RELAYS AND SWITCHES

High Quality Parts for Industrial, Consumer, Commercial and MRO Applications

Includes complete information on **more than 1,340** Relays and Switches

NTE® ELECTRONICS, INC.

Contents

Introduction to Electro–Mechanical Relays

General Information

NTE Relays are electro–mechanical devices, which function by presenting a control voltage (AC or DC) to a coil, which in turn creates a magnetic field that activates a mechanism which closes (NO) or opens (NC) a set (or sets) of contacts through which a particular load is then connected. When the control voltage is removed, initial conditions return with the relay reset to begin its operation.

Due to relative mechanical standardization and the simplicity of operation, electro–mechanical relays are particularly suited for ease of replacement, as long as certain guidelines are maintained.

Generally, care in handling relays is advised – do not drop or mishandle them, nor open the case of enclosed units, nor subject them to chemical atmospheres or extremes of temperature. Do not exceed the maximum voltage or current ratings, and, in the case of DC relays, observe its polarity.

AC–Switching Relays

The coil temperature of the AC–switching relay rises because of resistance losses in the shading coil, magnetic eddy–current losses, and hysteresis losses. Also, a phenomenom known as “chatter” may occur if an AC relay operates on a voltage lower than that rated, sometimes causing contact burning if not prevented.

Inrush current (the current generated when the armature of the relay is initially released) is higher than the rated level and should be considered with respect to power consumption, especially when using several devices in parallel.

DC–Switching Relays

If the device is used as a “marginal” (i.e., turns ON or OFF if the voltage or current reaches a critical value) relay, then the control output may not satisfy the stated ratings, because the current gradually increases or decreases, thus slowing down the speed at which the contacts move. The coil resistance of the DC–switching relay changes by about 0.4% per C change in the ambient temperature. It also changes when the relay generates heat. This means that the pickup and dropout voltages may increase as the temperature rises.

Coils

A relay coil consists of copper wire wound many times around an iron–core bobbin. As such it will exhibit resistance to the flow of electric current according to Ohm’s Law, I = E/R (I is current, E is the rated voltage, and R is the stated coil resistance).

Relay coils are designed to operate on either AC or DC voltages, with the “pick–up” (the point at which the coil begins to energize) voltage typically 80% of the stated relay value.

This pick–up voltage can also be affected by the operating temperature of the relay, and in the case of remote devices, by the wiring to the device; and so, in replacing relays these elements should be considered.

It is impractical to use an AC relay in a DC circuit, because they are so constructed that the armature, in its seated position, “touches” (magnetically) the core (DC relays have a pin to prevent this): after the release of coil power no residual magnetism will hold the armature seated– if an AC voltage is used. But, a DC voltage could cause at worse, the armature to hold, and at least, a reduction in the pick–up voltage. Secondarily, the coil power rating ($P = E^2/R$) would dictate that a DC voltage of a smaller scale be used to prevent overheating the coil.

Similarly, DC relays operated on an AC voltage will cause the armature to bounce with each half–cycle, and the applied voltage would have to be ***increased*** to compensate for power losses and ensure current flow. Attempts to use a rectifying diode in parallel with the coil will surely result in the destruction of the diode!

Magnetic action causes the opening and closing of the contacts when power is applied to the coil. The applied voltage, therefore, should be sufficient to energize the coil (and thereby the contacts) at all times, since malfunctions of the relay could occur if it is allowed to drift too low; but not higher than the rated maximum voltage to prevent over–heating and possible short–circuits. If the relay is expected to operate at a higher than usual temperature, it may be necessary to increase the coil drive slightly to compensate for the increase in the coil resistance. Generally, the coil’s design will affect relay sensitivity, operating speed, and power consumption.

Contacts

The contacts in a relay make or break connections in electrical circuits; and so, have physical and electrical properties. Performance physically will depend on the switching arrangement, the overall mechanical construction of the relay, and the choice of material for the contacts. Electrically, the magnitude of the load current and its open circuit voltage, along with any special characteristics of the applied circuit (such as inrush current), are usually considered.

Contact material is of two forms: low–level or power. Low–level contacts require maintainence, since contamination can prevent signals from being switched. Power relays, however, have self–cleaning contacts that arc and burn off oxidation and contamination. The following table describes these characteristics (See Table 1 on the next page).

Table 1 – Contact Material Characteristics

Contact	Applications	Typical Ratings	Comments
Palladium or platinum, Bifurcated, gold–plated, or gold overlay	“Dry” and low current. Measurement and signal switching	0 to 2A Rated to 120VAC, but best for 24V or less.	Low, steady contact resistance.
Silver	Communications, Alarm systems	2 to 5A	Oxidizes easily. Should be gold–flashed for storage protection.
Silver cadmium oxide	Power, inductive and capacitive loads. Motor and incandecent lamp loads. High inrush currents.	5A and up	Resists welding. Good arc–extinguishing characteristics. Less suited below 12V.

For example, the NTE R12 series relays have a contact rating of 3A, 5A and 10 Amps, therefore, the contact material most suited would be silver.

NTE offers a wide selection of relays to fit practically any type of physical and electrical contact requirement. Expert engineering is yours for the asking.

Enclosures

Unsealed

These relays offer an unsealed dust cover but ***cannot*** be immersion cleaned because flux cleaning solvents will penetrate them.

Sealed

Sealed relays are similar to unsealed devices in that they offer a dust cover. But, in this version the cover is epoxy sealed, preventing penetration by cleaning solvents and solder flux when immersion cleaned.

Hermetically Sealed (R02 & R12 Series)

These relays offer total protection from the environment and are often used in harsh environments where gases or solvents may corrode them.

General Purpose Relays

R02 Series

Features

- **Hermetically Sealed, Metal Enclosure Types (H–suffix)**
- **U/L Approved for Class 1, Div 2 Hazardous Locations (H–suffix)**
- **Push–to–Test Button Types (B–suffix)**
- **Indicator Lamp Types (N–suffix)**
- **8–Pin and 11 –Pin Octal Plug–In Types**
- **SPDT, DPDT and 3PDT Types**
- **Clear Plastic Dust Cover**

AC OPERATED

NTE TYPE No.	Nom. Voltage	Contact Arr.	Coil Res. Ohms (Typ)	Nom. Power	Max. Contact Cur. @ 28VDC or 120VAC	Diag No.
R02–5A10–12	12VAC	SPDT	–	3.9VA	10A	D1C
R02–5A10–240	240VAC	SPDT	–	3.9VA	10A	D1C
R02–11A10–6	6VAC	DPDT	–	2.0VA	10A	D1A
R02–11A10–12	12VAC	DPDT	–	2.0VA	10A	D1A
R02–11A10–24	24VAC	DPDT	–	2.0VA	10A	D1A
R02–11A10–24H	24VAC	DPDT	–	3.0VA	10A	D2A
R02–11A10–24N	24VAC	DPDT	–	2.0VA	10A	D1A
R02–11A10–120	120VAC	DPDT	–	2.0VA	10A	D1A
R02–11A10–120H	120VAC	DPDT	–	3.0VA	10A	D2A
R02–11A10–120N	120VAC	DPDT	–	2.0VA	10A	D1A
R02–11A10–240	240VAC	DPDT	–	2.0VA	10A	D1A
R02–14A10–6	6VAC	3PDT	–	3.9VA	10A	D1B
R02–14A10–6M	6VAC	3PDT	–	3.9VA	10A	D1B
R02–14A10–12	12VAC	3PDT	–	2.75VA	10A	D1B
R02–14A10–24	24VAC	3PDT	–	2.75VA	10A	D1B
R02–14A10–24B	24VAC	3PDT	–	2.75VA	10A	D1B
R02–14A10–120	120VAC	3PDT	–	2.75VA	10A	D1B
R02–14A10–120H	120VAC	3PDT	–	3.0VA	10A	D2B
R02–14A10–120N	120VAC	3PDT	–	2.75VA	10A	D1B
R02–14A10–240	240VAC	3PDT	–	2.75VA	10A	D1B

DC OPERATED

R02–5D10–6	6VDC	SPDT	30	1.2W	10A	D1C
R02–5D10–110	110VDC	SPDT	10K	1.2W	10A	D1C
R02–11D10–6	6VDC	DPDT	30	1.2W	10A	D1A
R02–11D10–12	12VDC	DPDT	120	1.0W	10A	D1A
R02–11D10–12H	12VDC	DPDT	100	1.5W	10A	D2A
R02–11D10–12N	12VDC	DPDT	120	1.0W	10A	D1A
R02–11D10–24	24VDC	DPDT	470	1.0W	10A	D1A
R02–11D10–24B	24VDC	DPDT	470	1.0W	10A	D1A
R02–11D10–24H	24VDC	DPDT	472	1.2W	10A	D2A
R02–11D10–48	48VDC	DPDT	1630	1.5W	10A	D1A
R02–11D10–110	110VDC	DPDT	10K	1.2W	10A	D1A
R02–11D10–110H	110VDC	DPDT	8K	1.5W	10A	D2A
R02–14D10–6	6VDC	3PDT	30	1.2W	10A	D1B
R02–14D10–12	12VDC	3PDT	120	1.0W	10A	D1B
R02–14D10–12B	12VDC	3PDT	120	1.0W	10A	D1B
R02–14D10–24	24VDC	3PDT	470	1.0W	10A	D1B
R02–14D10–48	48VDC	3PDT	1630	1.5W	10A	D1B
R02–14D10–110	110VDC	3PDT	10K	1.2W	10A	D1B

Note 1. R02 Series hermetically sealed relays (H–suffix) are UL recognized for Class1, Division 2 (Hazardous locations).

Note 2. The R02 Series is generally being replaced by the R03 Series full–feature relays shown on Page 4.

General Purpose, 10 Amp Multicontact AC and DC Relays.

Electrical Specifications

Contact

Contact Rating

Poles	120VAC	240VAC	28VDC Max
SPDT	10A (1/10 HP)	10A (1/6 HP)	6A
DPDT	10A (1/3 HP)	10A (1/3 HP)	10A
3PDT	10A (1/3 HP)	6A (1/2 HP)	6A

Contact Material: 3/16" Silver cadmium oxide
Contact Resistance: 0.050 ohms max initial

Coil

Coil Voltages: See Chart
Pick–up Voltage: 80% of nominal or less, DC
80% of nominal or less, AC
Resistance: See chart
Min Sensitivity: (125mW per pole)
Duty Cycle: Continuous

Operational Characteristics

Timing Values . . . . . **Operate Time:** 25 mS or less
Release Time: 20 mS or less
} at nominal coil voltage

Insulation Characteristics

Dielectric Strength

Contact To Coil: 1500 VRMS
Across Open Contacts: 1000 VRMS
Pole to Pole: 1500 VRMS
Contacts To Frame: 1500 VRMS

Insulation Material: Molded polyester
Insulation Resistance: 1 x 10^3 megohms min

Environmental Characteristics

Operating: –10°C to +50°C (AC), –10°C to +60°C (DC)
Non–operating (storage): –30°C to +105°C

Weight

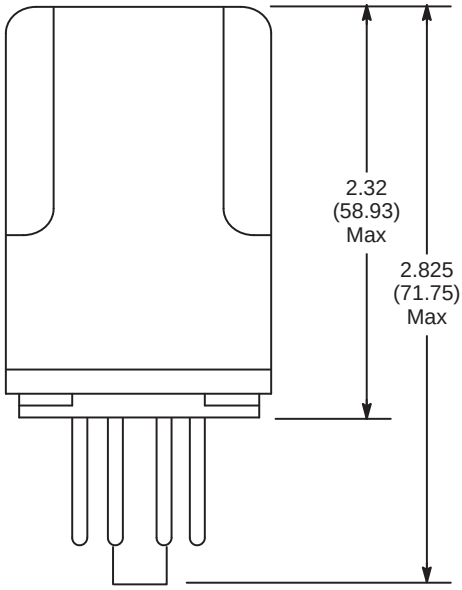
Std: $3\frac{1}{2}$ ozs (99.2 grams)—typical
Hermetic sealed: 5 ozs (141.7 grams)—typical

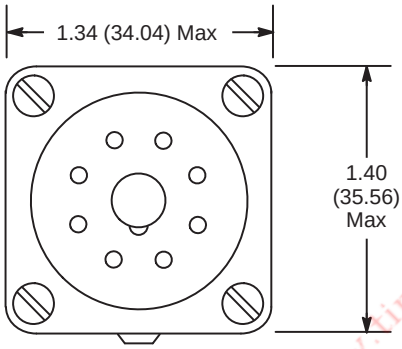
ACCESSORIES

MOUNTING STYLES	DESCRIPTION	NTE TYPE NO.
SURFACE MOUNT	8–PIN OCTAL 11–PIN OCTAL	R95–101 R95–104
DIN RAIL MOUNT	8–PIN OCTAL 11–PIN OCTAL	R95–113, R95–181 R95–114, R95–182
PANEL MOUNT	8–PIN OCTAL 11–PIN OCTAL	R95–118 R95–119

General Purpose Relays

D1





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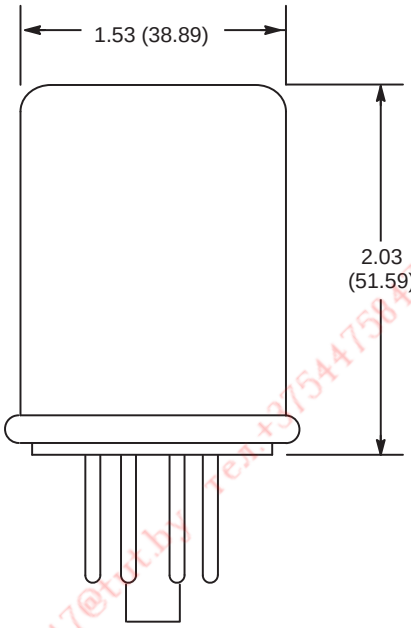
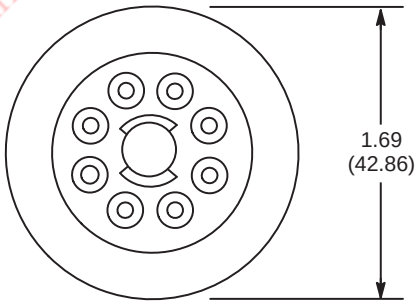
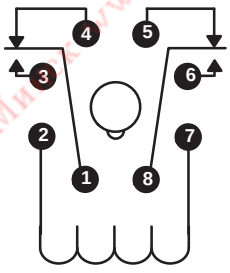




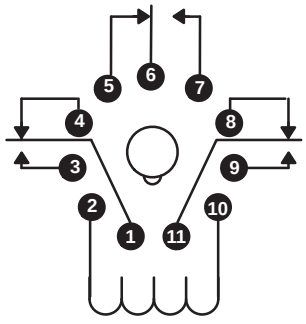
Note: Models with “N” suffix will have indicator lamp connected across coil.

