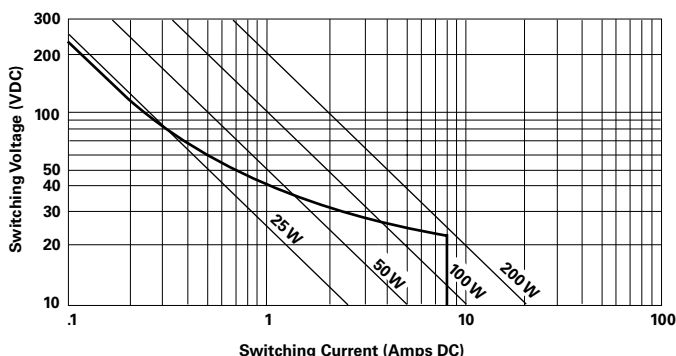
Maximum Switched Power: 200W, DC; 2,000VA, AC.

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



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.

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.

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: 85°C 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

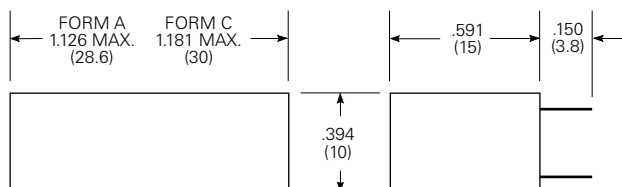
Our authorized distributors are more likely to maintain the following items in stock for immediate delivery.

T75S5D112-05

T75S5D112-12

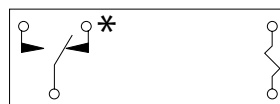
T75S5D112-24

Outline Dimensions



CONTACT TERMINALS: .023 x .040 (.58 x 1.02) REF.
COIL TERMINALS: .024 (.61) DIA. REF.

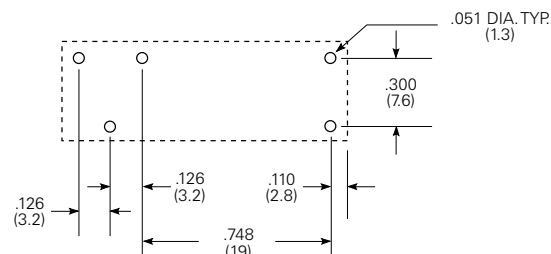
Wiring Diagram (Bottom View)



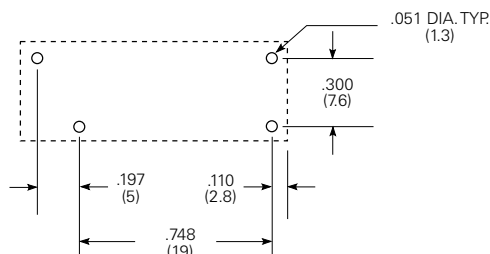
* ON SINGLE THROW MODELS,
ONLY NECESSARY TERMINALS
ARE PRESENT.

PC Board Layouts (Bottom Views)

1 Form C



1 Form A





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: 10⁸ 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: Contact Rating 3: -40°C to +105°C.

Contact Rating 10: -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 board.

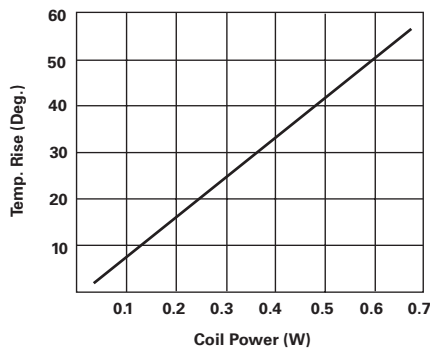
Enclosures (94V-0 Flammability Ratings):

T77S: Immersion cleanable.

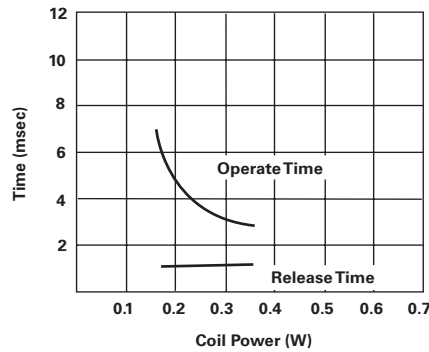
T77V: Vented, flux-tight, plastic cover.

Weight: 0.36 oz. (9g).

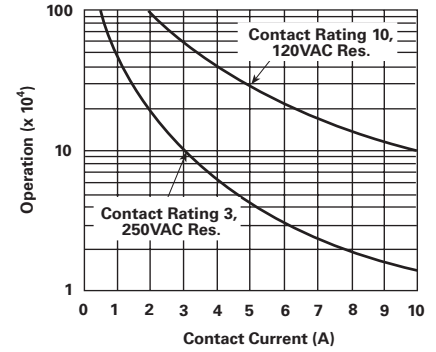
Figure 1 - Coil Temperature Rise



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.

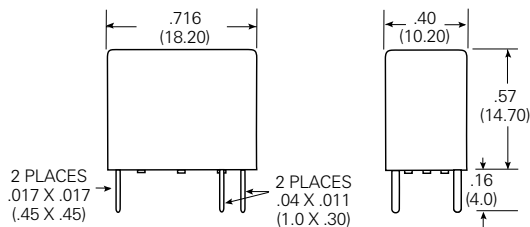
T77V1D3-12
T77V1D3-24

T77V1D10-12
T77V1D10-24

T77S1D3-12
T77S1D3-24

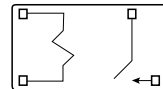
T77S1D10-12
T77S1D10-24

Outline Dimensions

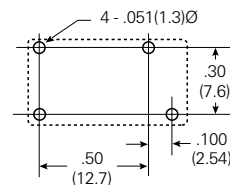


Wiring Diagram (Bottom View)

1 Form A



Suggested PC Board Layout (Bottom View)





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: 10⁸ ohms min. @ 500VDC.

Coil Data @ 20°C

Voltage: 3 to 48VDC.

Nominal Power: 360 milliwatts.

510 milliwatts for 48VDC coil.

Coil Temperature Rise: 35°C 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.

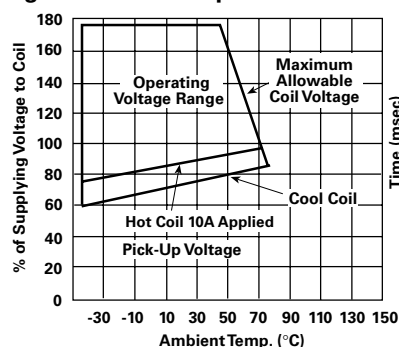
Enclosure (94V-0 Flammability Ratings):

T7CS: Immersion cleanable with knock-off nib.

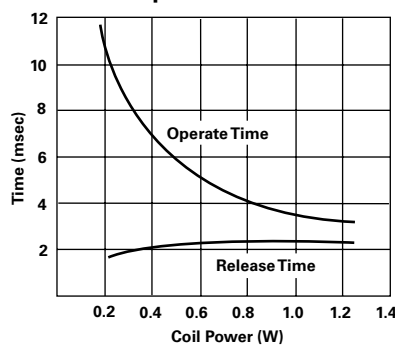
T7CV: Vented, flux-tight, plastic cover with knock-off nib.

Weight: 0.42 oz. (12g).

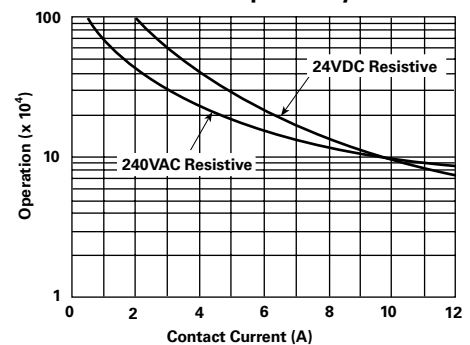
Figure 1 - Coil Temperature Rise



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

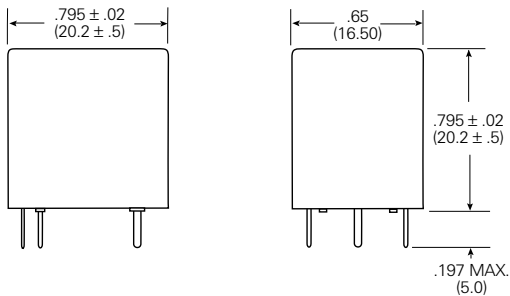
Typical Part Number ►				T7C	V	5	D	-24
1. Basic Series: T7C = Miniature power relay.								
2. Enclosure: V = Vented (Flux-tight)* S = Immersion cleanable case with knock-off nib.								
3. Contact Arrangement: 1 = 1 Form A (SPST-NO) 5 = 1 Form C (SPDT)								
4. Coil Input: D = DC Voltage								
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

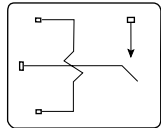
Outline Dimensions



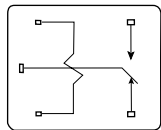
Movable Contact Terminal:
.012 x .039 (0.3 x 1.0)
Stationary Contact Terminals:
.012 x .039 (0.3 x 1.0)
Coil Terminals:
.022 x .022 (.56 x .56)

Wiring Diagrams (Bottom Views)

1 Form A

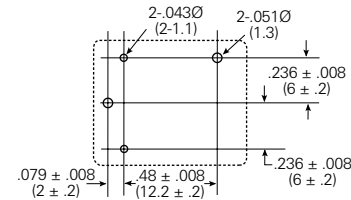


1 Form C

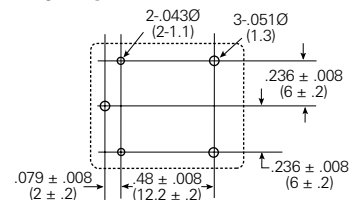


Suggested PC Board Layouts (Bottom Views)

1 Form A

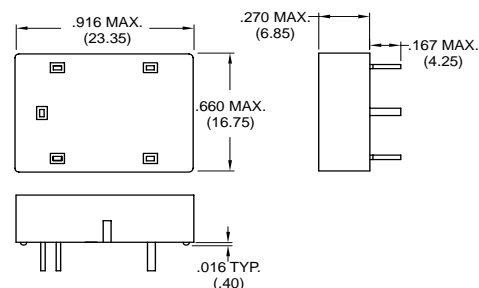


1 Form C



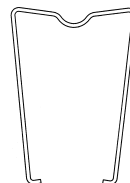
Socket

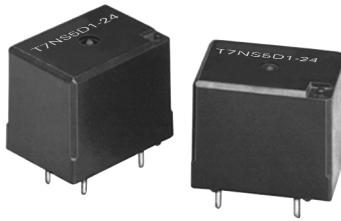
27E1064 socket is rated 10A @ 300VAC. UL Recognized for US and Canada. Designed to fit same suggested board layout as relay.



Hold-Down Spring

20C430 spring is designed to secure T7C relay in 27E1064 socket.





T7N series

10 Amp Miniature
PC Board Relay

UL File E22575

SP 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: 10⁸ 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).

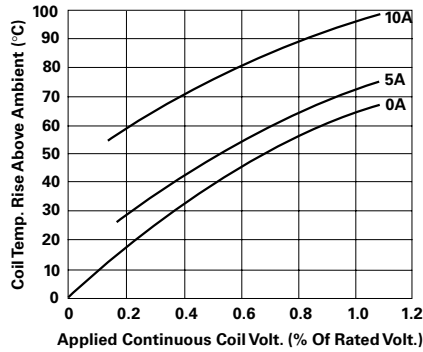
Environmental Data

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.

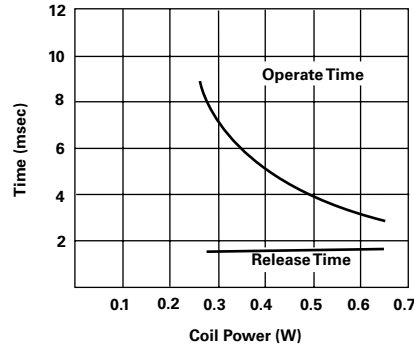
Mechanical Data

Termination: Printed circuit terminals.**Enclosure (UL 94V-0 Flammability Ratings):****T7NS:** Immersion cleanable case with knock-off nib for ventilation.**T7NV:** Vented, flux-tight plastic cover.**Weight:** 0.38 oz. (11g) approximately.

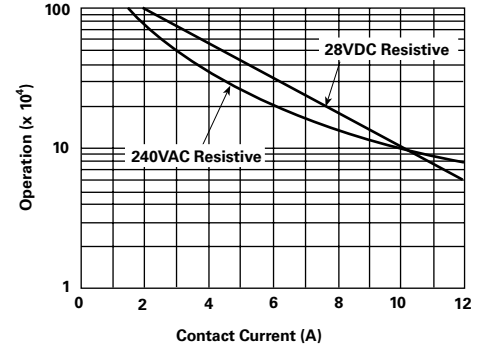
Figure 1 – Coil Temperature Rise



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

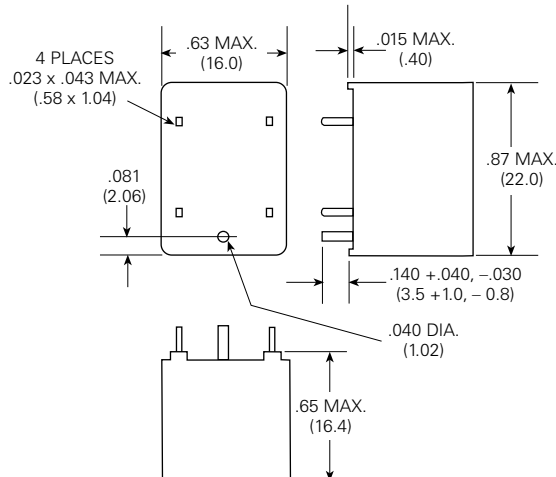
* Not suitable for immersion cleaning.

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

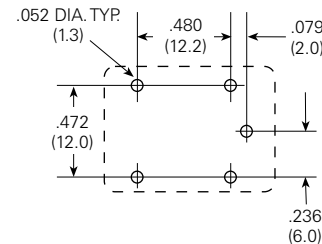
T7NS1D1-12 T7NS5D1-05 T7NS5D1-24
T7NS1D1-24 T7NS5D1-12 T7NS5D1-48

Outline Dimensions

Tolerance (unless otherwise noted): 3 decimal: $\pm .010$ ($\pm .254$); 2 decimal: $\pm .015$ ($\pm .381$).

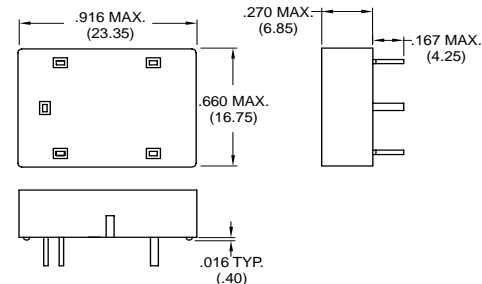


Suggested PC Board Layout (Bottom View)

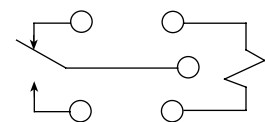


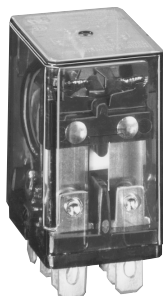
Socket

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)





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.

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

Initial Dielectric Strength

Between Open Contacts: 1,000V rms.

Between Adjacent Contacts: 1,500V rms.

Between Contacts and Coil: 1,500V rms.

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).

Coil Data

Nominal Voltage	DC Coils		AC Coils	
	Resistance in Ohms $\pm 10\%$	Nominal Current in Milliamps	Resistance in Ohms $\pm 15\%$	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.

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.

Environmental Data

Temperature Range:

Storage: -60°C to +105°C.

Operating: -45°C to +70°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

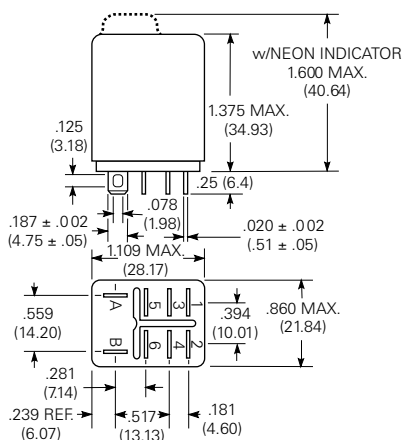
Typical Part No. ►	K10	P	-11	D	1	5	-6
1. Basic Series: K10 = 15 amp miniature relay.							
2. Cover: P = Polycarbonate (smoke color).							
3. Contact Arrangement: 11 = 2 Form C (DPDT)							
4. Coil Input: A = 50/60 Hz. AC D = DC							
5. Mounting & Termination: 1 = Socket mount; .187" (4.75mm) quick 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.

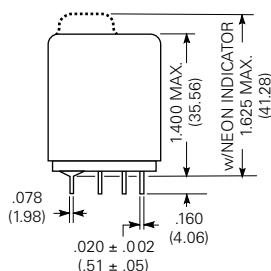
K10P-11A15-6	K10P-11D15-6	K10P-11D55-24
K10P-11A15-12	K10P-11D15-12	K10P-11D55-110
K10P-11A15-24	K10P-11D15-24	K10P-11DT5-12
K10P-11A15-120	K10P-11D15-110	K10P-11DT5-24
K10P-11AT5-120	K10P-11DT5-12	

Outline Dimensions

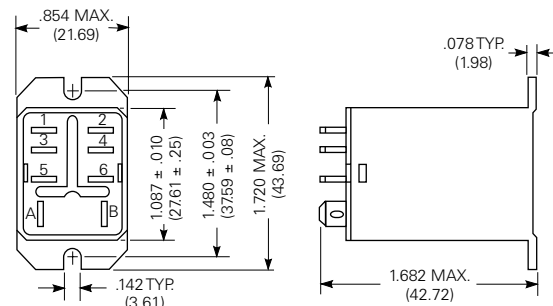
Mounting Code 1 Socket Mount



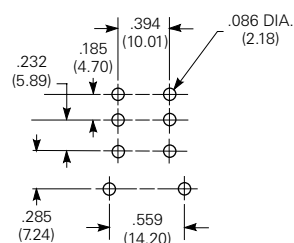
Mounting Code 5 Printed Circuit Terminals



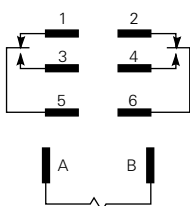
Mounting Code T



PC Board Layout



Wiring Diagram



Dimensions are shown for reference purposes only.

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

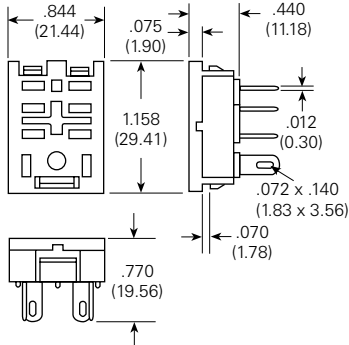
Specifications and availability
subject to change.

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

Sockets and Accessories for K10 Relays

Sockets for K10 series relays are rated 10 amps, and are UL recognized, File E59244, and CSA certified, File LR15734.

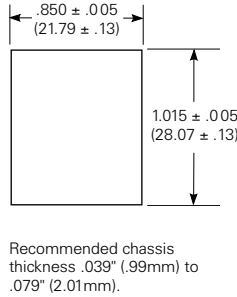
27E488 Pierced Solder Terminals



20C217 Hold Down Spring For 27E488 & 27E489

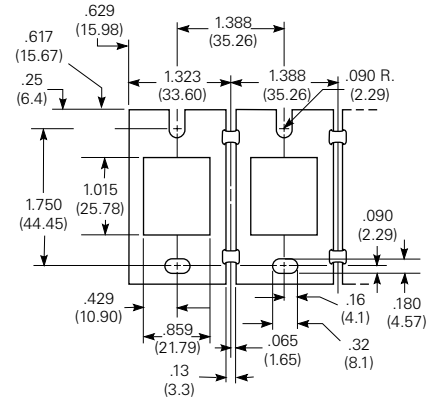


Chassis Cutout For Mounting 27E488 Socket



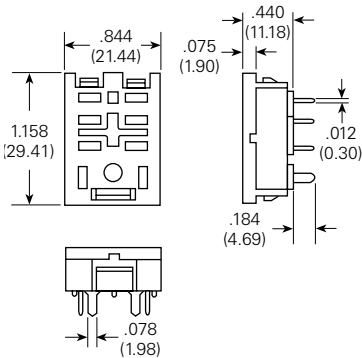
Socket punch
Greenlee part
5015115.0, Type 731R
available from
Greenlee Tool Co.,
Rockford, Illinois.

37D633 Mounting Strip

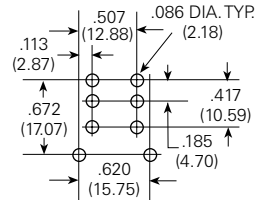


37D633 will mount eight 27E488 sockets in one length of aluminum strip measuring 10.97" x 2.25" x .062".
(278.64 x 57.15 x 1.57)

27E489 Printed Circuit Terminals



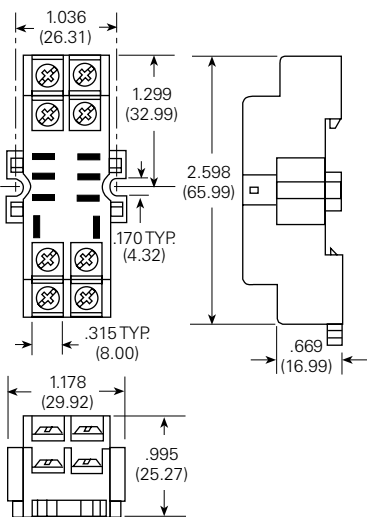
PC. Board Layout For Socket



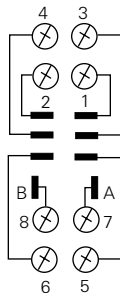
Note: PC. terminal socket will also fit PC. board layout for relay. However, in order to accomplish this, terminals must be formed accordingly.

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.

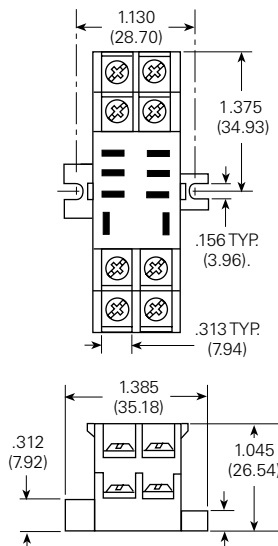
27E895 Screw Terminals, DIN Rail Snap-Mount (Use with mounting track 24A110)



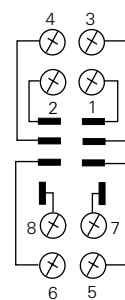
Terminal Location



27E487 Screw Terminals



Terminal Location



20C426 Hold Down Spring For 27E487 & 27E895



KRPA



KRP



KA

KRPA, KRP, KA, KR series

5 to 10 Amp General Purpose Relay

File E29244, 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

- 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.

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		
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

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

¹Listed by C.S.A. for 5A @ 120VAC 80% PF

²Listed by C.S.A. for 10A @ 120VAC 80% PF

Note: See KRPA, KRP, KA 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
	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	175
	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

Termination: **Open Models:** Solder terminals.

Enclosed Models: Octal-type plug.

Enclosure: Transparent polycarbonate.

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)
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	KA
Codes Available	Y, G, N,	Y, G, N,	Y, G,

Y = Silver, no indicator lamp
G = Silver-cadmium oxide, no indicator lamp
N = Silver-cadmium oxide, with indicator lamp*

5. 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	KRP-11AN-24	KRPA-5AG-120	KRPA-11AY-240	KRPA-14AY-240
KA-5AY-120	KRP-11AN-120	KRPA-5AY-120	KRPA-11DG-6	KRPA-14DG-12
KA-5DG-6	KRP-11AY-120	KRPA-5DG-6	KRPA-11DG-12	KRPA-14DG-24
KA-5DG-12	KRP-11DG-12	KRPA-5DG-12	KRPA-11DG-24	KRPA-14DG-48
KA-5DG-110	KRP-11DG-24	KRPA-5DG-24	KRPA-11DG-48	KRPA-14DG-110
KA-11AG-120	KRP-11DG-48	KRPA-5DY-12	KRPA-11DG-110	KRPA-14DN-24
KA-11AY-6	KRP-11DG-110	KRPA-5DY-24	KRPA-11DN-12	KRPA-14DY-24
KA-11AY-24	KRP-11DG-125	KRPA-11AG-6	KRPA-11DN-24	
KA-11AY-120	KRP-11DN-12	KRPA-11AG-12	KRPA-11DN-110	
KA-11DG-12	KRP-11DN-24	KRPA-11AG-24	KRPA-11DY-12	
KA-11DG-24	KRP-11DY-24	KRPA-11AG-120	KRPA-11DY-24	
KA-11DG-110	KRP-14AG-120	KRPA-11AG-240	KRPA-14AG-12	
KA-14AG-120	KRP-14AG-240	KRPA-11AN-12	KRPA-14AG-24	
KA-14AY-120	KRP-14AN-120	KRPA-11AN-24	KRPA-14AG-120	
KA-14DG-24	KRP-14AY-120	KRPA-11AN-120	KRPA-14AG-240	
KA-14DG-110	KRP-14DG-12	KRPA-11AN-240	KRPA-14AN-24	
KRP-5AG-120	KRP-14DG-24	KRPA-11AY-6	KRPA-14AN-120	
KRP-11AG-24	KRP-14DG-110	KRPA-11AY-12	KRPA-14AN-240	
KRP-11AG-120	KRP-14DN-24	KRPA-11AY-24	KRPA-14AY-24	
KRP-11AG-240	KRPA-5AG-24	KRPA-11AY-120	KRPA-14AY-120	



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.

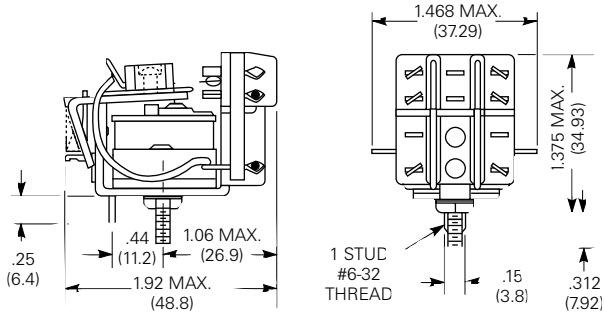
KRP-3AH-120

KRP-3DH-24

KRP-5AG-120

Outline Dimensions

KA Series

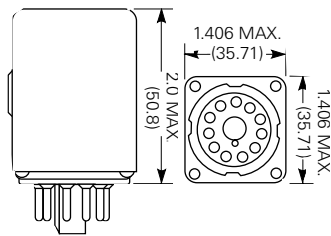


Tolerances on .XX Decimals $\pm .02$ ($\pm .5$) Unless Otherwise Specified
Tolerances on .XXX Decimals $\pm .005$ ($\pm .13$) Unless Otherwise Specified

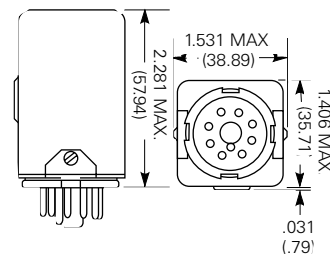
KR Series Enclosures

Type "P" Clear Dust Cover

For KRPA and KRP



For KRP3-H



Hold-Down Spring

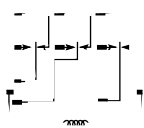
20C176 KRPA & KRP
20C206 KAP and KRP3



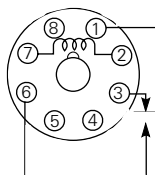
Durable stainless steel spring can be moved aside for relay removal or installation. Mounts with same machine screws or rivets that secure socket to chassis. Two .156" (3.96mm) dia. holes required.

Wiring Diagrams (Bottom Views)

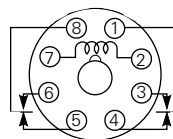
KA



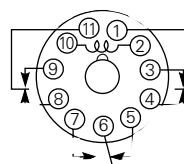
KR5
KAP5
KRP5
KRPA5



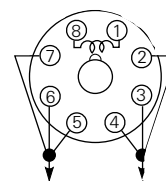
KAP11
KRP11
KRPA11



KAP14
KRP14
KRPA14



KRP3AH

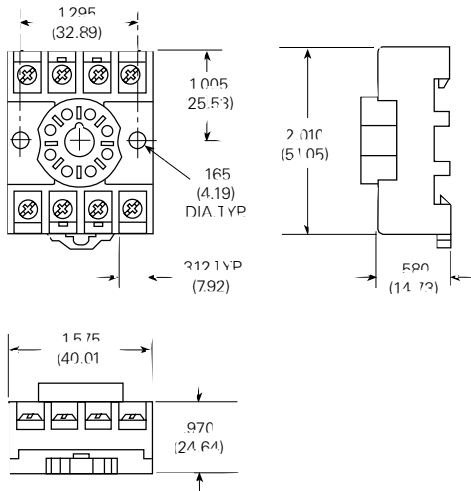


Sockets For KRP, KRPA Series Relays

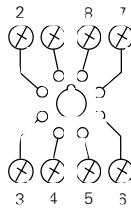
The following sockets are normally maintained in stock for immediate delivery.

Screw Terminal, DIN Rail Snap-Mount Sockets (Use with mounting track 24A110)

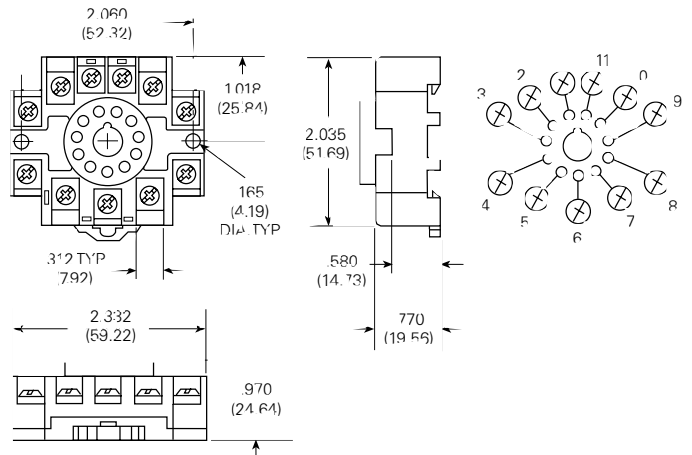
27E891 10A, 300VAC



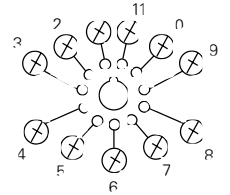
Terminal Location Top View



27E892 10A, 300VAC



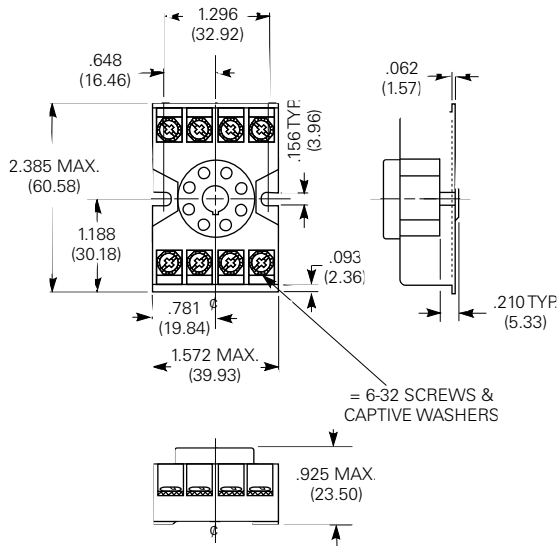
Terminal Location Top View



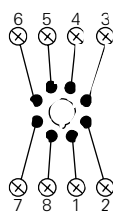
Sockets have M3.5 screw terminals which accept up to two #12 AWG wires. Rated 10 amps @ 300VAC and meets UL 94V-0.

Screw Terminal Sockets

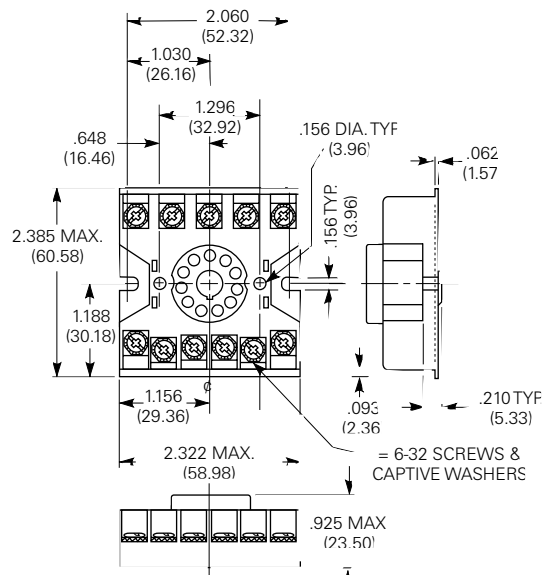
27E122 10A, 300VAC 8-pin



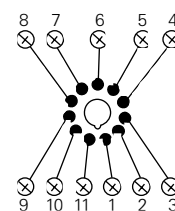
Terminal Location



27E123 10A, 300VAC 11-pin



Terminal Location





KHAU

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.
- 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.

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.

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

Nominal Voltage	DC Coils		AC Coils	
	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.

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).
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 U types; printed circuit terminals on E types.

6. Contact Material:

Relay Type	E	U
Available Codes	1, 2, 3, 6, 8	1, 2, 6, 8

*UL Rated 1/10 HP, 3A, 120VAC when used with mounting & termination 1.

1 = Silver. 3 = Gold-silver-nickel. 8 = Gold diffused silver.
2 = Silver-cadmium oxide. 6 = Bifurcated crossbar, gold overlay silver.

7. Options Available:

Relay Type	E	U
Available Codes	B (DPDT only)	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, 240VAC
6, 12, 24, 48, 110VDC

Note 1: Some KHA models available in KH construction. Specify KH instead of KHA.

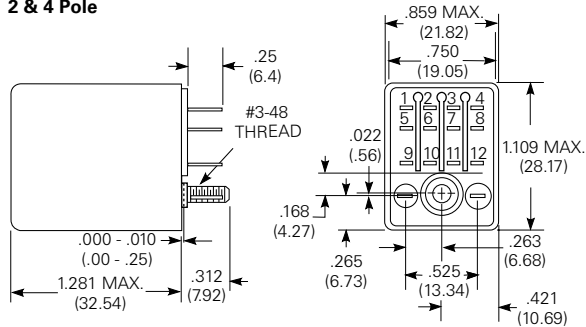
Stock Items – Our authorized distributors are likely to stock the following items.

KHAE-17D12-24	KHAU-17A16-24	KHAU-17D12-24
KHAU-11A11-120	KHAU-17A16-120	KHAU-17D12-48
KHAU-11D11-24	KHAU-17A18-120	KHAU-17D12-110
KHAU-17A11-12	KHAU-17D11-6	KHAU-17D16-12
KHAU-17A11-24	KHAU-17D11-12	KHAU-17D16-24
KHAU-17A11-120	KHAU-17D11-24	
KHAU-17A11N-120	KHAU-17D11-48	
KHAU-17A12-120	KHAU-17D11-110	
KHAU-17A13-120	KHAU-17D12-12	

Outline Dimensions

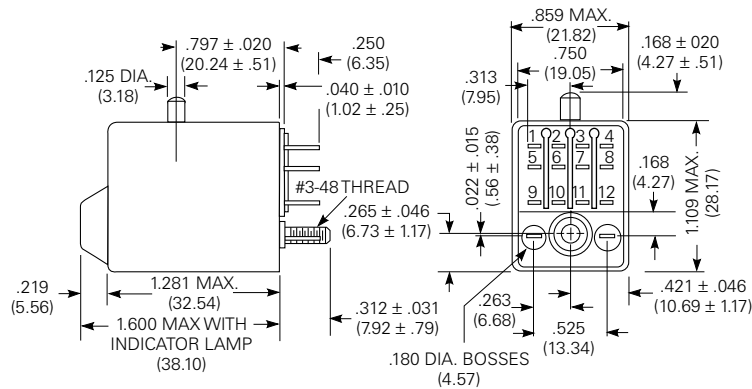
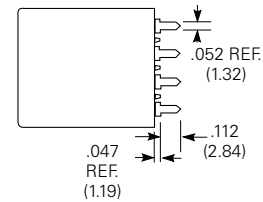
Mounting Code 1 - KHAU only.

2 & 4 Pole



PC terminal models have rivet, not stud.
Max. seated height in 27E006 socket is
1.37" (34.8mm).

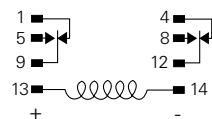
Mounting Code 1 - Neon Indicator, Push-To-Test.

Printed Circuit
Terminals

Printed circuit terminal thickness .022 (.558)

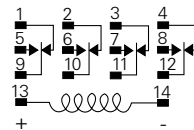
Wiring Diagrams (Bottom Views)

2 Pole

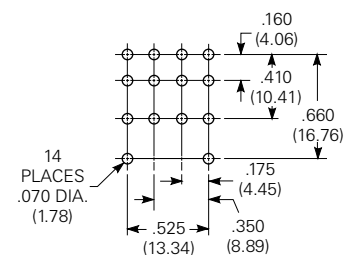


+ = Polarity for LED indicator.

4 Pole



PC Board Layout (Bottom View)



For KHAU Relays
with PC terminals
and sockets with
PC terminals

Sockets For KHA Series

Boldface sockets are normally maintained in stock for immediate delivery.

For KHAU, KHU Relays.

Relays with solder terminals are required for use with sockets.