A (DPDT), 2 Form “C”



Viewed from Pin end of Plug

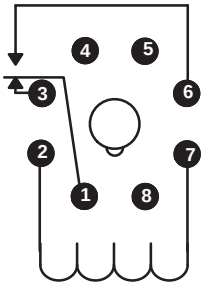
B (3PDT), 3 Form “C”



Viewed from Pin end of Plug

Note: R02−14A10−120H has Pin5 and Pin6 Reversed.

C (SPDT), 1 Form “C”



Viewed from Pin end of Plug

General Purpose Relays

R03 Series

General Purpose, 10 Amp, DPDT & 3PDT, AC & DC Full–Feature Relays.

Features

- Offers a “One Stop Solution” for your Power Management System
- Full–Featured Relay Includes:
  - Push–to–Test Button
  - Removable Lock–Down Door
  - Flag Indicator
  - LED Status Lamp
  - Removable ID Tag
  - Contact Viewing Window
- See–Thru Plastic Finger–Grip Cover
- 8–Pin and 11 –Pin Octal Plug–In Types

AC OPERATED

NTE Type No.	Nom. Voltage	Contact Arr.	Coil Res. Ohms (Typ)	Nom. Power	Max. Contact Cur. @ 28VDC or 120VAC	Diag No.
R03–11A10–12	12VAC	DPDT	18	3VA	10A	D85a
R03–11A10–24	24VAC	DPDT	72	3VA	10A	D85a
R03–11A10–120	120VAC	DPDT	1700	3VA	10A	D85a
R03–11A10–240	240VAC	DPDT	7200	3VA	10A	D85a
R03–14A10–12	12VAC	3PDT	18	3VA	10A	D85b
R03–14A10–24	24VAC	3PDT	72	3VA	10A	D85b
R03–14A10–120	120VAC	3PDT	1700	3VA	10A	D85b
R03–14A10–240	240VAC	3PDT	7200	3VA	10A	D85b

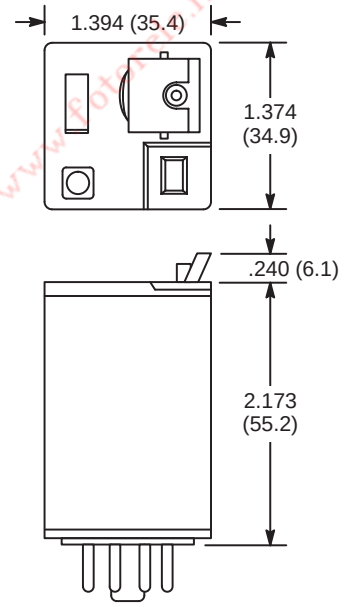
DC OPERATED

R03–11D10–12	12VDC	DPDT	120	1.4W	10A	D85a
R03–11D10–24	24VDC	DPDT	470	1.4W	10A	D85a
R03–11D10–48	48VDC	DPDT	1800	1.4W	10A	D85a
R03–11D10–110	110VDC	DPDT	10000	1.4W	10A	D85a
R03–14D10–12	12VDC	3PDT	120	1.4W	10A	D85b
R03–14D10–24	24VDC	3PDT	470	1.4W	10A	D85b
R03–14D10–48	48VDC	3PDT	1800	1.4W	10A	D85b
R03–14D10–110	110VDC	3PDT	10000	1.4W	10A	D85b

ACCESSORIES

MOUNTING STYLES	DESCRIPTION	NTE TYPE NO.
SURFACE MOUNT	8–PIN OCTAL 11–PIN OCTAL	R95–101 R95–104
DIN RAIL MOUNT	8–PIN OCTAL 11–PIN OCTAL	R95–113, R95–181 R95–114, R95–182
PANEL MOUNT	8–PIN OCTAL 11–PIN OCTAL	R95–118 R95–119

D85



Electrical Specifications

Contact

Contact Rating: 10 Amp @ 240 VAC (1/2 HP),
10 Amp @ 120 VAC (1/3 HP)
10 Amp @ 28 VDC
Maximum Switching Voltage: 300V
Minimum Switching Requirement: 100mA @ 5VDC (500mW)
Contact Material: Gold Flashed Silver Alloy

Coil

Coil Voltages: See Chart
Pick–up Voltage: 80 to 110% of nominal, DC
85 to 110% of nominal, AC
Drop–out Threshold: 10%, DC
15%, AC
Resistance: See chart

Operational Characteristics

Timing Values . . . . . Response Time: 20 mS

Insulation Characteristics

Dielectric Strength
Contact To Coil: 1500 VRMS
Pole to Pole: 1500 VRMS

Environmental Characteristics

Operating: –40°C to +55°
Non–operating (storage): –40°C to +85°C

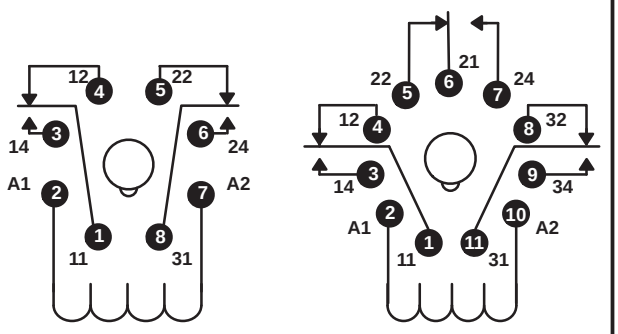
Life

Mechanical: 5 million operations (no load)
Electrical: 100,000 operations (at rated load, resistive)

Weight

Std: 3.14 ozs (89 grams)—typical

A (DPDT), 2 Form “C” **B (3PDT), 3 Form “C”**



Viewed from Pin end of Plug

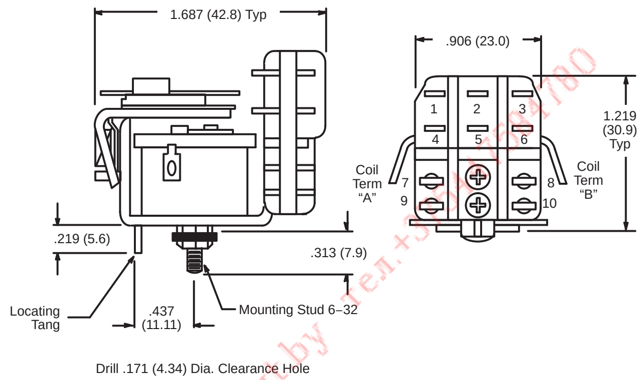
R06 Series

Features

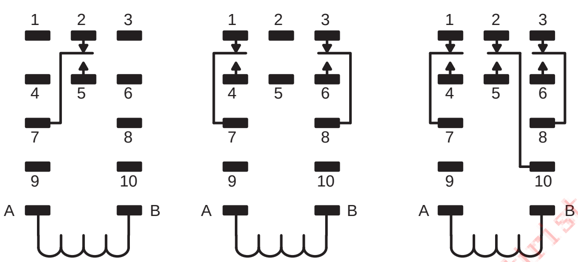
- SPDT, DPDT & 3PDT Models
- Solder Terminals
- High Dielectric Strength
- Multi–Pole Switching

General Purpose, 10 Amp Multicontact AC and DC Open Frame Relays.

D6



A (SPDT), 1 Form "C" **B (DPDT), 2 Form "C"** **C (3PDT), 3 Form "C"**



Schematic Diagrams Viewed from Terminal End

NTE Type No.	Nom. Voltage	Contact Arr.	Coil Res. Ohms (Typ)	Nom. Power	Max. Contact Cur. @ 28VDC or 120VAC	Diag No.
AC OPERATED						
R06–5A10–24	24VAC	SPDT	—	2.0VA	10A	D6A
R06–5A10–120	120VAC	SPDT	—	2.0VA	10A	D6A
R06–11A10–120	120VAC	DPDT	—	2.0VA	10A	D6B
R06–14A10–24	24VAC	3PDT	—	2.75VA	10A	D6C
R06–14A10–120	120VAC	3PDT	—	2.75VA	10A	D6C
DC OPERATED						
R06–11D10–6	6VDC	DPDT	32	1.0W	10A	D6B
R06–11D10–12	12VDC	DPDT	120	1.0W	10A	D6B
R06–11D10–24	24VDC	DPDT	470	1.0W	10A	D6B
R06–11D10–48	48VDC	DPDT	1800	1.0W	10A	D6B
R06–14D10–12	12VDC	3PDT	120	1.0W	10A	D6C
R06–14D10–24	24VDC	3PDT	470	1.0W	10A	D6C
R06–14D10–110	110VDC	3PDT	10K	1.0W	10A	D6C

Electrical Specifications

Contact

Contact Rating

Poles	120VAC	240VAC	28VDC
SPDT	12A (1/3 HP)	12A (1/2 HP)	10A
DPDT	12A (1/3 HP)	8A (1/2 HP)	10A
3PDT	10A (1/3 HP)	6A (1/2 HP)	10A

Contact Material: 3/16" Silver cadmium oxide
Contact Resistance: 0.050 ohms max initial

Coil

Coil Voltages: See Chart
Pick–up Voltage: 80% of nominal or less, AC or DC
Resistance: See chart
Min Sensitivity: 125mW per value
Duty Cycle: Continuous

Operational Characteristics

Timing Values . . . . . Operate Time: 25 mS or less } at nominal
Release Time: 20 mS or less } coil voltage

Insulation Characteristics

Dielectric Strength

Contact To Coil: 1500 VRMS
Across Open Contacts: 1000 VRMS
Pole to Pole: 1500 VRMS
Contacts To Frame: 1500 VRMS
Insulation Material: Molded polyester
Insulation Resistance: 1 x 10^3 megohms

Environmental Characteristics

Operating: –10°C to +50°C (AC), –10°C to +60°C (DC)
Non–operating (storage): –30°C to +105°C

Weight

Std: $2^1/_2$ ozs (70.9 grams)—approx

General Purpose Relays

R10 Series

General Purpose, 10 Amp AC & DC Relays.

Features

- .187” (4.75mm) 3–Way Terminals Suitable for Plug–In, Solder and Quick Connect
- SPDT, DPDT & 3PDT
- Clear See–Thru Cover
- Flange Mount (F–suffix), Push–to–Test Button (B–suffix), and Indicator Lamp (N–suffix) Types

AC OPERATED

NTE Type No.	Nom. Voltage	Contact Arr.	Coil Res. Ohms (Typ)	Nom. Power	Max. Contact Cur. @ 28VDC or 120VAC	Diag No.
R10–5A10–12	12VAC	SPDT	—	2.0VA	10A	D7A
R10–5A10–12B	12VAC	SPDT	—	2.0VA	10A	D7A
R10–5A10–12F	12VAC	SPDT	—	2.0VA	10A	D7B
R10–5A10–12N	12VAC	SPDT	—	2.0VA	10A	D7A
R10–5A10–24	24VAC	SPDT	—	2.0VA	10A	D7A
R10–5A10–24B	24VAC	SPDT	—	2.0VA	10A	D7A
R10–5A10–24F	24VAC	SPDT	—	2.0VA	10A	D7B
R10–5A10–24N	24VAC	SPDT	—	2.0VA	10A	D7A
R10–5A10–120	120VAC	SPDT	—	2.0VA	10A	D7A
R10–5A10–120B	120VAC	SPDT	—	2.0VA	10A	D7A
R10–5A10–120F	120VAC	SPDT	—	2.0VA	10A	D7B
R10–5A10–120N	120VAC	SPDT	—	2.0VA	10A	D7A
R10–11A10–12	12VAC	DPDT	—	2.0VA	10A	D7A
R10–11A10–12B	12VAC	DPDT	—	2.0VA	10A	D7A
R10–11A10–12F	12VAC	DPDT	—	2.0VA	10A	D7B
R10–11A10–12N	12VAC	DPDT	—	2.0VA	10A	D7A
R10–11A10–24	24VAC	DPDT	—	2.0VA	10A	D7A
R10–11A10–24B	24VAC	DPDT	—	2.0VA	10A	D7A
R10–11A10–24F	24VAC	DPDT	—	2.0VA	10A	D7B
R10–11A10–24N	24VAC	DPDT	—	2.0VA	10A	D7A
R10–11A10–120	120VAC	DPDT	—	2.0VA	10A	D7A
R10–11A10–120B	120VAC	DPDT	—	2.0VA	10A	D7A
R10–11A10–120F	120VAC	DPDT	—	2.0VA	10A	D7B
R10–11A10–120N	120VAC	DPDT	—	2.0VA	10A	D7A
R10–11A10–240	240VAC	DPDT	—	2.0VA	10A	D7A
R10–14A10–12	12VAC	3PDT	—	2.0VA	10A	D7A
R10–14A10–12B	12VAC	3PDT	—	2.0VA	10A	D7A
R10–14A10–12F	12VAC	3PDT	—	2.0VA	10A	D7B
R10–14A10–12N	12VAC	3PDT	—	2.0VA	10A	D7A
R10–14A10–24	24VAC	3PDT	—	2.75VA	10A	D7A
R10–14A10–24B	24VAC	3PDT	—	2.0VA	10A	D7A
R10–14A10–24F	24VAC	3PDT	—	2.75VA	10A	D7B
R10–14A10–24N	24VAC	3PDT	—	2.0VAC	10A	D7A
R10–14A10–120	120VAC	3PDT	—	2.75VA	10A	D7A
R10–14A10–120B	120VAC	3PDT	—	2.0VA	10A	D7A
R10–14A10–120F	120VAC	3PDT	—	2.75VA	10A	D7B
R10–14A10–120N	120VAC	3PDT	—	2.0VA	10A	D7A
R10–14A10–240	240VAC	3PDT	—	2.75VA	10A	D7A
R10–14A10–240B	240VAC	3PDT	—	2.0VA	10A	D7A
R10–14A10–240F	240VAC	3PDT	—	2.0VA	10A	D7B
R10–14A10–240N	240VAC	3PDT	—	2.0VA	10A	D7A

DC OPERATED

NTE Type No.	Nom. Voltage	Contact Arr.	Coil Res. Ohms (Typ)	Nom. Power	Max. Contact Cur. @ 28VDC or 120VAC	Diag No.
R10–5D10–12	12VDC	SPDT	120	1.2W	10A	D7A
R10–5D10–12B	12VDC	SPDT	120	1.2W	10A	D7A
R10–5D10–12F	12VDC	SPDT	120	1.2W	10A	D7B
R10–5D10–12N	12VDC	SPDT	120	1.2W	10A	D7A
R10–5D10–24	24VDC	SPDT	470	1.2W	10A	D7A
R10–5D10–24B	24VDC	SPDT	470	1.2W	10A	D7A
R10–5D10–24F	24VDC	SPDT	470	1.2W	10A	D7B
R10–5D10–24N	24VDC	SPDT	470	1.2W	10A	D7A
R10–11D10–12	12VDC	DPDT	120	1.2W	10A	D7A
R10–11D10–12B	12VDC	DPDT	120	1.2W	10A	D7A
R10–11D10–12F	12VDC	DPDT	120	1.2W	10A	D7B
R10–11D10–12N	12VDC	DPDT	120	1.2W	10A	D7A
R10–11D10–24	24VDC	DPDT	470	1.2W	10A	D7A
R10–11D10–24B	24VDC	DPDT	470	1.2W	10A	D7A
R10–11D10–24F	24VDC	DPDT	470	1.2W	10A	D7B
R10–11D10–24N	24VDC	DPDT	470	1.2W	10A	D7A
R10–11D10–110	110VDC	DPDT	10K	1.2W	10A	D7A
R10–14D10–12	12VDC	3PDT	120	1.2W	10A	D7A
R10–14D10–12B	12VDC	3PDT	120	1.2W	10A	D7A
R10–14D10–12F	12VDC	3PDT	120	1.2W	10A	D7B
R10–14D10–12N	12VDC	3PDT	120	1.2W	10A	D7A
R10–14D10–24	24VDC	3PDT	470	1.2W	10A	D7A
R10–14D10–24B	24VDC	3PDT	470	1.2W	10A	D7A
R10–14D10–24F	24VDC	3PDT	470	1.2W	10A	D7B
R10–14D10–24N	24VDC	3PDT	470	1.2W	10A	D7A
R10–14D10–110	110VDC	3PDT	10K	1.2W	10A	D7A

Electrical Specifications

Contact

Contact Rating: 10 Amp @ 120 VAC/240 VAC, 28 VDC
Contact Material: 3/16” Silver cadmium oxide

Coil

Coil Voltages: See Chart
Pick–up Voltage: 75% of nominal or less for DC relays @ 25°C
85% of nominal or less for AC relays @ 25°C
Resistance: See chart
Min Sensitivity: 250 (DPDT), 375 (3PDT) mW per pole
Duty Cycle: Continuous

Operational Characteristics

Timing Values . . . . . Operate Time: 15ms (SPDT), 20 mS (DPDT), 24 mS (3PDT)
Release Time: 10ms (SPDT), 28 mS (DPDT), 26 mS (3PDT)
} at nominal coil voltage

Insulation Characteristics

Dielectric Strength
Contact To Coil: 2000 VRMS
Across Open Contacts: 500 VRMS
Pole to Pole: 2000 VRMS
Contact To Frame: 2000 VRMS

Environmental Characteristics

Operating: –30°C to +50°C (AC), –30°C to +65°C (DC)
Non–operating (storage): –30°C to +100°C

Weight

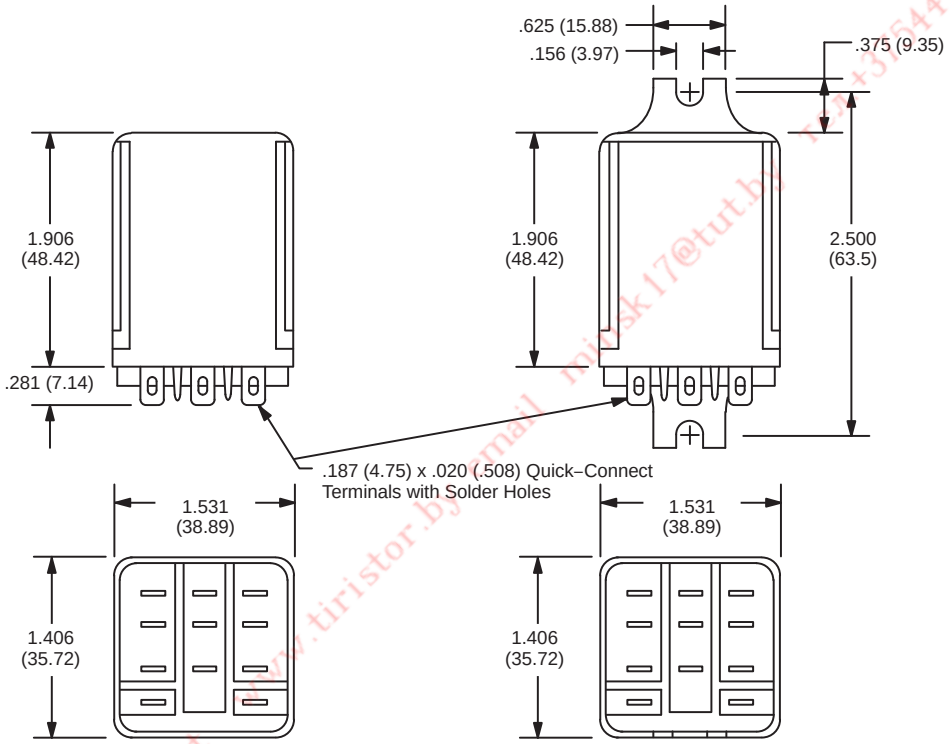
Std: 3.1 ozs (88 grams)—approx

General Purpose Relays

ACCESSORIES		
MOUNTING STYLES	DESCRIPTION	NTE TYPE NO.
SURFACE MOUNT SCREW TERMINALS	11–PIN BLADE	R95–105
PANEL MOUNT SOLDER TERM	11–PIN BLADE	R95–116
PANEL MOUNT QUICK CONNECT	11–PIN BLADE	R95–124
DIN RAIL MOUNT	11–PIN BLADE	R95–115
PC MOUNT	11–PIN BLADE	R95–123

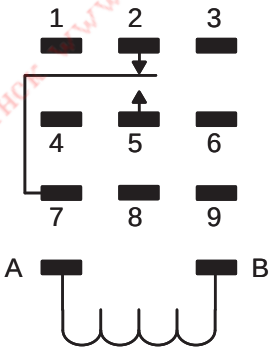
D7A Standard Cover

D7B Flange Cover

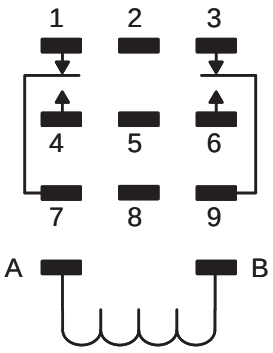


Note: Models with “N” suffix will have indicator lamp connected across coil.

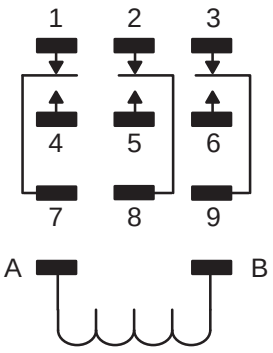
SPDT, 1 Form “C”



DPDT, 2 Form “C”



3PDT, 3 Form “C”



Schematic Diagrams Viewed from Terminal End

General Purpose Relays

R12 Series

Features

- Slightly Larger than One Cubic Inch
- See–Thru Plastic Cover
- Plug–In or Solder Terminal
- PC Board Mount (P–suffix)
- Indicator Lamp Types (N–suffix)
- Hermetically Sealed, Metal Enclosure Types (H–suffix)
- Push–to–Test Button Types (B–suffix)
- Bifurcated Contact Type (T–suffix)
- High Reliability, 50 Million Operations

AC OPERATED						
NTE Type No.	Nom. Voltage	Contact Arr.	Coil Res. Ohms (Typ)	Nom. Power	Max. Contact Cur. @ 28VDC or 120VAC	Diag No.
R12–11A5–12	12VAC	DPDT	—	1.2VA	5A	D8a
R12–11A5–24	24VAC	DPDT	—	1.2VA	5A	D8a
R12–11A5–120	115VAC	DPDT	—	1.2VA	5A	D8a
R12–11A5–240	240VAC	DPDT	—	1.2VA	5A	D8a
R12–14A5–12	12VAC	3PDT	—	1.2VA	5A	D32b
R12–14A5–24	24VAC	3PDT	—	1.2VA	5A	D32b
R12–14A5–120	120VAC	3PDT	—	1.2VA	5A	D32b
R12–17A5–24H	24VAC	4PDT	—	1.2VA	5A	D22c
R12–17A5–24N	24VAC	4PDT	—	1.2VA	5A	D8c
R12–17A5–120H	115VAC	4PDT	—	1.2VA	5A	D22c
R12–17A5–120N	120VAC	4PDT	—	1.2VA	5A	D8c
R12–17A3–12	12VAC	4PDT	—	1.2VA	5A	D8c
R12–17A3–12B	12VAC	4PDT	—	1.2VA	3A	D8c
R12–17A3–12P	12VAC	4PDT	—	1.2VA	3A	D9c
R12–17A3–12T	12VAC	4PDT	—	1.2VA	1A	D8c
R12–17A3–24	24VAC	4PDT	—	1.2VA	5A	D8c
R12–17A3–24B	24VAC	4PDT	—	1.2VA	3A	D8c
R12–17A3–24P	24VAC	4PDT	—	1.2VA	5A	D9c
R12–17A3–24T	24VAC	4PDT	—	1.2VA	1A	D8c
R12–17A3–120	120VAC	4PDT	—	1.2VA	5A	D8c
R12–17A3–120B	120VAC	4PDT	—	1.2VA	5A	D8c
R12–17A3–120P	120VAC	4PDT	—	1.2VA	5A	D9c
R12–17A3–120T	120VAC	4PDT	—	1.2VA	1A	D8c
R12–17A3–240	240VAC	4PDT	—	1.2VA	3A	D8c
DC OPERATED						
R12–11D5–12	12VDC	DPDT	160	0.9W	5A	D8a
R12–11D5–24	24VDC	DPDT	650	0.9W	5A	D8a
R12–14D5–6	6VDC	3PDT	40	0.9W	5A	D32b
R12–14D5–12	12VDC	3PDT	160	0.9W	5A	D32b
R12–14D5–24	24VDC	3PDT	650	0.9W	5A	D32b
R12–17D5–12H	12VDC	4PDT	160	0.9W	5A	D22c
R12–17D5–12N	12VDC	4PDT	160	0.9W	5A	D8c
R12–17D5–24H	24VDC	4PDT	650	0.9W	5A	D22c
R12–17D5–24N	24VDC	4PDT	650	0.9W	5A	D8c
R12–17D3–6	6VDC	4PDT	40	0.9W	5A	D8c
R12–17D3–6P	6VDC	4PDT	40	0.9W	5A	D9c
R12–17D3–12	12VDC	4PDT	160	0.9W	3A	D8c
R12–17D3–12B	12VDC	4PDT	160	0.9W	3A	D8c
R12–17D3–12P	12VDC	4PDT	160	0.9W	3A	D9c
R12–17D3–24	24VDC	4PDT	650	0.9W	5A	D8c
R12–17D3–24B	24VDC	4PDT	650	0.9W	3A	D8c
R12–17D3–24P	24VDC	4PDT	650	0.9W	5A	D9c
R12–17D3–24T	24VDC	4PDT	650	0.9W	1A	D8c
R12–17D3–48	48VDC	4PDT	2600	0.9W	3A	D8c
R12–17D3–110	110VDC	4PDT	11000	0.9W	3A	D8c

Note 1. R12 Series hermetically sealed relays (H–suffix) are UL recognized for Class1, Division 2 (Hazardous locations).