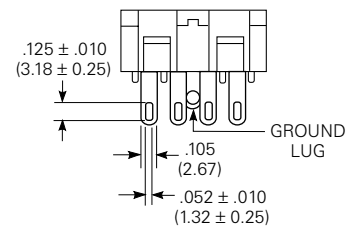
Socket Description

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	P.C. .218" (5.54mm)	No	Nylon
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		

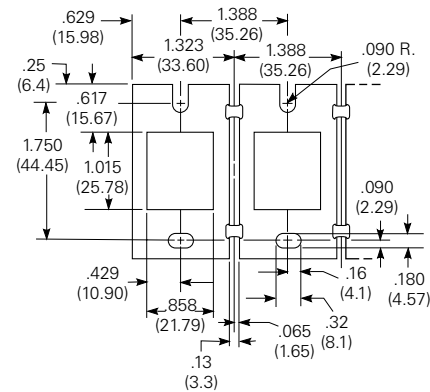
* UL Recognized, file E22575

** UL Recognized, file E59244

Pierced Solder Terminals



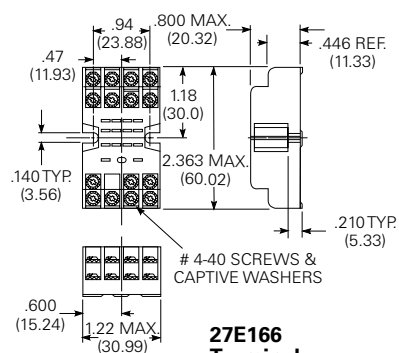
Mounting Strip 37D633



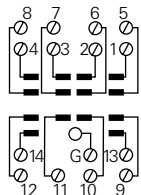
37D633 will mount eight solder terminal sockets in one length of aluminum strip measuring 10.97" x 2.25" x .062 (278.6 x 57.15 x 1.57)

Screw Terminal Socket 27E166

Relays with solder terminals are required for use with screw terminal sockets.



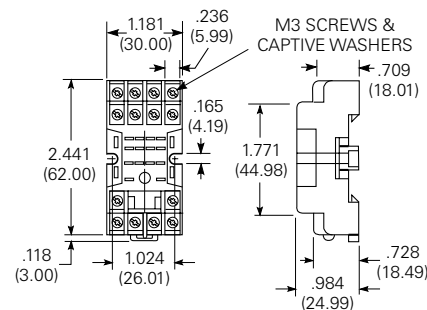
27E166 Terminal Location



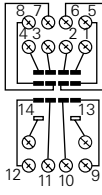
Top View

Screw Terminal DIN Rail, Snap-Mount Socket 27E894

(Use with mounting track 24A110)

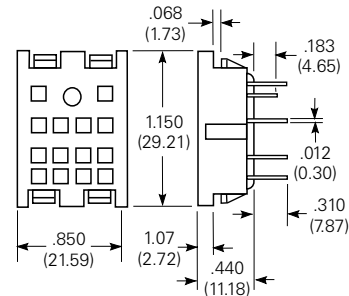


27E894 Terminal Location

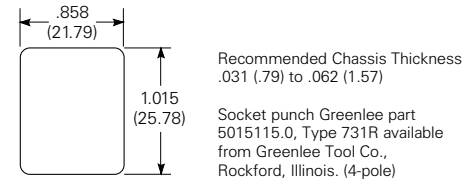


Top View

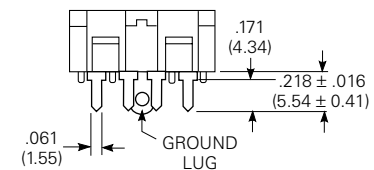
4-Pole Socket



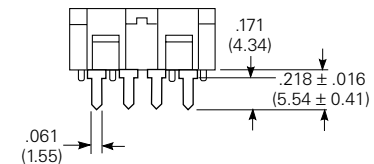
Recommended Chassis Cutouts For Mounting Sockets



Printed Circuit Terminals With Grounding Lug

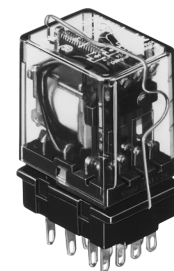


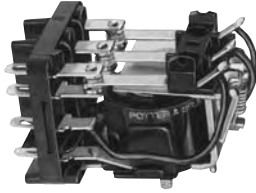
Without Grounding Lug



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.

Hold Down Spring 20C217



RoHS
Ready

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 offers 8mm contact-to-coil spacing for a higher degree of isolation.
- KUGP provides 3mm contact gap and 8mm contact-to-coil spacing.
- 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 KUEP All KUMP	10 amps @ 28VDC or 240VAC, 80% PF, 5 amp tungsten @ 120VAC, 3A 600VAC, 1/2 amp @ 120VDC.	100,000
		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 KUEP 2PST-NO KUEP 2PDT	10 amp @ 150VDC 5 amp @ 150VDC 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.

Dimensions are shown for
reference purposes only.

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

KU series

KUP Enclosed Relay

KUIP 8mm Coil to Contacts

KUGP 3mm Contact Gap, 8mm Coil to Contacts

KUEP 10 Amp 150VDC Load Switching

KUMP 15 Amp 277VAC

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.

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 Nominal	1.2 Watt		1.8 Watt	
	DC Ohms $\pm 10\%$	Nom. I ma	DC Ohms $\pm 10\%$	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 Nominal	2VA		2.7VA	
	DC Ohms $\pm 15\%$	Nom. I ma	DC Ohms $\pm 15\%$	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.

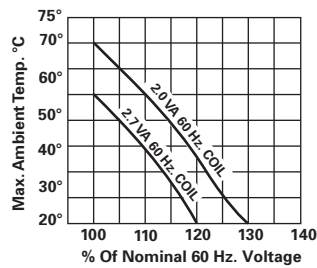
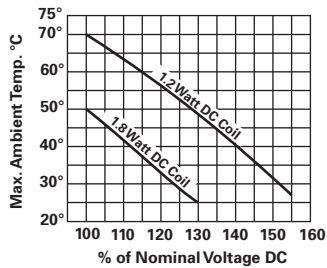
Max C°	+45°C	+50°C	+55°C	+70°C	+75°C	+80°C	+95°C
KUP	AC 3-4 pole	DC 4 pole	AC 1-2 pole	DC 1-3 pole			
KUIP				AC 3 pole		AC 1-2 pole	DC 1-3 pole
KUGP				AC 2 pole	DC 2 pole		
KUEP	AC 2 pole		AC 1 pole	DC 1-2 pole			
KUMP	AC 3 pole		AC 1-2 pole	DC 1-3 pole			

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) 14 = 3C (3PDT)

5 = 1C (SPDT) 17 = 4C (4PDT)

11 = 2C (DPDT)

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
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.		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

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.

**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.

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.

Note: All part numbers are RoHS compliant.

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

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-11D55-120	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

High Isolation Design

Typical Part No. >		KUIP KUGP	-5	A	5	5	-120
1. Basic Series & Type: KUIP = Enclosed relay with 8mm contact to coil spacing. KUGP = Enclosed relay with 3mm open contact spacing and 8mm contact to coil spacing. (Form A and Form X arrangements only)							
2. Contact Arrangement: 5 = 1 Form C (SPDT)* 7 = 2 Form A (DPST-NO) * Not offered on KUGP model.		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" (1.19mm) 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.					

Note: All part numbers are RoHS compliant.

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

KUGP-7D55-24 KUIP-14A15-120
KUIP-5A55-120 KUIP-14D15-12
KUIP-11D55-12 KUIP-14D15-24
KUIP-11D55-24

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" (1.19mm) printed circuit; silver-cadmium-oxide.					
6. Coil Voltage: To 240VAC, 50/60 Hz. or 110VDC. (For 277VAC, consult factory.)							

Note: All part numbers are RoHS compliant.

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

KUEP-3A15-120 KUEP-3D15-110 KUEP-11D15-12
KUEP-3D15-12 KUEP-7D15-24 KUEP-11D15-24
KUEP-3D15-24 KUEP-11A15-120

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.	1 = PLAIN CASE; 2 = with test button. 3 = with indicator lamp.* 4 = with test button & indicator lamp.*	A = PLAIN CASE, #6-32 STUD LOCATING TAB; B = with test button. C = with indicator lamp.* D = with test button & indicator lamp.*
2 = 2-hole bracket, #6-32 tapped.	5 = BRACKET MOUNT CASE; 6 = with test button.	E = PLAIN CASE, TAPPED CORE, LOCATING TAB; F = with test button.
3 = #6-32 tapped core, .125" (3.18mm) locating tab.	7 = with indicator lamp.* 8 = with test button & indicator lamp.*	G = with indicator lamp.* H = with test button & indicator lamp.*
4 = #6-32 tapped core, .218" (5.54mm) locating tab.	9 = STUD ON END OF PLAIN CASE.	T = TOP FLANGE CASE.
5 = #6-32 tapped core, no locating tab.	*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.)

Note: All part numbers are RoHS compliant.

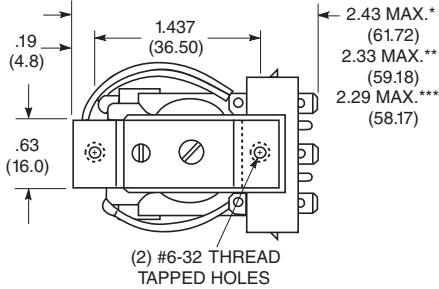
Our authorized distributors are more likely to stock the following items for immediate delivery.

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	

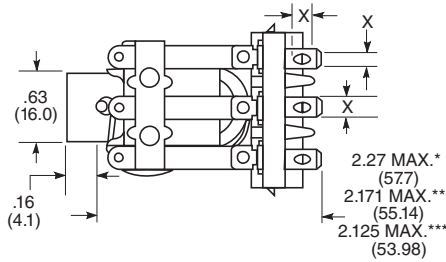
Outline Dimensions

Open Relays

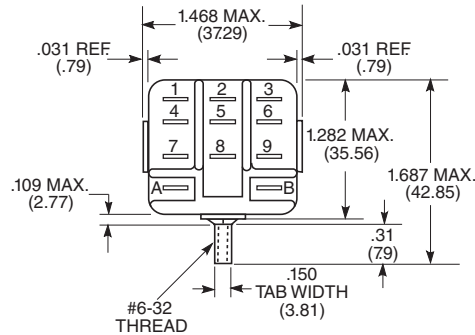
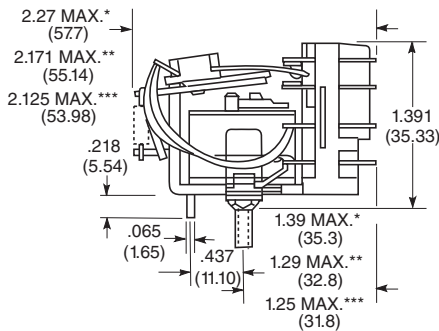
Bracket Type



X Is For Terminal Dimensions.
See Terminal Drawings.

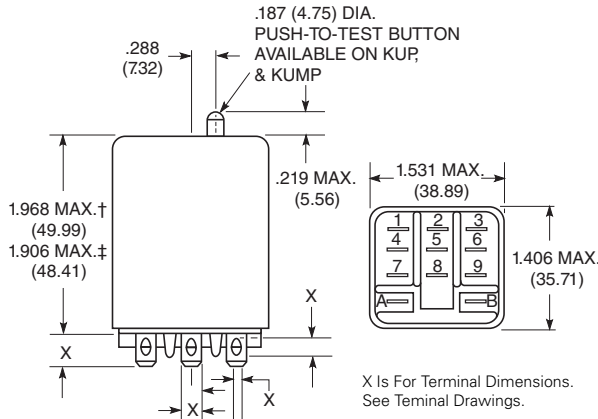


Stud Type



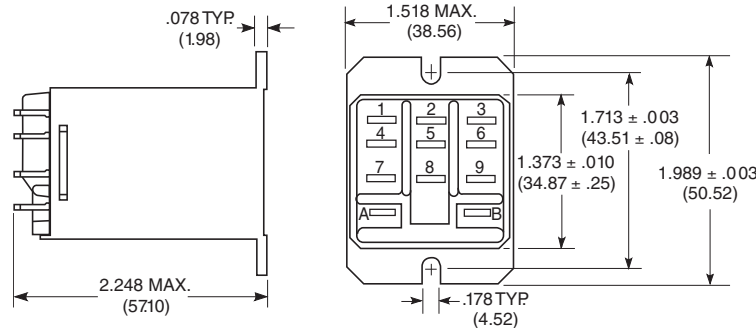
Enclosed Relays

Plain Case

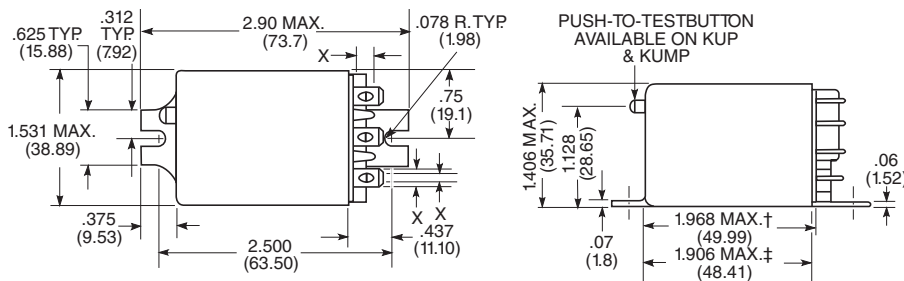


X Is For Terminal Dimensions.
See Terminal Drawings.

Top Flange Case



Bracket Mount Case



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.

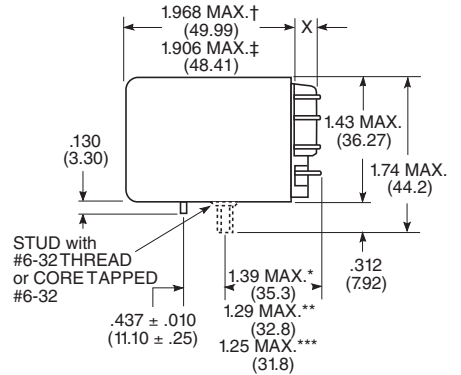
STUD TYPE also available with .125" (3.18mm) tab, as well as without stud and locating tab. Models without stud have core tapped #6-32 THREAD, .25" (6.4mm) minimum depth.

*Dimensions with .250" (6.35mm) terminals.

**Dimensions with .110" (2.79mm) or .205" (5.21mm) terminals.

***Dimensions with .187" (4.75mm) terminals.

Core and Stud Mount Cases



†Dimensions with .250" (6.35mm) terminals.

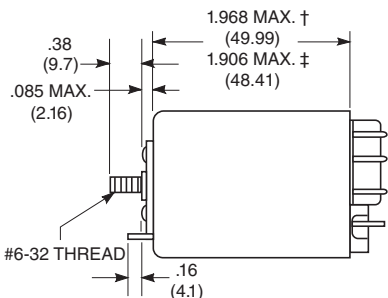
‡Dimensions with .110" (2.79mm), .187" (4.75mm) and .205" (5.21mm) terminals.

*Dimensions with .250" (6.35mm) terminals.

**Dimensions with .110" (2.79mm) or .205" (5.21mm) terminals

***Dimensions with .187" (4.75mm) terminals.

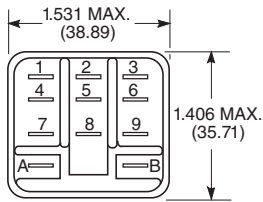
Stud on End Case



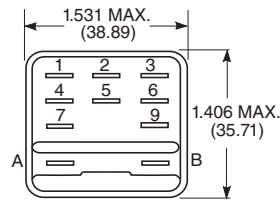
Outline Dimensions (Continued)

Relay Front Diagrams

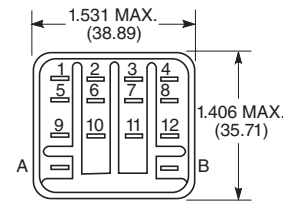
1-3 Pole Relays



Relays With .250" (6.35mm) Terminals



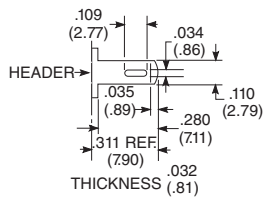
4 Pole Relays



Terminal Dimensions

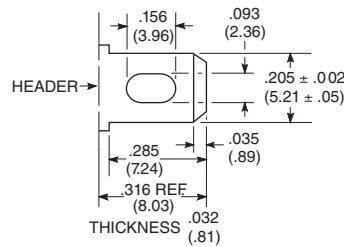
.110" (2.79mm)

Quick ConnectQuick Connect

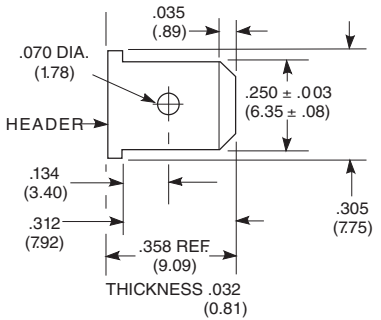


.205" (5.21mm)

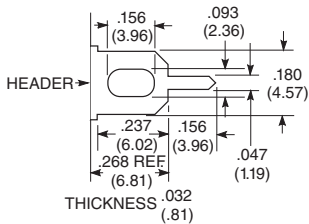
Quick Connect



.250" (6.35mm)

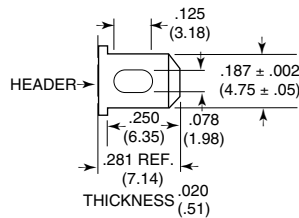


Printed Circuit



.187" (4.75mm)

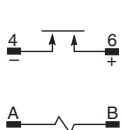
Quick Connect



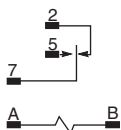
Note: All drawings shown oversized.

Wiring Diagrams

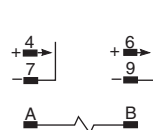
*1 Form X



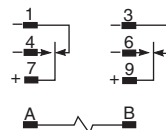
1 Form C



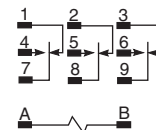
*2 Form A



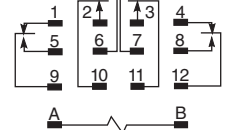
*2 Form C



3 Form C



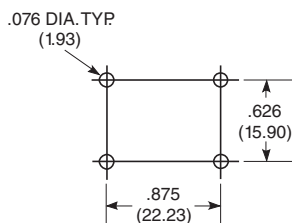
4 Form C



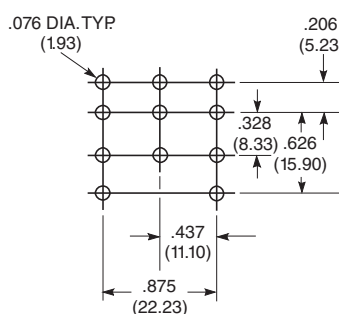
*Recommended Load Polarity for Optimum Arc Suppression.

PC Board Layouts (Bottom Views)

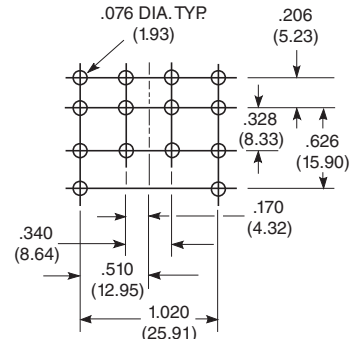
1 Form X



3 Pole Models



4 Pole Models



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.

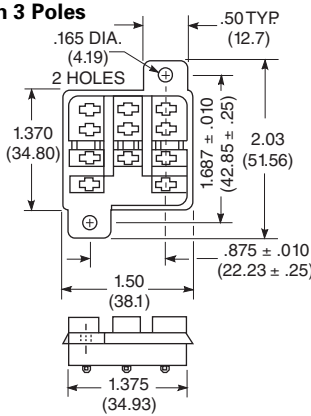
Note: All part numbers are RoHS compliant.

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

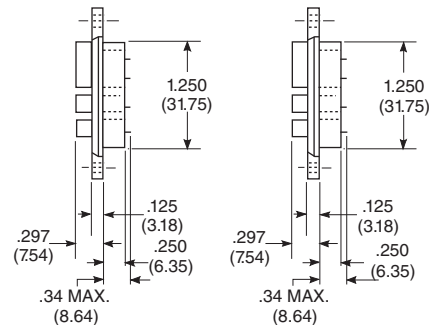
27E043—with solder eyelet terminals.

27E067—with .187" (4.75mm) quick connect terminals.



27E043

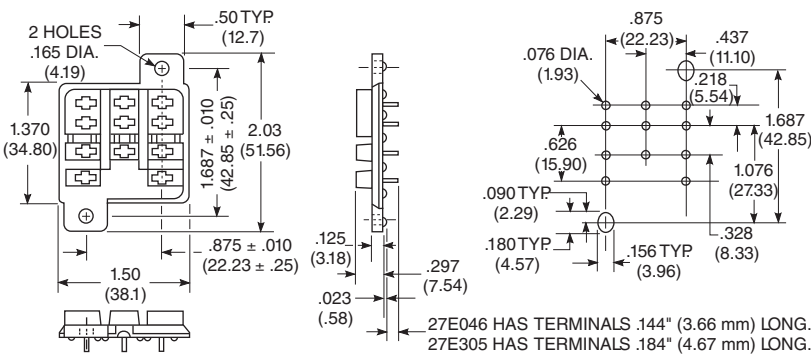
27E067



The 27E043 and 27E067 use chassis cutout shown on this page.

27E046, 27E305

Socket With Printed Circuit Terminals



Suggested Socket PC Board Layout

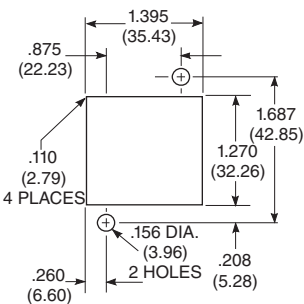
27E396

Snap-In Socket For Relays Through 3 Poles

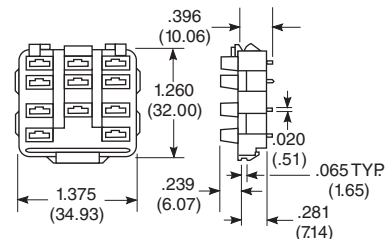
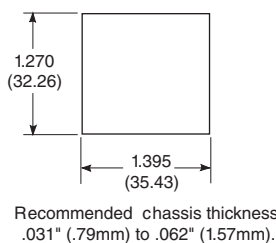
Nylon snap-in socket with .187" (4.75mm) quick connect terminals is available for KUEP, KUGP, KUIP, KUMP, and KUP relays, through 3 poles, with .187" (4.75mm) quick connect terminals. Snap-in sockets reduce labor by eliminating time consuming screw or rivet mounting. Preassembled wiring harnesses may 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



Recommended Chassis Cutout For Snap-In Sockets



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 (continued)

27E121

Screw Terminal Socket

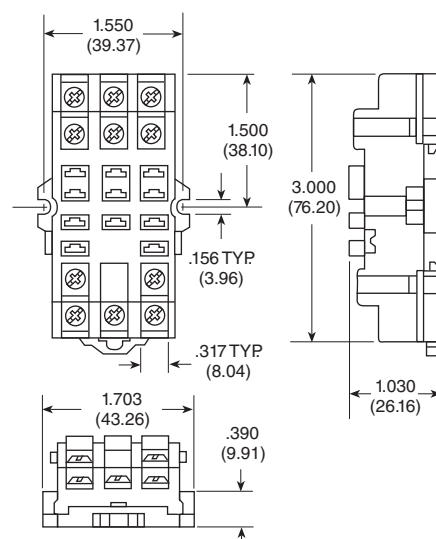
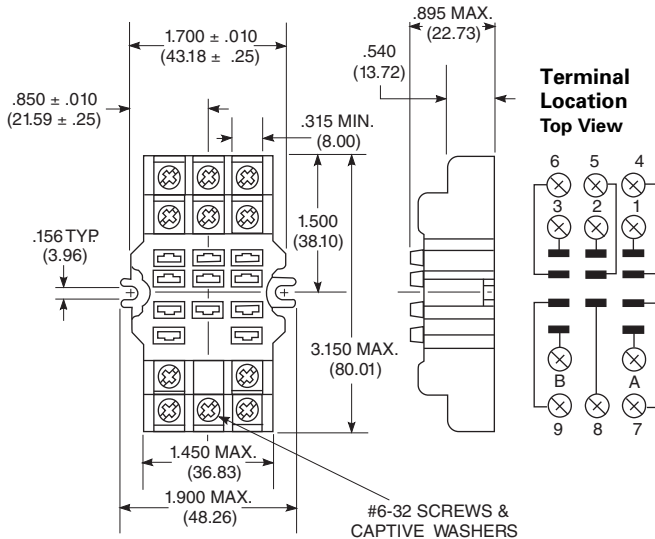
The 27E121 socket offers screw termination for KUEP, KUGP, KUIP, KUL, KUMP and KUP relays, through 3 poles, with .187" (4.75mm) quick connect terminals. This socket stacks on 1.700" (43.18mm) centers. When surface mounting, two #6-32 screws of suitable length are required. When track mounting, two 24A071 retainer clips (not shown) are required. The 27E121 is rated 15 amps and is UL recognized, File E59244, CSA certified, File LR15734.

27E893

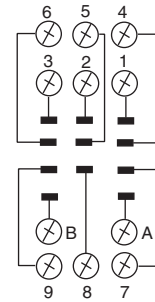
Screw Terminal, Din Rail Snap-Mount Socket

(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.



Terminal Location Top View



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 Termination	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.

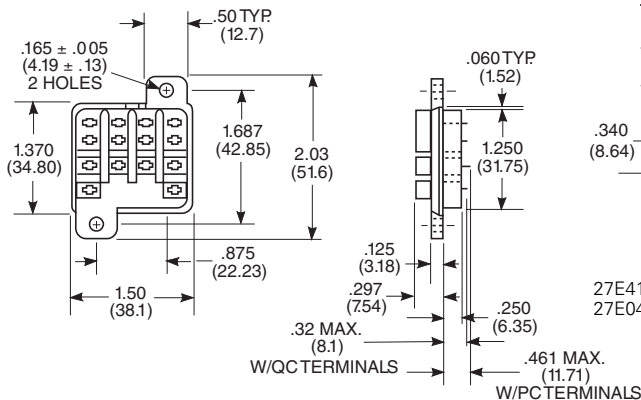
Note: All part numbers are RoHS compliant.

Hard Mount Sockets For 4 Pole Relays

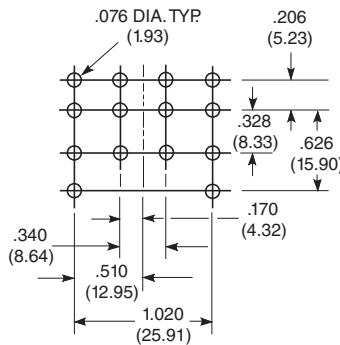
27E415—with .187" (4.75mm) quick connect/solder terminals.

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.



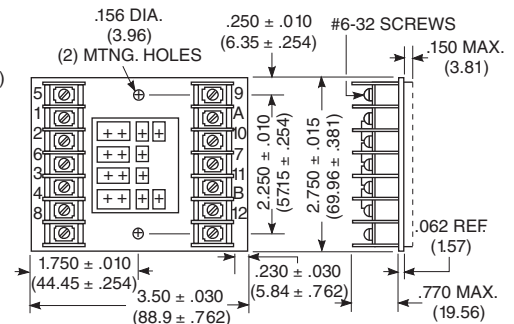
Suggested Socket PC Board Layout

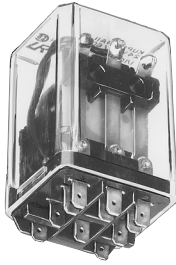


27E415 uses same chassis cutout as 27E043.

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.





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.

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 10 FLA, 30 LRA @ 120VAC, 5 FLA, 15 LRA @ 240VAC	100,000
		30,000

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

Nominal Power:
DC Coils: 1.2 Watts.
AC Coils: 2.7VA.
Initial Insulation Resistance: 100 megohms, min., at 25°C.

Coil Data

	Nominal Voltage	DC Resistance in Ohms ± 10%*	Must Operate Voltage	Nominal Coil Current (mA)
DC Coils	12	120	9.0	100
	24	472	18.0	51
AC Coils	24	72	20.4	115
	120	1,700	102.0	24
	240	7,200	204.0	12

*AC coils, ± 15%

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.

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.

Mechanical Data

Termination: .187" x .020" quick connect.

Enclosures: Clear polycarbonate dust cover.

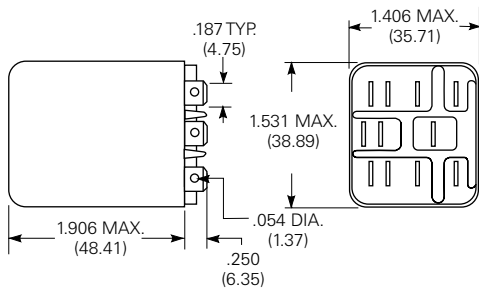
Weight: 3.0 oz. (86g) approximately.

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.							

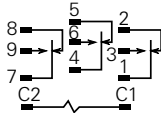
Our authorized distributors are more likely to stock the following items for immediate delivery.
No items in this series typically are stocked.

Outline Dimensions

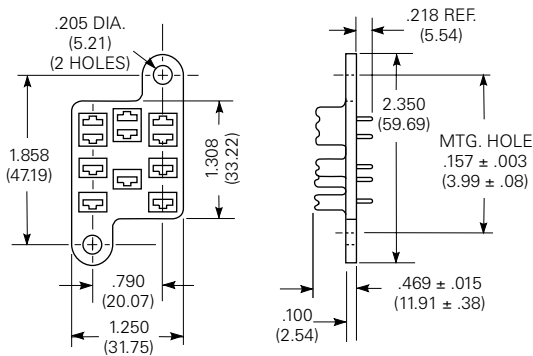


Wiring Diagrams

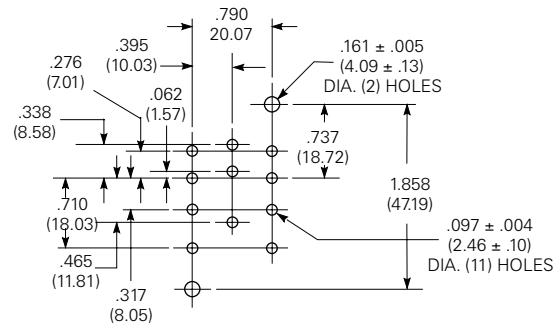
3 Form C



KUP93 Sockets



Socket PC Board Layout (Component Side of Board)

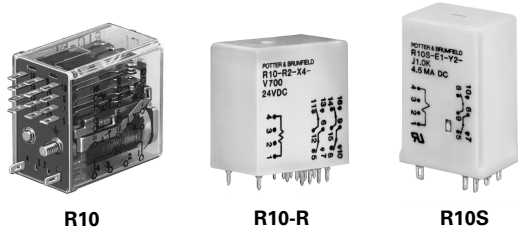


KUP93 Socket Number

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.



R10

R10-R

R10S

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.

Dimensions are shown for reference purposes only.

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

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

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.

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.

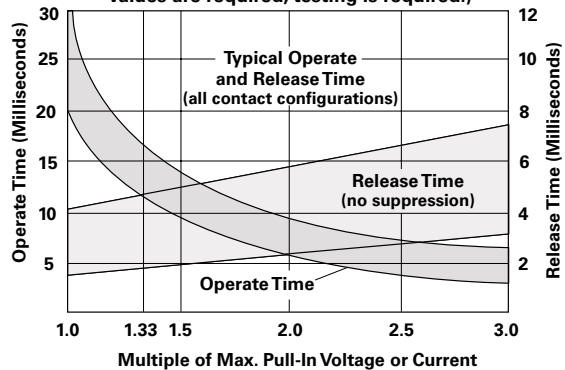
Maximum Coil Power: 2.2 Watts.

Coil Temperature Rise: 30°C per Watt.

Maximum Coil Temperature: 105°C.

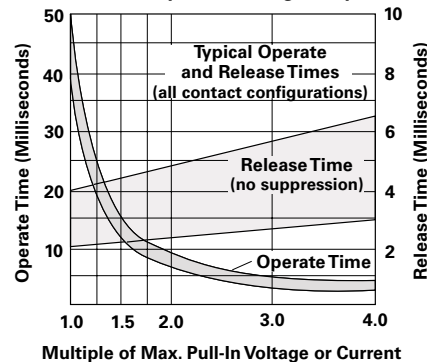
Operate Data @ 25°C

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.

Specifications and availability subject to change.

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

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			Nominal Voltage @ 25°C (VDC)
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)	
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.

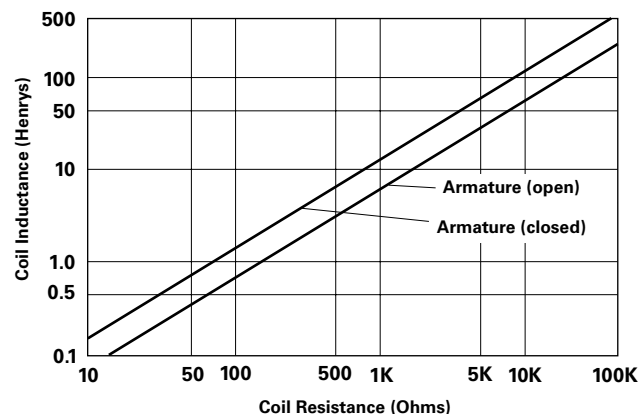
(C) Suggested for 24VDC operation.

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



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 Level Contacts	Bifurcated Crossbar, Dry Circuit Contacts
	V, Q, S & J Coil Adjustment Only				
	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.

4 = 4 pole

2 = 2 pole.

6 = 6 pole (not available with W contacts).

3 = 3 pole.

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

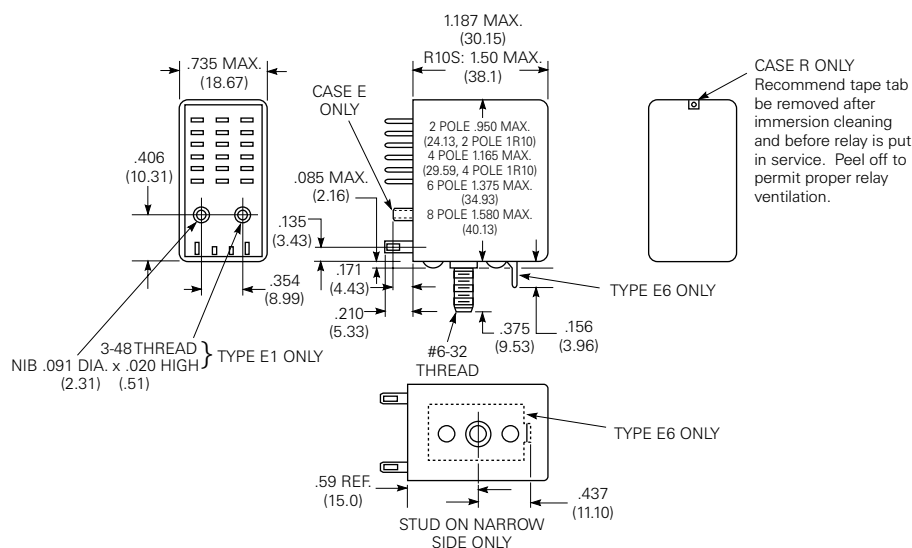
R10-E1Y2-J1.0K
R10-E1Y2-J2.5K
R10-E1Y2-V15.0K
R10-E1Y2-V185
R10-E1Y2-V2.5K
R10-E1Y2-V700
R10-E1Y4-J10.0K
R10-E1Y4-V2.5K
R10-E1Y4-V52

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

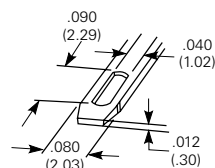
R10-E2P4-V185
R10-E2P4-V700
R10-E2W2-V185
R10-E2X2-V185
R10-E2X2-V700
R10-E2X4-V185
R10-E2X4-V700
R10-E2Y2-V185
R10-E2Y2-V700

R10-E2Y4-V185
R10-E2Y4-V700
R10S-E1Y2-J5.0K
R10S-E2Y1-J1.0K

Outline Dimensions

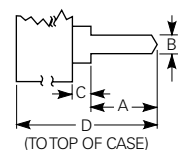


Solder Terminal Dimensions



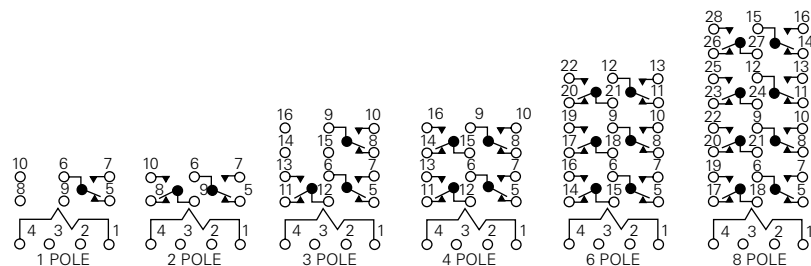
PC Terminal Dimensions

	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	—

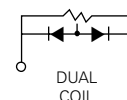


Wiring Diagrams (Bottom Views)

R10 Wiring Diagrams

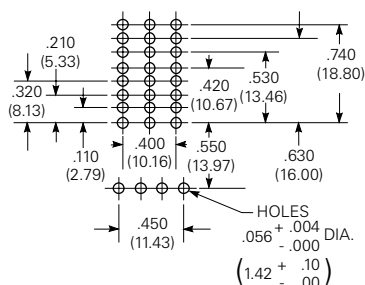


R10-AC Wiring Diagram

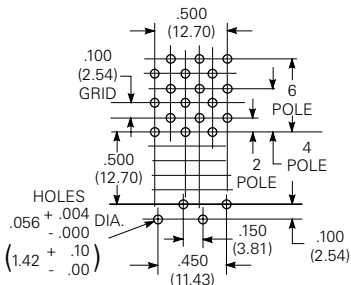


Suggested PC Board Layouts (Component Side of Boards)

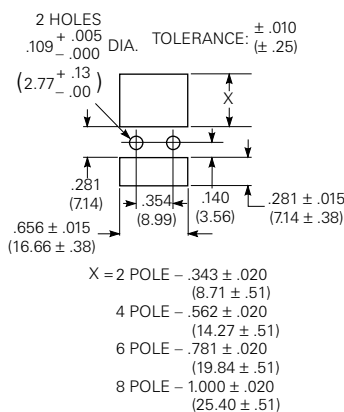
Terminal Types E2 & R2



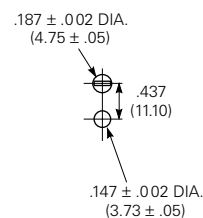
Terminal Types E9 & R9



Suggested Panel Cutout For Relay or Socket



Mounting Hole Layout For Terminal & Mounting Style 6



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:** 10⁹ 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:

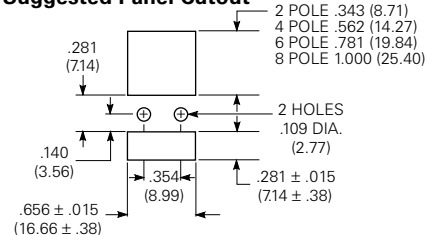
Printed circuit sockets are manufactured with "floating" (loose) terminals. This permits them to align with holes in the circuit board and with the relay terminals. During the mounting and soldering of the socket, vertical float should be eliminated and the terminals seated on the board. (This may be 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.