General Purpose, 1 Amp, 3 Amp & 5 Amp, DPDT, 3PDT & 4PDT AC & DC Relays.

Electrical Specifications

Contact

Contact Rating: 5 Amp @ 240 VAC/28 VDC,
3 Amp @ 240 VAC/28 VDC
1 Amp @ 240 VAC/28 VDC
Contact Material: AgNi / AgSnO Alloy
Silver ^{W}/Gold Flashing (T–type ONLY)
Contact Resistance: 100 milliohms max. (at 6 VDC, 1 Amp)

Coil

Coil Voltages: See Chart
Pick–up Voltage: 80% of nominal or less for AC
75% of nominal or less for DC
Resistance: See chart
Min Sensitivity: 0.5 Watts DC .75 volt Amps (60Hz)
Duty Cycle: Continuous

Operational Characteristics

Timing Values . . . . . **Operate Time:** 25 mS or less
Release Time: 25 mS or less
} at nominal coil voltage

Insulation Characteristics

Dielectric Strength

Contact To Coil: 1500 VRMS (50/60 Hz)
Across Open Contacts: 1000 VRMS (50/60 Hz)
Coil to Frame: 1500 VRMS (50/60 Hz)
Insulation Resistance: 100 megohms Min. @ 500 VDC

Environmental Characteristics

Operating: –30°C to +55°C

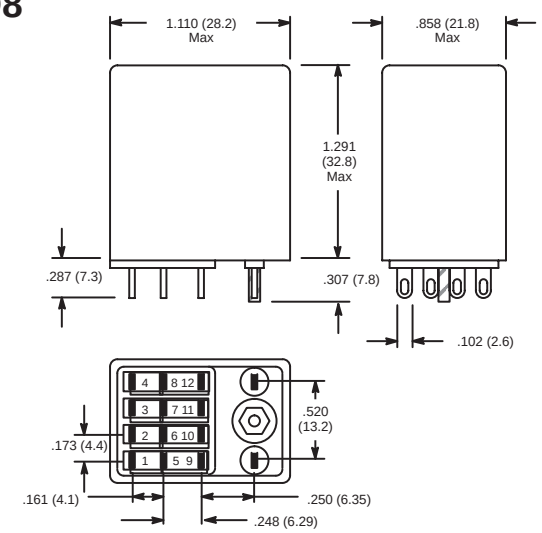
Weight

Std: 1 1/2 ozs (45 grams)—approx

ACCESSORIES		
MOUNTING STYLES	DESCRIPTION	NTE TYPE NO.
SURFACE MOUNT	14–PIN BLADE	R95–106A
SURFACE MOUNT	8–PIN BLADE	R95–150
PANEL MOUNT	14–PIN BLADE	R95–122
PANEL MOUNT	11–PIN BLADE	RLY9151
PANEL MOUNT	8–PIN BLADE	R95–148
PC MOUNT	14–PIN BLADE	R95–107
PC MOUNT	11–PIN BLADE	RLY9152
PC MOUNT	8–PIN BLADE	R95–149
DIN RAIL MOUNT	14–PIN BLADE	R95–117
DIN RAIL MOUNT	11–PIN BLADE	RLY9153

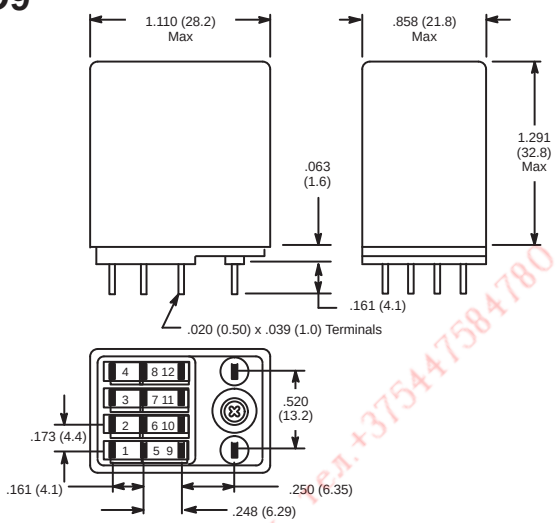
General Purpose Relays

D8

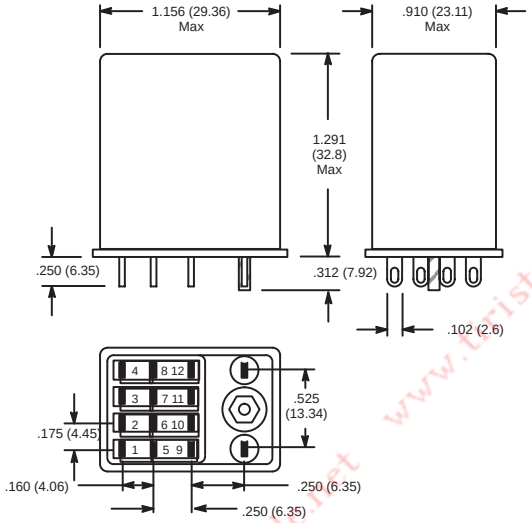


Note: 3–56 Thread Size

D9

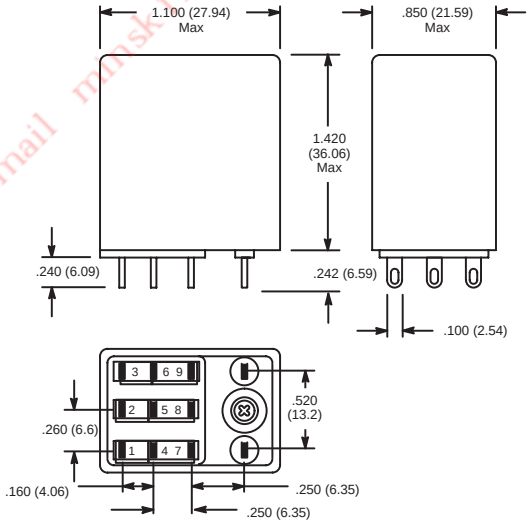


D22

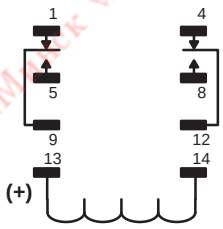


Note: 3–48 Thread Size

D32

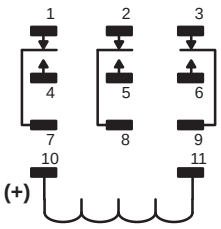


A (DPDT), 2 Form "C"



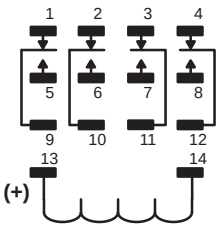
Viewed from Pin end of Plug

B (3PDT), 3 Form "C"



Viewed from Pin end of Plug

C (4PDT), 4 Form "C"



Viewed from Pin end of Plug

General Purpose Relays

R14 Series

Features

- Slightly Larger than One Cubic Inch
- SPDT, DPDT, 3PDT, and 4PDT
- See–Thru Plastic Cover
- Plug–In or Solder Terminal, will also accept .187” (4.75mm) Faston Terminals
- PC Board Mount (P–suffix)
- Flange Mount Version (F–suffix)
- Indicator Lamp Types (N–suffix)
- High Reliability, 50 Million Operations

NTE Type No.	Nom. Voltage	Contact Arr.	Coil Res. Ohms (Typ)	Nom. Power	Max. Contact Cur. @ 28VDC or 120VAC	Diag No.
AC OPERATED						
R14–5A15–24	24VAC	SPDT	—	1.2VA	15A	D10
R14–5A15–120	120VAC	SPDT	—	1.2VA	15A	D10
R14–5A15–240	240VAC	SPDT	—	1.2VA	15A	D10
R14–11A10–12	12VAC	DPDT	—	1.2VA	10A	D10
R14–11A10–12F	12VAC	DPDT	—	1.2VA	10A	D10
R14–11A10–12P	12VAC	DPDT	—	1.2VA	10A	D10A
R14–11A10–24	24VAC	DPDT	—	1.2VA	10A	D10
R14–11A10–24F	24VAC	DPDT	—	1.2VA	10A	D10
R14–11A10–24P	24VAC	DPDT	—	1.2VA	10A	D10A
R14–11A10–120	120VAC	DPDT	—	1.2VA	10A	D10
R14–11A10–120F	120VAC	DPDT	—	1.2VA	10A	D10
R14–11A10–120N	120VAC	DPDT	—	1.2VA	10A	D10
R14–11A10–120P	120VAC	DPDT	—	1.2VA	10A	D10A
R14–11A10–240	240VAC	DPDT	—	1.2VA	10A	D10
R14–14A10–12	12VAC	3PDT	—	1.2VA	10A	D59
R14–14A10–24	24VAC	3PDT	—	1.2VA	10A	D59
R14–14A10–120	120VAC	3PDT	—	1.2VA	10A	D59
R14–17A10–12	12VAC	4PDT	—	1.2VA	10A	D57
R14–17A10–24	24VAC	4PDT	—	1.2VA	10A	D57
R14–17A10–120	120VAC	4PDT	—	1.2VA	10A	D57
DC OPERATED						
R14–5D15–12	12VDC	SPDT	160	0.9W	15A	D10
R14–5D15–24	24VDC	SPDT	650	0.9W	15A	D10
R14–11D10–6	6VDC	DPDT	40	0.9W	10A	D10
R14–11D10–6F	6VDC	DPDT	40	0.9W	10A	D10
R14–11D10–6P	6VDC	DPDT	40	0.9W	10A	D10A
R14–11D10–12	12VDC	DPDT	160	0.9W	10A	D10
R14–11D10–12F	12VDC	DPDT	160	0.9W	10A	D10
R14–11D10–12P	12VDC	DPDT	160	0.9W	10A	D10A
R14–11D10–24	24VDC	DPDT	650	0.9W	10A	D10
R14–11D10–24F	24VDC	DPDT	650	0.9W	10A	D10
R14–11D10–24P	24VDC	DPDT	650	0.9W	10A	D10A
R14–11D10–48	48VDC	DPDT	2600	0.9W	10A	D10
R14–11D10–110	110VDC	DPDT	11000	0.9W	10A	D10
R14–14D10–6	6VDC	3PDT	25.7	0.9W	10A	D59
R14–14D10–12	12VDC	3PDT	107	0.9W	10A	D59
R14–14D10–24	24VDC	3PDT	410	0.9W	10A	D59
R14–14D10–48	48VDC	3PDT	1700	0.9W	10A	D59
R14–14D10–110	110VDC	3PDT	8500	0.9W	10A	D59
R14–17D10–6	6VDC	4PDT	25	0.9W	10A	D57
R14–17D10–12	12VDC	4PDT	100	0.9W	10A	D57
R14–17D10–24	24VDC	4PDT	350	0.9W	10A	D57
R14–17D10–48	48VDC	4PDT	1600	0.9W	10A	D57
R14–17D10–110	110VDC	4PDT	6900	0.9W	10A	D57

General Purpose 10 Amp & 15 Amp AC & DC Relays.

Electrical Specifications

Contact

Ratings: 15 Amp @ 150 VAC/30 VDC, 10 Amp @ 240 VAC
1/3 HP @ 120 VAC, 1/2 HP @ 240 VAC
10 Amp @ 240/30 VDC Resistive, 1/3 HP @ 120 VAC
1/2 HP @ 240 VAC
Contact Material: Silver cadmium oxide
Contact Resistance: 100 milliohms max. (at 6 VDC, 1 Amp)

Coil

Coil Voltages: See Chart
Pick–up Voltage: 80% of nominal or less for AC
75% of nominal or less for DC
Resistance: See chart
Min Sensitivity: 0.5 Watts DC .75 volt Amps (60Hz)
Duty Cycle: Continuous

Operational Characteristics

Timing Value ...... **Operate Time:** 25 mS or less, **Release Time:** 25 mS or less } at nominal coil voltage

Insulation Characteristics

Dielectric Strength
Contact To Coil: 1500 VRMS (50/60 Hz)
Across Open Contacts: 1000 VRMS (50/60 Hz)
Coil To Frame: 1500 VRMS (50/60 Hz)
Insulation Resistance: 100 megohms Min. @ 500 VDC

Environmental Characteristics

Operating: –30°C to +55°C

Weight

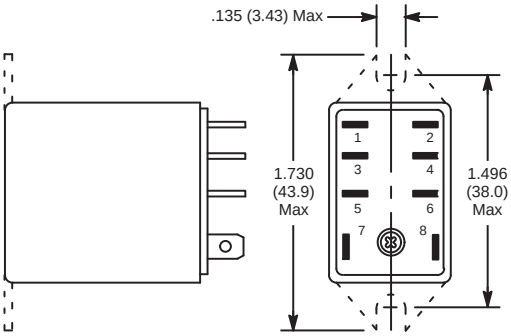
Std: $1^1/_2$ ozs (45 grams)—approx

ACCESSORIES

MOUNTING STYLES	DESCRIPTION	NTE TYPE NO.
SURFACE MOUNT	8–PIN BLADE	R95–110
PANEL MOUNT	8–PIN BLADE	R95–111
	11–PIN BLADE	RLY9154
	14–PIN BLADE	RLY9157
PC MOUNT	8–PIN BLADE	R95–120
	11–PIN BLADE	RLY9155
	14–PIN BLADE	RLY9158
DIN RAIL MOUNT	8–PIN BLADE	R95–121
	11–PIN BLADE	RLY9156
	14–PIN BLADE	RLY9159

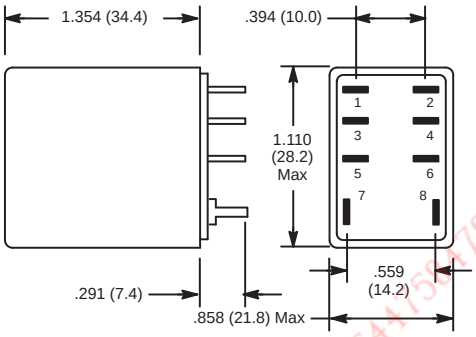
General Purpose Relays

D10

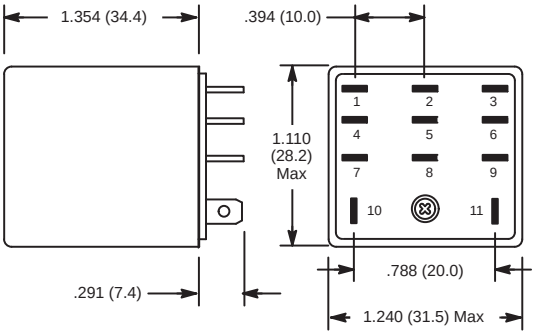


NOTE: Dotted line indicates flange mount case style.
All dimensions are common to both D10 & D10A.

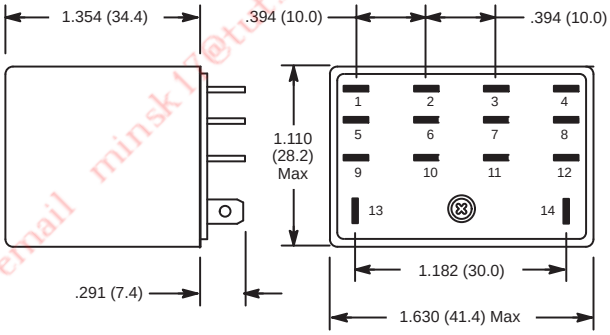
D10A



D59

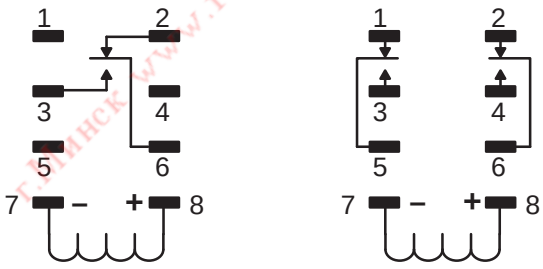


D57

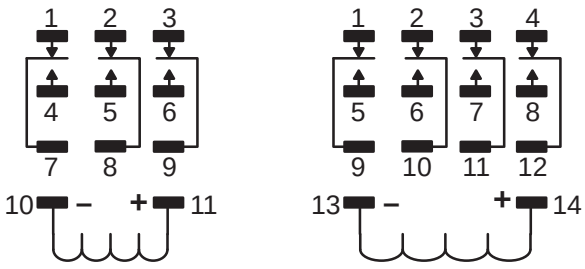


NOTE: Models with "N" suffix will have indicator lamp connected across coil.

SPDT, 1 Form "C" DPDT, 2 Form "C"



3PDT, 3 Form "C" 4PDT, 4 Form "C"



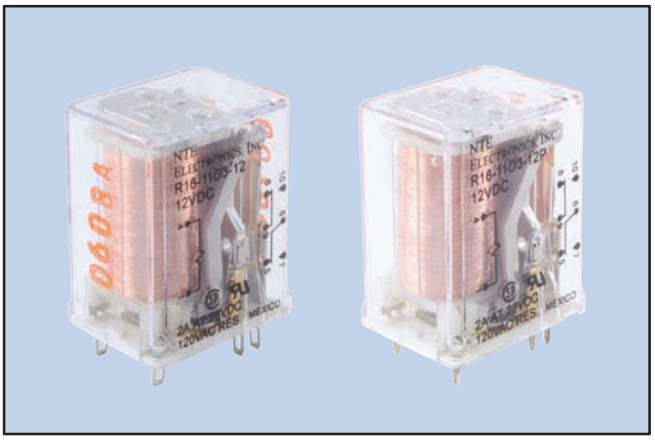
Schematic Diagrams Viewed from Terminal End
NOTE: Polarity is for DC types **ONLY**.

R16 Series

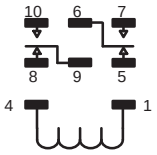
Miniature Industrial 3 Amp & 5 Amp AC & DC Relays.

Features

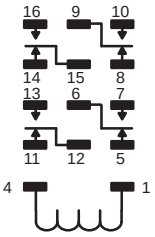
- DPDT, 4PDT & 6PDT Versions
- Combination Solder/Plug–In Terminals
- Printed Circuit Mount Version (P–suffix)
- See–Thru Plastic Cover
- Gold Overlay Bar Type Long Life Contacts



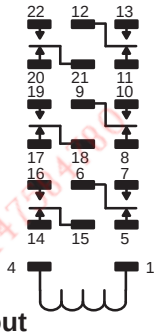
DPDT, 2 Form "C"



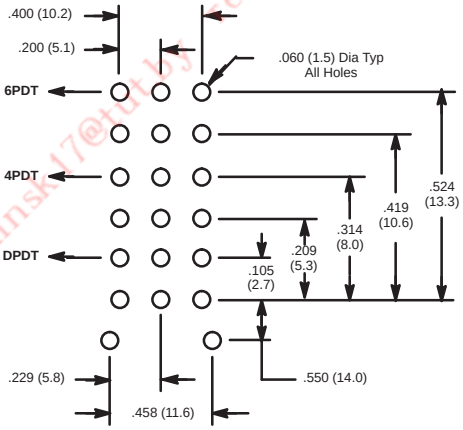
4PDT, 4 Form "C"



6PDT, 6 Form "C"



Suggested Circuit Board Layout



AC OPERATED						
NTE Type No.	Nom. Voltage	Contact Arr.	Coil Res. Ohms (Typ)	Nom. Power	Max. Contact Cur. @ 28VDC or 120VAC	Diag No.
R16–11A5–115	115VAC	DPDT	—	1.5VA	5A	D12
R16–17A5–115	115VAC	4PDT	—	2.5VA	5A	D12
DC OPERATED						
R16–11D3–12	12VDC	DPDT	185	0.75W	3A	D12
R16–11D3–12P	12VDC	DPDT	185	1W	3A	D12A
R16–11D3–24	24VDC	DPDT	700	1W	3A	D12
R16–11D3–24P	24VDC	DPDT	700	1W	3A	D12A
R16–17D3–12	12VDC	4PDT	185	0.75W	3A	D12
R16–17D3–24	24VDC	4PDT	700	1W	3A	D12
R16–11D5–5	5/6VDC	DPDT	52	0.5W	5A	D12
R16–11D5–12	12VDC	DPDT	185	0.75W	5A	D12
R16–11D5–24	24VDC	DPDT	700	1W	5A	D12
R16–17D5–5	5/6VDC	4PDT	52	1W	5A	D12
R16–17D5–12	12VDC	4PDT	185	1W	5A	D12
R16–17D5–12P	12VDC	4PDT	185	1W	5A	D12A
R16–17D5–24	24VDC	4PDT	700	1W	5A	D12
R16–17D5–24P	24VDC	4PDT	700	1W	5A	D12A
R16–23D5–12 (RLY2572 Note1)	12VDC	6PDT	90	1W	5A	D12
R16–23D5–24 (RLY2573 Note2)	24VDC	6PDT	430	1W	5A	D12

Note 1. R16–23D5–12 and RLY2572 are **exact** equivalents and may be received with either device number on the package.
Note 2. R16–23D5–24 and RLY2573 are **exact** equivalents and may be received with either device number on the package.

ACCESSORIES		
MOUNTING STYLES	DESCRIPTION	NTE TYPE NO.
PANEL MOUNT (DPDT)	10–PIN BLADE	R95–103
(4PDT)	16–PIN BLADE	R95–109
(6PDT)	22–PIN BLADE	RLY9134
FLANGE MOUNT (DPDT)	10–PIN BLADE	RLY9173
(4PDT)	16–PIN BLADE	RLY9174
(6PDT)	22–PIN BLADE	RLY9175
PC MOUNT (DPDT)	10–PIN BLADE	R95–102
	10–PIN BLADE	RLY9170
(4PDT)	16–PIN BLADE	R95–108
	16–PIN BLADE	RLY9171
(6PDT)	22–PIN BLADE	RLY9135
	22–PIN BLADE	RLY9172

Electrical Specifications

Contact

Contact Rating: See chart (Note: U.L for 3 Amp **Only**)
Contact Material: Silver, gold alloy and gold overlay
Contact Resistance: 0.050 Max. initial

Coil

Coil Voltages: See Chart
Pick–up Voltage: 80% of nominal or less
Resistance: See chart

Operational Characteristics

Timing Values . . . . . Operate Time: DPDT–12 mS, 4PDT –14 mS or less } at nominal coil voltage
Release Time: 8 mS or less

Insulation Characteristics

Dielectric Strength

Contact To Coil: 1500 VRMS
Across Open Contacts: 500 VRMS
Coil To Frame: 1000 VRMS
Insulation Resistance: 1000 megohms at 25°C and 50% RH

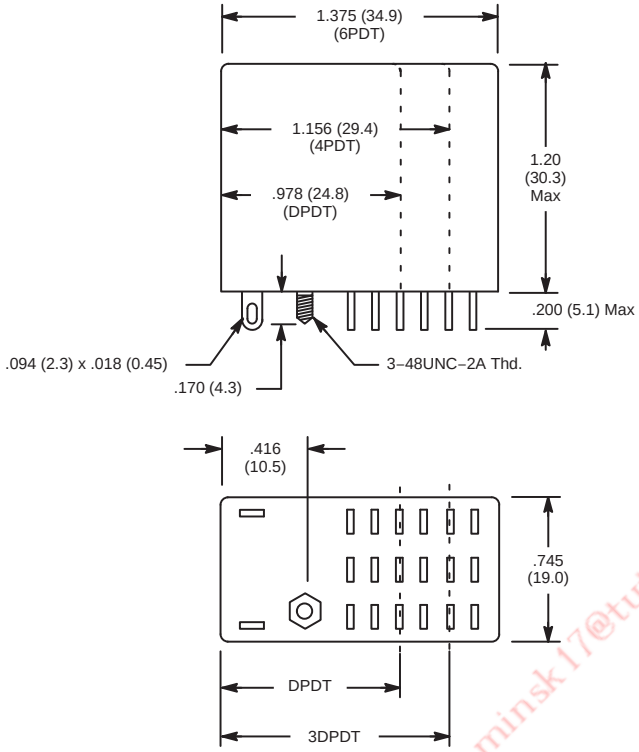
Environmental Characteristics

Operating: –55°C to +70°C, 10 sec. max
Solder–bath: +525°F (+260°C) approx.

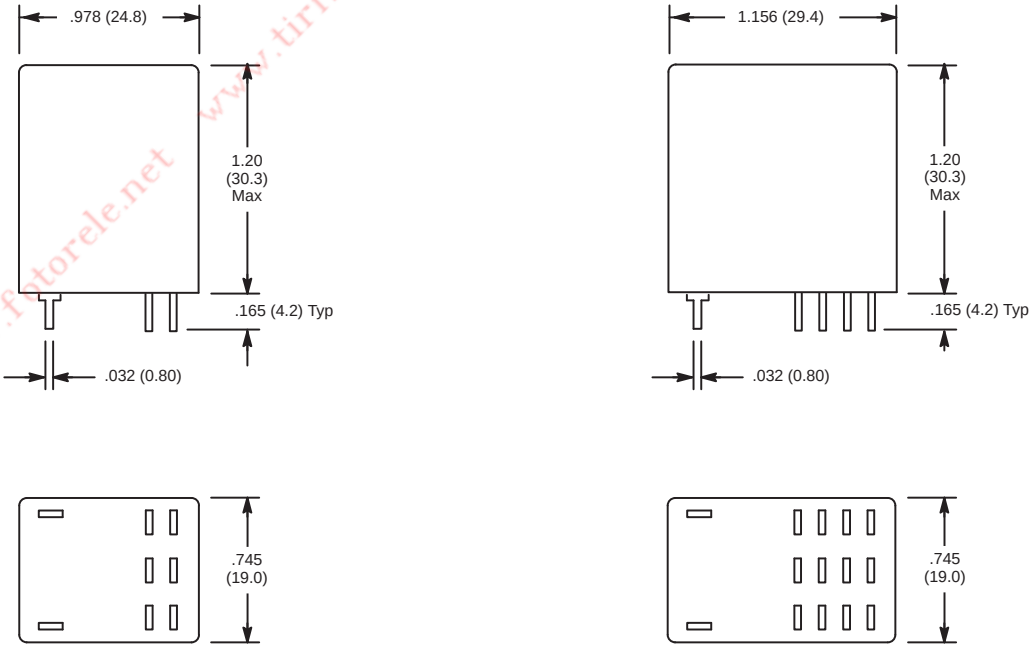
Weight

Std: 0.8 to 1.4 oz (22 to 40 grams) approx.