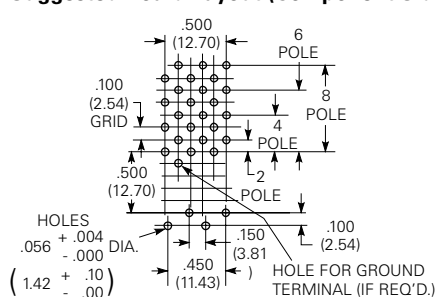
Socket Part No.	No. of Poles	Type of Terminal	Grounding Provision
27E125	2	Solder	Strip
27E126	4		Strip
27E127	6		Strip
27E162	2		None
27E163	4		None
27E164	6		None
27E128	2	PC Stag.	Strip
27E129	4		Strip
27E130	6		Strip
27E254	8		Strip
27E212	2		None
27E213	4		None
27E271	6		None
27E258	8		None
27E193	2	Terminal	Terminal
27E194	4		Terminal
27E636	2	PC Stag.	Strip
27E637	4		Strip
27E631	2	PC In-line	Strip
27E632	4		Strip
27E340	6		Strip
27E342	2		None
27E629	4		None
27E630	6		None
27E338	4		Terminal
27E633	2	PC In-line	Strip
27E634	4		Strip
27E635	6		Strip

All tolerances ±.010 (±.25) unless otherwise noted.

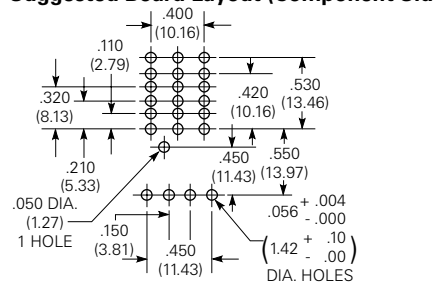
Suggested Panel Cutout



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

See following page for additional sockets & accessories.

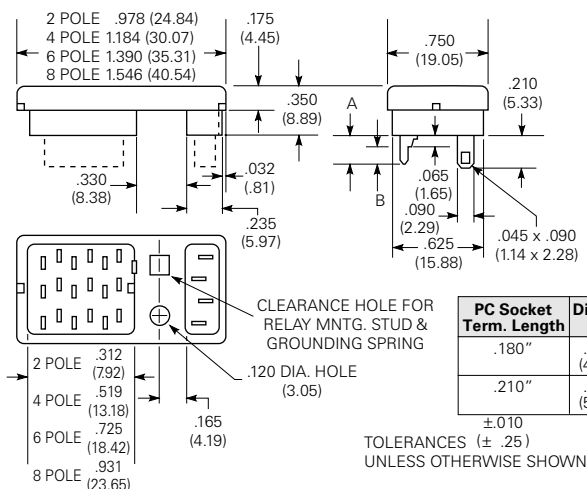
Hold Down Spring



Hold Down Strap (PC Sockets Only)

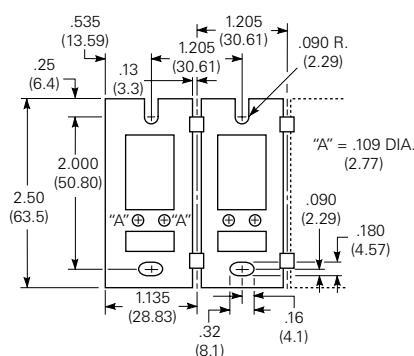


Solder & PC Terminal Socket Outline Dimensions



37D645 – Mounting Strip

Strip of .060" (1.52mm) aluminum contains ten pre-punched, breakaway mounting plates. Each plate accommodates a 2, 4, 6 or 8 pole solder terminal R10 relay or socket to facilitate chassis- or rack mounting.



Dimensions are shown for reference purposes only.

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

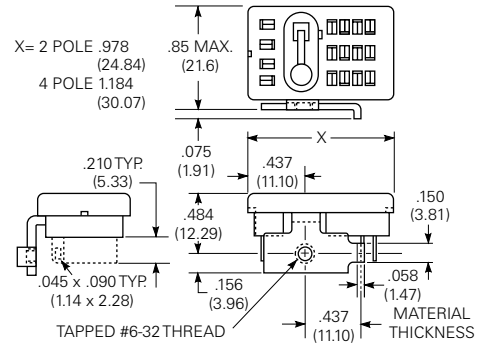
Specifications and availability subject to change.

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

R10 Socket & Accessory Information (Continued)

Ordering Data – Stock items are boldfaced.

Socket Part No.	No. of Poles	Type of Terminal	Grounding Provision
27E317 27E152	2 4	Solder/ Bracket	Strip Strip

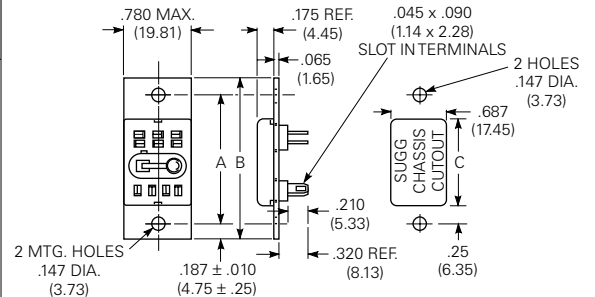


Bracket Mount Socket
Allows solder terminal relay to mount flat on a chassis.

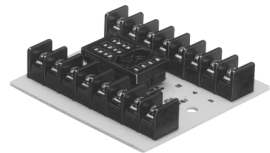
Socket Part No.	No. of Poles	Dim. A Nom.	Dim. B Max.	Dim. C Min.
27E446	2	1.437 (36.50)	1.822 (46.27)	.937 (23.80)
27E447	4	1.687 (42.85)	2.072 (52.63)	1.125 (28.58)
27E448	6	1.875 (47.63)	2.260 (57.40)	1.343 (34.11)



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.

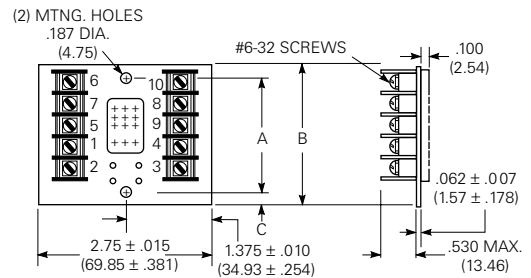


Part No.	No. of Poles	Dim. A Nom.	Dim. B Max.	Dim. C Nom.
27E460	2	1.800 (45.72)	2.230 (56.64)	.200 (5.08)
27E461	4	2.125 (53.98)	2.830 (71.88)	.337 (8.56)
27E462	6	2.812 (71.42)	3.830 (97.28)	.494 (12.55)

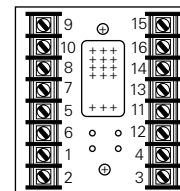


Track Mount Socket
Provides front wiring, screw terminal connections for R10 family relays. No grounding provision.

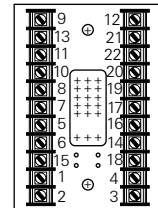
2 Pole Terminal Wiring Code



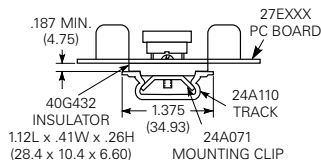
4 Pole Terminal Wiring Code



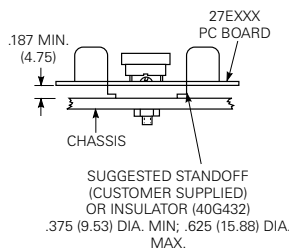
6 Pole Terminal Wiring Code



Suggested Track Mounting



Suggested Chassis Mounting





KCP series

2 Amp, Enclosed Current Actuated Relay



Features

- DC current sensitive relay.
- Enclosed in a clear polycarbonate dust cover.
- Operates on 125mW per movable arm.
- Up to 3 Form C (3PDT) contact arrangements.
- 8- or 11-pin octal-style plugs.

Contact Data @ +25°C

Arrangements: 1 Form C (SPDT), 2 Form C (DPDT) and 3 Form C (3PDT).
Ratings: 2 amps @ 120VAC, 60 Hz.
Material: Silver.
Expected Life: 15 million operations, mechanical;
 100,000 operations, minimum, at rated load.

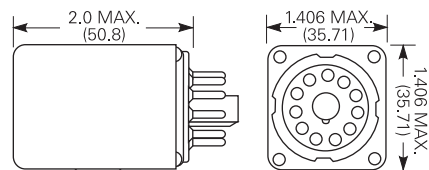
Initial Dielectric Strength

Between Open Contacts: 500V rms.
Between Adjacent Contacts: 500V rms.
Between Contacts and Coil: 500V rms.

Coil Data @ +25°C

Nominal Power: 125mW for 1 Form C (SPDT) models;
 250mW for 2 Form C (DPDT) models;
 375mW for 3 Form C (3PDT) models.
Maximum Power: 3.0W.
Duty Cycle: Continuous.
Initial Insulation Resistance: 1,000 megohms, minimum.

Outline Dimensions



Note: KCP-14 shown. KCP-5 and KCP-11 have 8-pin bases.

Coil Data

Contact Arrangement	Coil Resistance (Ohms)	Factory Adjustment Pick-up mA DC
1 Form C	2,500	7.2
	5,000	5.0
	10,000	3.6
2 Form C	2,500	10.0
	5,000	7.2
	10,000	5.0
3 Form C	2,500	12.3
	5,000	8.7
	10,000	6.1

Operate Data @ +25°C

Operate Time: 20 milliseconds, excluding bounce.
Release Time: 10 milliseconds, excluding bounce.

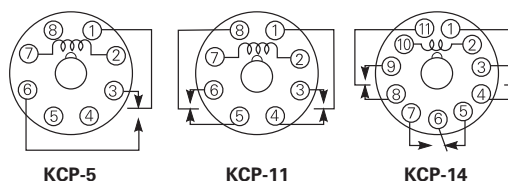
Environmental Data

Operating Temperature Range: -45°C to +70°C.

Mechanical Data

Termination: 8- or 11-pin octal-style plug.
Enclosure: Plastic dust cover.
Sockets: Various sockets and accessories are available. Consult your Tyco Electronics authorized distributor or sales engineer for details.
Weight: 2.9 oz. (82.2g) approximately.

Wiring Diagrams (Bottom Views)



Ordering Information

Typical Part Number >			
1. Type: KCP = Enclosed, DC current sensitive relay with octal-style plug for socket mounting.	KCP	-11	-5000
2. Contact Arrangement: 5 = 1 Form C (SPDT) 11 = 2 Form C (DPDT) 14 = 3 Form C (3PDT)			
3. Coil Resistance: 2,500 = 2,500 Ohms 5,000 = 5,000 Ohms 10,000 = 10,000 Ohms			

Note: All part numbers are RoHS compliant.

Our authorized distributors are more likely to maintain the following item in stock for immediate delivery.

KCP-11-10000

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Catalog 1-1773449-2
 Revised 1-08
www.tycoelectronics.com

Dimensions are in inches and millimeters unless otherwise specified. Values in parentheses are metric equivalents.

Dimensions are shown for reference purposes only. Specifications and availability subject to change.

USA: 1-800-522-6752
 Canada: 1-905-470-4425
 Mexico: 1-800-733-8926
 C. America: 52-55-1106-0803

South America: 55-11-2103-6000
 Hong Kong: 852-2735-1628
 Japan: 81-44-844-8013
 UK: 44-208-420-8341



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: 10⁹ 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

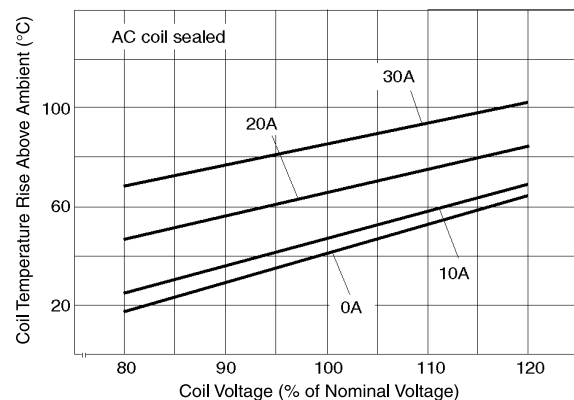
Termination: Printed circuit and quick connect terminals ⁽⁴⁾.

Enclosures (all have 94V-0 flammability rating):

Open, unsealed dust cover or sealed case.

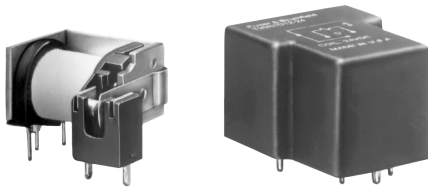
Weight: 1.2 oz. (33g) approx.

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.



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: 10⁹ 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.

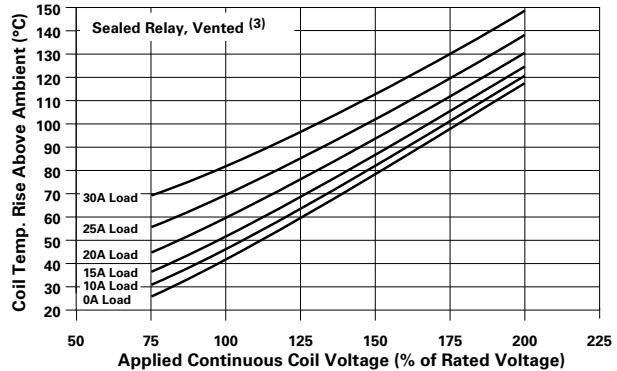
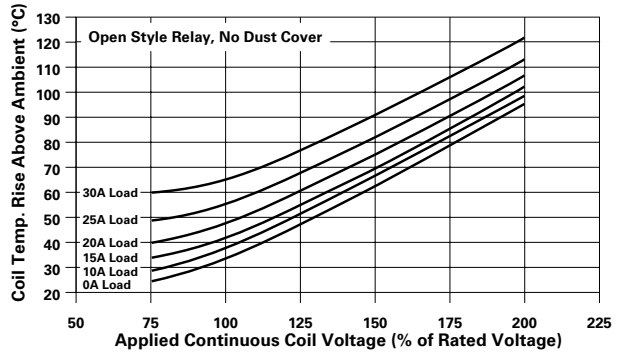
Operate Time (Including Bounce)[†]: 15 ms, max.

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

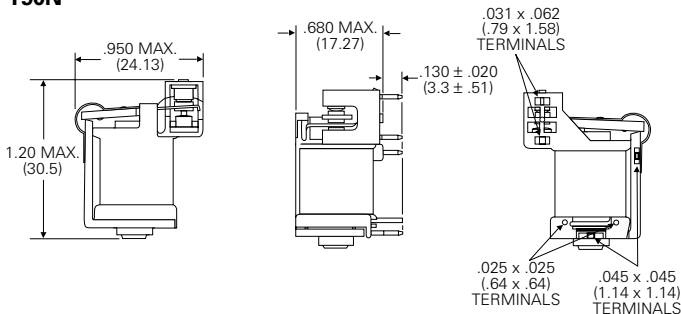
Typical Part Number ▶		T90	S	5	D	1	2	-24
1. Basic Series: T90 = Printed circuit board power relay.								
2. Enclosure: N = Open, no cover (snap-on dust cover available as an option). S = Immersion cleanable, sealed plastic case with knock-off nib for ventilation.								
3. Contact Arrangement: 1 = 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.

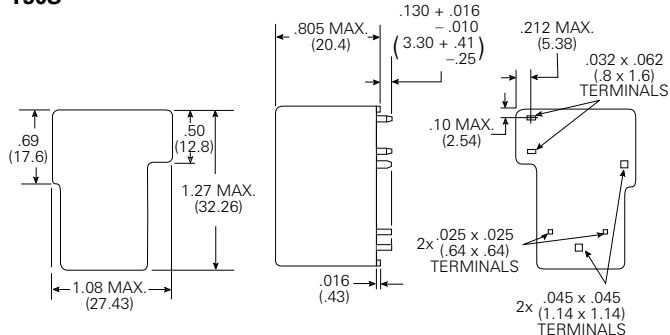
T90N1D12-12	T90N1D42-24	T90N5D42-24	T90S1D42-24	T90S5D42-24
T90N1D12-18	T90N5D12-12	T90S1D12-12	T90S5D12-12	
T90N1D12-24	T90N5D12-24	T90S1D12-24	T90S5D12-24	

Outline Dimensions

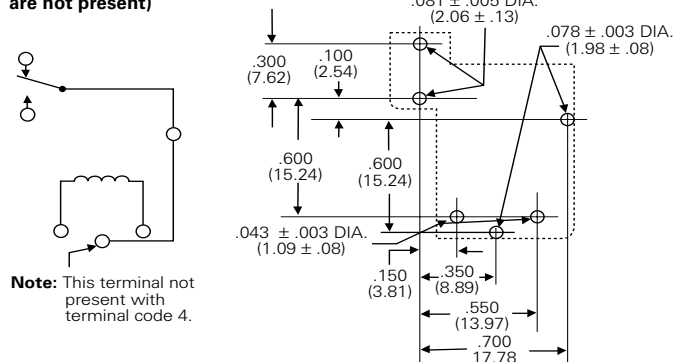
T90N



T90S



Wiring Diagram & PC Board Layout (Bottom Views)

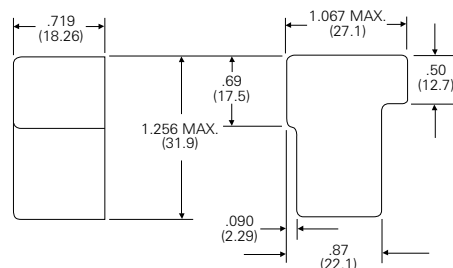
1 Form C
(Unused terminals
are not present)

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.

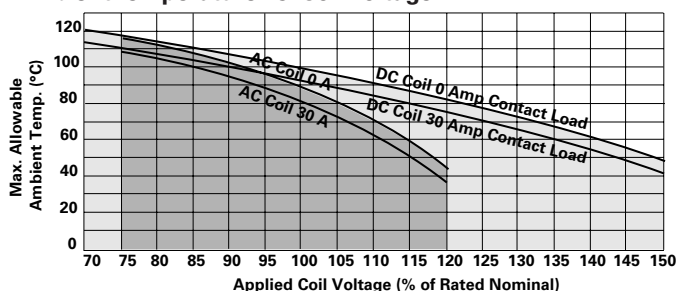


UL & CSA Contact Ratings

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%.

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: Silver cadmium oxide contacts: -40°C to +85°C.
Silver tin indium oxide contacts: -40°C to +70°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.

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: Dust protected plastic case or wash-tight, tape sealed, (washable) plastic case.

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 = Dust protected plastic case. S = Wash-tight, tape sealed, plastic case (Mounting & Termination Type 1). Top sealed, not wash-tight, not tape sealed on bottom (Mounting & Termination Types 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. 4 = Silver tin indium 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	208 = 200/208VAC	240 = 220/240VAC	277 = 250/277VAC			

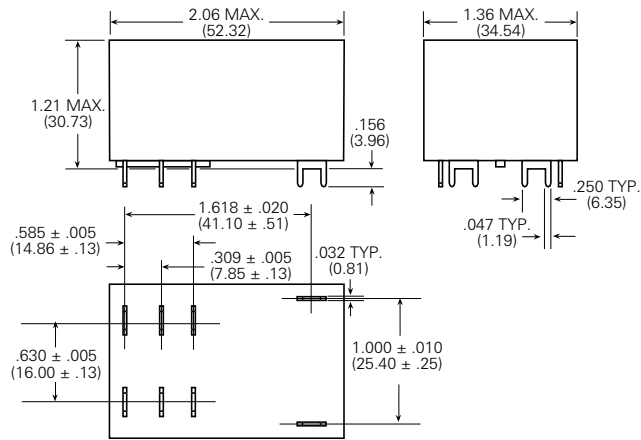
NOTE: All part numbers are RoHS compliant.

Stock Items – We recommend that our authorized distributors stock the following items for immediate delivery.

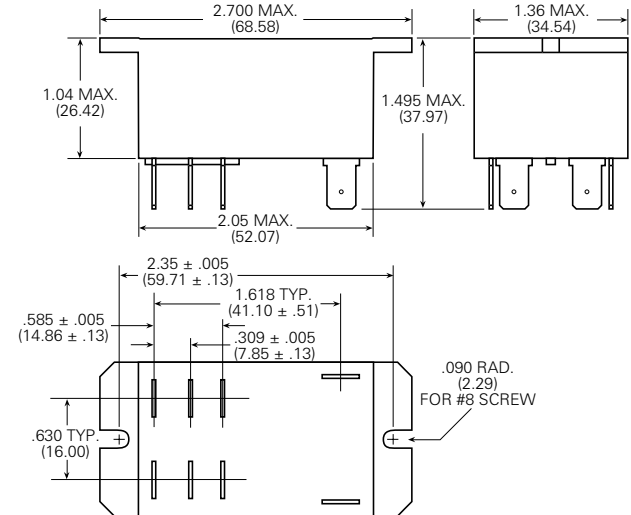
T92P7A22-24	T92P7A22-240	T92P7D12-24	T92P7D22-24	T92P11A22-120	T92P11D22-12	T92S7D12-12	T92S11D22-12
T92P7A22-120	T92P7D12-12	T92P7D22-12	T92P11A22-24	T92P11A22-240	T92P11D22-24	T92S7D12-24	T92S11D22-24

Outline Dimensions

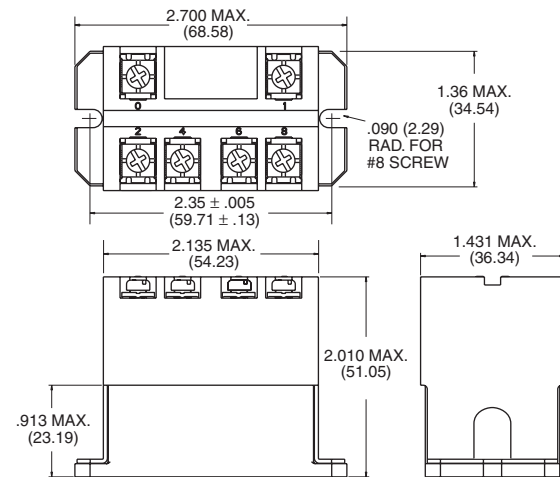
Mounting & Termination Type 1



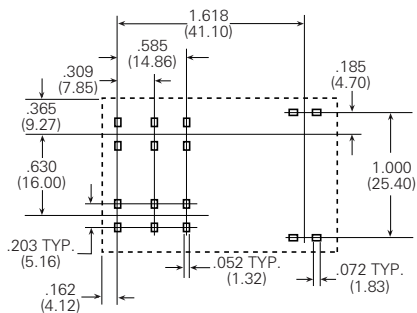
Mounting & Termination Types 2, 3 & 4



Mounting & Termination Type 5

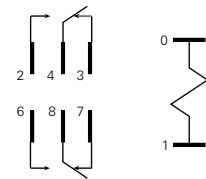


Suggested PC Board Layout (Bottom View)

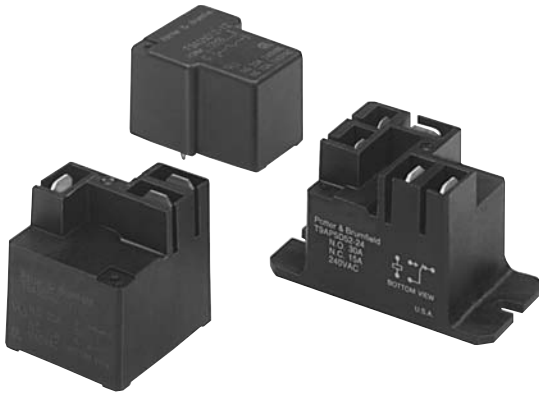


Note: An alternate PC board layout utilizes .076 ± .003 (1.93 ± .076) diameter holes on the same center-to-center spacing shown above. Use of the rectangular holes is recommended for improved solderability.

Wiring Diagram



Only necessary terminals are present on single throw models.



T9A series

DC Coil 30 Amp PC Board or Panel Mount Relay

File E22575

File LR15734

RoHS
Ready

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.
- Wash-tight (washable)⁽⁶⁾, plastic 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: 10⁹ 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
6	36	167
9	81	111
12	144	83
15	225	67
18	324	56
22	484	45
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
6	40	150
9	97	93
12	155	77
15	256	59
18	380	47
20	450	44
22	545	40
24	660	36
28	890	31
36	1,450	25
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.

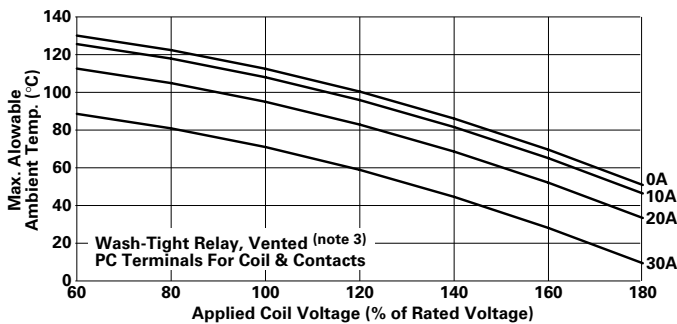
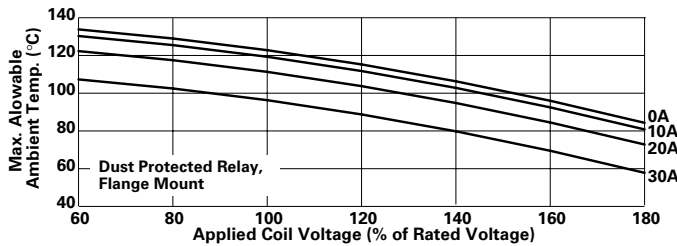
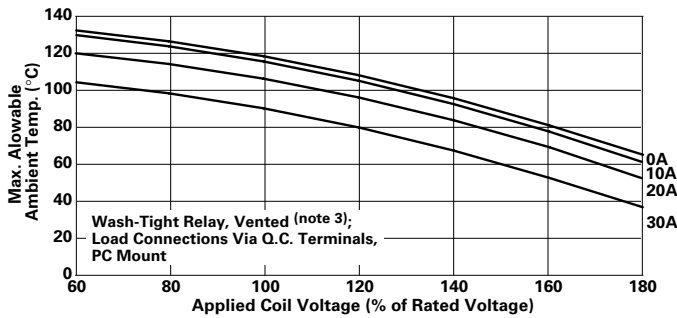
Operate Time (Including Bounce)§: 15 ms, max.

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: Dust protected plastic case

T9AS: Wash-tight plastic case (washable) (2 & 3).

T9AV: Flux-proof plastic case.

Weight: Q.C. version: 1.2 oz. (33g) approx. (mounting code 2 & 5).

Wash-tight 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) Wash-tight relay terminals should not be bent.
- (3) Remove knock-off nib after cleaning process for optimum life of wash-tight 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 = Dust protected plastic case (mounting code 5).

S = Wash-tight (washable) plastic case with knock off nib (mounting codes 1 & 2).

V = Flux-proof plastic case (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

9 = 9VDC

15 = 15VDC

20 = 20VDC

24 = 24VDC

36 = 36VDC

110 = 110VDC

6 = 6VDC

12 = 12VDC

18 = 18VDC

22 = 22VDC

28 = 28VDC

48 = 48VDC

a) Only available with enclosure code "S" & "V".

b) Only available with enclosure code "S".

c) Only available with enclosure code "P".

NOTE: All part numbers are RoHS compliant.

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

T9AP1D52-9	T9AS1D12-18	T9AS5D12-12
T9AP1D52-12	T9AS1D12-24	T9AS5D12-24
T9AP5D52-12	T9AS1D12-48	T9AS5D22-12
T9AP5D52-24	T9AS1D22-12	T9AS5D22-24
T9AS1D12-12	T9AS1D22-24	T9AV1L22-24

Dimensions are shown for reference purposes only.

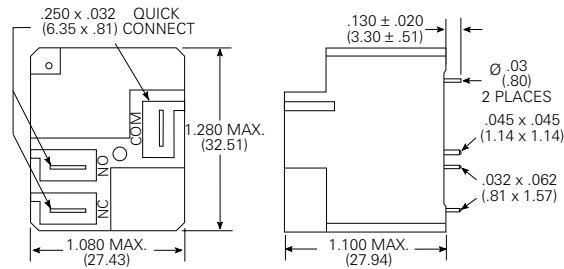
Dimensions are in inches over (millimeters) unless otherwise specified.

Specifications and availability subject to change.

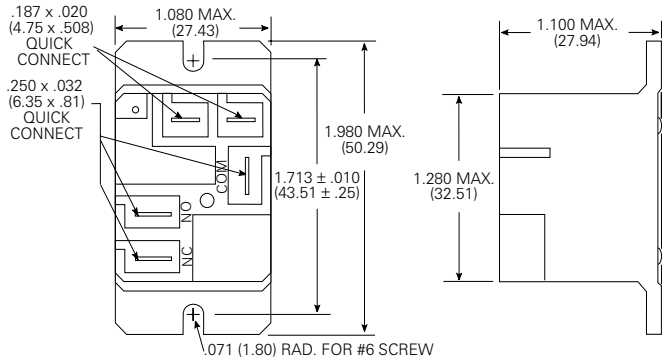
www.tycoelectronics.com
Technical support:
Refer to inside back cover.

Outline Dimensions

T9AS – Mounting & Termination Code 2

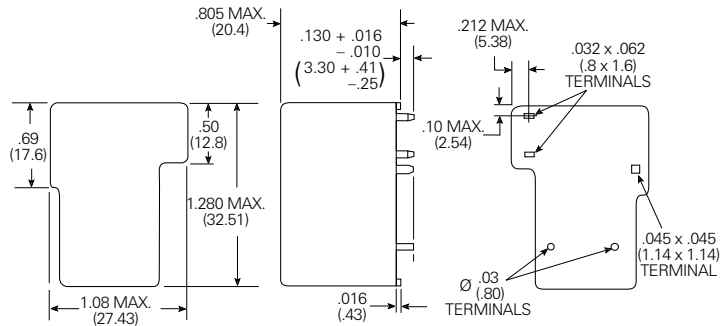


T9AP – Mounting & Termination Code 5



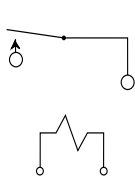
Note: Recommended mounting screw torque is 4.0-5.0 lbs.in when #6 screw is used.

T9AS/V – Mounting & Termination Code 1

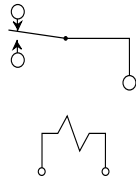


Wiring Diagrams (Bottom Views)

1 Form A

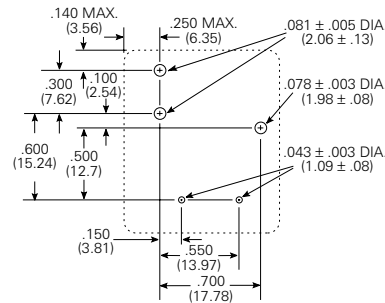


1 Form C

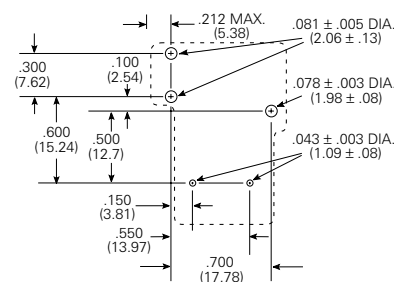


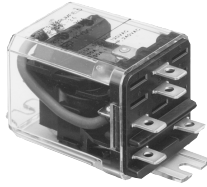
PC Board Layouts (Bottom Views)

T9AP/S – Mounting & Termination Code 2



T9AS/V – Mounting & Termination Code 1





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.

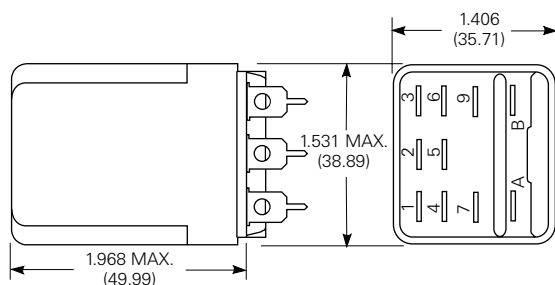
Dimensions are in inches over (millimeters) unless otherwise specified.

Specifications and availability subject to change.

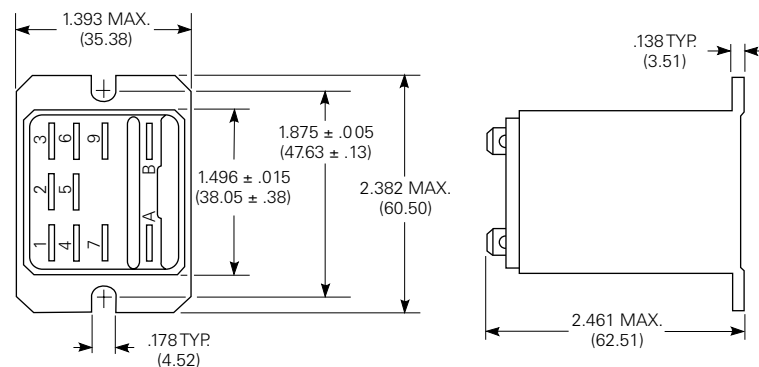
www.tycoelectronics.com
Technical support:
Refer to inside back cover.

Outline Dimensions

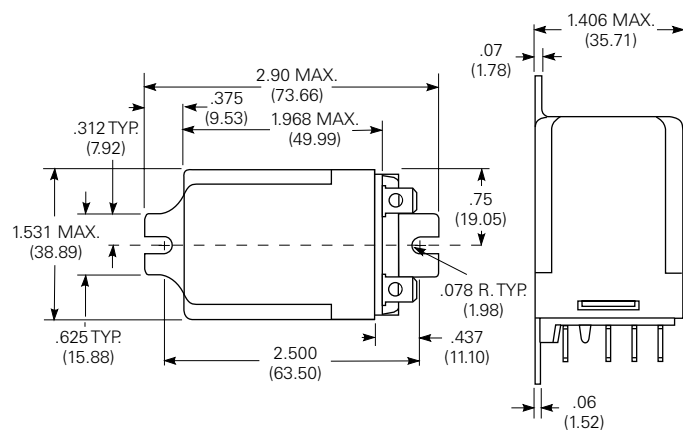
Plain Case



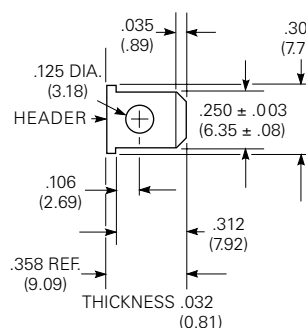
Top Flange Enclosure



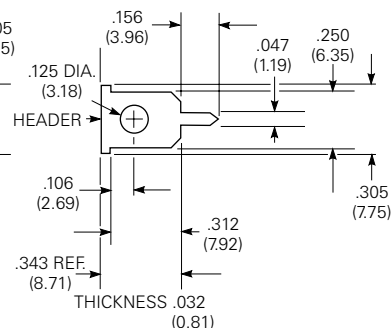
Bracket Mount Case



Terminal Dimensions .250" (6.35mm) Quick Connect/Solder



Printed Circuit

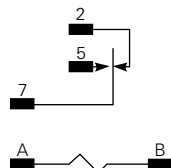


Wiring Diagrams

1 Form C

1 Form A (Delete 2)

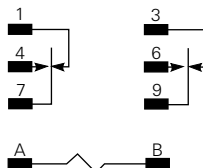
1 Form B (Delete 5)



2 Form C

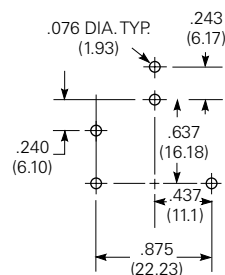
2 Form A (Delete 1 & 3)

2 Form B (Delete 4 & 6)

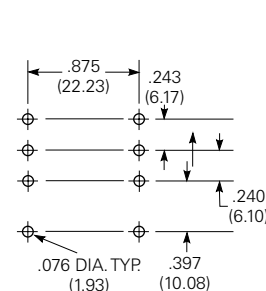


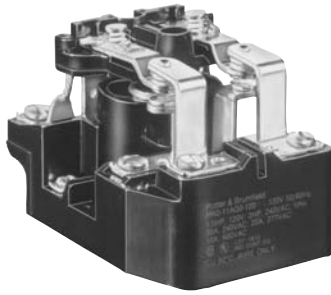
PC Board Layouts (Bottom Views)

1 Pole Model



2 Pole Model





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 tables.

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. Specific exceptions are noted in ratings tables. Life increases at reduced loads or with appropriate arc suppression.

UL/CSA Contact Ratings

Models with Screws or Quick Connects as Main Terminals

Type	Contact Code	Contact Ratings
PRD-1, 3 or 5	Y	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	G	30 amps at 277VAC Res. 1.5 HP at 120VAC 2HP at 250VAC 10 amp at 600VAC
PRD-1, 3 or 5	F	50 amps at 240VAC Gen. Purp. (20,000 Ops.) 30 amps at 277VAC Res. 1.5 HP at 120VAC 2HP at 250VAC 10 amp at 600VAC
PRD-7 or 11	Y	25 amps at 240VAC 20 amps at 277VAC 1 HP at 120VAC 2 HP at 250VAC 7 amps at 50VDC Res. 10 amps at 600VAC
PRD-7 or 11	G	30 amps at 240VAC 20 amps at 277VAC 1.5 HP at 120VAC 2 HP at 250VAC 10 amps at 600VAC
PRD-7 or 11	F	50 amps at 240VAC Gen. Purp. (20,000 Ops.) 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	H or J	20 amp at 125VDC 1/3 HP at 125VDC
PRD-1, 5, 7 or 11	N	25 amp at 250VAC 1 HP at 125VAC 2 HP at 250VAC

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.