D12



D12A



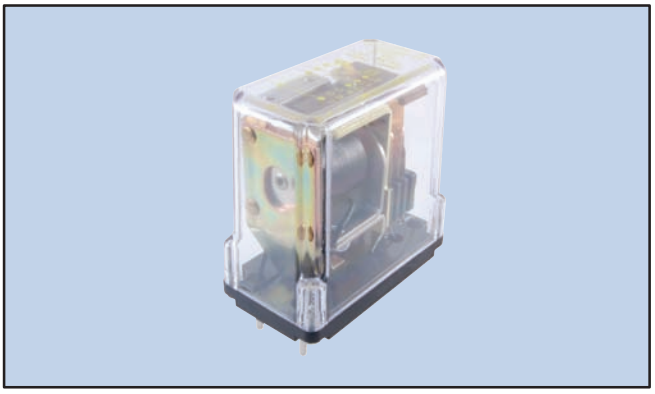
General Purpose Relays

R17 Series

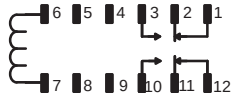
General Purpose, Industrial, 10 Amp, AC & DC, Plug–In Relays.

Features

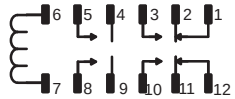
- DPDT, DPDT + 2 NO, & 4PDT Versions
- Plug–In Terminals
- Encapsulated Coil for Protection
- See–Thru Plastic Cover



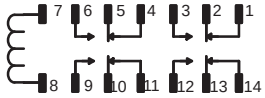
DPDT, 2 Form “C”



DPDT + 2 NO, 2 Form “C” 2 Form “A”



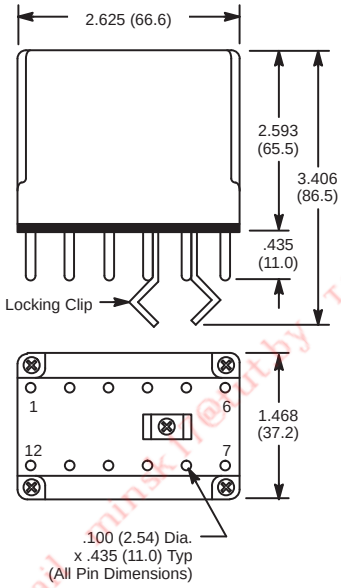
4PDT, 4 Form “C”



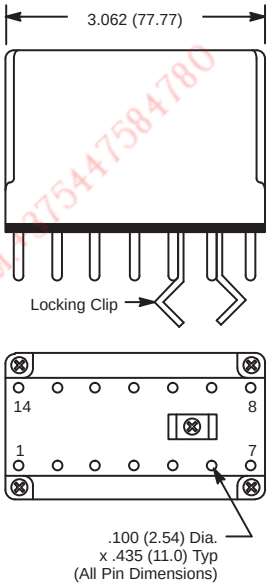
AC OPERATED						
NTE Type No.	Nom. Voltage	Contact Arr.	Coil Res. Ohms (Typ)	Nom. Power	Max. Contact Cur. @ 28VDC or 120VAC	Diag No.
R17–11A10–24	24VAC	DPDT	—	5VA	10A	D64a
R17–11A10–120	120VAC	DPDT	—	5VA	10A	D64a
R17–11NA10–24	24VAC	DPDT–NO	—	5VA	10A	D64a
R17–17A10–24	24VAC	4PDT	—	5VA	10A	D64b
R17–17A10–120	120VAC	4PDT	—	5VA	10A	D64b
DC OPERATED						
R17–11D10–24	24VDC	DPDT	250	1.8W	10A	D64a
R17–11D10–115	115/125 VDC	DPDT	6200	2.5W	10A	D64a
R17–11ND10–24	24VDC	DPDT–NO	250	1.8W	10A	D64a
R17–11ND10–115	115/125 VDC	DPDT–NO	6200	2.5W	10A	D64a
R17–17D10–24	24VDC	4PDT	250	1.8W	10A	D64b
R17–17D10–115	115/125 VDC	4PDT	6200	2.5W	10A	D64b

ACCESSORIES		
MOUNTING STYLES	DESCRIPTION	NTE TYPE NO.
SURFACE MOUNT	12–PIN 14–PIN	R95–180 R95–180A

D64a



D64b



Electrical Specifications

Contact

Contact Rating: See chart
Contact Material: Silver cadmium oxide, gold diffused
Contact Resistance: 0.050 Max. initial

Coil

Coil Voltages: See Chart
Pull–In Voltage (Min): 85% of nominal Coil Vltg. (AC)
80% of nominal Coil Vltg. (DC)
Overvoltage (Max): 110% of nominal Coil Vltg.
Resistance: See chart

Operational Characteristics

Timing Values . . . . . Operate Time: 25 mS Max
Release Time: 20 mS Max

Insulation Characteristics

Dielectric Strength
All Mutually Insulated Points: 1500 VRMS
Insulation: 1/4” over surface, 1/8” thru air

Environmental Characteristics

Rated Operating: –10°C to +60°C

Life

Mechanical: 10 million operations (no load)
Electrical: 100,000 operations (at rated load)

Weight

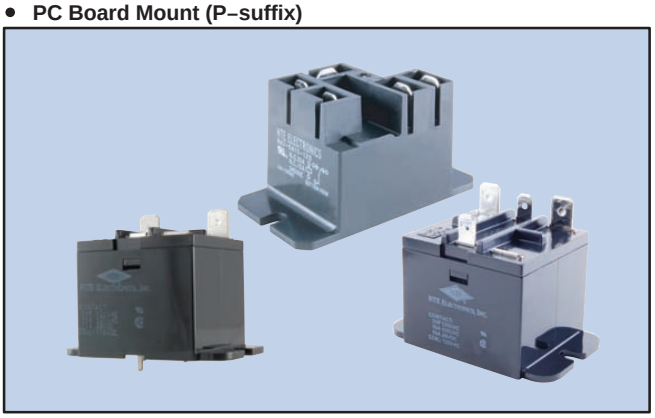
Std: 8.5 oz (241 grams) approx.

General Purpose Relays

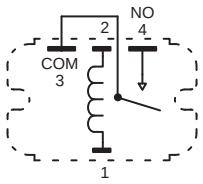
R47 Series

Features

- Miniature Relay Ideal for Switching Motor Load Lamp Load, Heater, etc.
- Creepage Distance of more than .08”
- Upper Mounting Bracket Type for Easy Wiring and Mounting
- .187” (4.75mm) Quick Connect Coil Terminals
- .250” (6.35mm) Quick Connect Terminals for Load
- PC Board Mount (P–suffix)

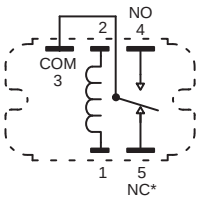


SPST–NO, 1 Form “A”

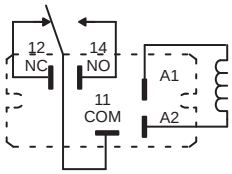


* Pin5 (NC) is missing on all SPST–NO devices.

SPDT, 1 Form “C”



SPDT, 1 Form “C”
R47–5A15–120

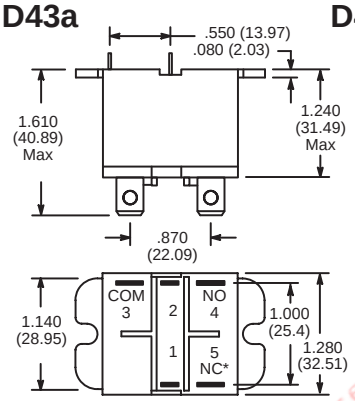


AC OPERATED						
NTE TYPE No.	Nom. Voltage	Contact Arr.	Coil Res. Ohms (Typ)	Approx. Nom. Power	Max. Contact Cur. @ 24VDC or 220VAC	Diag No.
R47–5A15–120	120VAC	SPDT	–	1.6VA	20A/10A *	D43c
R47–5A15–120P	120VAC	SPDT	–	1.6VA	20A/10A *	D43a
DC OPERATED						
R47–1D15–12P	12VDC	SPST–NO	135	1.2W	15A	D43a
R47–1D15–24P	24VDC	SPST–NO	480	1.2W	15A	D43a
R47–1D15–110	110VDC	SPST–NO	12.3K	1.2W	15A	D43b
R47–1D15–110P	110VDC	SPST–NO	12.3K	1.2W	15A	D43a
R47–5D15–110	110VDC	SPDT	12.3K	1.2W	15A	D43b
R47–5D15–110P	110VDC	SPDT	12.3K	1.2W	15A	D43a

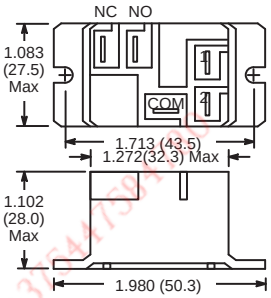
* 250VAC, Resistive, 25°C

General Purpose, 15 Amp, AC & DC, SPST–NO & SPDT Relay for HVAC, Appliance Controls, and Copiers.

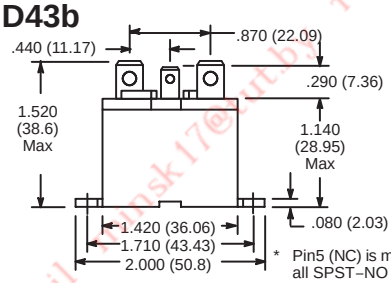
D43a



D43c



D43b



* Pin5 (NC) is missing on all SPST–NO devices.

Electrical Specifications

Contact

Rating: 15 Amp @ 28VDC (resistive load)
15 Amp @ 120VAC (inductive load)
10 Amp @ 240VAC (inductive load)
1HP @ 120VAC
20A/10A, 250VAC (resistive load) **R47–5A15–120 ONLY**
Material: AgCdO
AgSnOlnO **R47–5A15–120 ONLY**
Resistance: 30mΩ (max.)
75mΩ (at 1A at 5VDC or 12VAC) **R47–5A15–120 ONLY**

Coil

Coil Voltages: See Chart
Pick–up Voltages: 80% of nominal Coil Vltg.
Drop–out Voltages: 30% of rated voltage (min.)
Resistance: See Chart

Operational Characteristics

Timing Values: .... **Operate Time:** 20 mS (max.)
.... **Operate Time:** 15 mS (max.) **R47–5A15–120**

Insulation Characteristics

Dielectric Strength: 2000VAC, 50/60Hz for 1 minute
(1000VAC between open contacts)
2500V_{rms} **R47–5A15–120 ONLY**
(1500VAC between open contacts)
Insulation Resistance: 100MΩ min. (at 500VDC)
1MΩ min. **R47–5A15–120 ONLY**

Environmental Characteristics

Operating: –10°C to +55°C

Life

Mechanical: 10,000,000 operations min
5,000,000 operations min **R47–5A15–120 ONLY**

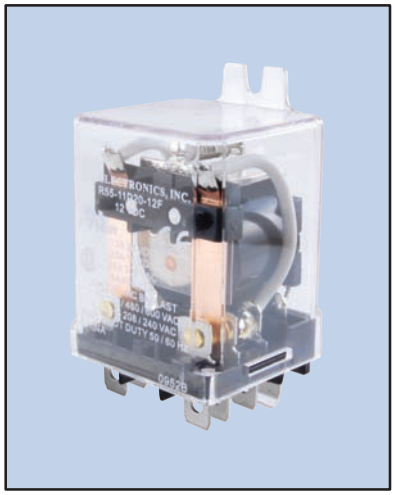
Weight

Std: 1.55 oz (44 grams) approx
1.16 oz (33 grams) approx **R47–5A15–120 ONLY**

R55 Series

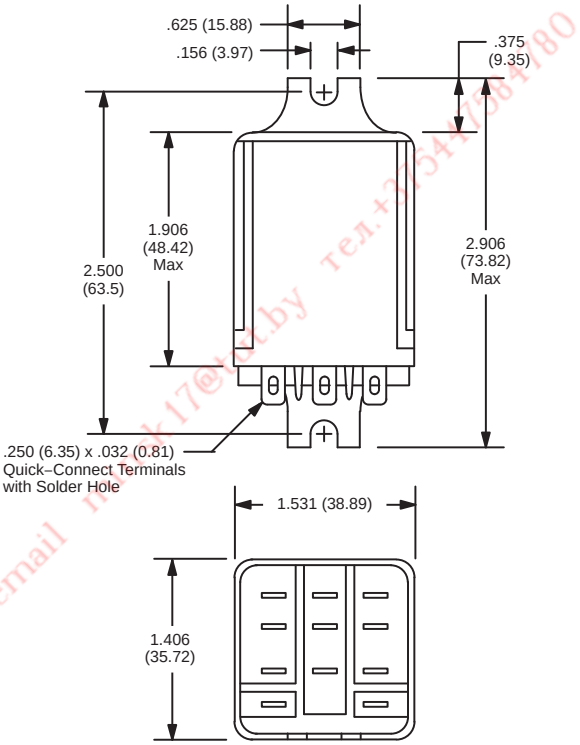
Features

- Clear See–Thru Cover
- Flange Mount
- .250” (6.35mm) Quick Connect Terminals also Suitable for Soldering
- Heavy Duty Contacts

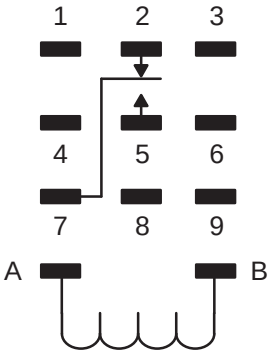


General Purpose, 25 Amp, SPDT & DPDT, AC & DC Relays for Alarm Controls, Vending Machines.

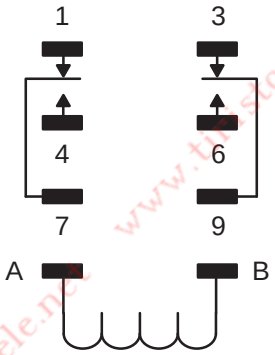
D26



SPDT, 1 Form “C”



DPDT, 2 Form “C”



AC OPERATED						
NTE Type No.	Nom. Volt.	Contact Arr.	Coil Res. Ohms (Typ)	Nom. Power	Max. Contact Cur. @ 28VDC or 300VAC	Diag No.
R55–5A20–24F	24VAC	SPDT	—	3.0VA	25A	D26
R55–5A20–120F	120VAC	SPDT	—	3.0VA	25A	D26
R55–11A20–24F	24VAC	DPDT	—	2.75VA	25A	D26
R55–11A20–120F	120VAC	DPDT	—	2.75VA	25A	D26
R55–11A20–240F	240VAC	DPDT	—	2.75VA	25A	D26
DC OPERATED						
R55–5D20–12F	12VDC	SPDT	120	1.2W	25A	D26
R55–5D20–24F	24VDC	SPDT	472	1.2W	25A	D26
R55–11D20–12F	12VDC	DPDT	100	1.5W	25A	D26
R55–11D20–24F	24VDC	DPDT	400	1.5W	25A	D26

Electrical Specifications

Contact

Rating: 25 Amps, 1 HP @ 120 VAC, 13A @ 28 VDC resistive, 20A @ 15 VDC resistive, 25A @ 300 VAC resistive, 5A @ 600 VAC resistive
Material: Silver cadmium oxide gold flashed 1/4”

Coil

Coil Voltages: See Chart

Insulation Characteristics

Dielectric Strength

Across Open Contacts: 1000 VRMS
Pole To Adjacent Pole: 2200 VRMS
Contacts/Coil To Frame: 1600 VRMS

Environmental Characteristics

Operating: –30°C to +50°C (AC), –30°C to +60°C (DC)
Storage: –30°C to +100°C

Weight

Std: 3.3 oz (94 grams) approx

R04 Series

Features

- Screw Terminals
- Long Life Contacts
- Molded Plastic Barrier Insulation
- Molded Nylon Bobbin Coil

Heavy Duty, 30 Amp, Open Frame Relay designed for Industrial Control, High Inrush Current Applications such as Motor Starting and Incandescent Lamp Loads.

D3

D4

D5

NTE TYPE No.	Nom. Voltage	Contact Arr.	Coil Res. Ohms (Typ)	Nom. Power	Max. Contact Cur. @ 28VDC or 120VAC	Diag No.
AC OPERATED						
R04–3A30–12	12VAC	SPST–NO	—	10VA	30A	D4
R04–3A30–24	24VAC	SPST–NO	—	10VA	30A	D4
R04–3A30–120	120VAC	SPST–NO	—	10VA	30A	D4
R04–3A30–240	240VAC	SPST–NO	—	10VA	30A	D4
R04–5A30–12	12VAC	SPDT	—	10VA	30A	D3
R04–5A30–24	24VAC	SPDT	—	10VA	30A	D3
R04–5A30–110	120VAC	SPDT	—	10VA	30A	D3
R04–5A30–240	240VAC	SPDT	—	10VA	30A	D3
R04–7A30–12	12VAC	DPST–NO	—	10VA	30A	D4
R04–7A30–24	24VAC	DPST–NO	—	10VA	30A	D4
R04–7A30–120	120VAC	DPST–NO	—	10VA	30A	D4
R04–7A30–240	240VAC	DPST–NO	—	10VA	30A	D4
R04–11A30–12	12VAC	DPDT	—	10VA	30A	D5
R04–11A30–24	24VAC	DPDT	—	10VA	30A	D5
R04–11A30–120	120VAC	DPDT	—	10VA	30A	D5
R04–11A30–240	240VAC	DPDT	—	10VA	30A	D5
DC OPERATED						
R04–3D30–12	12VDC	SPST–NO	70	2.0W	30A	D4
R04–3D30–24	24VDC	SPST–NO	290	2.0W	30A	D4
R04–5D30–12	12VDC	SPDT	70	2.0W	30A	D3
R04–5D30–24	24VDC	SPDT	290	2.0W	30A	D3
R04–5D30–110	110VDC	SPDT	6K	2.0W	30A	D3
R04–7D30–12	12VDC	DPST–NO	70	2.0W	30A	D4
R04–7D30–24	24VDC	DPST–NO	290	2.0W	30A	D4
R04–7D30–110	110VDC	DPST–NO	6K	2.0W	30A	D4
R04–11D30–12	12VDC	DPDT	70	2.0W	30A	D5
R04–11D30–24	24VDC	DPDT	290	2.0W	30A	D5
R04–11D30–48	48VDC	DPDT	1200	2.0W	30A	D5
R04–11D30–110	110VDC	DPDT	6K	2.0W	30A	D5

ACCESSORIES

DESCRIPTION	NTE TYPE NO.
DUST COVER, 2–PIECE ENAMELED STEEL ENCLOSURE	RLY9165

Electrical Specifications

Contact

Contact Rating: 30 Amps up to 300VAC 50/60 Hz, 5 Amps @ 480/600VAC, 50/60Hz, 0.75pf (slightly inductive) load. $1^{1}/_{2}$ HP motor load at 120 thru 600VAC 50/60Hz. 30 Amps @ 28VDC, resistive load (each pole). 2 HP motor load at 200 thru 600VAC 50/60Hz when using two poles to switch both sides of load.
Contact Material: Silver cadmium oxide, 5/16" Dia

Coil

Coil Voltages: See Chart
Coil Resistance: See chart
Coil Power: Maximum Coil Dissipation: 4 watts DC
Duty Cycle: Continuous

Operational Characteristics

Timing Values . . . . . Operate Time: 40mS or less
Release Time: 30mS or less

Insulation Characteristics

Dielectric Strength
Across Open Contacts: 1500 VRMS
Between mutually insulated conductive elements: 2200 VRMS

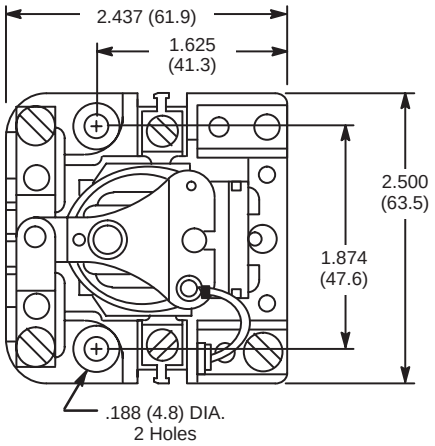
Environmental Characteristics

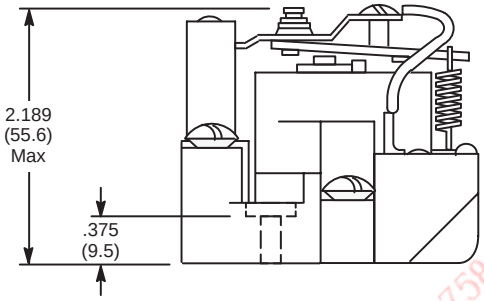
Operating: –30°C to +50°C (AC), –30°C to +60°C (DC)
Non–operating (storage): –30°C to +100°C

Weight

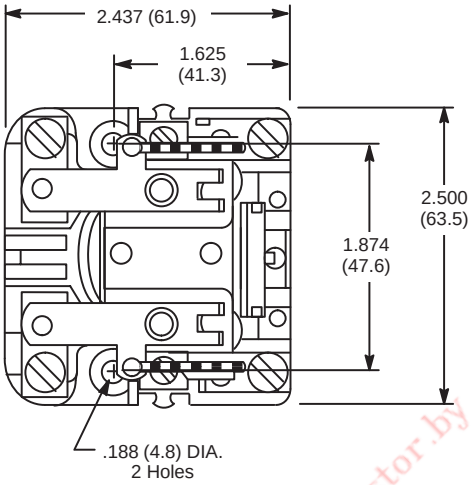
D3 case: 8 ozs (227 grams)—approx
D4 case: 9 ozs (255 grams)—approx
D5 case: 11 ozs (311 grams)—approx

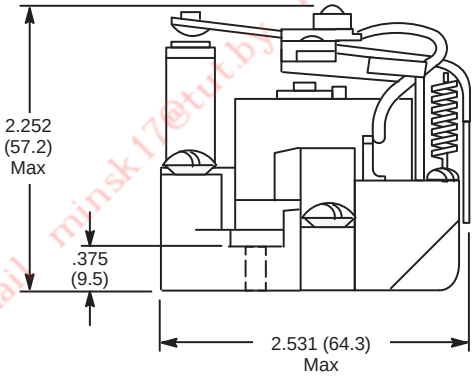
D3



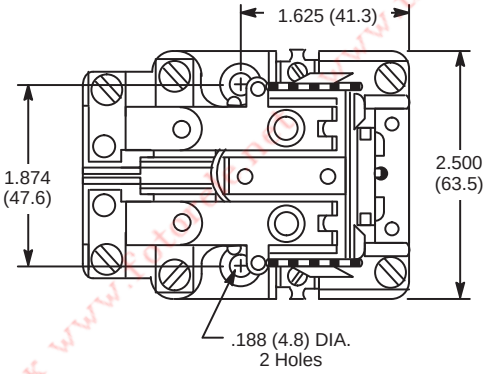


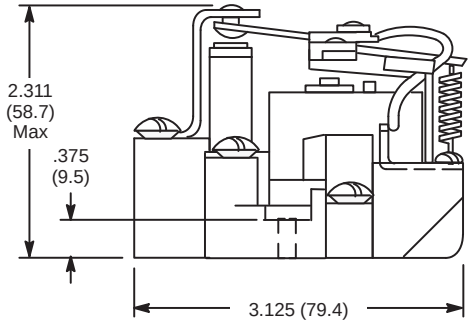
D4



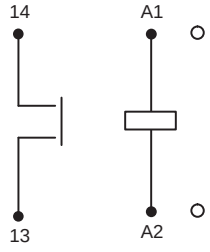


D5

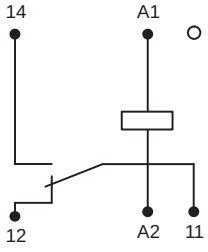




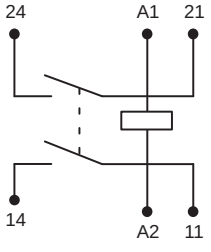
SPST–NO
1 Form “A”



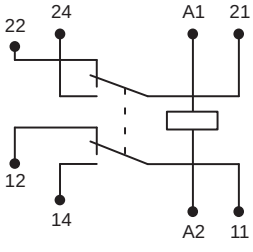
SPDT
1 Form “C”



DPST–NO
2 Form “A”



DPDT
2 Form “C”



R18 Series

Features

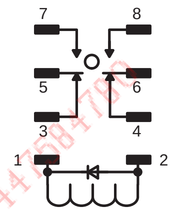
- Rectified Type Coil
- Clear, Tough Polycarbonate Plastic Cover
- Jones Plug Terminals
- Suitable for Domestic Switching of Tungsten Lamp Loads of 1000 Watts @ 120 VAC
- Polarizing Pin

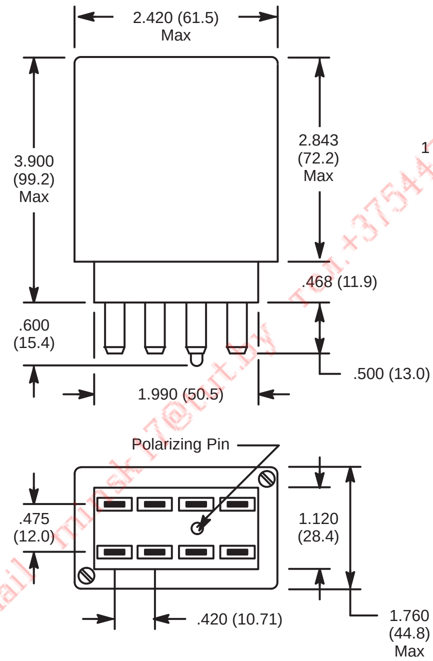
AC OPERATED					
NTE Type No.	Nom. Voltage	Contact Arr.	Nom. Power	Max. Contact Cur. @ 28VDC or 120VAC	Diag No.
R18–11A20–120	120VAC	DPDT	4.0VA	20A	D13

ACCESSORIES		
MOUNTING STYLES	DESCRIPTION	NTE TYPE NO.
PANEL MOUNT	8–PIN JONES PLUG	R95–112

Enclosed Style, 20 Amp AC Power DPDT Relay designed to Switch Tungsten Lamp Loads for the Traffic Control Industry.

D13 **DPDT, 2 Form "C'**





Electrical Specifications

Contact

Ratings: 20 Amp, 28VDC (Resistive)
1 1/2 HP, 120VAC (Motor); 2 HP, 240VAC (Motor)
20 Amp, 120VAC (Tungsten Lamp)
10 Amp, 240VAC (Tungsten Lamp)
Contact Arrangement: DPDT
Contact Material: 3/8" dia Silver alloy

Coil

Coil Voltages: See Chart
Pull–in Voltage: 70% of nominal AC @ 20°C or less
Dropout Voltage: 10% of nominal voltage or more
Power: 4.0 VA nominal

Insulation Characteristics

Dielectric Strength
Across Open Contacts: 500 VRMS
Contact To Coil: 1500 VRMS
Contact to Frame: 1500 VRMS

Environmental Characteristics

Operating: –40°C to +84°C

Life Expectancy

Mechanical: 5 million operations min (No Load)
Electrical: 200,000 operations min. @ 20 Amps Tungsten, 120VAC

Weight

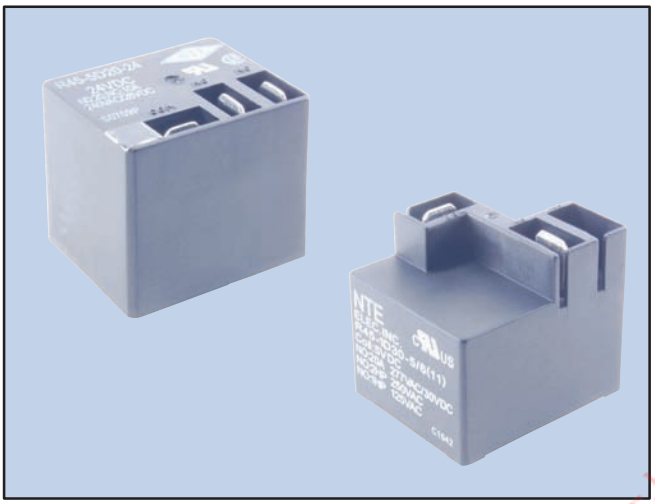
Std: 7.2 ozs. (204.7 grams) approx.