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

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.

UL Contact Ratings

Models with Box Lugs as Main Terminals

Type	Contact Code	Contact Ratings
PRD-3AP4 PRD-3DP4	P	50 amps at 277VAC, Gen. Purp. 30 amps at 277VAC, Ballast (6,000 Ops.) 15 amps at 277VAC, Tungsten (6,000 Ops.) 102LRA, 17FLA at 240VAC (30,000 Ops.) 120LRA, 20FLA at 120VAC (30,000 Ops.) 1.5 HP at 120VAC (30,000 Ops.) 3 HP at 240VAC (30,000 Ops.)

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

Models with Box Lugs as Main Terminals

Type	Contact Code	Contact Ratings
PRD-3AR4 PRD-3DR4	R	60 amps at 28VDC Res. 30 amps at 125VDC

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

DC Coils			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
48	1150	41.7	120	290	85
110	6050	18.2	240	1200	43
220	Use 110V relay with approx. 6,000 ohm 5W wire-wound resistor in series.		480	4500	22

Operate Data @ +25°C

Must-Operate Voltage: **DC:** 75% of nominal; **AC:** 85% of nominal.

Environmental Data

Temperature Range: **AC:** -55°C to +45°C.; **DC:** -55°C to +80°C.

Mechanical Data

Mounting: Two .187" (4.75mm) Dia. 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 for Models with Screws or Quick Connects for Main Terminals

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

7 = DPST-NO

3 = SPST-NO-DM

7V = DPST-NO with 3mm contact gap

5 = SPDT

11=DPDT

3. Coil Input:

A = 50/60 Hz.

D = DC

4. Main Contact Material:

Y = .312" (7.92mm) dia. silver. [25A max. rating]

G = .312" (7.92mm) dia. silver cad.-oxide. [30A max. rating]

F = .312" (7.92mm) dia. silver cad.-oxide. [50A max. rating]

†H = Silver w/magnetic blow out. [20A DC max. rating]

†J = Silver cad.-oxide w/magnetic blow out. [20A DC max. rating]

N = Tungsten stationary & silver cad.-oxide movable. [25A max. rating] Code 1, 5, 7 & 11 only.

†Available with Code 3, 7& 11 contact arrangement only.

5. Termination:

CODE	PRD			PRDA (With Aux. SPDT Snap-Action Switch)		
	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, 48, 110VDC

6, 12, 24, 120, 240, 480VAC, 50/60 Hz. Coil voltages are available to 125VDC and 600VAC.

Note: All part numbers are RoHS compliant.**Stock Items – The following items are normally maintained in stock for immediate delivery.**

PRD-3AG0-120
PRD-3AJ3-24
PRD-3AY0-120
PRD-3DY0-12
PRD-3DY0-24
PRD-5DF0-12
PRD-5AY0-24
PRD-5AY0-120
PRD-5AY1-120

PRD-5AY0-240
PRD-5DY0-12
PRD-5DY0-24
PRD-7AG0-120
PRD-7AY0-24
PRD-7AY0-120
PRD-7AY0-240
PRD-7AY3-120
PRD-7DG0-24

PRD-7DY0-12
PRD-7DY0-24
PRD-11AF0-240
PRD-11AG0-24
PRD-11AG0-120
PRD-11AG0-240
PRD-11AH0-120
PRD-11AY0-24
PRD-11AY0-120

PRD-11AY0-240
PRD-11AY0-480
PRD-11DF0-12
PRD-11DF0-110
RD-11DG0-12
PRD-11DG0-24
PRD-11DH0-12
PRD-11DH0-24
PRD-11DH0-110

PRD-11DJ0-24
PRD-11DY0-12
PRD-11DY0-24
PRD-11DY0-110
PRDA-11AGA-120
PRDA-11AYA-120

Ordering Information for 50A Models with Box Lugs for Main Terminals

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

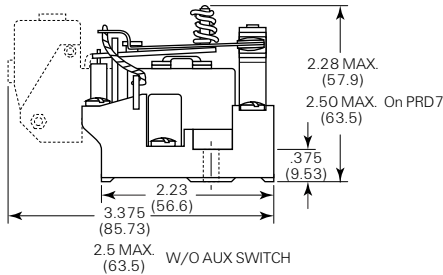
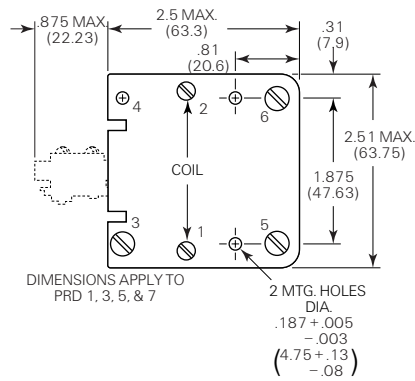
24, 120, 240, 277, 480VAC, 50/60 Hz.

Note: All part numbers are RoHS compliant.**Stock Items - The following items are normally maintained in stock for immediate delivery.**

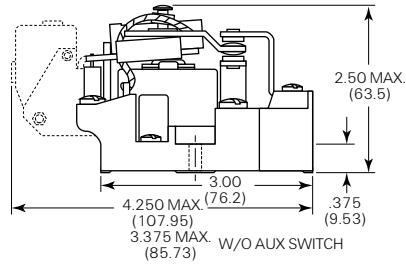
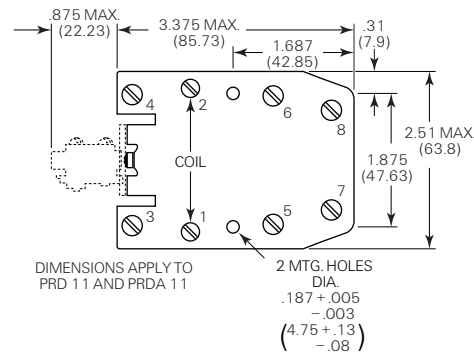
No models in the PRD-3AP / PRD-3DP series are maintained in stock.

Outline Dimensions

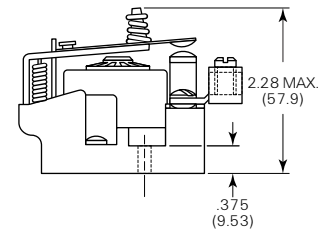
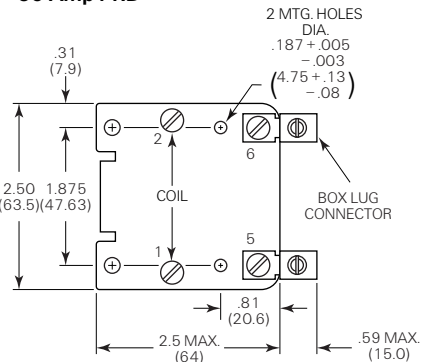
PRD/PRDA Small Base - Top View



PRD/PRDA Large Base - Top View



50 Amp PRD



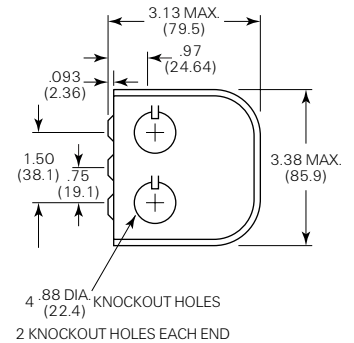
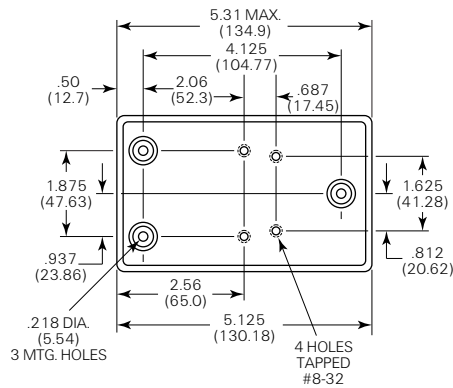
Dust Cover Open

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:

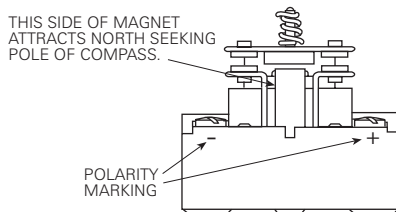
Three No. 10 holes on 1.875" (47.63mm) x 4.125" (104.77mm) centers.



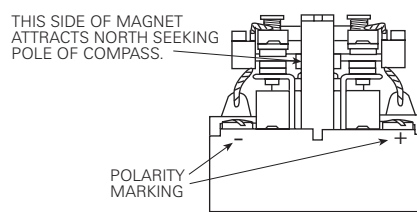
Note: Additional unused holes may be present in dust cover base.

PRD Magnetic Blow-Out Drawings

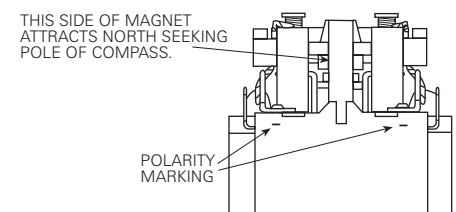
PRD3 with Magnetic Blow-Out



PRD7 with Magnetic Blow-Out

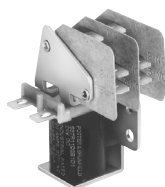


PRD11 with Magnetic Blow-Out





**S86R
Mounting
Style 1**



**S87R
Mounting
Style 2**

S86R/S87R series

Low Cost 20 Amp Industrial Relays

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, $\pm 15\%$ DC, $\pm 10\%$		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: S87: (See outline dimensions)
1 = Style 1 2 = Style 2

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
S86R11A1B1D1120

S86R11D1B1D1-12
S87R5A2B1D1-120

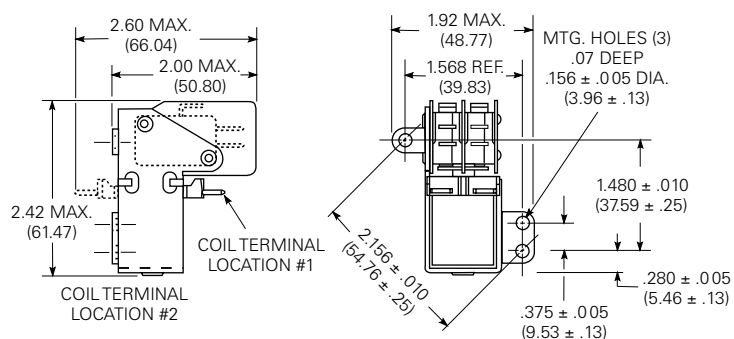
S87R5A2B1D1-240
S87R5D2B1D1-24

S87R11A2B1D1-24
S87R11A2B1D1120

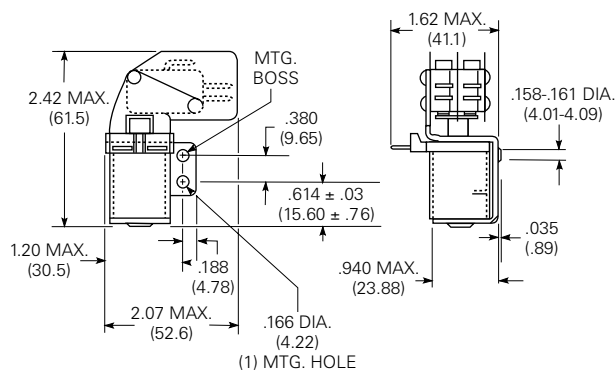
S87R11A2B1D1240
S87R11D2B1D1-110

Outline Dimensions

S86R (2 pole shown) Style 1

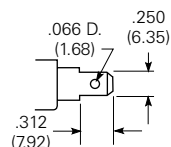


S87R (2 pole shown) Style 2



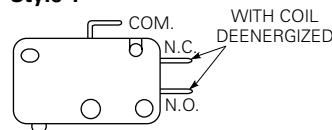
Switch Terminal Style

.250" (6.35mm) Quick Connect



Switch Terminal Configuration

Style 1



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

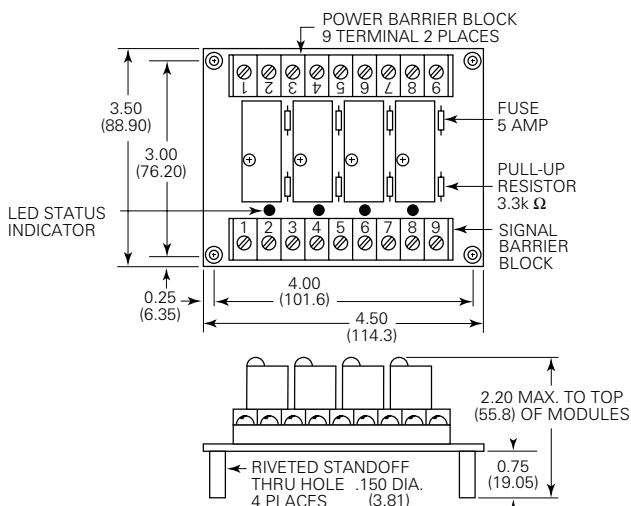
File LR15734-93

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.

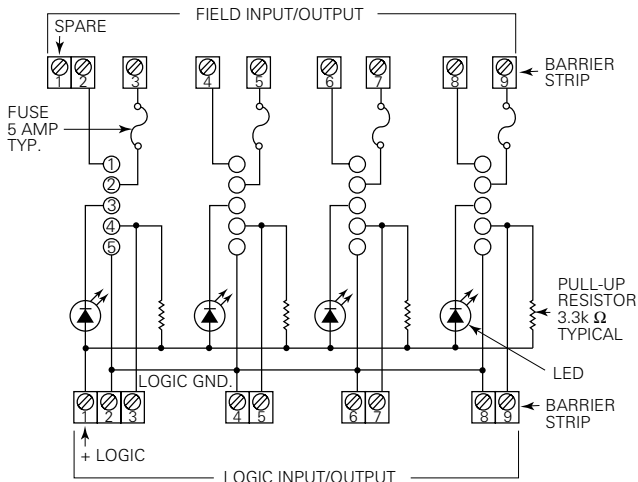
Part Number	2IO4A	2IO4B	2IO4C	2IO8	2IO16	2IO16A	2IO16B	2IO16C	2IO24
Number of I/O Channels	4	4	4	8	16	16	16	16	24
Number of Module Positions	4	4	4	8	16	16	16	16	24
Field Terminals: Screw Terminals	X	X	X	X	X	X	X	X	X
Logic Terminals: Screw Terminals	X	X	X			X	X	X	
Logic Terminals: 26-pin card edge connector				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



2IO4A Schematic

Designed to operate with neg. true logic (active low) systems & one logic voltage.



Suggested Mating Connectors and Fuses

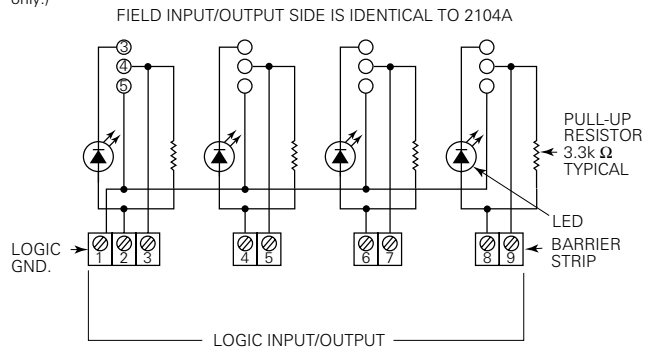
26-pin card edge connector	3M 3462-0001*
50-pin card edge connector	3M 3415-0001*
5 amp fuse	Littelfuse 251-005*
1 amp fuse**	Littelfuse 251-001*

* Or equivalent. Customer assumes ultimate responsibility for applicability.

** Used on 2IO24 only.

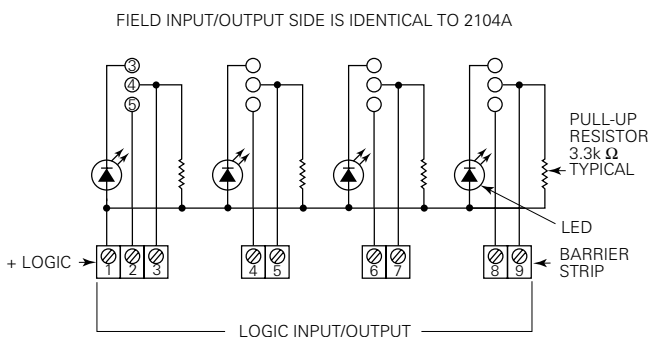
2IO4B Schematic

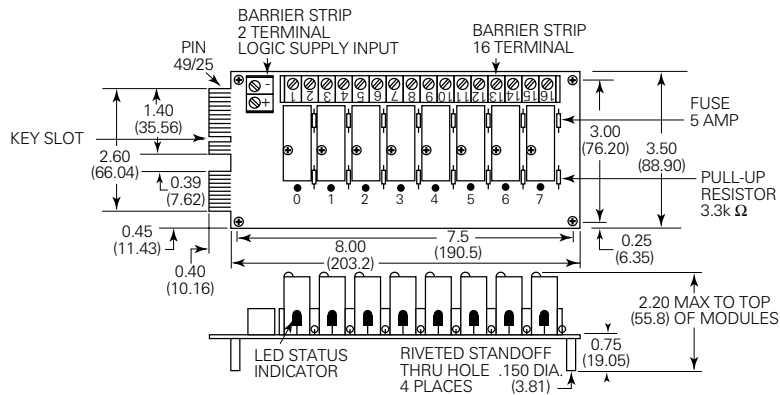
Designed to operate with either neg. or pos. true logic (active low or high) systems & different logic voltages. (output modules only - input modules must be used in negative logic systems only.)



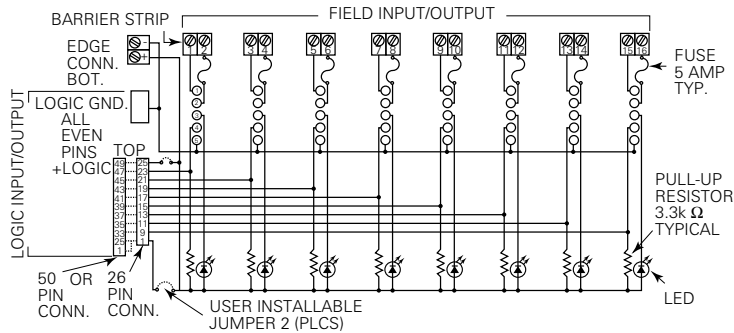
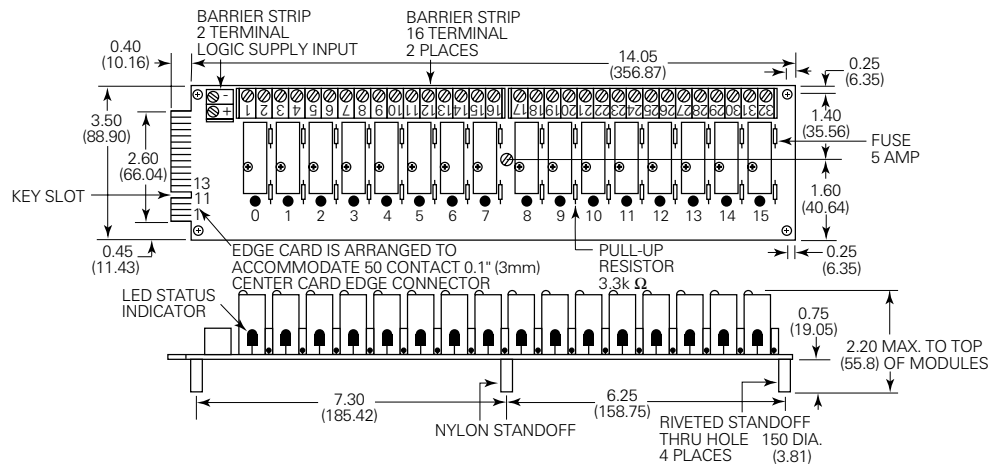
2IO4C Schematic

Designed to operate with neg. true logic (active low) systems & different logic voltages.

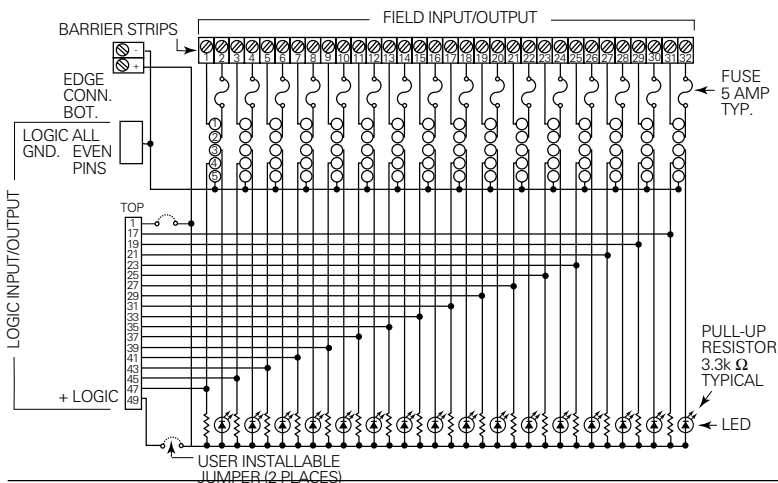


2IO8 Outline Dimensions**2IO8 Schematic**

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.



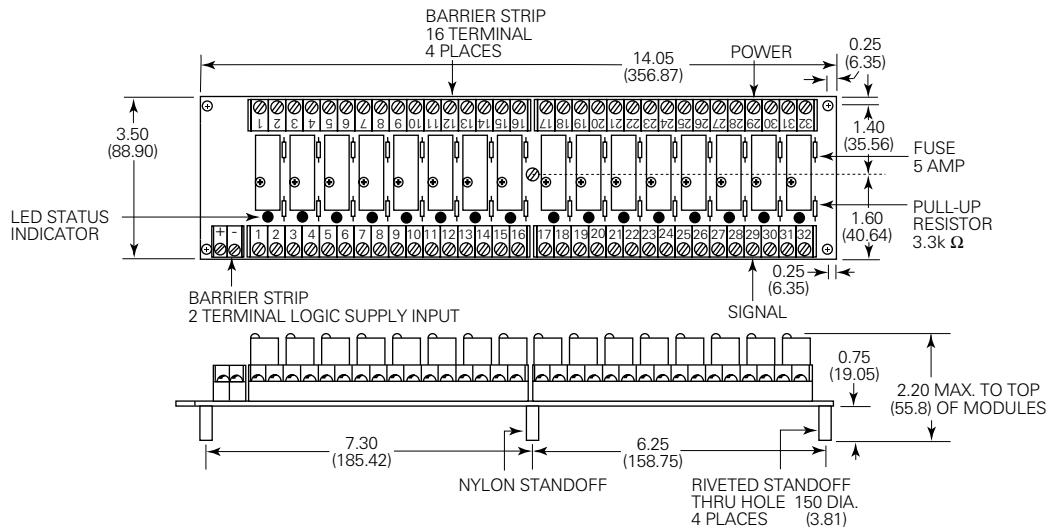
Dimensions are shown for reference purposes only

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

Specifications and availability subject to change.

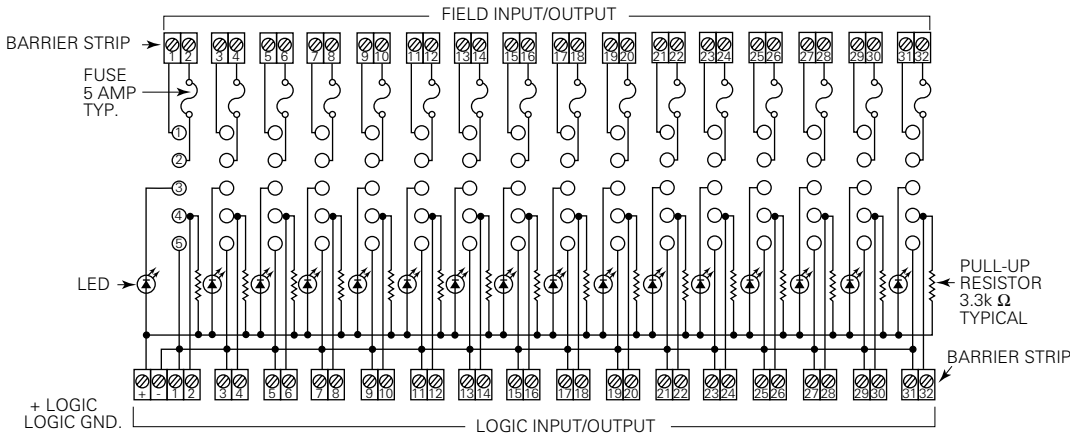
www.tycoelectronics.com
Technical support:
Refer to inside back cover.

2IO16A, 2IO16B & 2IO16C Outline Dimensions



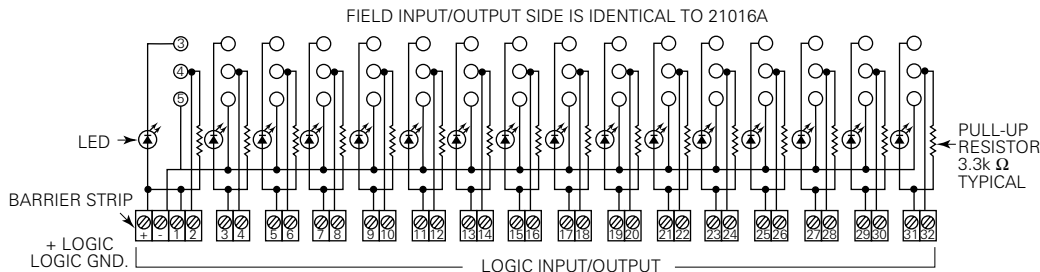
2IO16A Schematic

Designed to operate with neg. true logic (active low) systems & one logic voltage.



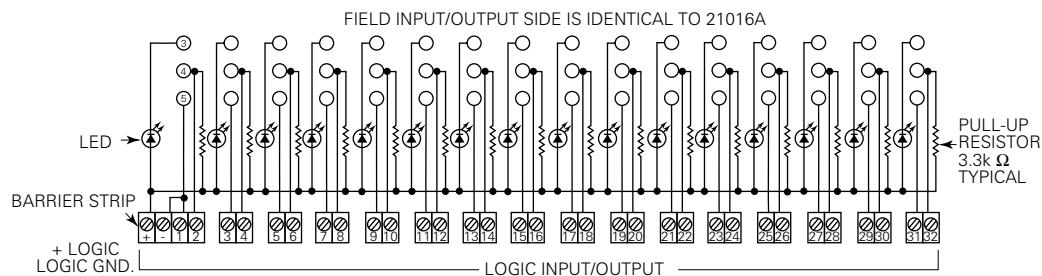
2IO16B Schematic

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.)

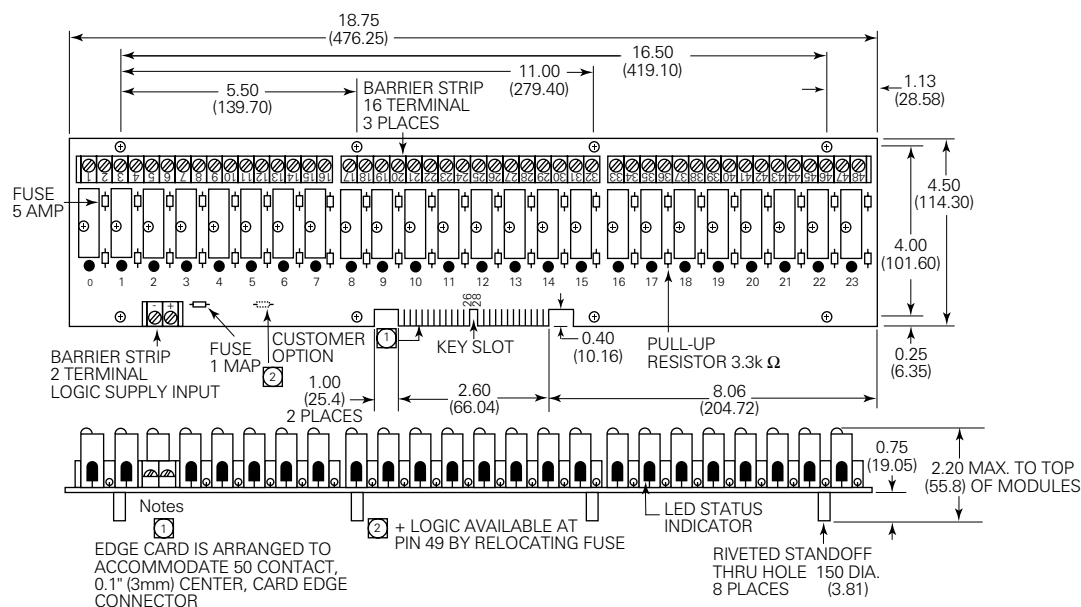


2IO16C Schematic

Designed to operate with neg. true logic (active low) systems & different logic voltages.

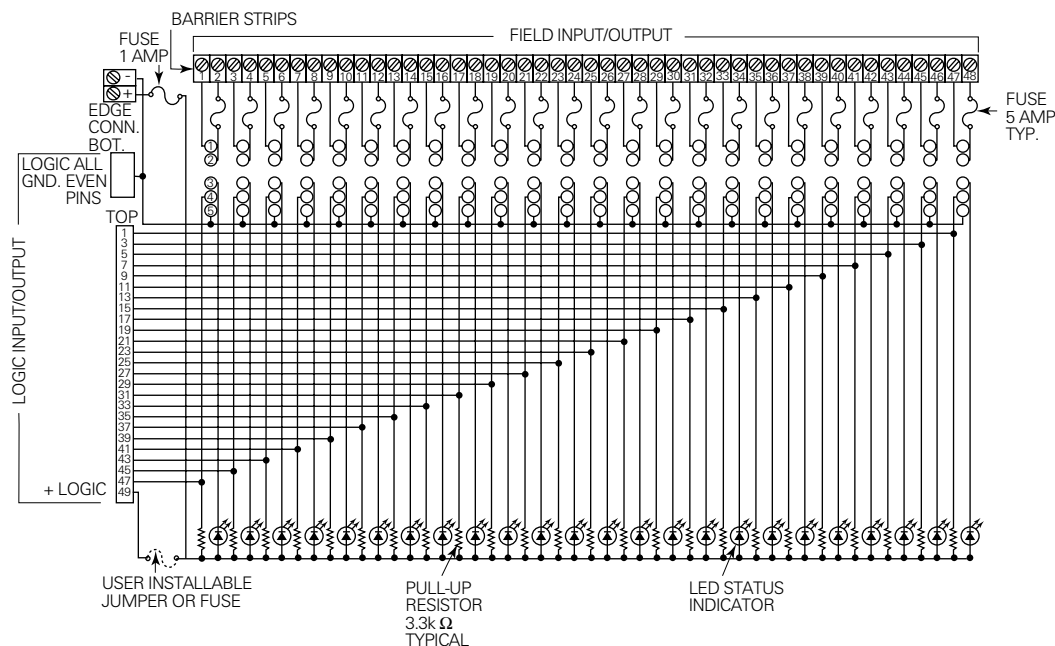


21024 Outline Dimensions



21024 Schematic

Designed to operate with neg. true logic (active low) systems & one logic voltage.



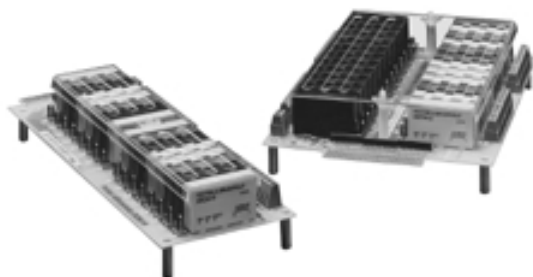
Dimensions are shown for reference purposes only.

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.

1117



210M 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

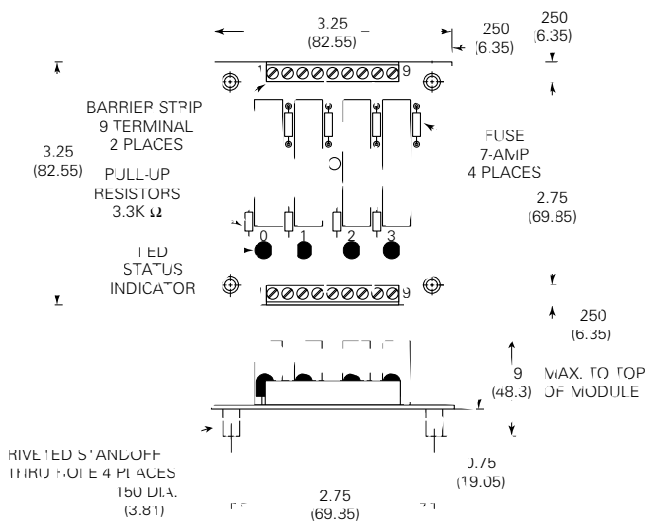
Suggested Mating Connectors and Fuses

50-pin card edge connector	3M 3415-0001 ¹
50-pin header connector	AMP 7-1437021-4 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:

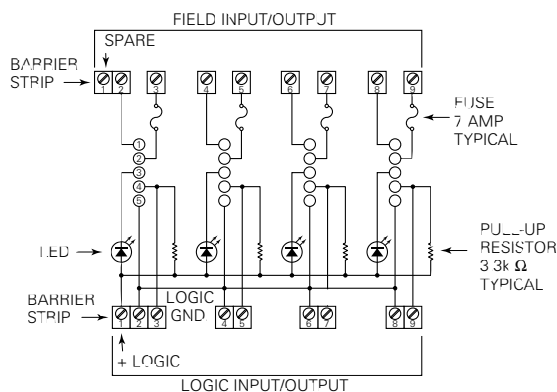
1. Or equivalent. Customer assumes ultimate responsibility for applicability.
2. Used only on 24 and 32 position models.
3. Used only on 2IOM4A and 2IOM16A.

2IOM4A Outline Dimensions



2IOM4A Schematic

Designed to operate with neg. true logic (active low) systems & one logic voltage.

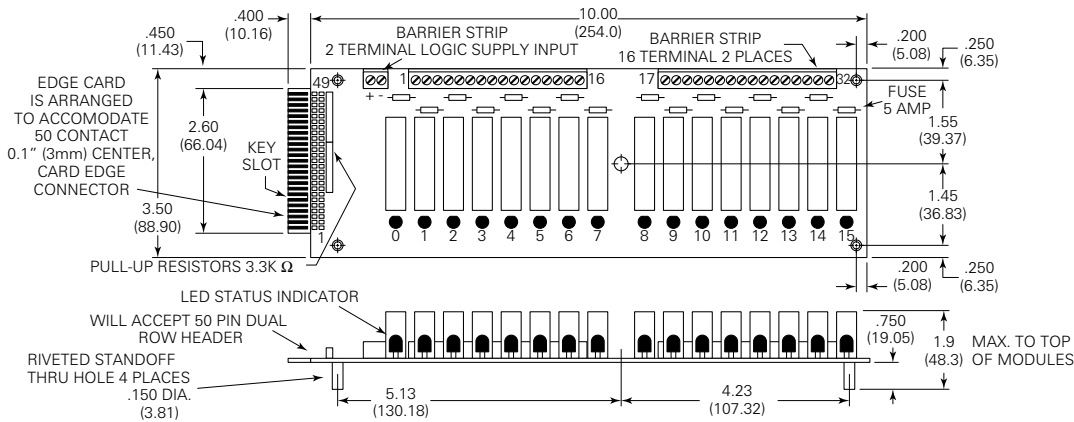
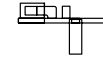


Dimensions are shown for reference purposes only.

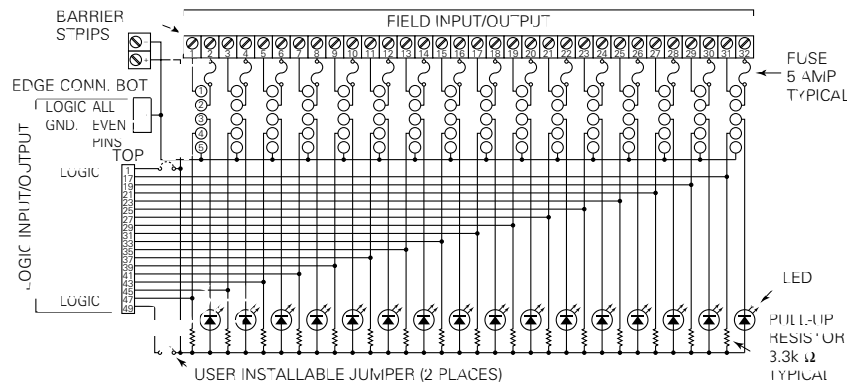
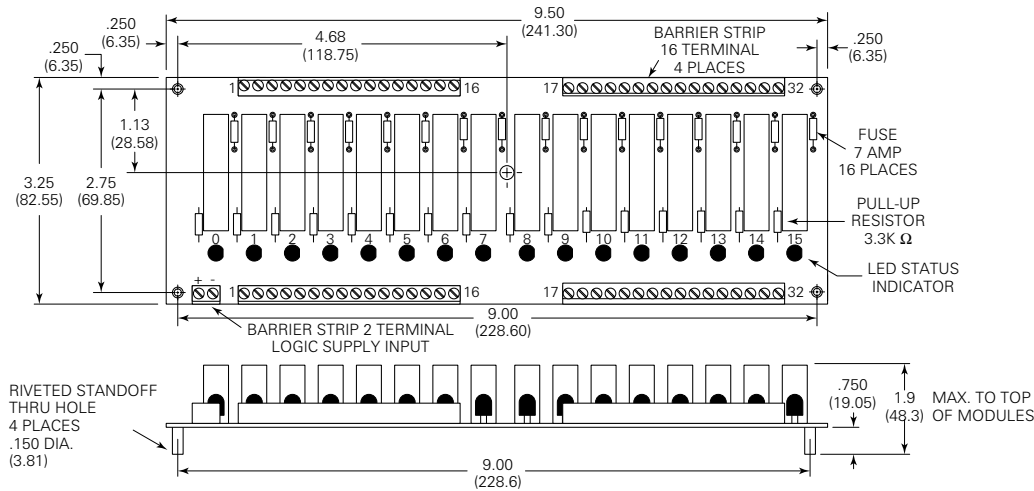
Dimensions are in inches over (millimeters) unless otherwise specified.

Specifications and availability
subject to change.

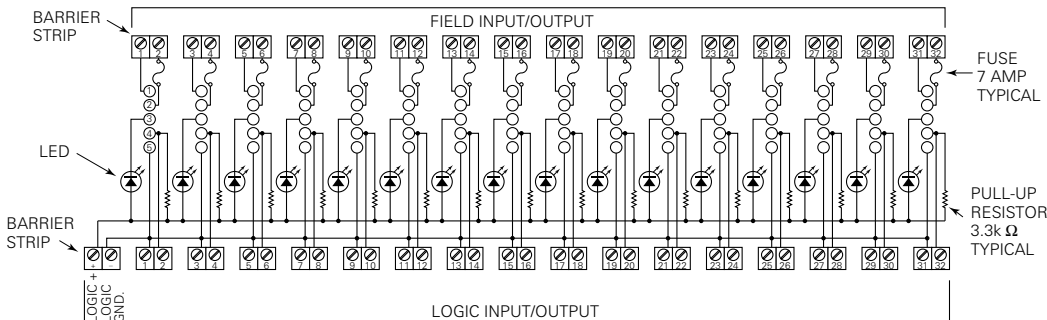
www.tycoelectronics.com
Technical support:
Refer to inside back cover.

2IOM16 & 2IOM16E Outline Dimensions**2IOM16E With Right-Angle Header****2IOM16 & 2IOM16E Schematic**

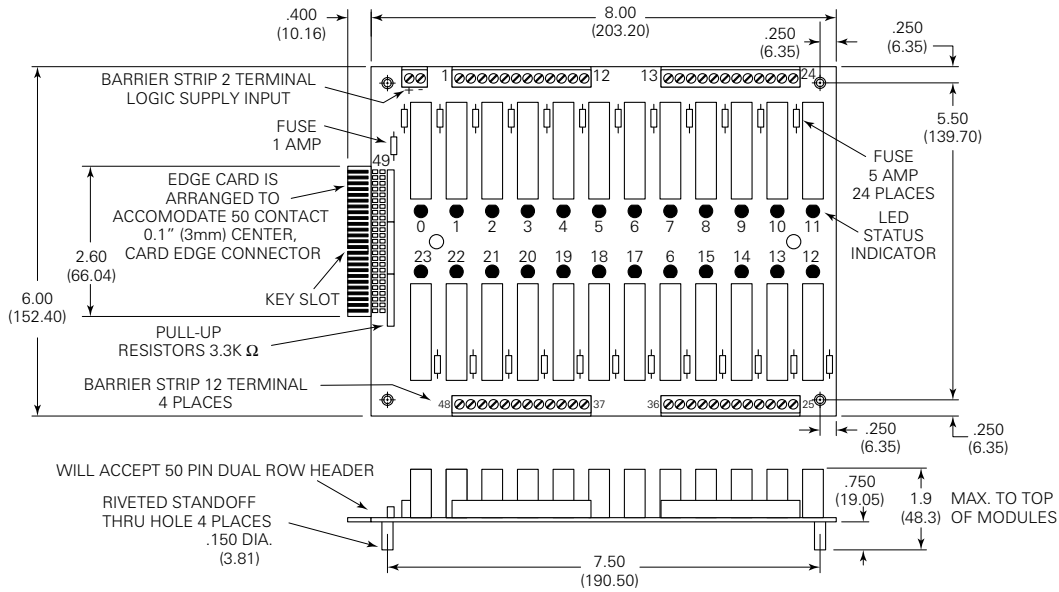
Designed to operate with neg. true logic (active low) systems & one logic voltage.

**2IOM16A Outline Dimensions****2IOM16A Schematic**

Designed to operate with neg. true logic (active low) systems & one logic voltage.

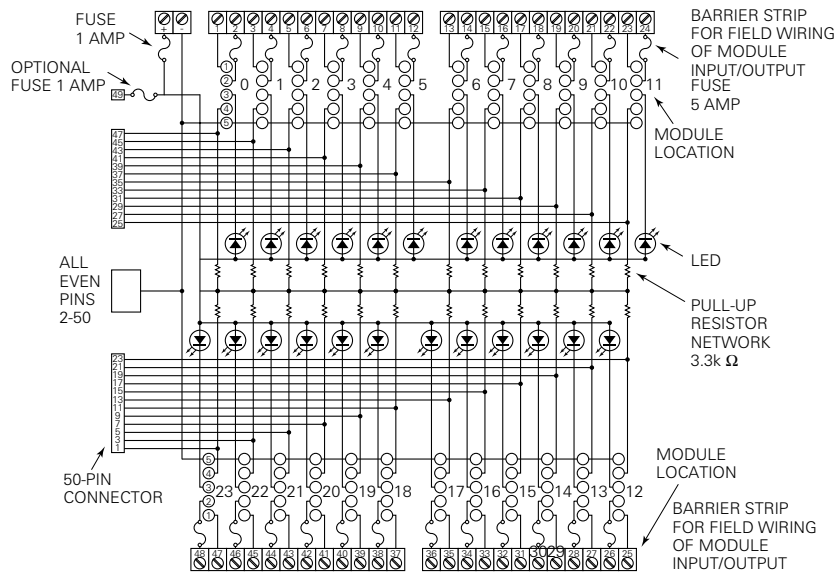


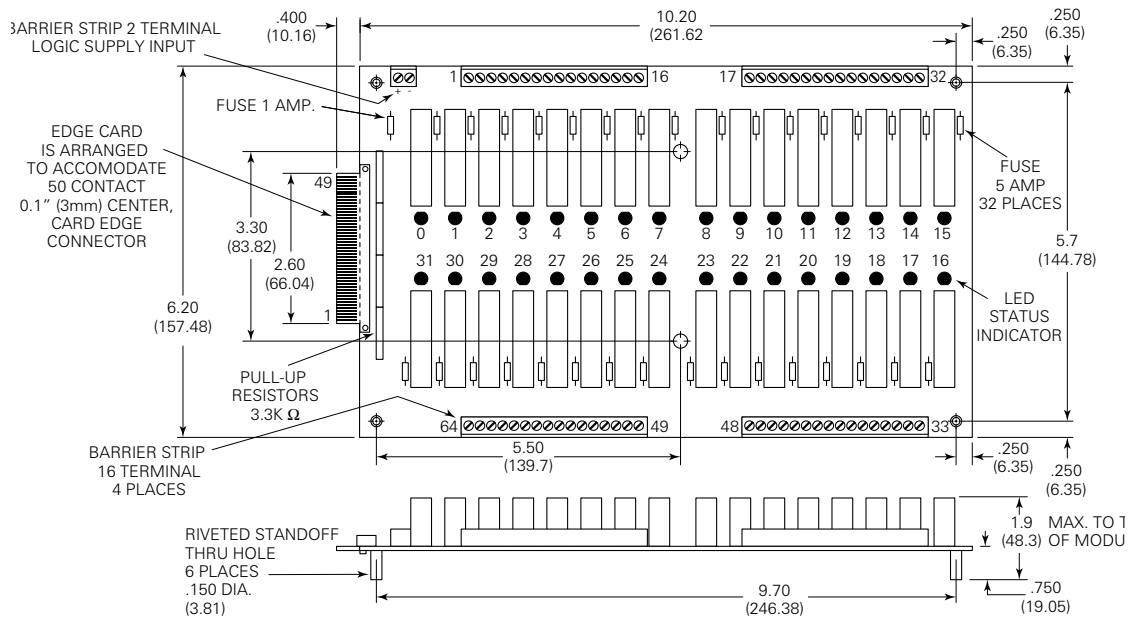
2IOM24 & 2IOM24D Outline Dimensions



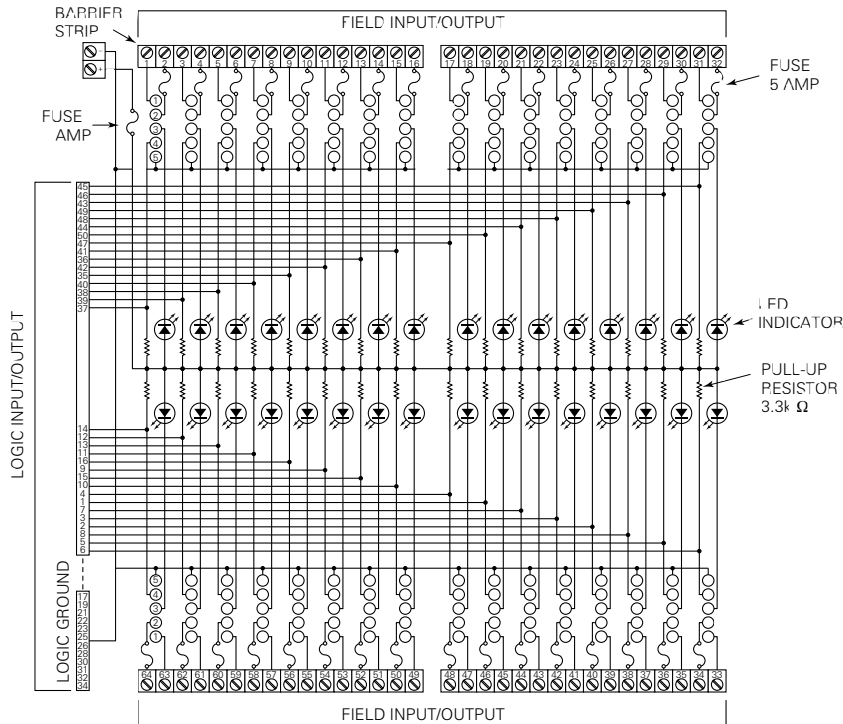
2IOM24 & 2IOM24D Schematic

Designed to operate with neg. true logic (active low) systems & one logic voltage.



210M32D Outline Dimensions**210M32D With Straight Header****210M32D Schematic**

Designed to operate with neg. true logic (active low) systems & one logic voltage.



Engineering Notes

A large grid of graph paper for engineering notes, consisting of 30 columns and 40 rows of small squares.



**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.

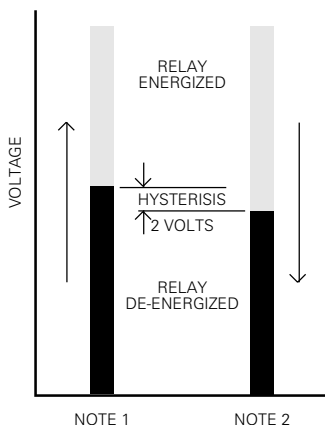
Sensing Modes

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.

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 hysteresis, the voltage differential between pick-up and drop-out, is typically 2% of pick-up.

Engineering Data

Power Requirement: Typically less than 3VA or 3W.

Duty Cycle: Continuous.

Repeatability: $\pm 1\%$, 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 $+55^{\circ}\text{C}$.

Temperature Coefficient: $0.2\%/^{\circ}\text{C}$, 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.

Ordering Information –

Distributors are more likely to stock boldface items.

Fixed Pick-Up and Adjustable Drop-Out

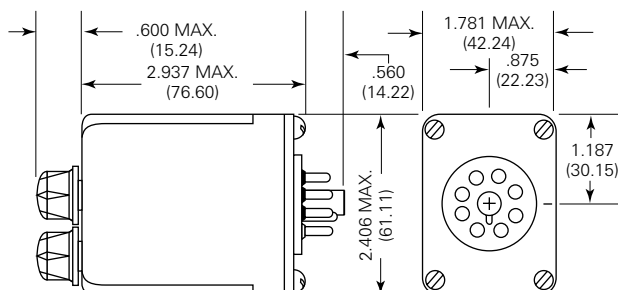
Part Number	Pick-Up (Volts)	Drop-Out Range (Volts)	Maximum Voltage
CSJ-38-71010	105	90-103	140VAC (50/60 Hz.)
CSL-38-31010	22	16-21	32VDC

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

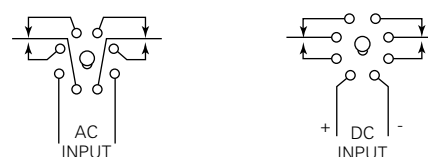
* Actual maximum drop-out voltage is the selected pick-up voltage less the hysteresis voltage.

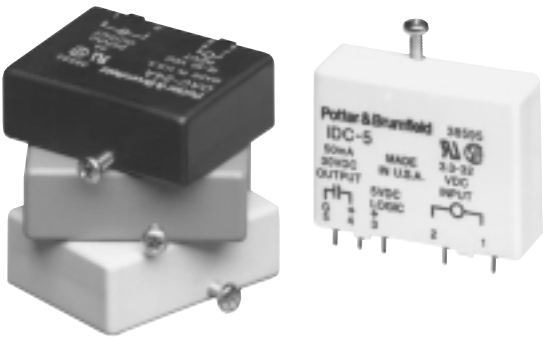
Outline Dimensions



Wiring Diagrams – Bottom Views

(pins numbered clockwise from keyway)





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

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.	μ ADC			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($I_{SINKING}$)			Normally Open($I_{SINKING}$)			Normally Open($I_{SINKING}$)		

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
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
@ 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/ μ s			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.

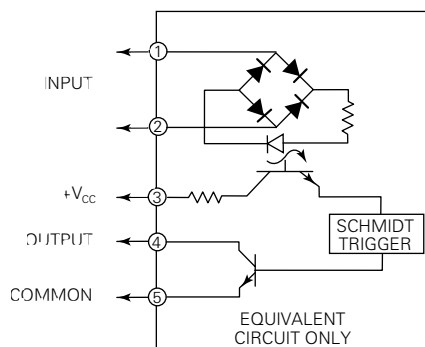
Output Specifications (@ +25°C unless otherwise specified)

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
Maximum Turn-On Time		ms			.1			.1
Maximum Turn-Off Time		ms			.75			.75

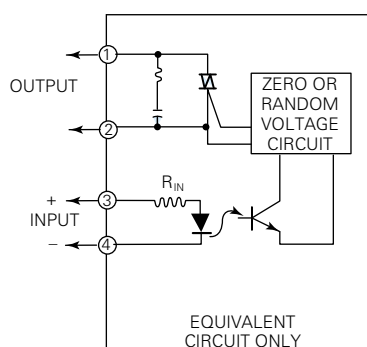
At 40°C, derate by 50mA/°C to 80°C.

PIN-1 must be positive with respect to PIN-2 for correct operation.

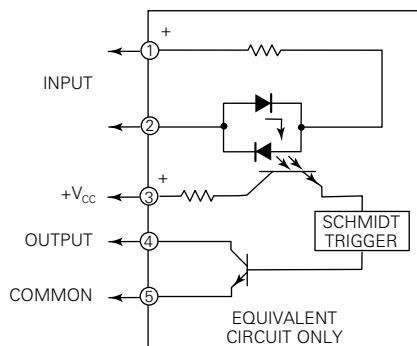
IAC Operating Diagram



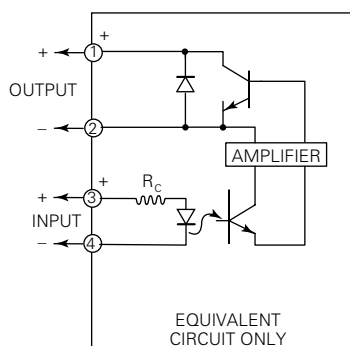
OAC Operating Diagram



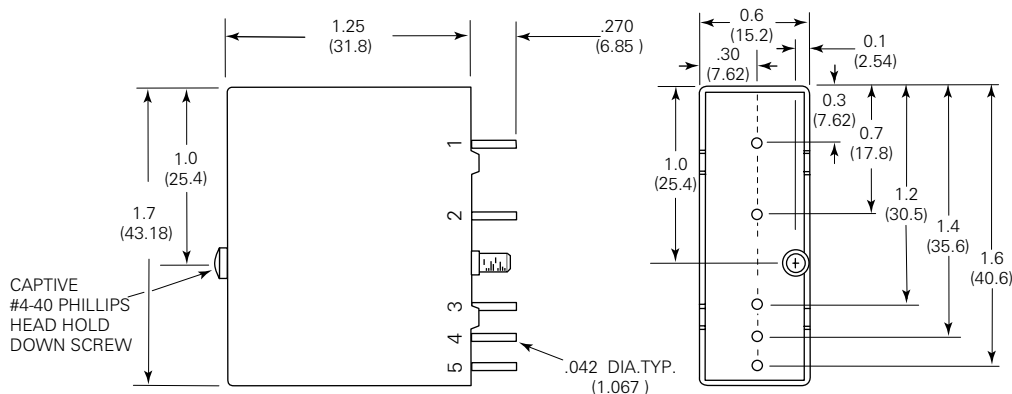
IDC Operating Diagram



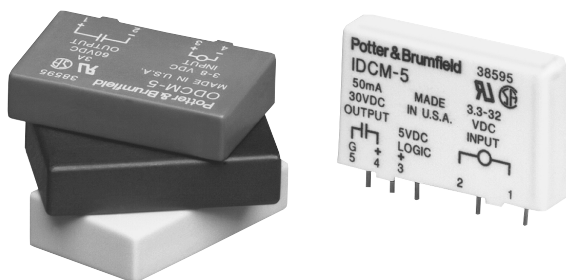
ODC Operating Diagram



Outline Dimensions



Note: Pin 5 is not present on Output Modules.



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

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 R_{IN}		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.	μ ADC			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 Derating		mA/°C		58mA/°C			66mA/°C			66mA/°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/ μ s		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)		ms		1 *			1 *			1 *		.05		.05		.05		.05		.05
Turn-Off Time (Nominal)		ms		1 *			1 *			1 *		.10		.10		.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.

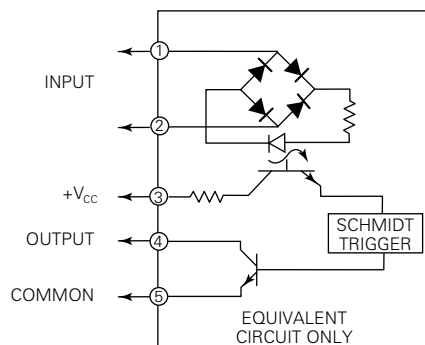
Output Specifications (@ +25°C unless otherwise specified)

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
Maximum Turn-On Time		ms			.1			.1
Maximum Turn-Off Time		ms			.75			.75

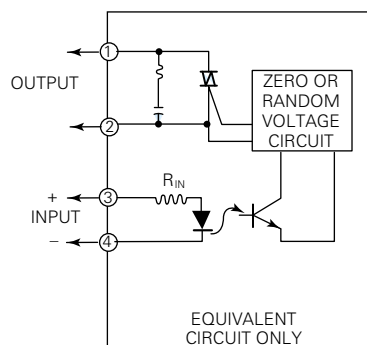
* Above 40°C, derate by 50mA/°C to 80°C.

PIN-1 must be positive with respect to PIN-2 for correct operation.

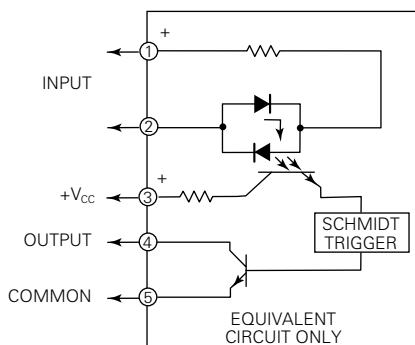
IACM Operating Diagram



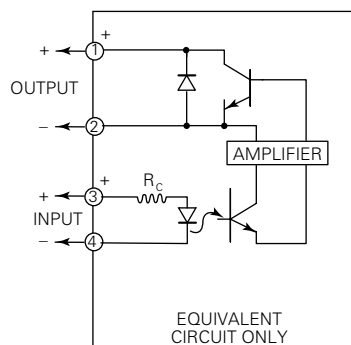
OACM Operating Diagram



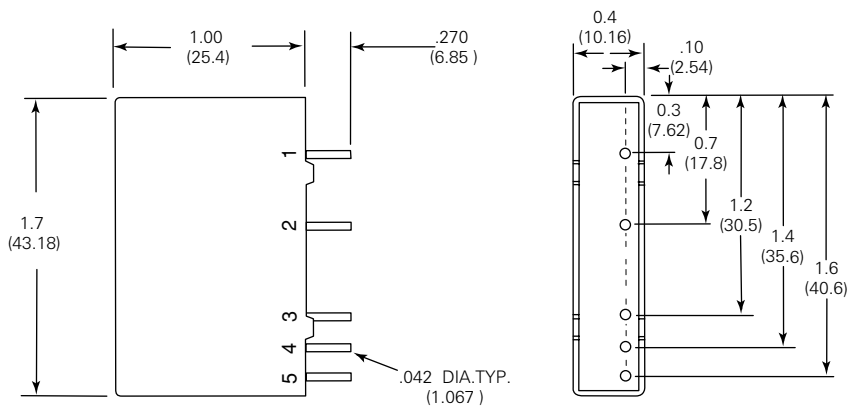
IDCM Operating Diagram



ODCM Operating Diagram



Outline Dimensions



Note: Pin 5 is not present on Output Modules.



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 $\pm 10\%$.

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: $\pm 25\%$ 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.

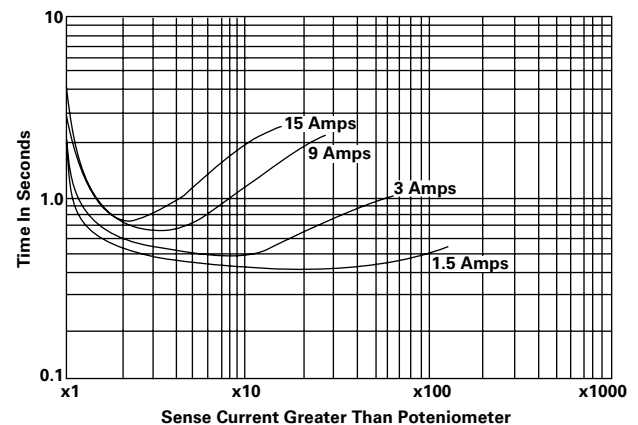
Operating: -25°C to +70°C.

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.

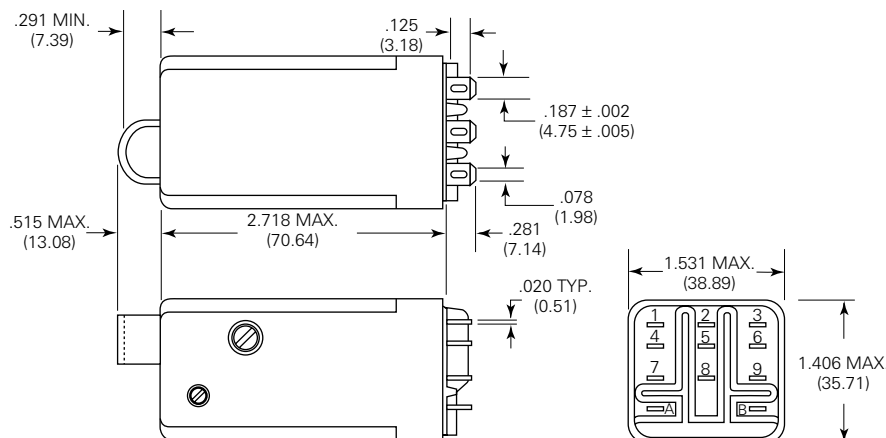
Undercurrent Sensors

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

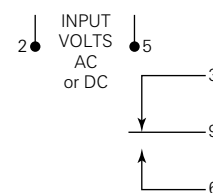
Part Number	Contacts	Mounting
SDAS-01-8Y2S1024	DPDT, 2A DC/1A AC	Socket

Outline Dimensions

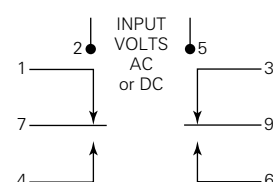


Wiring Diagrams – Bottom Views

1 Form C



2 Form C





"Hockey Puck" Solid State Relay With Paired SCR Output

cUL[®] US File E81606

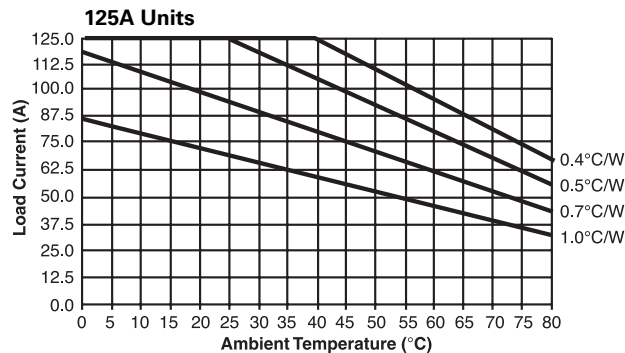
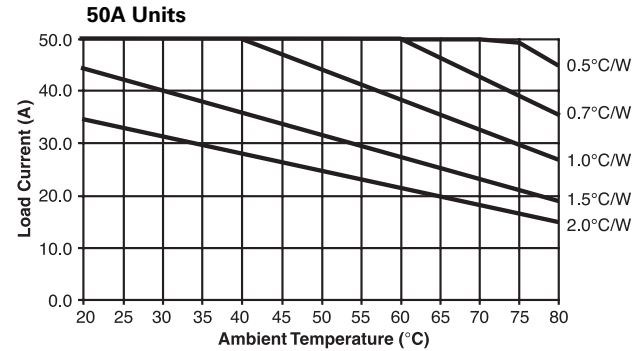
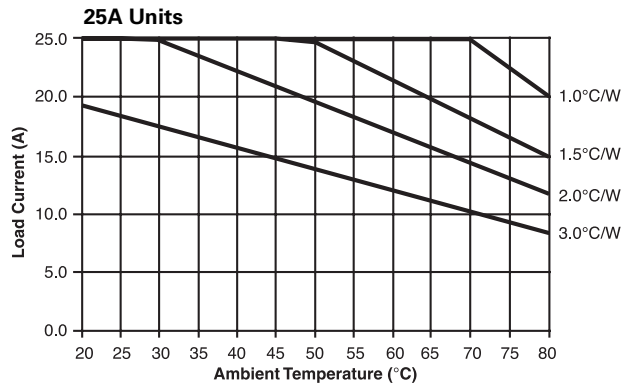
Courtesy of Steven Engineering, Inc.-230 Ryan Way, South San Francisco, CA 94080-6370-Main Office: (650) 588-9200-Outside Local Area: (800) 258-9200-www.stevenengineering.com

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	$f = 60 \text{ Hz}$, $V_L = 240\text{V rms}$	mA rms	.1		
	480V Model	$f = 60 \text{ Hz}$, $V_L = 480\text{V rms}$.25		
On-State Voltage Drop (Max.)	120/240 & 480V Models	$I_L = \text{Max.}$		1.35		
Static dv/dt (Off-State) (Min.)	120/240 & 480V Models		V/μs	500		
Thermal Resistance, Junction to Case ($R_{\theta JC}$) (Max.)	120/240 & 480V Models		°C/W	0.4	0.25	.15
Turn-On Time (Max.)	120/240 & 480V Models	$f = 60 \text{ Hz}$	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	$f = 60 \text{ Hz}$	ms	8.3 for DC input types, 30 for AC input types		
I^2T Rating	120/240 & 480V Models	$t = 8.3 \text{ ms}$	A ² Sec.	937	2,458	12,000
Load Power Factor Rating	120/240 & 480V Models	$I_L = \text{Max.}$		0.5 - 1.0		

*See Derating Curves

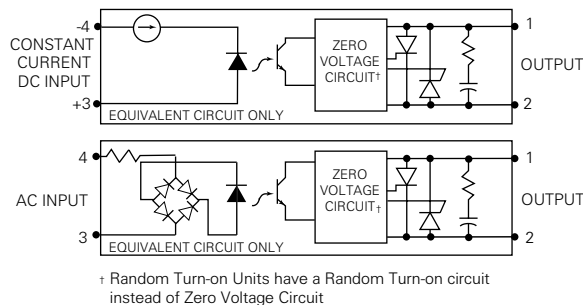
Electrical Characteristics (Thermal Derating Curves)



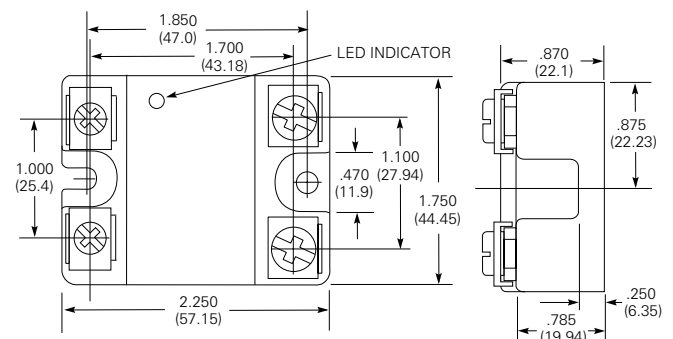
Heatsink Recommendations

- 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

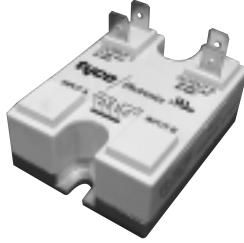


Outline Dimensions



SSRD series

Dual AC Output "Hockey Puck" Solid State Relay With Paired SCR Outputs



UL 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.
- Choose from 4-15 VDC or 17-32 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
DE = 17-32 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

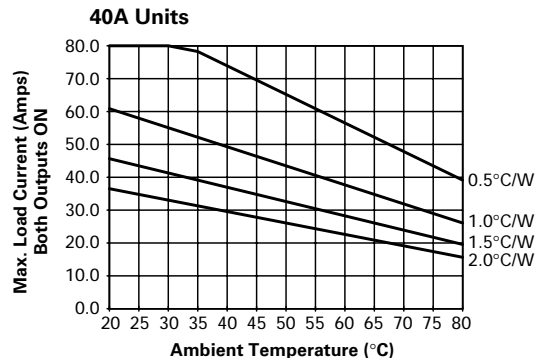
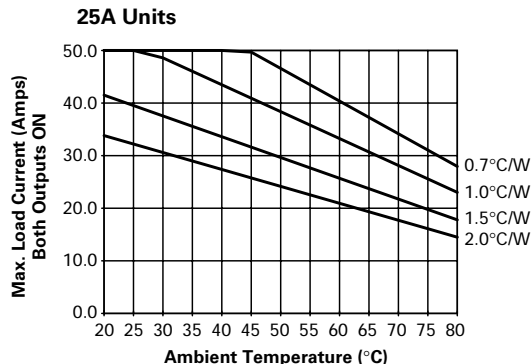
Parameter	Units	Zero V Turn-on and Random V Turn-on Units	
Control Voltage Range V_{IN}	VDC	4-15	17-32
Must Operate Voltage $V_{(NIOPI)}$ (Min.)	VDC	3.75	17
Must Release Voltage $V_{(NIREL)}$ (Min.)	VDC	1	1
Input Current (Max.)	mA DC	34	24
Input Current (Min. for On-State)	mA DC	7.5	13
Input Resistance	Ohms	500	1,500

Output Specifications (@ 25° C, unless otherwise specified)

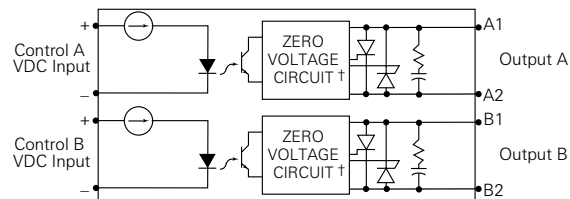
Parameter	Conditions	Units	25A Models	40A Models
Load Voltage Range V_L	$f = 47 - 63 \text{ Hz.}$	V rms	24-280	
Peak Voltage (Min.)	$t = 1 \text{ Min.}$	V peak	550	
Load Current Range I_L^*	Resistive	A rms	0.1-25	0.1-40
Single Cycle Surge Current (Max.)		A peak	500	780
One Second Surge Current (Max.)		A peak	150	234
Leakage Current (Off-State) (Max.)	$V_L = 280 \text{V rms}$	mA rms	0.1	
On-State Voltage Drop (Max.)	$I_L = \text{Max.}$	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.)	$f = 60 \text{ Hz.}$	ms	8.33 for Zero Voltage Turn-On Models <0.1 for Random Voltage Turn-On Models	
Turn-Off Time (Max.)	$f = 60 \text{ Hz.}$	ms	8.33	
I^2t Rating	$t = 8.3 \text{ ms}$	A ² Sec.	1,041	2,435
Load Power Factor Rating	$I_L = \text{Max.}$		0.5 - 1.0	

*See Derating Curves

Electrical Characteristics (Thermal Derating Curves)



Operating Diagram

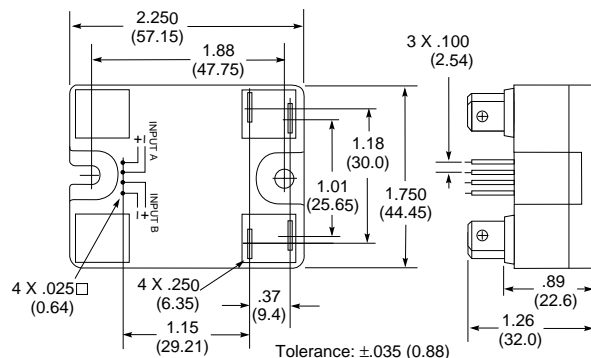


† Random Turn-on Units have a Random Turn-on circuit instead of Zero Voltage Circuit

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.

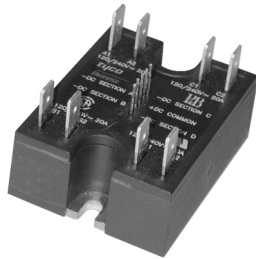
Outline Dimensions



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

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 $V_{IN(OPS)}$ (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

Output Specifications (@ 25° C, unless otherwise specified)

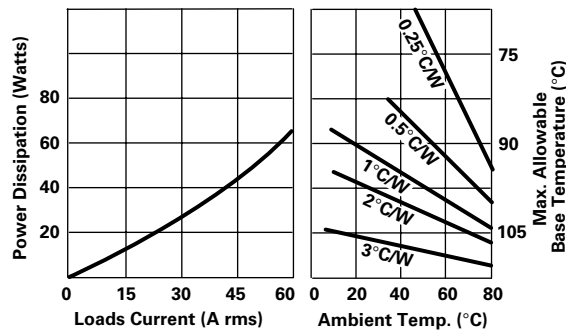
Parameter	Conditions	Units	
Load Voltage Range V_L		V rms	24-280
Repetitive Blocking Voltage (Min.)		V peak	±600
Load Current Range I_L^*	Resistive	A rms	.15-20
Single Cycle Surge Current (Min.)		A peak	250
Leakage Current (Off-State) (Max.)	$f = 60 \text{ Hz}$, $V_L = 280\text{Vrms}$	mA rms	10
On-State Voltage Drop (Max.)	$I_L = \text{Max.}$	V peak	1.6
Static dv/dt (Off-State) (Min.)	$V_L = 280\text{Vrms}$	V/ μs	200
Thermal Resistance, Junction to Case ($R_{\theta JC}$) (Max.)	All Sections On	°C/W	1.2
Turn-On Time (Max.)	$f = 60 \text{ Hz}$	ms	8.3 for Zero Voltage Turn-On Models 0.1 for Random Voltage Turn-On Models
Turn-Off Time (Max.)	$f = 60 \text{ Hz}$	ms	8.3
$I^2 t$ Rating	$t = 8.3 \text{ ms}$	A ² Sec.	260
Load Power Factor Rating	$I_L = \text{Max.}$		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: $I_L = \text{Four } 7.5\text{A loads @ } 60^\circ\text{C}$

Find: Minimum heatsink required

Solution: From Thermal Dissipation Graph

$4 \times 7.5\text{A} = 30\text{A}$ 4 sections ON

Heatsink = 2°C/W minimum

Example #2:

Given: SSRQ24020

Find: Maximum rating mounting to $1.0^\circ\text{C/W HS @ } 60^\circ\text{C}$ All sections ON

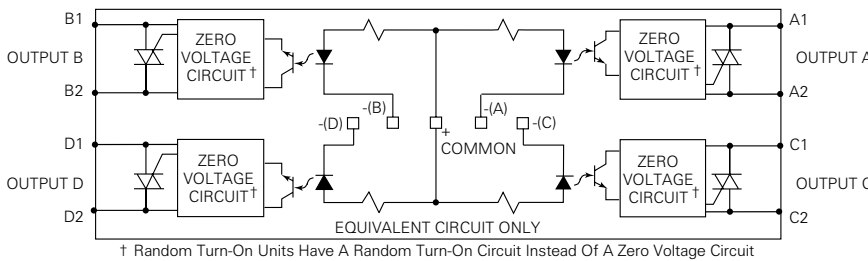
Solution: From Thermal Dissipation Graph

Rating mounted to $1.0^\circ\text{C/W HS @ } 60^\circ\text{C} = 36\text{A total}$

$9\text{A for } 4 \text{ Sections ON} = 36\text{A total}$

$12\text{A for } 3 \text{ Sections ON} = 36\text{A total}$

Operating Diagram

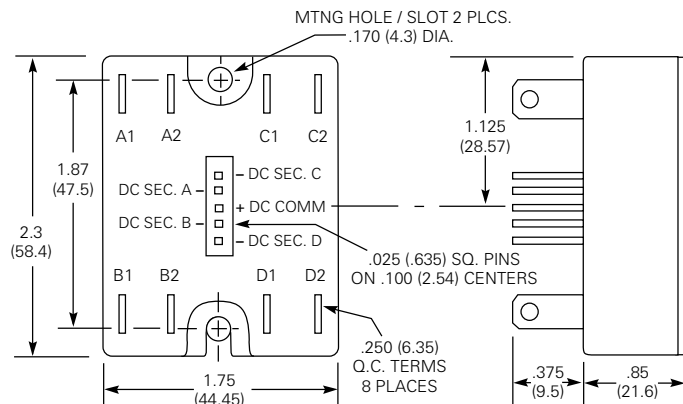


† Random Turn-On Units Have A Random Turn-On Circuit Instead Of A Zero Voltage Circuit

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



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.



SSRT series

“Hockey Puck” Solid State Relay With Snubberless Triac Output

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

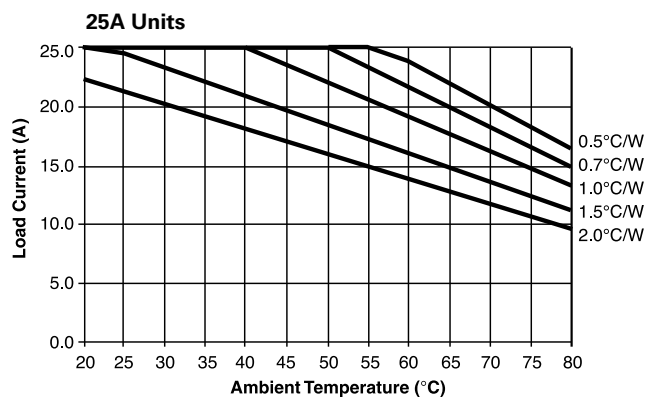
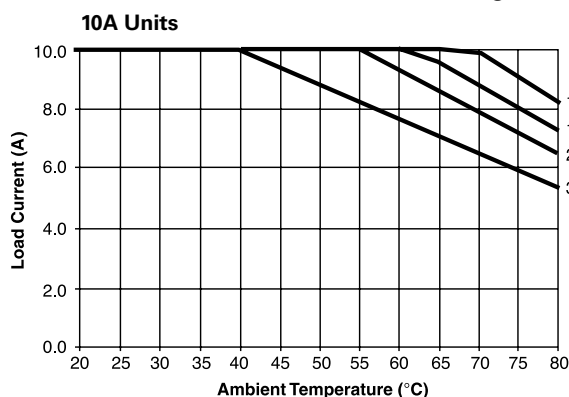
Input Specifications

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

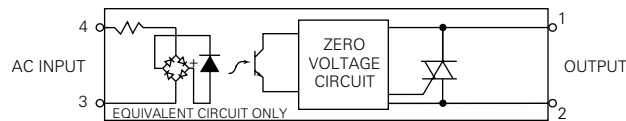
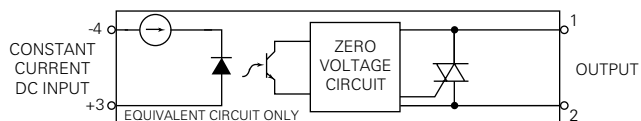
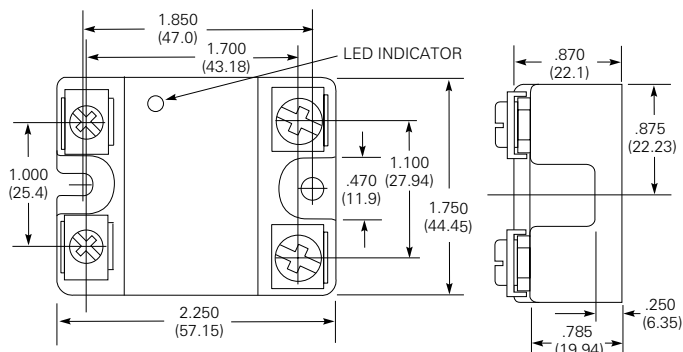
Output Specification (@ 25°C, unless otherwise specified)

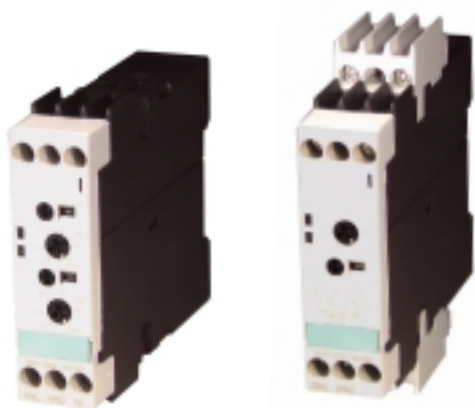
Parameter	Conditions	Units	SSRT-240A10 & SSRT-240D10	SSRT-240A25 & SSRT-240D25
Load Voltage Range V_L		V rms	24 - 280	
Repetitive Blocking Voltage (Min.)		V peak	± 600	
Load Current Range I_L^*	Resistive	A rms	.1 - 10	.1 - 25
Single Cycle Surge Current (Min.)		A peak	100	250
Leakage Current (Off-State) (Max.)	$f = 60 \text{ Hz}$, $V_L = \text{Nom.}$ (120 or 240 V rms)	mA rms	.1	
On-State Voltage Drop (Max.)	$I_L = \text{Max.}$	V peak	1.5	1.3
Static dv/dt (Off-State) (Min.)		V/ μs	500	
Thermal Resistance, Junction to Case ($R_{\theta JC}$) (Max.)		$^{\circ}\text{C/W}$	2.2	1.7
Turn-On Time (Max.)	$f = 60 \text{ Hz}$	ms	8.3 for DC input types, 20 for AC input types	
Turn-Off Time (Max.)	$f = 60 \text{ Hz}$	ms	8.3 for DC input types, 30 for AC input types	
$I^2 t$ Rating	$t = 8.3 \text{ ms}$	$\text{A}^2 \text{ Sec.}$	41	240
Load Power Factor Rating	$I_L = \text{Max.}$		0.5 - 1.0	

*See Derating Curves

Electrical Characteristics (Thermal Derating Curves)**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**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.



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 201 "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: $\pm 5\%$ of full scale value.

Reset Time: 150 ms.

Minimum On Period: 35 msec.

Repeatability: $\pm 1\%$.

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: 30×10^6 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.

Timing Modes

See the following page for a description of timing modes.

Mechanical Data

Termination: Screw terminal.

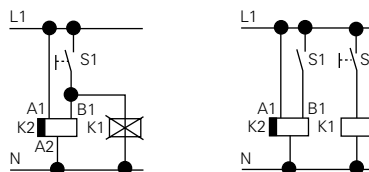
Enclosure: Plastic DIN case.

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

Dimensions are shown for reference purposes only.

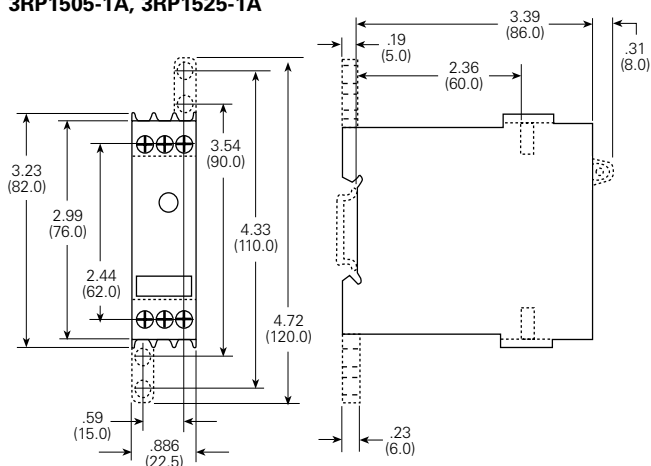
Dimensions are in inches over (millimeters) unless otherwise specified.

Specifications and availability subject to change.

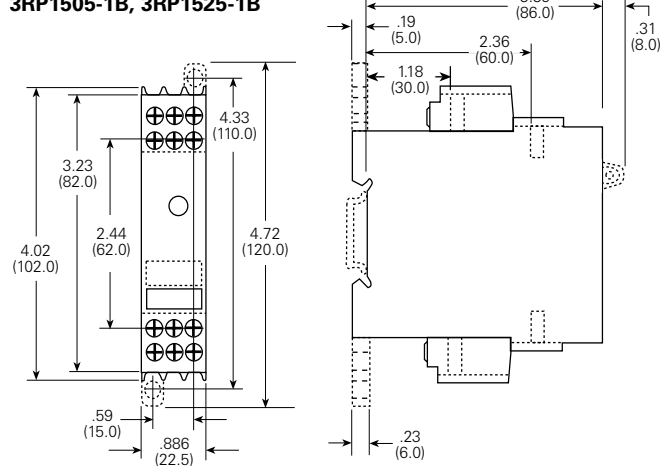
www.tycoelectronics.com
Technical support:
Refer to inside back cover.

Outline Dimensions

3RP1505-1A, 3RP1525-1A



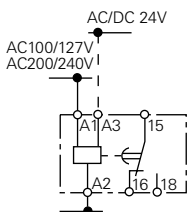
3RP1505-1B, 3RP1525-1B



Wiring Diagram

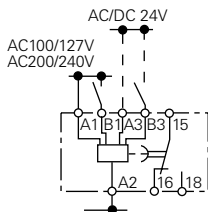
1. On-Delay

3RP1505-1A 3RP1525-1A



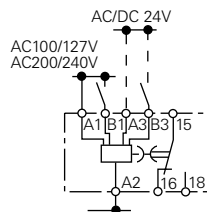
2. Off-Delay

With Auxiliary Voltage 3RP1505-1A



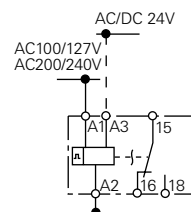
3. On and Off Delay

With Auxiliary Voltage 3RP1505-1A



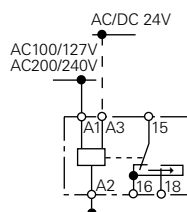
4. Flashing

3RP1505-1A



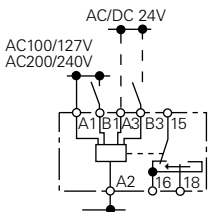
5. Making-Pulse Contact

3RP1505-1A 3RP1525-1A



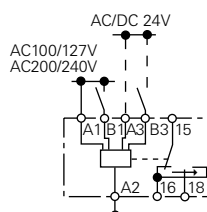
6. Breaking-Pulse Contact

With Auxiliary Voltage 3RP1505-1A



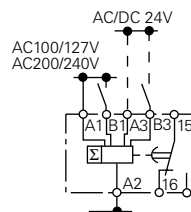
7. Pulse Forming

With Auxiliary Voltage 3RP1505-1A



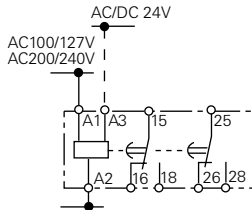
8. Additive On-Delay With Auxiliary Voltage and Instantaneous Contact

3RP1505-1A



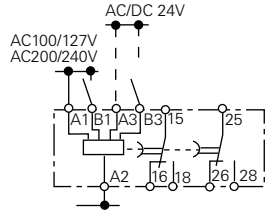
9. On-Delay

3RP1505-1B 3RP1525-1B



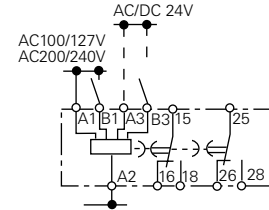
10. Off-Delay

With Auxiliary Voltage 3RP1505-1B



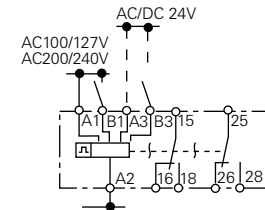
11. On-and Off-Delay

With Auxiliary Voltage 3RP1505-1B



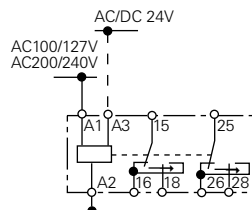
12. Flashing

3RP1505-1B



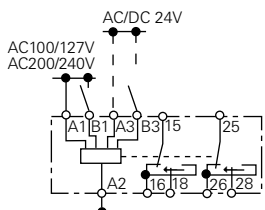
13. Making-Pulse Contact

3RP1505-1B



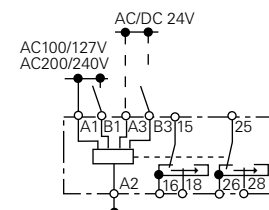
14. Breaking-Pulse Contact

With Auxiliary Voltage 3RP1505-1B



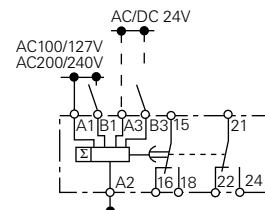
15. Pulse Forming

With Auxiliary Voltage 3RP1505-1B



16. Additive On-Delay With Auxiliary Voltage and Instantaneous Contact

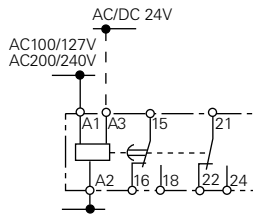
3RP1505-1B



Wiring Diagrams (continued)

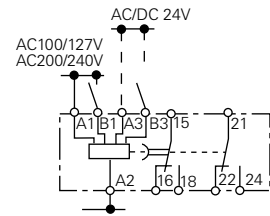
17. On-Delay and Instantaneous Contact

3RP1505-1B



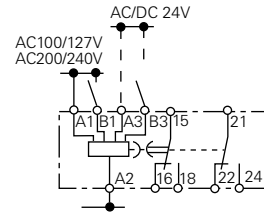
18. Off-Delay With Auxiliary Voltage and Instantaneous Contact

3RP1505-1B



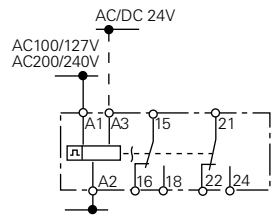
19. On and Off Delay With Auxiliary Voltage and Instantaneous Contact

3RP1505-1B



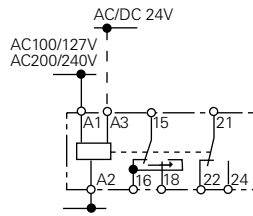
20. Flashing and Instantaneous Contact

3RP1505-1B



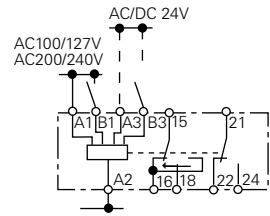
21. Making-Pulse Contact and Instantaneous Contact

3RP1505-1B



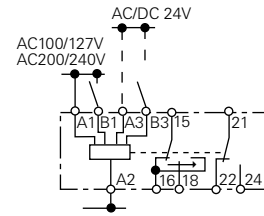
22. Breaking-Pulse Contact With Auxiliary Voltage and Instantaneous Contact

3RP1505-1B



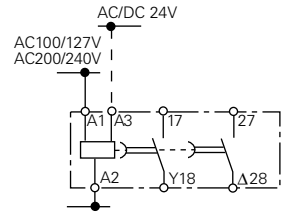
23. Pulse Forming With Auxiliary Voltage and Instantaneous Contact

3RP1505-1B



24. Star-Delta Function

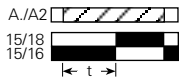
3RP1505-1B



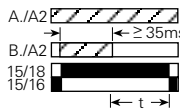
Timing Function Descriptions and Settings

3RP1505-1A

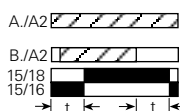
1. On Delay



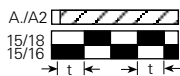
2. Off Delay



3. On/Off Delay



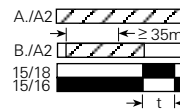
4. Flasher



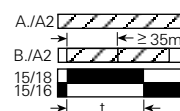
5. Impulse On



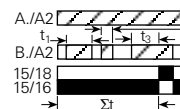
6. Impulse Off



7. Pulse Shaping



8. Cumulative On Delay

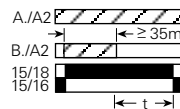


3RP1505-1B

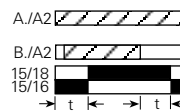
9. On Delay



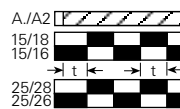
10. Off Delay



11. On/Off Delay



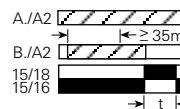
12. Flasher



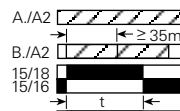
13. Impulse On



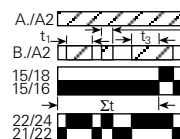
14. Impulse Off



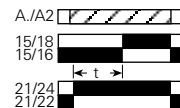
15. Pulse Shaping



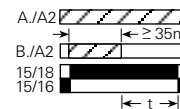
16. Cumulative On Delay



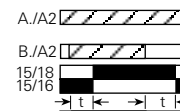
17. On Delay



18. Off Delay



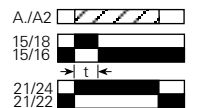
19. On/Off Delay



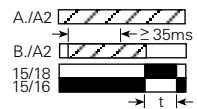
20. Flasher



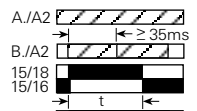
21. Impulse On



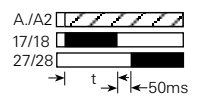
22. Impulse Off



23. Pulse Shaping



24. Star/Delta





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.

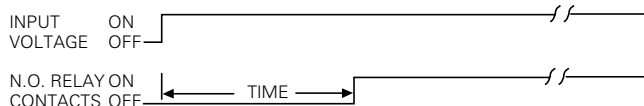
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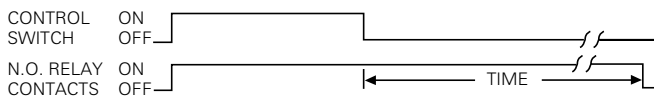
Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Timing Modes

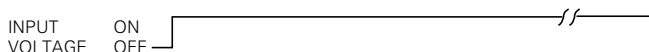
Delay on operate – Delay period begins when input voltage is applied. At the end of the delay period, the relay will operate and will not release until input voltage is removed. Reset occurs when input voltage is reapplied.



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 $\pm 1/2$ 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: $\pm 10\%$.

Res. Adj. Types: $\pm 10\%$ at high end of timing range; min. specified, or less, at low end.

Delta Time (for AC units add ± 1 cycle 60 Hz.): $\pm 10\%$.

Repeatability (for AC units add ± 1 cycle 60 Hz.): $\pm 2\%$.

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	20	28
	120	105	130
DC	12	11	13
	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	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

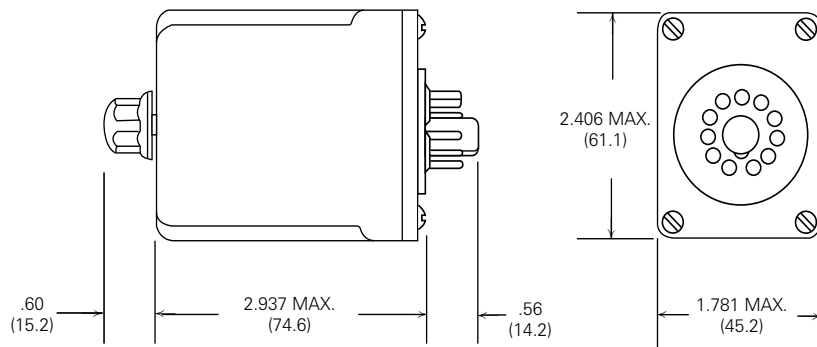
Delay on Release Models

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

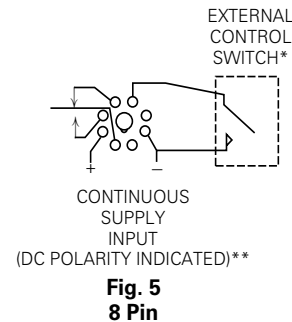
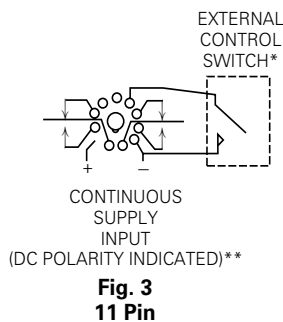
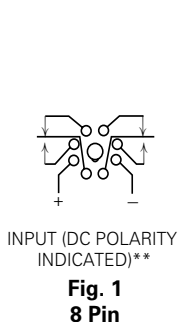
Interval on Models

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)



* 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 "-".



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.

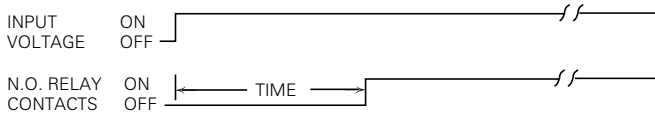
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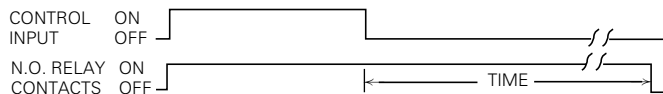
Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

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 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 $\pm 1/2$ cycle 60 Hz.):

Knob Adj. Types: $\pm 5\%$ of max. specified at high end of timing range; min. specified, or less, at low end; $\pm 10\%$ full scale.

Fixed Types: $\pm 5\%$.

Res. Adj. Types: $\pm 5\%$ at high end of timing range; min. specified, or less, at low end.

Delta Time (for AC units add ± 1 cycle 60 Hz.): $\pm 5\%$.

Repeatability (for AC units add ± 1 cycle 60 Hz.): $\pm 1\%$.

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 $\pm 5\%$.

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.

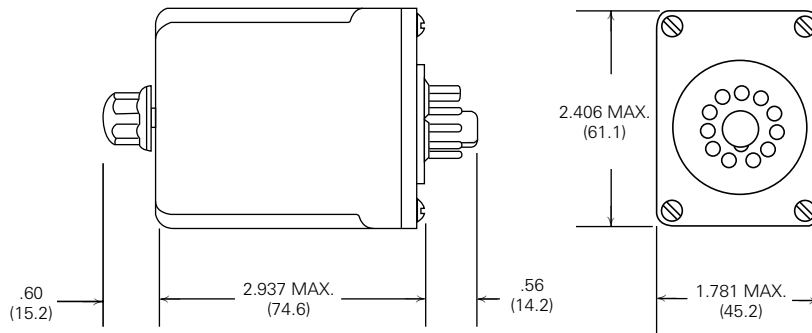
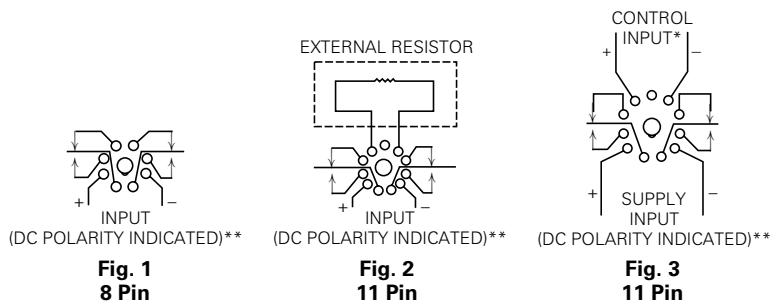
Weight: 8 oz. (227g) approximately.

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)**

* 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.



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.

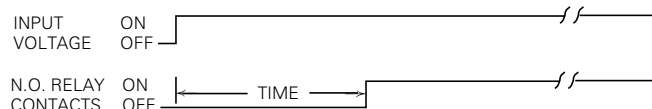
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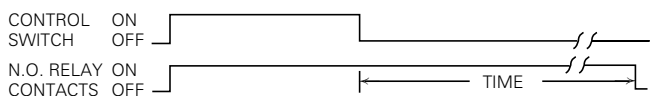
Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Timing Modes

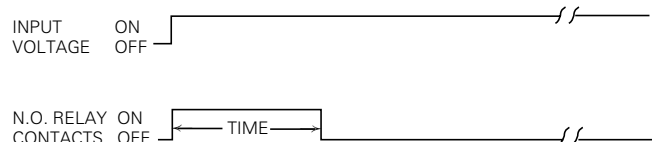
Delay on operate – Delay period begins when input voltage is applied. At the end of the delay period, the relay will operate and will not release until input voltage is removed. Reset occurs when input voltage is reapplied.



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 0.5 to 5.0 sec. through 10 to 100 min.

Timing Adjustment: Knob adjustable.

Tolerance (for AC units add $\pm 1/2$ 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.): $\pm 2\%$, typ.; $\pm 5\%$, max.

Repeatability (including first cycle of operation):

AC: $\pm 0.1\%$, typ.; $\pm 0.5\%$, max.; but not less than ± 16 ms.

DC: $\pm 0.05\%$ typ.; $\pm 0.1\%$ 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**

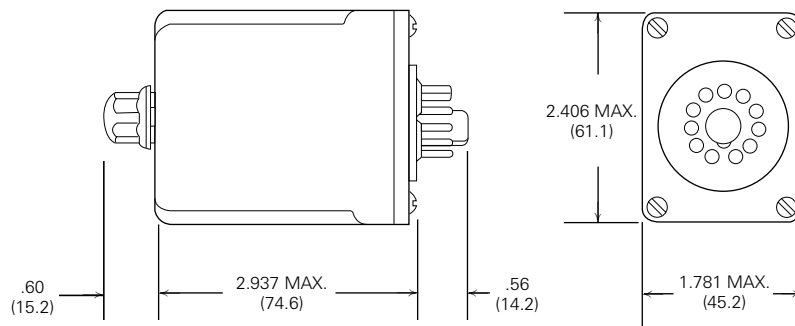
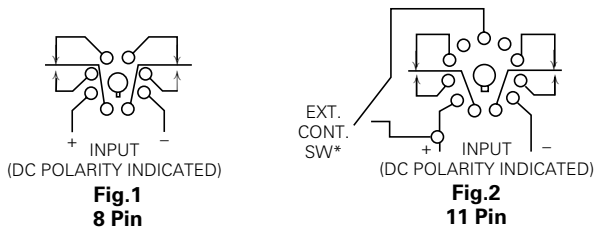
Voltage	Time	Adjustment	Wiring Dia.	Part Number
120VAC	0.5 to 5 Min. 1 to 10 Min. 5 to 50 Min. 10 to 100 Min.	Knob	1	CGB-38-70005M CGB-38-70010M CGB-38-70050M CGB-38-70100M
24VDC	5 to 50 Min.	Knob	1	CGD-38-30050M

Delay on Release Models

Voltage	Time	Adjustment	Wiring Dia.	Part Number
120VAC	1 to 10 Min. 5 to 50 Min.	Knob	2	CGB-38-78010M CGB-38-78050M

Interval on Models

Voltage	Time	Adjustment	Wiring Dia.	Part Number
120VAC	0.5 to 5 Sec. 1 to 10 Min.	Knob	1	CGB-38-79005S CGB-38-79010M
24VDC	1 to 10 Min.	Knob	1	CGD-38-39010M

Outline Dimensions**Wiring Diagrams – Bottom Views (pins numbered clockwise from keyway)**

* 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 "-".



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.

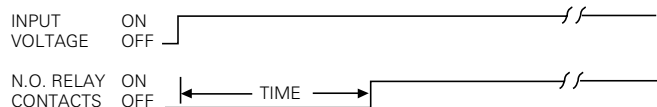
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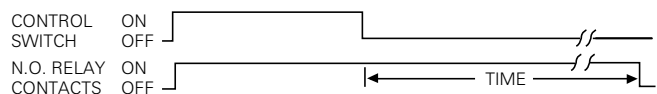
Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Timing Modes

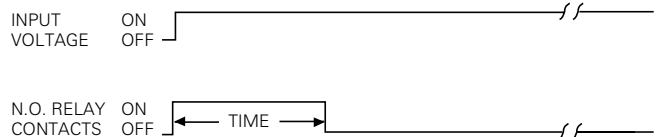
Delay on operate – Delay period begins when input voltage is applied. At the end of the delay period, the relay will operate and will not release until input voltage is removed. Reset occurs when input voltage is reapplied.



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 $\pm 1/2$ 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: $\pm 5\%$.

Res. Adj. Types: $\pm 5\%$ at high end of timing range; min. specified, or less, at low end.

Delta Time (for AC units add ± 1 cycle 60 Hz.): $\pm 10\%$.

Repeatability (for AC units add ± 1 cycle 60 Hz.): $\pm 2\%$.

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	20	28
	120	105	130
	240	210	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

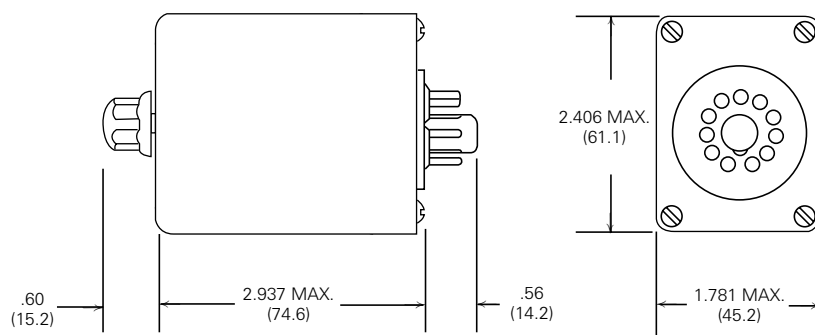
Delay on Release Models

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

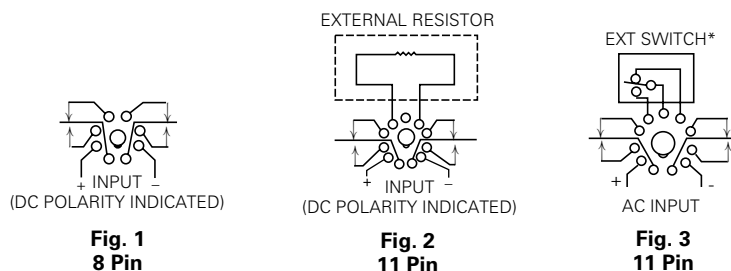
Interval on Models

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)



* 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 "-".



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.

File E22575

File LR15734

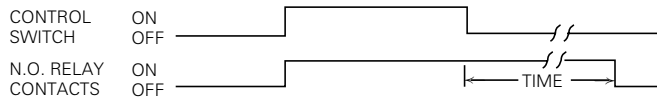
Users should thoroughly review the technical data before selecting a product part number. It is recommended that user also seek out the pertinent approvals files of the agencies/laboratories and review them to ensure the product meets the requirements for a given application.

Timing Modes

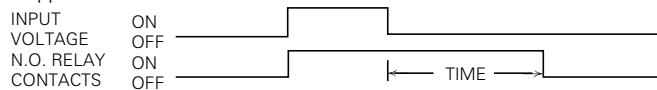
Delay on operate – Delay period begins when input voltage is applied. At the end of the delay period, the relay will operate and will not release until input voltage is removed. Reset occurs when input voltage is reapplied.



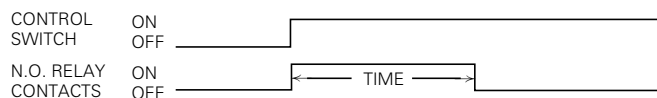
Delay on release – Input voltage must be applied continuously to operate the internal relay. When the control switch is closed, the relay energizes. When the control switch is opened, timing begins. When timing is complete, the relay will de-energize. Time may be reset to zero during timing by closing the control switch.



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 $\pm 1/2$ 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: $\pm 5\%$.

Res. Adj. Types: $\pm 5\%$ at high end of timing range; min. specified, or less, at low end.

Delta Time (for AC units add ± 1 cycle 60 Hz.): $\pm 10\%$.

Repeatability (for AC units add ± 1 cycle 60 Hz.): $\pm 2\%$.

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	20	28
	120	105	130
DC	12	11	13
	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	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

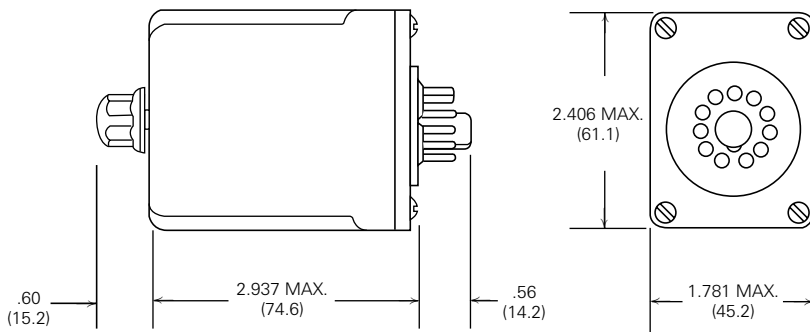
Delay On Dropout Models

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

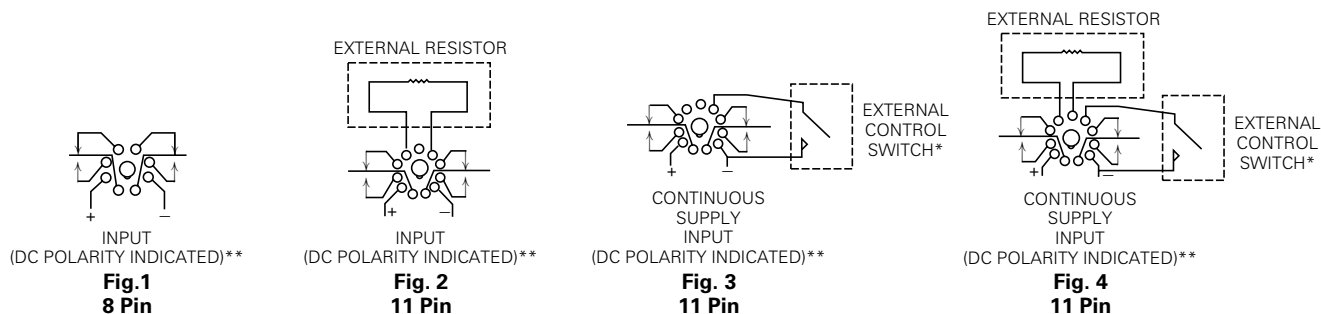
Interval On Models

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)



* 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 "-".

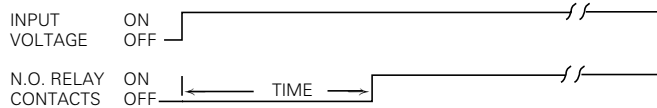
External Resistor Chart

See External Resistor Selection Charts at beginning of Time Delay Relay section of this Databook.



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 $\pm 1/2$ 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: $\pm 5\%$.

Res. Adj. Types: $\pm 10\%$ at high end of timing range; min. specified, or less, at low end.

Repeatability (for AC units add ± 1 cycle 60 Hz.): $\pm 3\%$.

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 $\pm 1/2$ 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: $\pm 5\%$.

Res. Adj. Types: $\pm 10\%$ at high end of timing range; min. specified, or less, at low end.

Repeatability (for AC units add ± 1 cycle 60 Hz.): $\pm 3\%$.

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.

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.	Knob	1	CLB-51-70010
	0.3 to 30 Sec.			CLB-51-70030
	1.2 to 120 Sec.			CLB-51-70120
120VAC	3 Sec.	Fixed	1	CLA-41-70003
	30 Sec.			CLA-41-70030
120VAC	0.1 to 10 Sec.	Resistor	2	CLF-41-70010
	0.1 to 10 Sec.			CLF-42-70010
	1.2 to 120 Sec.			CLF-41-70120

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)

UL File E22575

SP 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.

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	20	28
	120	105	130
DC	12	11	13
	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: 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.

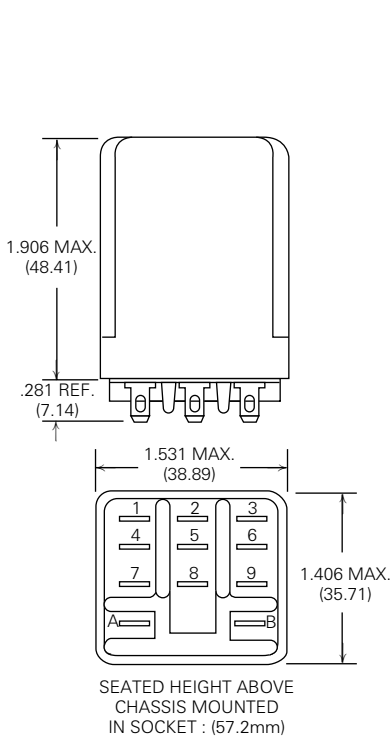
CU Ordering Information – Authorized distributors are more likely to stock boldface items listed below.

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
24VAC	1 to 10 Sec.	Resistor	2	CUF-42-30010
120VAC	1 to 10 Sec.	Knob	1	CUB-51-70010
120VAC	1 to 30 Sec.	Knob	1	CUB-51-70030
120VAC	1 to 60 Sec.	Knob	1	CUB-51-70060
120VAC	1 to 120 Sec.	Knob	1	CUB-51-70120
120VAC	1 Sec.	Fixed	1	CUA-41-70001
120VAC	3 Sec.	Fixed	1	CUA-41-70003
120VAC	3 Sec.	Fixed	1	CUA-42-70003
120VAC	5 Sec.	Fixed	1	CUA-41-70005
120VAC	10 Sec.	Fixed	1	CUA-41-70010
120VAC	10 Sec.	Fixed	1	CUA-42-70010
120VAC	30 Sec.	Fixed	1	CUA-42-70030
120VAC	120 Sec.	Fixed	1	CUA-41-70120

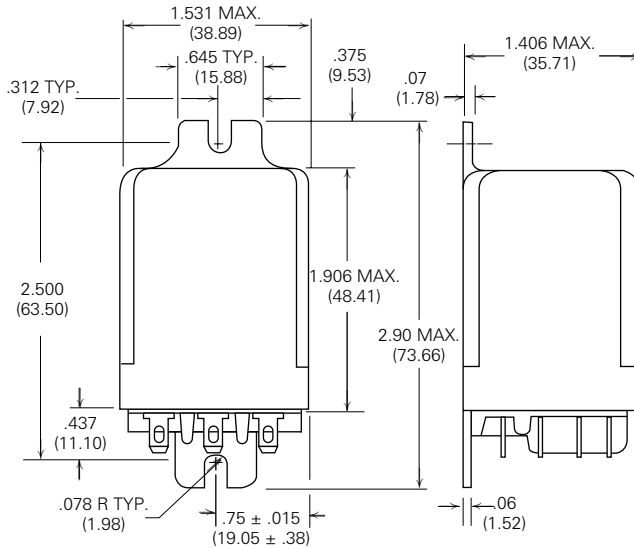
Voltage	Time	Adjustment	Wiring Dia.	Part Number
120VAC	1 to 10 Sec.	Resistor	2	CUF-41-70010
120VAC	1 to 10 Sec.	Resistor	2	CUF-42-70010
120VAC	1 to 30 Sec.	Resistor	2	CUF-41-70030
120VAC	1 to 120 Sec.	Resistor	2	CUF-41-70120
120VAC	1 to 120 Sec.	Resistor	2	CUF-42-70120
24VDC	1 to 10 Sec.	Resistor	2	CUH-41-30010
24VDC	1 to 10 Sec.	Resistor	2	CUH-42-30010
24VDC	1 to 120 Sec.	Resistor	2	CUH-41-30120
24VDC	1 to 120 Sec.	Resistor	2	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.

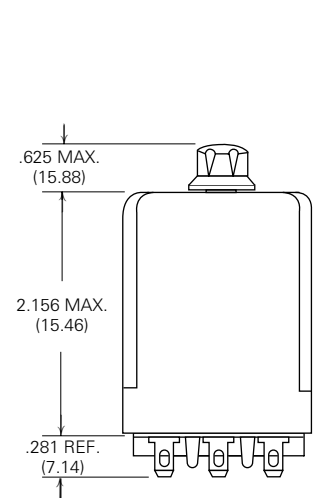
Outline Dimensions
41 Style



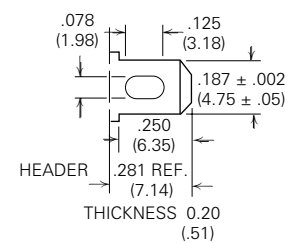
42 & 45 Style



51 Style



Terminal Dimensions
.187" (4.74mm)
Quick Connect/Solder



Wiring Diagrams – Bottom Views

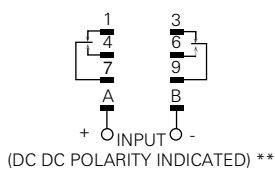


Fig. 1

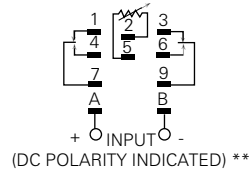


Fig. 2

**** 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.



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 \pm 15%)
- 10A output relay with DPDT contacts
- 1/16 DIN style enclosure with 8-pin plug-in base
- Thumbwheel switches for programming delay time

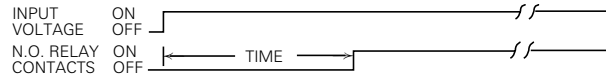
File E22575

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: $\pm 0.05\% \pm 0.04$ sec.*

Repeatability (Including first cycle of operation.): $< \pm .05\% \pm 0.04$ 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 \pm 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.

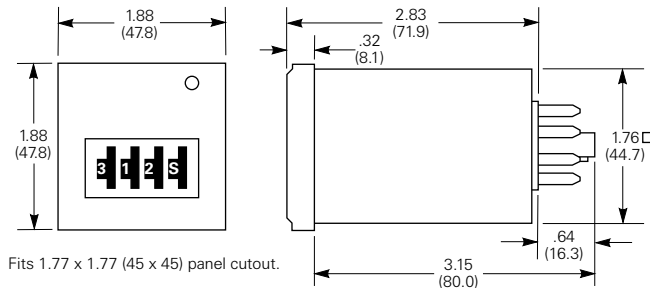
Weight: 4.3 oz. (122g) approximate.

Ordering Information – Authorized distributors are more likely to stock boldface items listed below.

Time Delay Relay

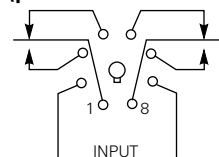
Input Voltage	Part Number
120VAC	CN1

Outline Dimensions



Wiring Diagram (Bottom View)

(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.

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



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 \pm 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: $\pm 0.05\% \pm 0.04$ sec.*

Repeatability (Including first cycle of operation.): $< \pm 0.05\% \pm 0.04$ 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 $\pm 15\%$, 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.

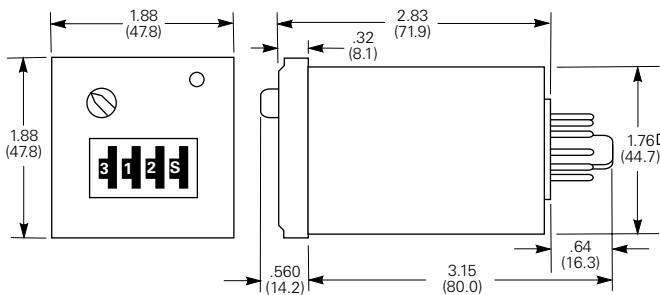
Weight: 4.3 oz. (122g) approximate.

Ordering Information – Authorized distributors are more likely to stock boldface items listed below.

Time Delay Relay

Input Voltage	Part Number
120VAC	CNM5

Outline Dimensions

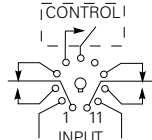


Fits 1.77 x 1.77 (45 x 45) panel cutout.

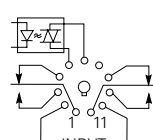
Wiring Diagrams (Bottom Views)

(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.

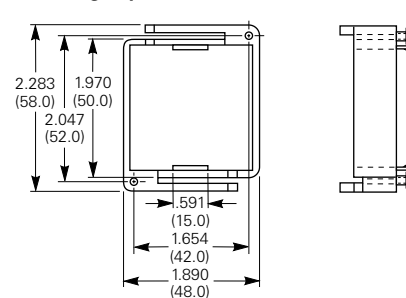
Accessory

Part Number	Name	Description
SSA-24C667	Mounting Clip	Ratchet-fit clip slides onto CNM5 from behind to secure CNM5 in panel mount applications.

Mounting Clip Dimensions

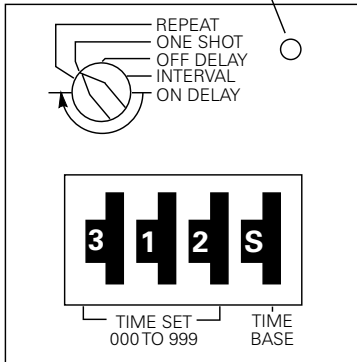
SSA-24C667

Mounting Clip



Timer Function Descriptions

LED to show time status.
See functional explanation for details.



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.



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.): $\pm 10\%$.

Repeatability (Including first cycle of operation.): $\pm 2\%$ (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.

Ordering Information – Authorized distributors are more likely to stock boldface items listed below.

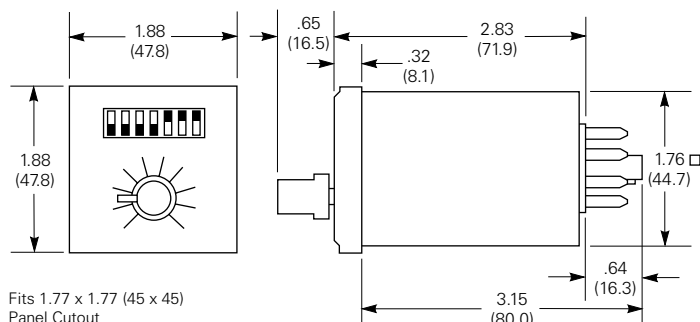
Universal Input Models

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

Outline Dimensions



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.

Input Data @ 25°C

Voltage: Universal Input Type: 24 - 240V $\pm 15\%$, 50/60 Hz. AC or DC.

Fixed Input Type: 120VAC $\pm 15\%$, 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.

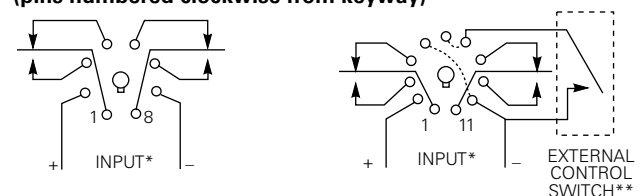
Weight: 4.3 oz. (122g) approximately.

Accessory

Part Number	Name	Description
SSA-24C667	Mounting Clip	Ratchet-fit clip slides onto CNS from behind to secure CNS in panel mount applications.

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 "-".

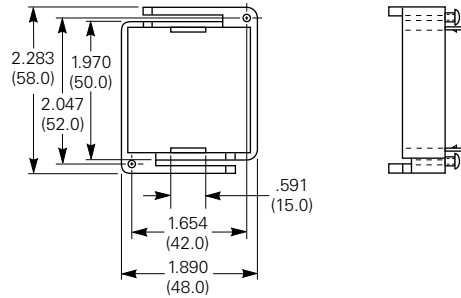
**** Important:** A dry circuit switch is recommended. A "dry circuit" switch is one rated to reliably switch currents of less than 50mA. Use of a switch rated for other than dry circuit may result in failure of the time delay relay to function properly.

The dotted lines shown between pins on 11-pin diagram indicate internal connections.

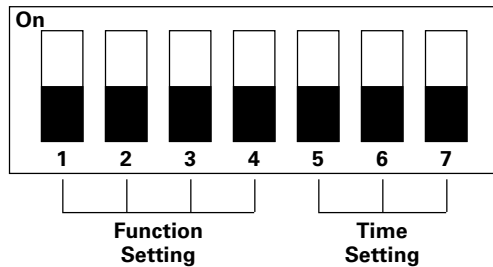
Mounting Clip Dimensions

SSA-24C667

Mounting 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	Timing Range	DIP Switch Setting	Timing Range
5 6 7	0.1 - 1.0 Second	5 6 7	0.1 - 1.0 Minute
5 6 7	1.0 - 10 Seconds	5 6 7	1.0 - 10 Minutes
5 6 7	10 - 100 Seconds	5 6 7	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.

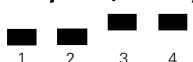
Recycler (Initially Off)



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.

Dimensions are shown for reference purposes only.

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

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 will energize. 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.

Specifications and availability subject to change.

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



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: $\pm 0.5\% \pm 0.05$ sec.

Delta Time (for AC units add ± 1 cycle 60 Hz.): $\pm 0.1\% \pm 0.05$ sec.

Repeatability (Including first cycle of operation.): $\pm 0.1\% \pm 0.05$ 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.

Minimum 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.

Ordering Information – Authorized distributors are more likely to stock boldface items listed below.

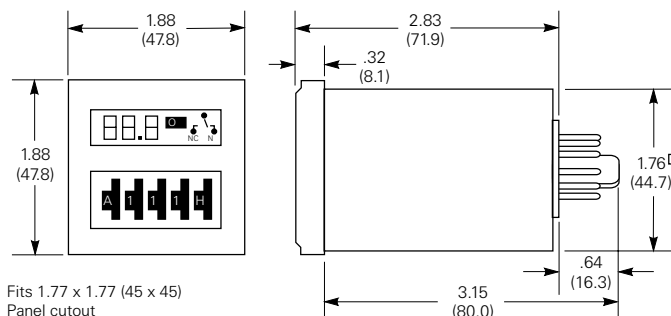
Universal Input Model

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

Outline Dimensions



Dimensions are shown for reference purposes only

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

Input Data @ 25°C

Voltage: Universal Input Type: 24 - 240V $\pm 15\%$, 50/60 Hz. AC or DC.

Fixed Input Types: 120VAC $\pm 15\%$, 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).

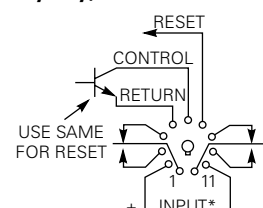
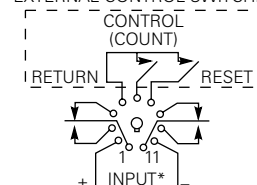
Accessories

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 inadvertent changes of programming switch settings.

Wiring Diagrams (Bottom Views)

(pins numbered clockwise from keyway)

EXTERNAL CONTROL SWITCHES**



* **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.

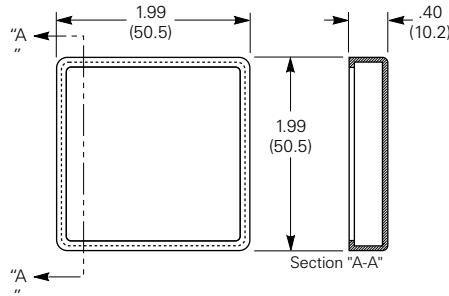
Specifications and availability subject to change.

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

Protective Cover & Mounting Clip Dimensions

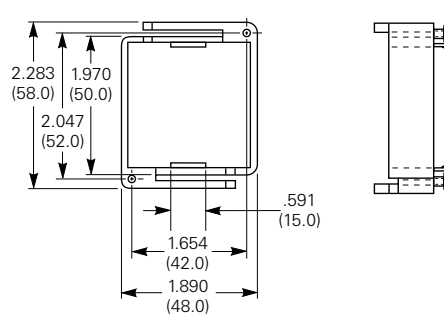
SSA-24C668

Protective Cover



SSA-24C667

Mounting Clip



Programming Switch Diagram

With this setting, the relay would operate after a delay period of 214 seconds.



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. S = 1 to 999 Sec.	.1M = 0.1 to 99.9 Min. M = 1 to 999 Min.	.1H = 0.1 to 99.9 Hrs. H = 1 to 999 Hrs.	10H = 10 to 9990 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 continued 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.



CR series

Recycle Time Delay Relay

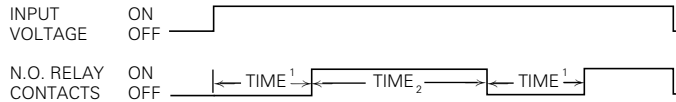
- Individual ON and OFF time adjustment knobs
- 10A output relay with DPDT contacts
- Various models time from 0.1 to 180 sec.

File E22575

File LR15734

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 $\pm 1/2$ 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.): $\pm 10\%$.

Repeatability (for AC units add ± 1 cycle 60 Hz.): $\pm 2\%$.

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.

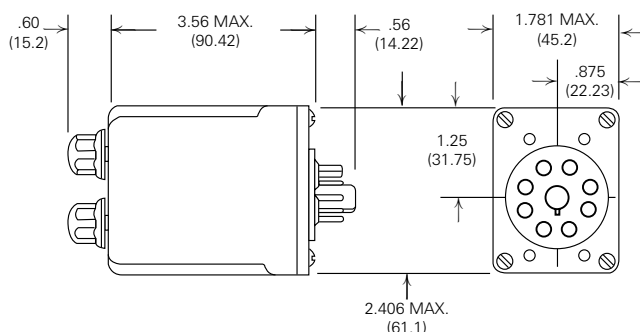
Weight: 6 oz. (170g) approximately.

Ordering Information – Boldface items listed below are normally maintained in stock for immediate delivery.

AC Types	Voltage	Time	Part Number
	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

DC Type	Voltage	Time	Part Number
	24VDC	1.8 to 180 Sec.	CRD-48-30180

Outline Dimensions



Wiring Diagram – Bottom View

(pins numbered clockwise from keyway)

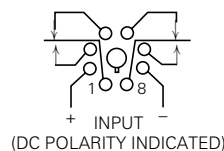


Fig. 1
8 Pin

**** Note:** Input polarity for DC operation. For most reliable operation on AC, connect high side to “+” and low side to “-”.



W28 series

Push to Reset Fuseholder-Type Thermal Circuit Breaker



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

Features

- Push to reset.
- Approved to many international standards.
- Replaces slow blow glass cartridge fuse.
- Labor-saving snap-in mounting.
- Button extends for visual trip indication.

Agency Approvals

W28 series is UL 1077 Recognized as Supplementary Protectors, File E69543, and CSA Accepted as Supplementary Protectors (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 (AC loads only) and provides 8mm isolation. 16 amp and 20 amp models do not have VDE, DEMKO and SEV approvals at present.

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.
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.

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. 5 to 60 seconds for 3 through 20 amp models.

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

Mechanical/Environmental Data

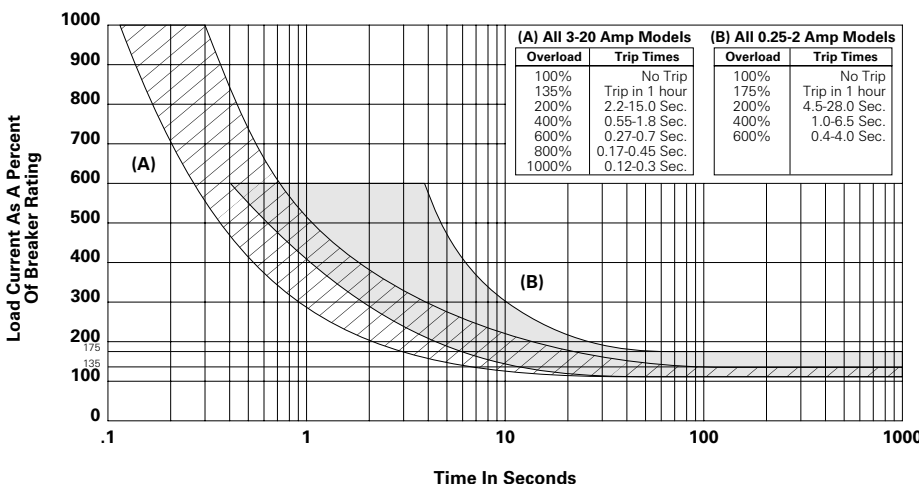
Termination: .250" (6.35mm) quick connects on-axis with circuit breaker body are standard. Right-angle quick connect terminals are available as a special order option. Consult the factory for availability of right-angle terminals.

Soldering to terminals is not recommended.

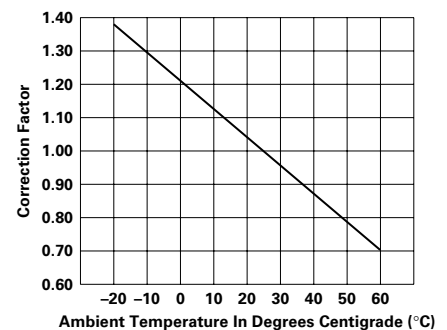
Mounting: Snaps into panel from front. See Recommended Panel Cutouts.

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.

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

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.

Above listed quick connect terminals are on-axis with circuit breaker body as shown in drawings below. Right-angle quick connect terminals are available on a special order basis. Consult the factory for availability of right-angle terminals.

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)

Consult factory for other bezel colors.

6. Button Color:

A = Black

B = Red

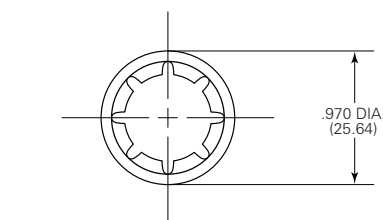
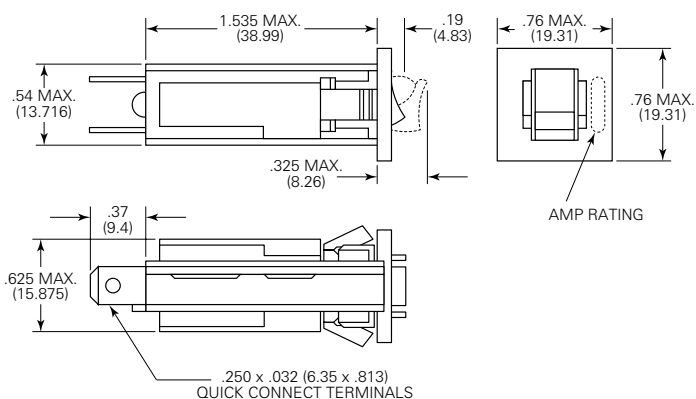
Consult factory for other button colors.

7. Amp Rating:

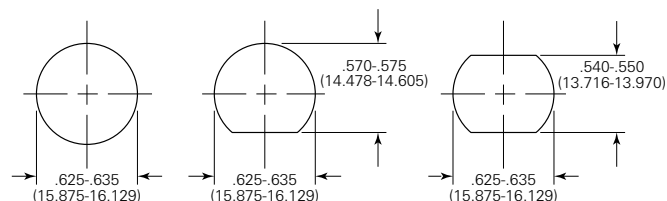
0.25	1	4	7	10	13	16
0.50	2	5	8	11	14	20
0.75	3	6	9	12	15	

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

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.



Courtesy of Steven Engineering, Inc.-230 Ryan Way, South San Francisco, CA 94080-6370-Main Office: (650) 588-9200-Outside Local Area: (800) 258-9200-www.stevenengineering.com

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

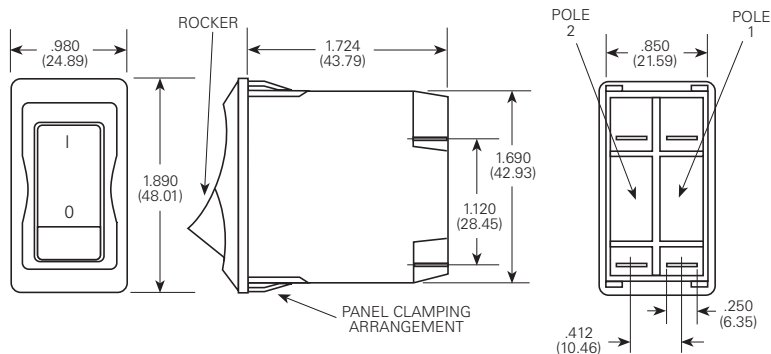
W33-T4B1Q-10

W33-S1N1Q-20

W33-T2N1Q-20

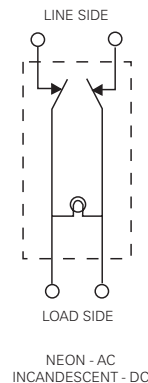
W33-T4B1Q-15

Outline Dimensions



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

Schematic





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 Accepted as Supplementary Protectors (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.

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.

Maximum Resistance vs. Current Rating @ +25°C

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

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.

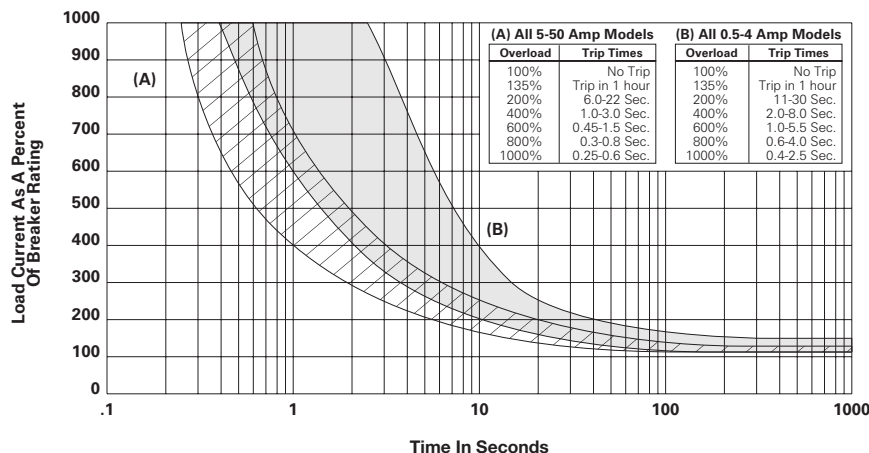
Termination: Two #8-32 screw terminals.

Mounting: W23 — Threaded bushing, 3/8" (9.53mm) diameter.

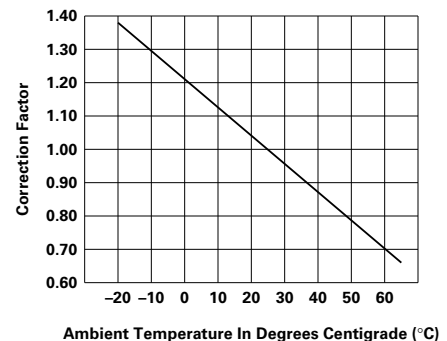
W31 — Threaded bushing, 15/32" (11.91mm) diameter, with or without anti-rotation flats.

Weight: Less than 2 oz. (57g).

Time Vs. Current Trip Curve @ +25°C



Ambient Compensation Chart



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 situated 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

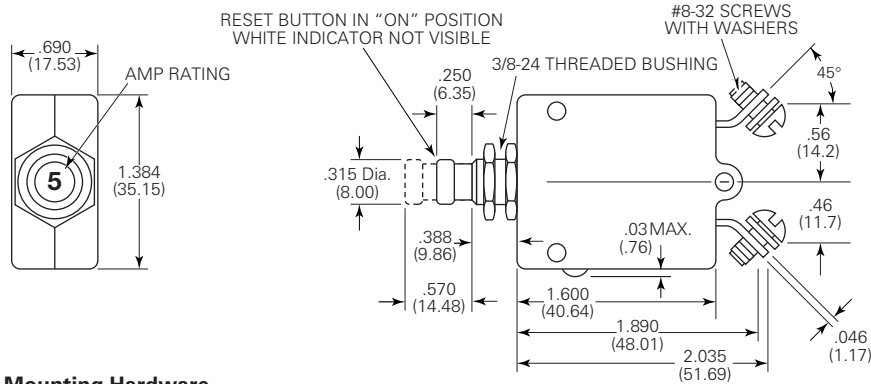
Typical Part No. ►		W	31	-X	2	M	1	G	-5
1. Designator: W = Circuit breaker									
2. Series Number: 31 = Single pole, toggle actuator									
3. Circuit Function: X = Series trip									
4. Mounting Bushing: 1 = 15/32"-32 threaded bushing .320" (8.13mm) long, round, silver color 2 = 15/32"-32 threaded 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 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.

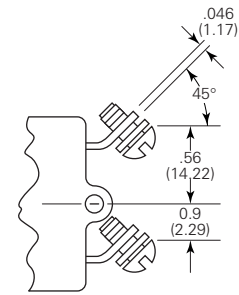
W31-X2M1G-1	W31-X2M1G-10	W31-X2M1G-35
W31-X2M1G-2	W31-X2M1G-15	W31-X2M1G-40
W31-X2M1G-3	W31-X2M1G-20	W31-X2M1G-50
W31-X2M1G-5	W31-X2M1G-25	
W31-X2M1G-7.50	W31-X2M1G-30	

W23 Outline Dimensions

Terminal Style 1



Terminal Style 3

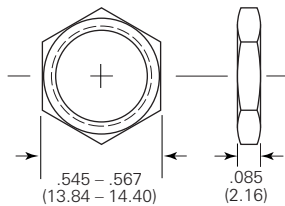


All dimensions are given as inches (mm)

Mounting Hardware

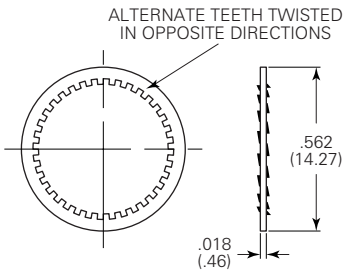
Hex Nut

(55-001D - Silver Color)



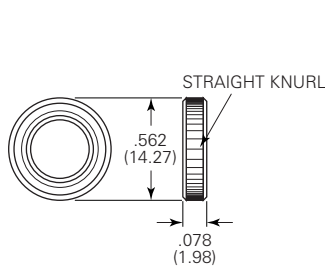
Lockwasher

(88-006B - Silver Color)

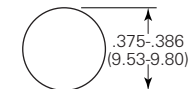


Knurled Nut

(55-008A - Silver Color)

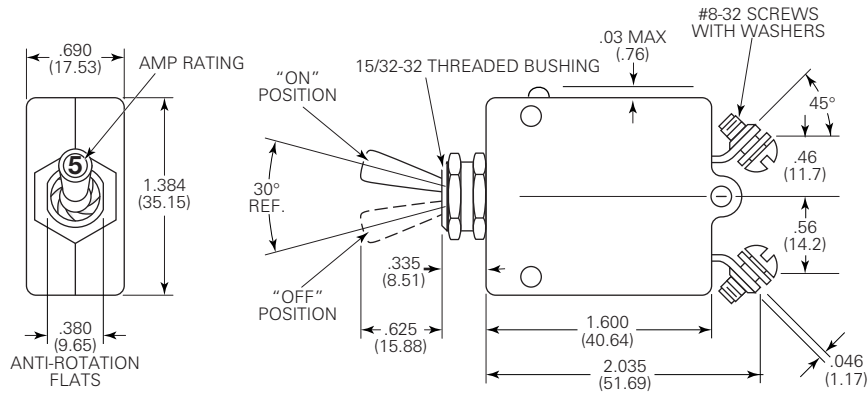


Suggested Mounting Holes

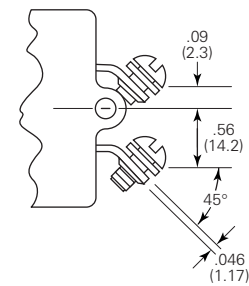


W31 Outline Dimensions

Terminal Style 1



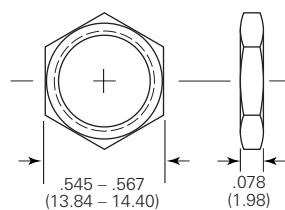
Terminal Style 5



Mounting Hardware

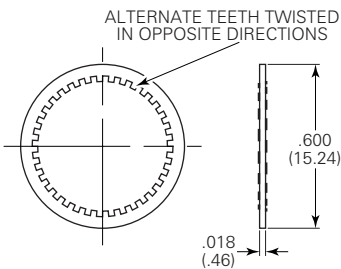
Hex Nut

(55-001B - Silver Color)



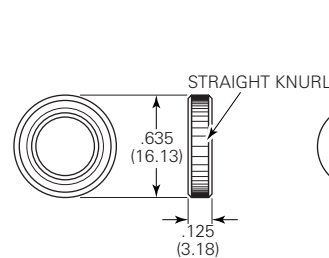
Lockwasher

(88-002B - Silver Color)

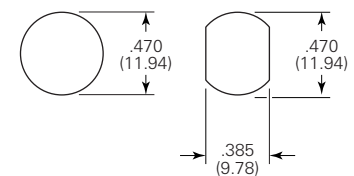


Knurled Nut

(55-010B - Silver Color)



Suggested Mounting Holes





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. Approved to VDE 0642/EN60934 (Circuit Breakers for Equipment) License Number 40017023 (for AC loads only). CCC mark compliant, certificate 2004010307123223.

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

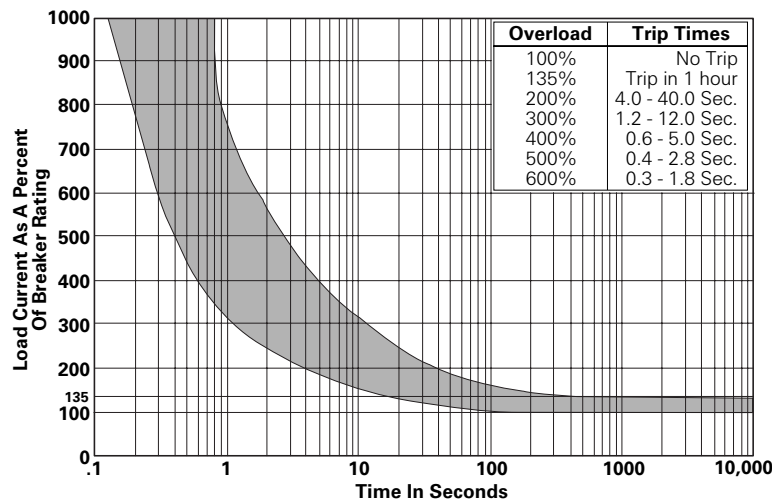
Operating Temperature Range: 0°C to +60°C.

Termination: .250" (6.35mm) quick connects, solder terminals or right angle PC terminals.

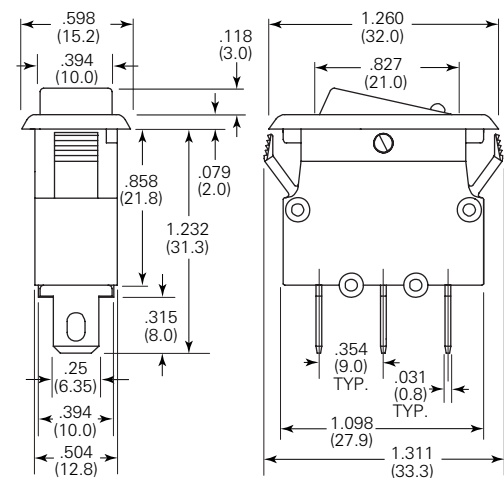
Mounting: Snaps into 1.122 x .531 (28.5 x 13.5) panel cutout.

Approximate Weight: 0.37 oz. (10.5g).

Time vs. Current Trip Curve @ +25°C



Outline Dimensions

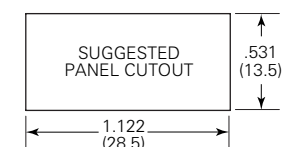


Ambient Compensation Table

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).

Ordering Information

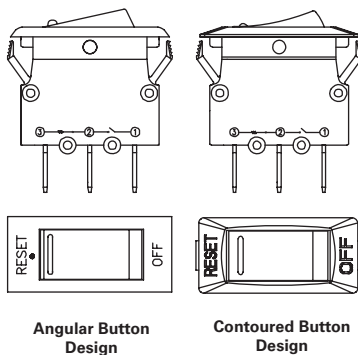
Typical Part No. ►		W	51	-A	1	2	1	B	1	-5
1. Designator: W = Circuit breaker										
2. Series Number: 51 = Switchable, Single Pole, Rocker-Actuated Thermal Model										
3. Terminals: A = Quick connect .250" (6.35mm) straight C = Printed Circuit - right angle										
4. Breaker Style & Base Color: 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 2 = RESET/OFF molded (only available on model with contoured button) 1 = RESET/OFF printed										
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



Marking Options

For Angular Button Design (Printed)

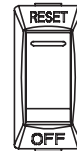


Standard - RESET/OFF
Printed on Bezel



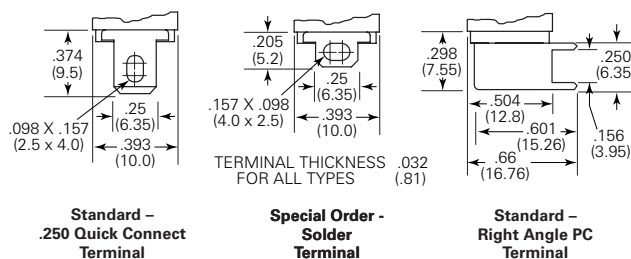
Standard - No Marking

For Contoured Button Design (Molded)



Standard - RESET/OFF
Molded into bezel

Terminal Types





W54 series

Push To Reset Only Thermal Circuit Breaker



Features

- New design.
- 5 to 40 amp ratings.
- Cannot be manually tripped.
- Button extends for visual trip indication.
- Push button to reset breaker.
- Numerous mounting and termination options.
- Choice of silver-cadmium oxide or silver-tin oxide contacts.

Agency Approvals

W54 series (except 35A and 40A models) is UL 1077 Recognized as Supplementary Protectors, File E69543, for Canada and the United States. CSA Accepted as Supplementary Protectors (Appliance Component Protectors), File 240027 (to 125VAC, excludes models rated >30A). Approved to VDE 0642/EN60934 (Circuit Breakers for Equipment) License Number 40007877 (excludes models rated >20A, models with screw terminals, models with silver-tin oxide contacts). CCC mark compliant, certificate 2004010307123217.

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.

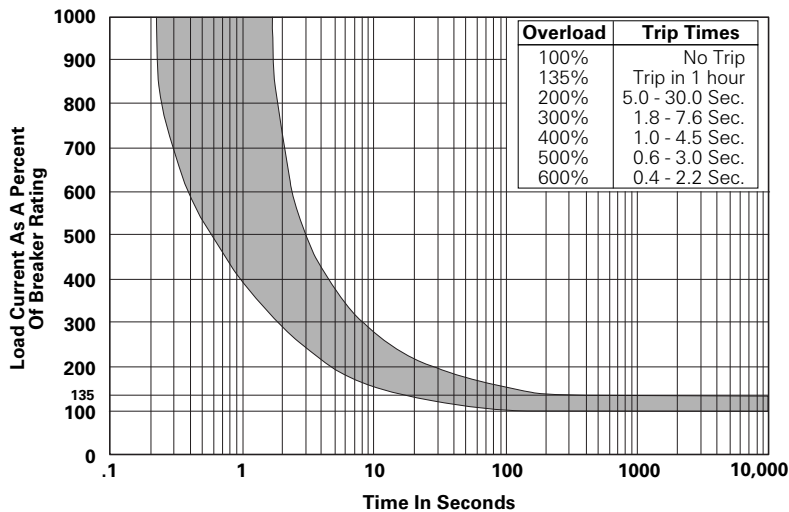
Typical Resistance vs. Current Rating @25°C

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

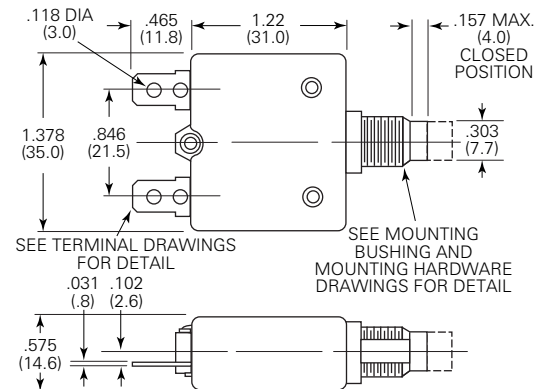


Ambient Compensation Table

Ambient Temperature in °C	Rating Correction Factor	
	5-8A 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

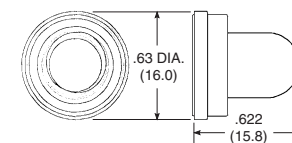
To use this chart: Divide the breaker rating by the correction factor to determine the compensated rating. Calculate the overloads in terms of the compensated rating to use the published trip curve. Do not use these devices outside their specified operating temperature ranges.

Outline Dimensions

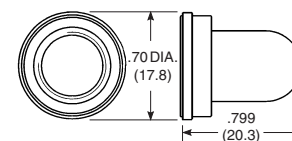


Optional Protective Boot

Silicone rubber boot is bonded to integral aluminum nut.



1-1423696-5
Black 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.

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 & Contact Material: X = Series trip, silver-cadmium oxide contacts F = Series trip, silver-tin oxide contacts †		†Not VDE										
4. Button: A = White, plain, no rate marking C = White with black rate marking (vertical) B = White with red rate marking (vertical)												
5. Mounting Bushing: 1 = M11 x 12.6mm long, metal 4 = M12 x 12.6mm long, metal 2 = 3/8" (one side flat) x 10mm 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) †		†Not VDE										
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	†Not VDE	†Not CSA		

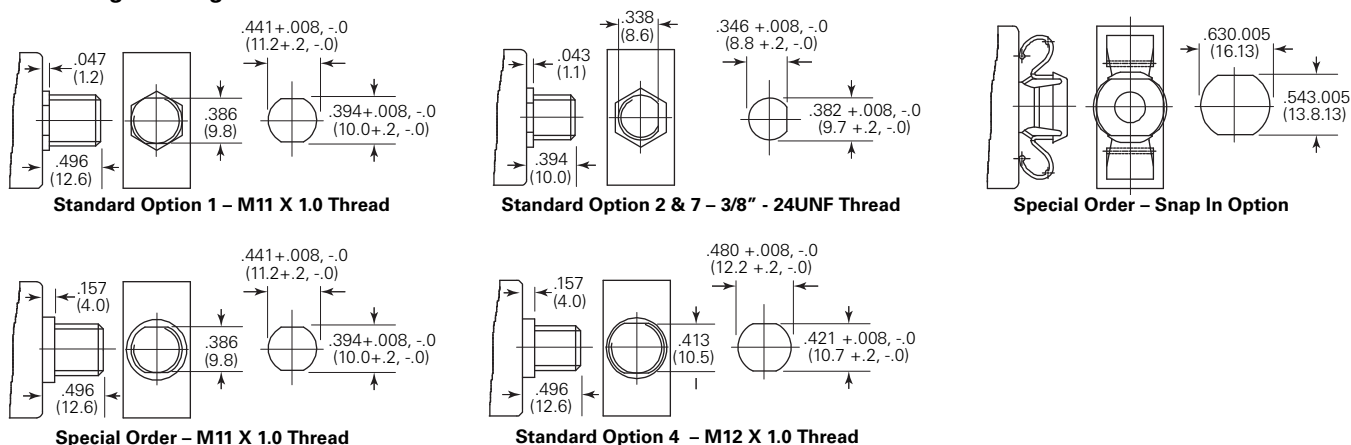
Our authorized distributors are more likely to stock the following items for immediate delivery.

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

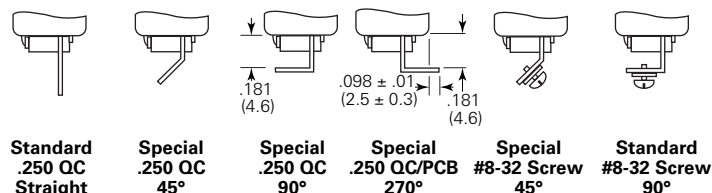
ORDERING NOTE:

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.

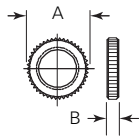
Mounting Bushings and Recommended Panel Cutouts



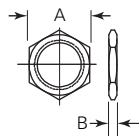
Termination Options



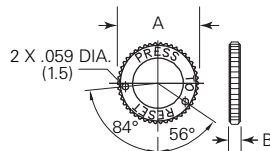
Mounting Hardware Options



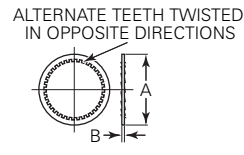
**Standard
Knurled Nut**



**Standard
Hex Nut**



**Special
Integrated Knurled Nut
with Small Holes**



Lockwasher

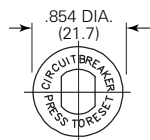
Mounting Hardware Dimensions

Dimension Code	Bushing Diameter	Plastic Knurled Nut	Integrated Plastic Knurled Nut w/Holes	Metal Knurled Nut	Metal Hex Nut	Lockwasher
A	3/8"	.74 (18.8)	—	.56 (14.2)	.55 (14.0)	.49 (12.5)
	M11	.74 (18.8)	.74 (18.8)	.59 (15.0)	.55 (14.0)	.587 (14.9)
	M12	—	—	.59 (15.0)	.55 (14.0)	.626 (15.9)
B	3/8"	.126 (3.2)	—	.079 (2.0)	.079 (2.0)	.02 (.5)
	M11	.126 (3.2)	.13 (3.3)	.102 (2.6)	.118 (3.0)	.02 (.5)
	M12	—	—	.102 (2.6)	.079 (2.0)	.02 (.5)

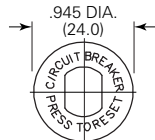
Mounting Hardware Ordering Information

Mounting Bushing Material	Mounting Bushing Code	Plastic Knurled Nut	Integrated Plastic Knurled Nut w/Holes	Metal Knurled Nut	Metal Hex Nut	Lockwasher
Metal	1 (M11)	—	—	1423696-4	1423696-6	1-1423696-2
	2 (3/8")	—	—	1-1423696-0	1423696-3	1-1423696-1
	3 (M11)	—	—	1423696-4	1423696-6	1-1423696-2
	4 (M12)	—	—	1423696-5	1423696-7	1-1423696-3
Plastic	6 (M11)	1423696-8	2-1423696-2	—	—	—
	8 (3/8")	1423696-2	—	—	—	—

Optional Nameplates



**Special
Embossed
Aluminum**



**Special
Silver Printing
On Black**



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. Approved to VDE 0642/EN60934 (Circuit Breakers for Equipment) License Number 40007874 (excludes models rated 4A and >15A). CCC mark compliant, certificate 2004010307123217.

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, 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

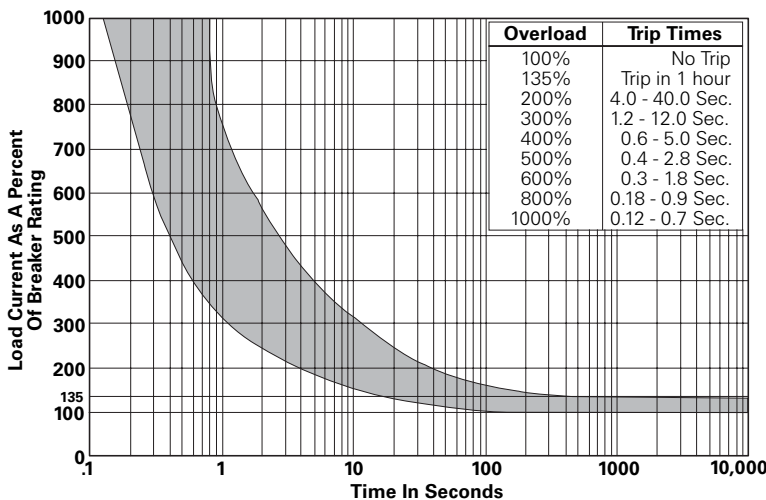
Operating Temperature Range: 0°C to +60°C.

Termination: .250" (6.35mm) quick connects.

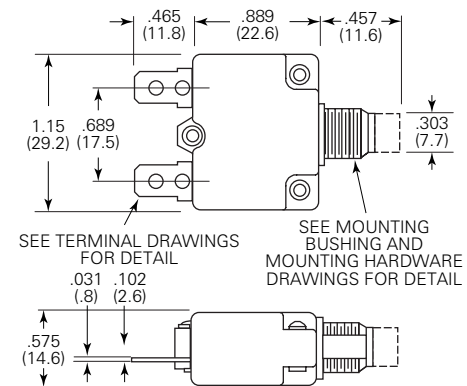
Mounting: Various options. See Ordering Information and drawings.

Approximate Weight: 0.5 oz. (14.3g).

Time vs. Current Trip Curve @ +25°C

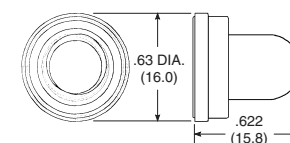


Outline Dimensions

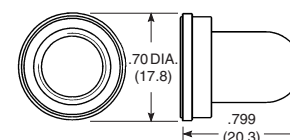


Optional Protective Boot

Silicone rubber boot is bonded to integral aluminum 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	
	4A Models	5-20A Models
-10	.70	.77
0	.75	.85
10	.82	.90
20	.90	.95
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

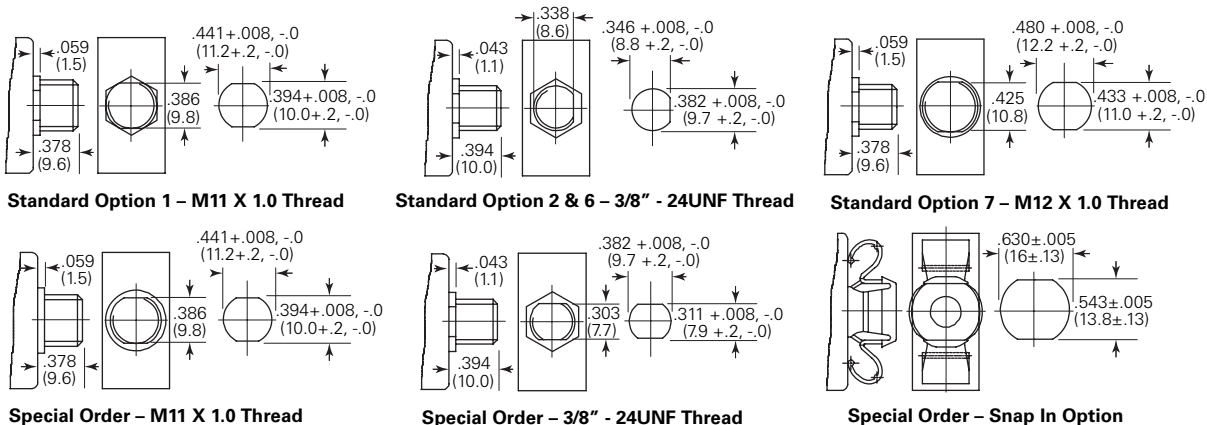
Typical Part No. ▶		W	57	-X	B	1	A	4	A	1	0	-4
1. Designator: W = Circuit breaker												
2. Series Number: 57 = Compact, Single Pole, Push-to-Reset, Thermal Model												
3. Circuit Function: X = Series Trip												
4. Button: A = White, plain, no rate marking C = White with black rate marking (vertical) B = White with red rate marking (vertical)												
5. Mounting Bushing: 1 = M11 x 9.6mm long, plastic 2 = 3/8" (one side flat) x 10.0mm long, plastic 6 = 3/8" (one side flat) x 10.5mm long, metal 7 = M12 x 9.6mm 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†	†Not VDE	

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

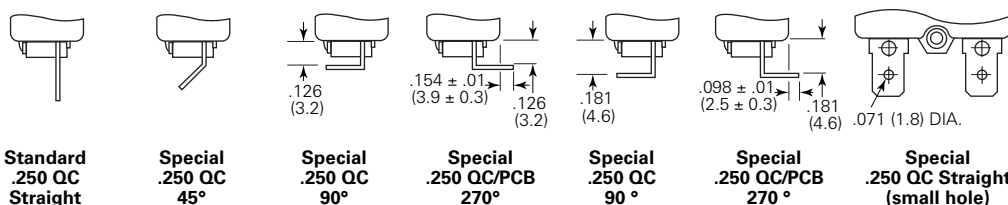
W57-XB1A4A10-5 W57-XB1A4A10-15 W57-XB1A5A10-5 W57-XB1A5A10-15
W57-XB1A4A10-10 W57-XB1A4A10-20 W57-XB1A5A10-10 W57-XB1A5A10-20

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.

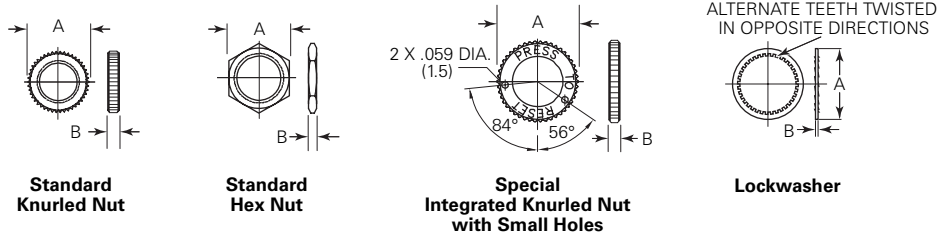
Mounting Bushings and Recommended Panel Cutouts



Termination Options



Mounting Hardware Options



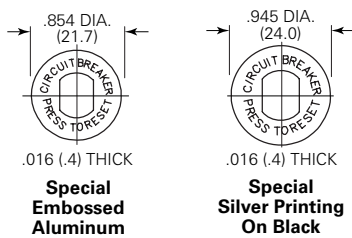
Mounting Hardware Dimensions

Dimension Code	Bushing Diameter	Plastic Knurled Nut	Integrated Plastic Knurled Nut w/Holes	Metal Knurled Nut	Metal Hex Nut	Lockwasher
A	3/8"	.74 (18.8)	—	.56 (14.2)	.55 (14.0)	.49 (12.5)
	M11	.74 (18.8)	.74 (18.8)	.59 (15.0)	.55 (14.0)	.587 (14.9)
	M12	—	—	.59 (15.0)	.55 (14.0)	.626 (15.9)
B	3/8"	.126 (3.2)	—	.079 (2.0)	.079 (2.0)	.02 (.5)
	M11	.126 (3.2)	.13 (3.3)	.102 (2.6)	.118 (3.0)	.02 (.5)
	M12	—	—	.102 (2.6)	.079 (2.0)	.02 (.5)

Mounting Hardware Ordering Information

Mounting Bushing Material	Mounting Bushing Code	Plastic Knurled Nut	Integrated Plastic Knurled Nut w/Holes	Metal Knurled Nut	Metal Hex Nut	Lockwasher
Plastic	1 (M11)	—	1423696-8	2-1423696-2	—	—
	2 (3/8")	—	1423696-2	—	—	—
Metal	5 (M11)	—	—	1423696-4	1423696-6	1-1423696-2
	6 (3/8")	—	—	1-1423696-0	1423696-3	1-1423696-1
	7 (M12)	—	—	1423696-5	1423696-7	1-1423696-3
	8 (3/8")	—	—	1-1423696-0	1423696-3	1-1423696-1

Optional Nameplates





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 Accepted as Supplementary Protectors (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.

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.

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

Mechanical/Environmental Data

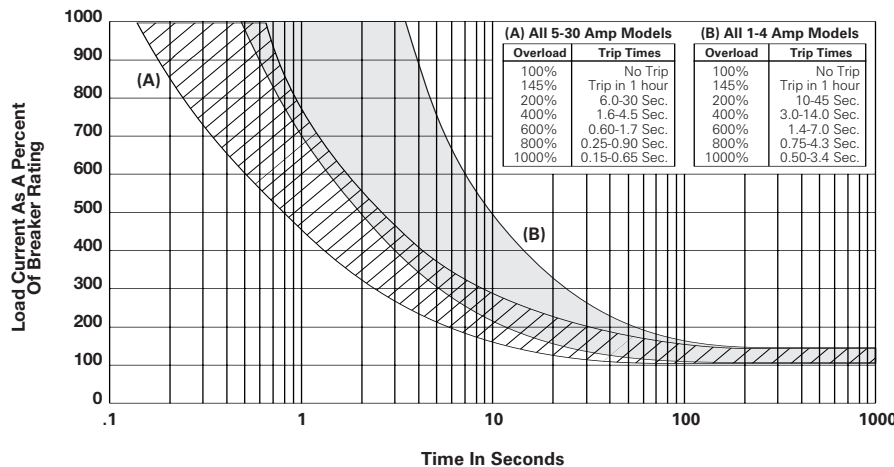
Shock: Withstands to 10g.

Endurance Cycling: Over 1,000 cycles at 200% of rated load.

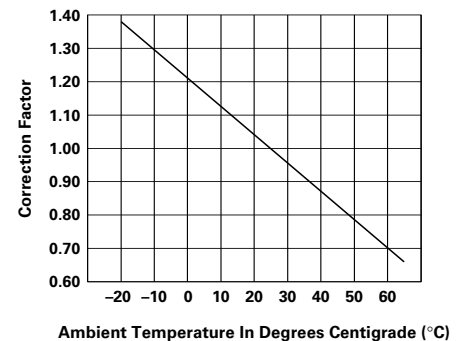
Vibration: Withstands to 10g at 10-55 Hz.

Weight: Less than 1 1/2 oz. (42.5g).

Time vs. Current Trip Curve @ +25°C



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.

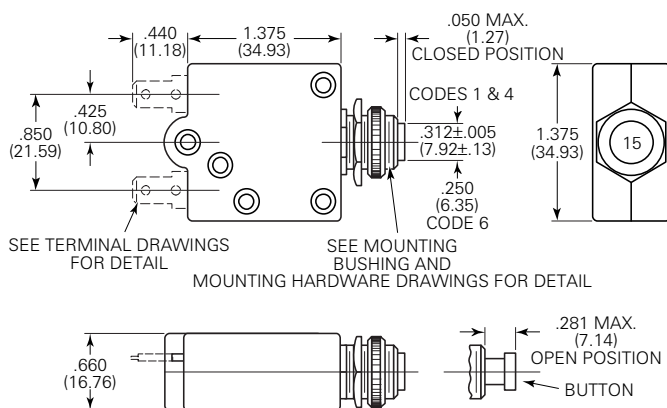
Ordering Information

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: <table border="0"> <tr> <td>0.5</td> <td>3</td> <td>6</td> <td>9</td> <td>15</td> <td>30*</td> </tr> <tr> <td>1</td> <td>4</td> <td>7</td> <td>10</td> <td>20</td> <td></td> </tr> <tr> <td>2</td> <td>5</td> <td>8</td> <td>12</td> <td>25</td> <td></td> </tr> </table> <p style="text-align: right;">*Not UL or CSA</p>										0.5	3	6	9	15	30*	1	4	7	10	20		2	5	8	12	25	
0.5	3	6	9	15	30*																						
1	4	7	10	20																							
2	5	8	12	25																							

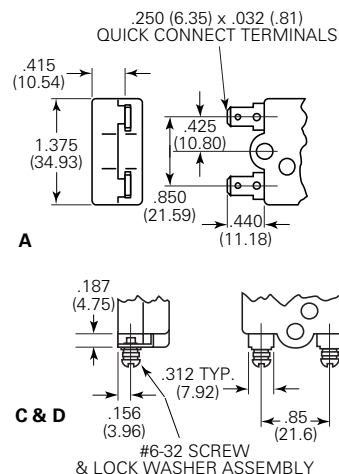
Stock Items – Authorized distributors are more likely to stock the following items.

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

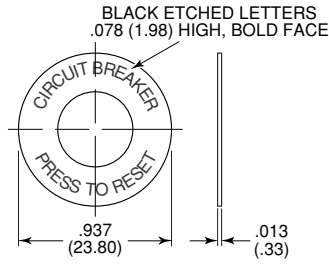


Terminal Options

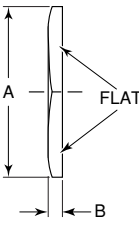


Mounting Hardware

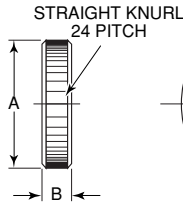
Disc



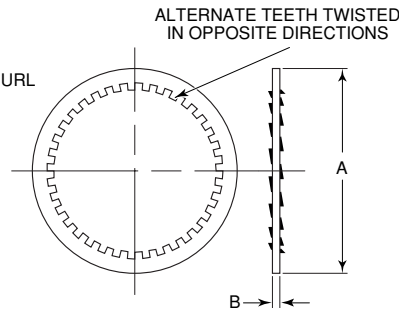
Hex Nut



Knurled Nut

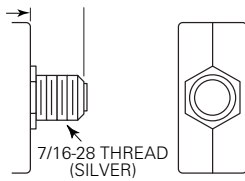


Lockwasher

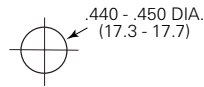


Mounting Bushing

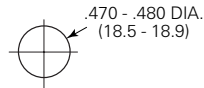
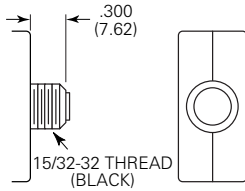
Type 1



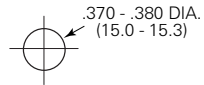
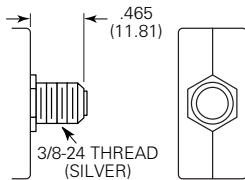
Recommended Cutout



Type 4



Type 6



Mounting Hardware Dimensions

Dimension		Hex Nut	Knurled Nut	Lockwasher
A.	3/8"	.556	.562	.562
	7/16"	.625	.625	.540
	15/32"	.556	.625	.600
B.	3/8"	.085	.078	.018
	7/16"	.111	.125	.022
	15/32"	.078	.125	.018

Mounting Hardware Ordering Information

Mounting Bushing Code	Knurled Nut	Hex Nut	Lock Washer	Push to Reset Disc
1	55-010A	55-011A	88-021B	33-012A
4	•	55-001B	88-002A	33-012C
6	55-008A	55-001D	88-006K	33-012B

• 55-010B (silver) 55-010E (black)



W6/W9 series

Magnetic Hydraulic Circuit Breakers



Features

- Designed for the international market. UL Recognized, CSA Accepted, 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: Accepted 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 (134% for AC/DC units).
Breakers must trip at 125% of rated load and above (135% for AC/DC units).

Dielectric Strength: 50/60 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)
0.2	90	90
1.0	1.2	1.2
2.0	0.28	0.28
5.0	0.04	0.04
10.0	0.013	0.013
20.0	0.004	0.005
30.0	0.0027	0.004
40.0	0.002	0.002
50.0	0.0015	0.0015

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

§ Note: 277/480VAC, 3Ø-Wye, rating is UL, but not CSA.

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

§ Note: 277/480VAC, 3Ø-Wye, rating is UL, but not CSA.

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 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

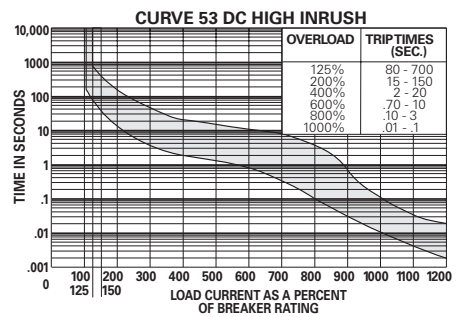
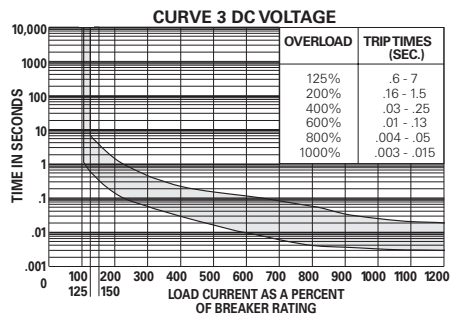
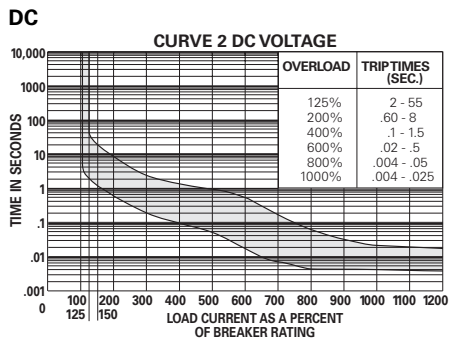
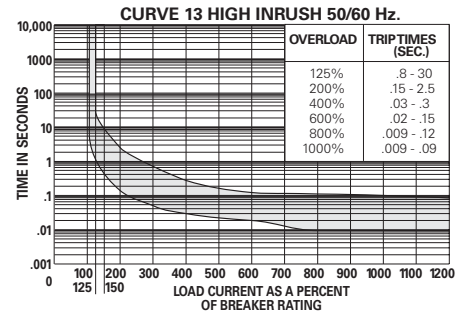
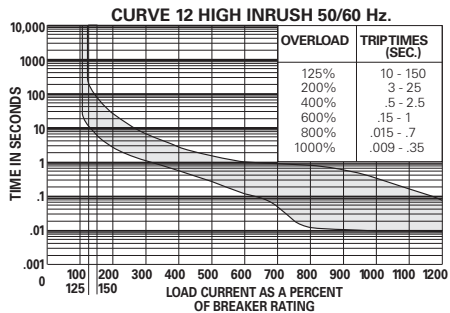
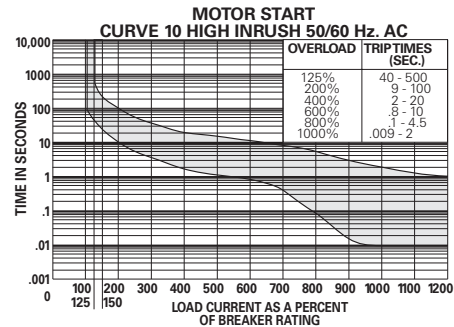
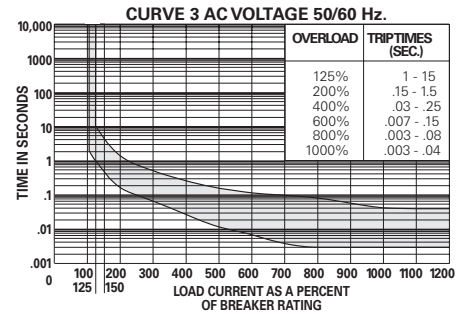
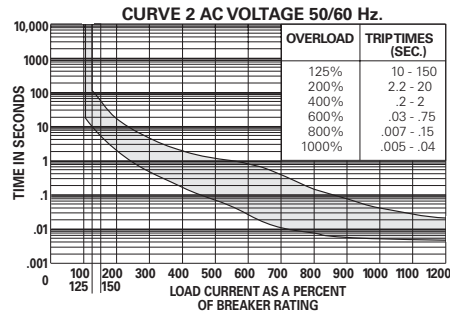
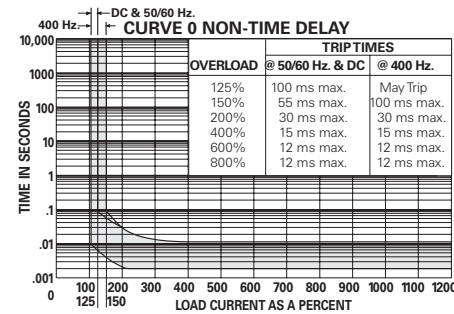
Approvals and Ratings Table 2

UL/CSA

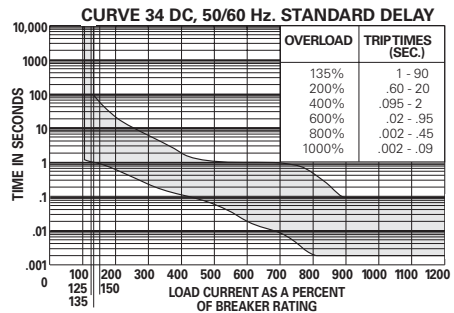
Switch Number	Voltage 50/60 Hz.	Current (Amps)	Terminals WxTxL
A	125	10	.093 x .020 x .250 (2.36 x .51 x 6.40)

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

AC 50/60 Hz.



AC/DC



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

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 = 277/480VAC § 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.) § Note: Maximum line voltage code "2," 277/480VAC, is UL, but not CSA.																	
7. Time Delay Curve: 0 = Instantaneous 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 other values. 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																	
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

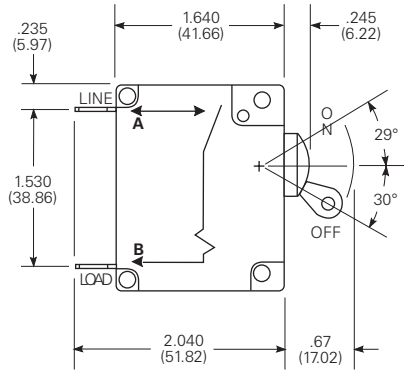
W9 Series										Typical Part No. ►		W	91-	X	1	1	2-	20																													
1. Circuit Breaker Mounting: W = #6-32 mounting threads. M = M3.0 x 0.5 mounting threads.																																															
2. Number of Poles: 91 = Single pole 92 = Two pole 93 = Three pole 94 = Four pole																																															
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) <table><tr><td>UL/CSA TYPES</td><td>1 = 277VAC, 50/60 Hz.</td><td>VDE TYPES</td><td>1 = 250VAC, 415/240VAC</td></tr><tr><td></td><td>2 = 277/480VAC §</td><td></td><td>5 = 65VDC</td></tr><tr><td></td><td>5 = 65VDC</td><td></td><td>7 = AC/DC 250VAC, 415/240VAC, 65VDC</td></tr><tr><td></td><td>7 = AC/DC 277VAC or 65VDC</td><td></td><td>(Delay curve 34 must be specified.)</td></tr><tr><td></td><td>(Delay curve 34 must be specified.)</td><td></td><td></td></tr></table> § Note: Maximum line voltage code "2," 277/480VAC, is UL, but not CSA.																		UL/CSA TYPES	1 = 277VAC, 50/60 Hz.	VDE TYPES	1 = 250VAC, 415/240VAC		2 = 277/480VAC §		5 = 65VDC		5 = 65VDC		7 = AC/DC 250VAC, 415/240VAC, 65VDC		7 = AC/DC 277VAC or 65VDC		(Delay curve 34 must be specified.)		(Delay curve 34 must be specified.)												
UL/CSA TYPES	1 = 277VAC, 50/60 Hz.	VDE TYPES	1 = 250VAC, 415/240VAC																																												
	2 = 277/480VAC §		5 = 65VDC																																												
	5 = 65VDC		7 = AC/DC 250VAC, 415/240VAC, 65VDC																																												
	7 = AC/DC 277VAC or 65VDC		(Delay curve 34 must be specified.)																																												
	(Delay curve 34 must be specified.)																																														
6. Time Delay Curve: 0 = Instantaneous 10 = AC high inrush (Motor start) 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. 2 = Standard delay 12 = AC high inrush version of #2 3 = Short delay 13 = AC high inrush version of #3 53 = DC high inrush 34 = Combination AC/DC standard delay																																															
7. Amp Rating: <table><tr><td>0.20</td><td>0.75</td><td>2.0</td><td>3.5</td><td>6.0</td><td>8.0</td><td>11.0</td><td>20.0</td><td>35.0</td><td>50.0</td></tr><tr><td>0.25</td><td>1.0</td><td>2.5</td><td>4.0</td><td>7.0</td><td>9.0</td><td>12.0</td><td>25.0</td><td>40.0</td><td>Consult factory for other values</td></tr><tr><td>0.50</td><td>1.5</td><td>3.0</td><td>5.0</td><td>7.5</td><td>10.0</td><td>15.0</td><td>30.0</td><td>45.0</td><td></td></tr></table>																		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	
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.

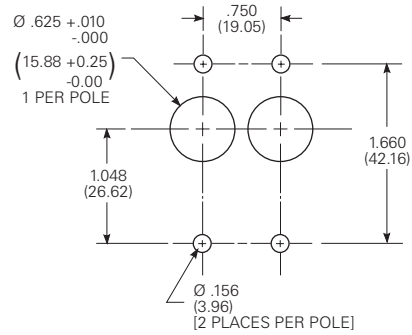
W91-X112-1	W91-X112-15	W91-X113-15	W91-X152-40	W92-X112-5	W92-X112-30	W92-X1110-30	W93-X112-30
W91-X112-2	W91-X112-20	W91-X150-5	W91-X152-50	W92-X112-7	W92-X112-40	W93-X112-5	W93-X112-40
W91-X112-3	W91-X112-40	W91-X152-10	W91-X1110-20	W92-X112-10	W92-X112-50	W93-X112-10	W93-X112-50
W91-X112-5	W91-X112-50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

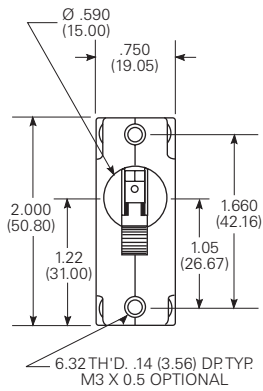


Panel Mounting Cutout

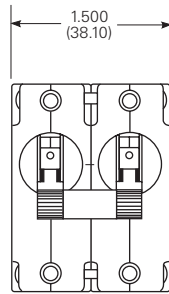


W6 Series

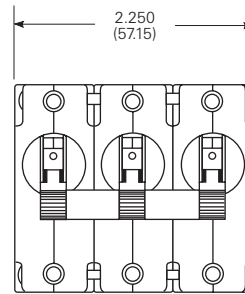
1 Pole



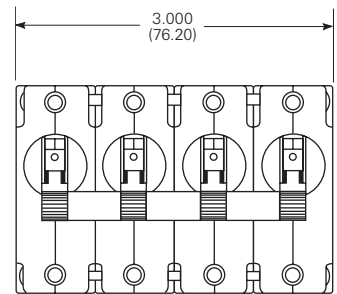
2 Pole



3 Pole

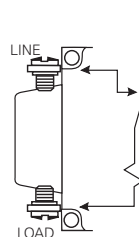


4 Pole

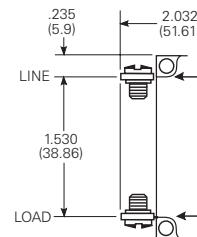


Note:
Multi-pole models furnished
with separate handle tie hardware.

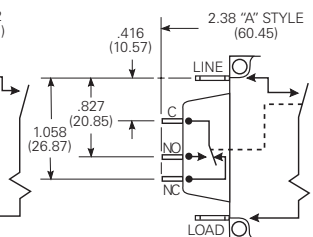
VDE Models W/Screw Terminals



UL/CSA Models W/Screw Terminals



UL/CSA/VDE Models W/Aux. Switch

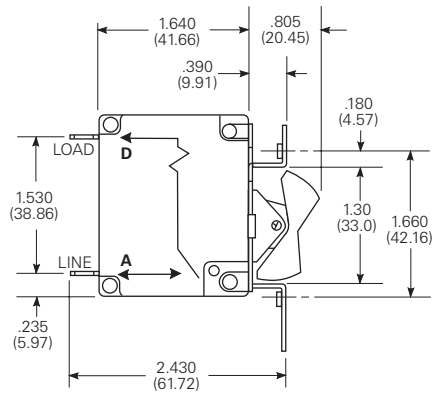


Notes:

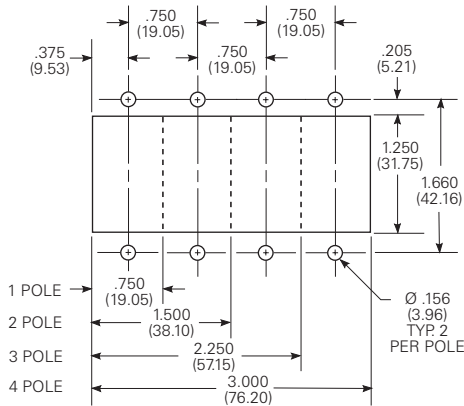
1. Terminal protrusion dimensions are referenced from back of mounting panel.
2. Main terminals are male quick connect type .250 (6.35) wide x .031 (.79) thick x .377 (9.58) long. Optional 8-32 x .250 (6.35) or 10-32 x .250 (6.35) screw type.
3. Panel mounting cutout detail mtg. detail tol.: $\pm .005$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

Outline Dimensions - Rocker Actuator Models

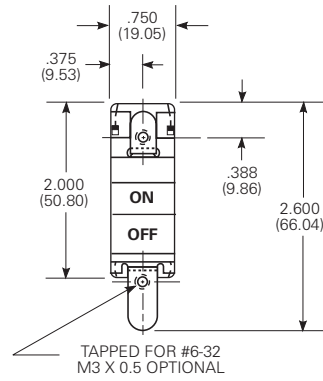
W6 Series



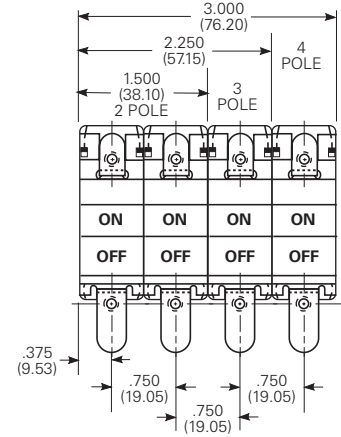
Panel Mounting Cutout



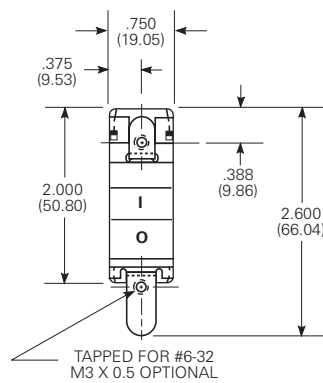
1 Pole



2, 3 & 4 Pole



VDE Rocker Marking



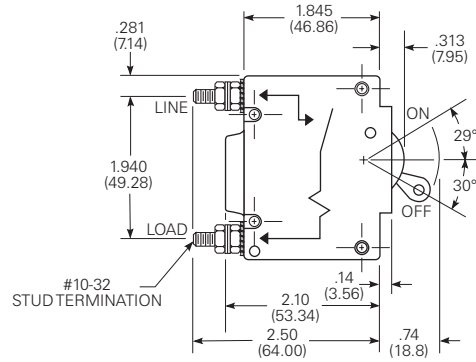
Notes:

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

Outline Dimensions

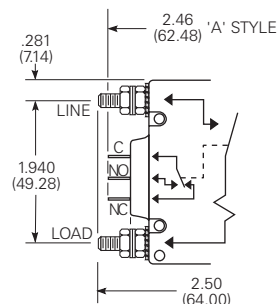
W9 Series

Series Trip Model

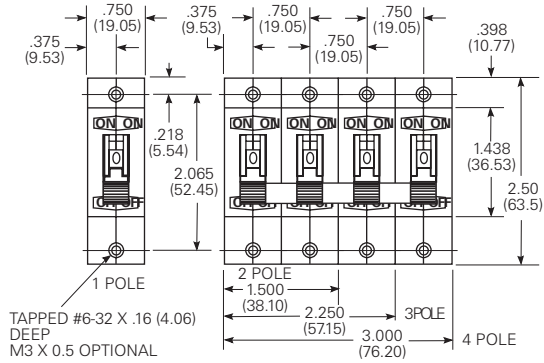


Series Trip Model

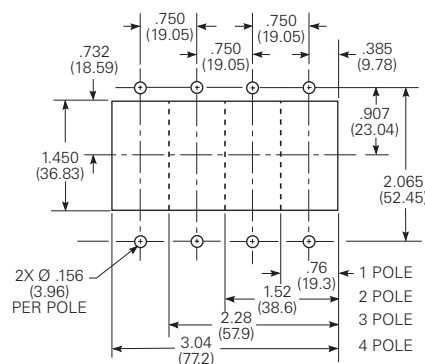
With Common Enclosed Auxiliary Switch



Series Trip Model



Panel Mounting Cutout Detail



Notes:

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