R45 Series

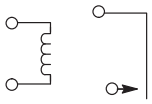
Industrial, Printed Circuit Mount, SPST and SPDT, 20 Amp and 30 Amp Relays for use in Machinery, Major Appliances, and Air Conditioning Controls.

Features

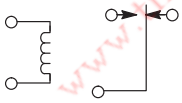
- .250" (6.35mm) Quick–Connect Terminals on Top
- .187" (4.70mm) Quick–Connect Terminals for Coil Diagram D42b only
- Printed Circuit Terminals on Bottom
- Flange Mount (F–suffix)
- Rugged, Miniature Construction
- Single–Pole Switching
- Epoxy Sealed



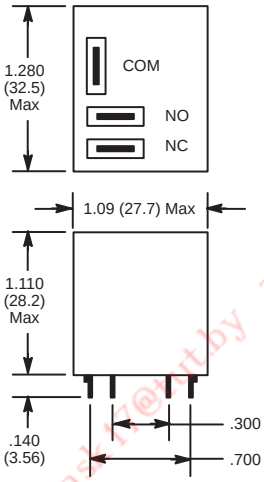
SPST–NO, 1 Form "A"



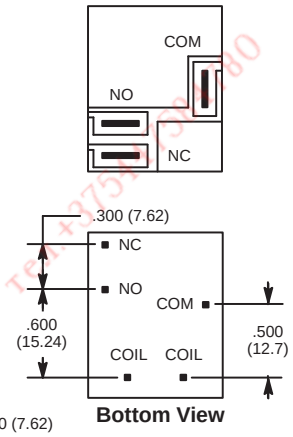
SPDT, 1 Form "C"



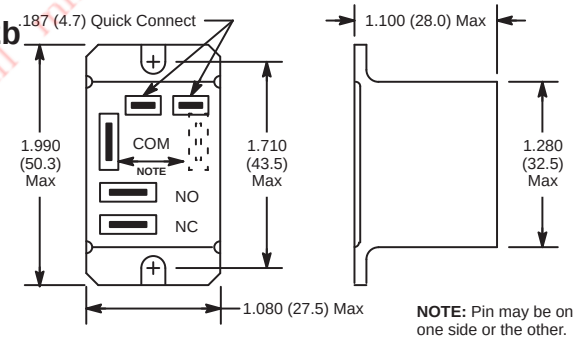
D42a



D42a (alt)



D42b



NOTE: Pin may be on one side or the other.

DC OPERATED						
NTE Type No.	Nom. Volt.	Contact Arr.	Coil Res. Ohms (Typ)	Nom. Power	Max. Contact Current @ 28VDC 240VAC	Diag No.
R45–1D30–5/6	5VDC	SPST–NO	28	900mW	30A	D42a
R45–1D30–5/6F	5VDC	SPST–NO	28	900mW	30A	D42b
R45–1D30–12	12VDC	SPST–NO	155	900mW	30A	D42a
R45–1D30–12F	12VDC	SPST–NO	155	900mW	30A	D42b
R45–1D30–24	24VDC	SPST–NO	660	900mW	30A	D42a
R45–1D30–24F	24VDC	SPST–NO	660	900mW	30A	D42b
R45–5D20–5/6	5VDC	SPDT	28	600mW	20A	D42a
R45–5D20–5/6F	5VDC	SPDT	28	600mW	20A	D42b
R45–5D20–12	12VDC	SPDT	155	600mW	20A	D42a
R45–5D20–12F	12VDC	SPDT	155	600mW	20A	D42b
R45–5D20–24	24VDC	SPDT	660	600mW	20A	D42a
R45–5D20–24F	24VDC	SPDT	660	600mW	20A	D42b

Electrical Specifications

Contact

Rating: 1 Form A (SPST–NO), 30 Amps at 240VAC/28VDC
1 Form C (SPDT), 20 Amps at 240VAC/28VDC
Resistance: See Chart

Coil

Coil Voltages: See Chart
Pick–up Voltage: 75% of Nom.
Drop–out Voltage: 10% of Nom.

Operational Characteristics

Timing Values . . . . . Operate Time: 15mS
Release Time: 20mS

Insulation Characteristics

Dielectric Strength (Initial)
Contact to Contact: 1500VAC/1 minute
Coil To Contact: 1500VAC/1 minute

Environmental Characteristics

Operating: –55°C to +85°C
Storage: –55°C to +125°C

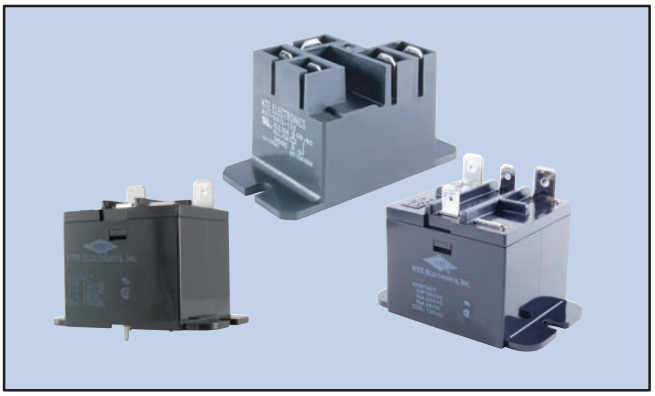
Life

Electrical: 100,000 operations min.
Mechanical: 10,000,000 operations min.

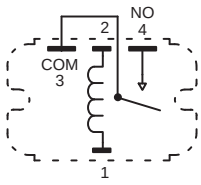
R47 Series

Features

- Miniature Relay Ideal for Switching Motor Load Lamp Load, Heater, etc.
- Creepage Distance of more than .08”
- Upper Mounting Bracket Type for Easy Wiring and Mounting
- .187” (4.75mm) Quick Connect Coil Terminals
- .250” (6.35mm) Quick Connect Terminals for Load
- PC Board Mount (P–suffix)

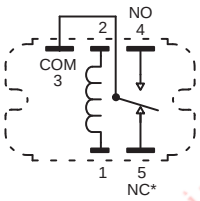


SPST–NO, 1 Form “A”

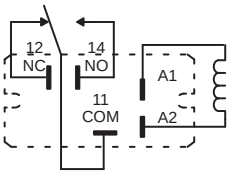


* Pin5 (NC) is missing on all SPST–NO devices.

SPDT, 1 Form “C”



SPDT, 1 Form “C”
R47–5A15–120

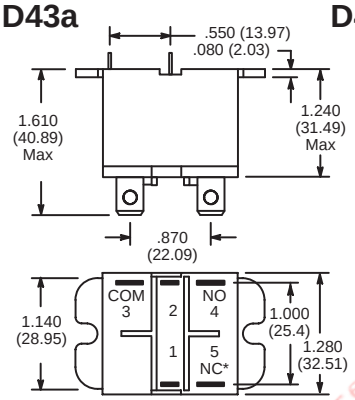


AC OPERATED						
NTE TYPE No.	Nom. Voltage	Contact Arr.	Coil Res. Ohms (Typ)	Approx. Nom. Power	Max. Contact Cur. @ 24VDC or 220VAC	Diag No.
R47–5A15–120	120VAC	SPDT	–	1.6VA	20A/10A *	D43c
R47–5A15–120P	120VAC	SPDT	–	1.6VA	20A/10A *	D43a
DC OPERATED						
R47–1D15–12P	12VDC	SPST–NO	135	1.2W	15A	D43a
R47–1D15–24P	24VDC	SPST–NO	480	1.2W	15A	D43a
R47–1D15–110	110VDC	SPST–NO	12.3K	1.2W	15A	D43b
R47–1D15–110P	110VDC	SPST–NO	12.3K	1.2W	15A	D43a
R47–5D15–110	110VDC	SPDT	12.3K	1.2W	15A	D43b
R47–5D15–110P	110VDC	SPDT	12.3K	1.2W	15A	D43a

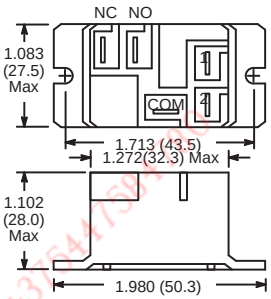
* 250VAC, Resistive, 25°C

General Purpose, 15 Amp, AC & DC, SPST–NO & SPDT Relay for HVAC, Appliance Controls, and Copiers.

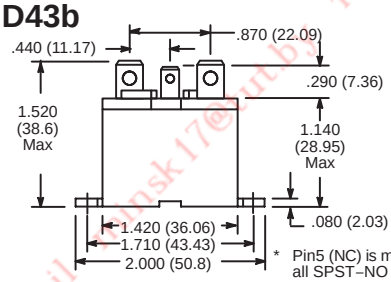
D43a



D43c



D43b



* Pin5 (NC) is missing on all SPST–NO devices.

Electrical Specifications

Contact

Rating: 15 Amp @ 28VDC (resistive load)
15 Amp @ 120VAC (inductive load)
10 Amp @ 240VAC (inductive load)
1HP @ 120VAC
20A/10A, 250VAC (resistive load) **R47–5A15–120 ONLY**

Material: AgCdO
AgSnOInO **R47–5A15–120 ONLY**

Resistance: 30mΩ (max.)
75mΩ (at 1A at 5VDC or 12VAC) **R47–5A15–120 ONLY**

Coil

Coil Voltages: See Chart
Pick–up Voltages: 80% of nominal Coil Vltg.
Drop–out Voltages: 30% of rated voltage (min.)
Resistance: See Chart

Operational Characteristics

Timing Values: .... **Operate Time:** 20 mS (max.)
.... **Operate Time:** 15 mS (max.) **R47–5A15–120**

Insulation Characteristics

Dielectric Strength: 2000VAC, 50/60Hz for 1 minute
(1000VAC between open contacts)
2500V_{rms} **R47–5A15–120 ONLY**
(1500VAC between open contacts)

Insulation Resistance: 100MΩ min. (at 500VDC)
1MΩ min. **R47–5A15–120 ONLY**

Environmental Characteristics

Operating: –10°C to +55°C

Life

Mechanical: 10,000,000 operations min
5,000,000 operations min **R47–5A15–120 ONLY**

Weight

Std: 1.55 oz (44 grams) approx
1.16 oz (33 grams) approx **R47–5A15–120 ONLY**

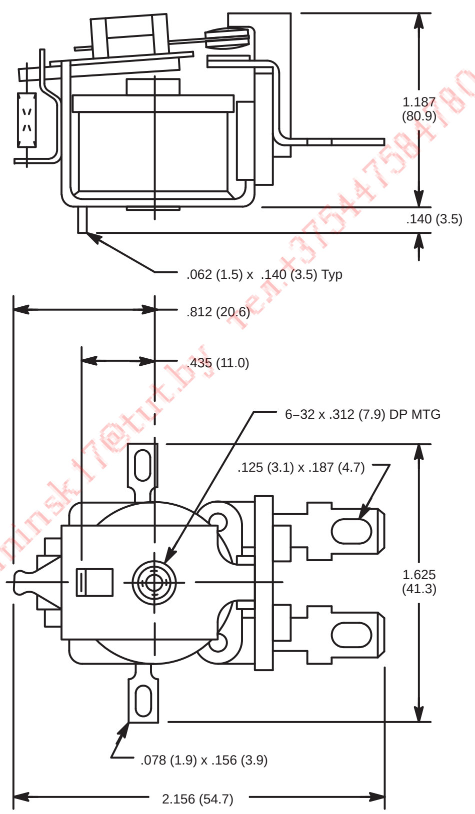
R54 Series

Features

- Industry Standard Package
- Quick Connect and/or Solder Terminals
- 6–32 THD Mounting Hole + Locating Pin
- Long Life Hinge Pin Armature

Heavy Duty 30 Amp, SPST–NO–DM AC & DC Relays for Small Motor Controls, Industrial Controls.

D25



NTE Type No.	Nom. Volt.	Contact Arr.	Coil Res. Ohms (Typ)	Nom. Power	Max. Contact Cur. @ 28VDC or 120VAC	Diag No.
AC OPERATED						
R54–3A30–24	24VAC	SPST–NO DM	—	3VA	30A	D25
R54–3A30–120	120VAC	SPST–NO DM	—	3VA	30A	D25
R54–3A30–240	240VAC	SPST–NO DM	—	3VA	30A	D25
DC OPERATED						
R54–3D30–12	12VDC	SPST–NO DM	100	1.5W	30A	D25
R54–3D30–24	24VDC	SPST–NO DM	400	1.5W	30A	D25
R54–3D30–110	110VDC	SPST–NO DM	8000	1.5W	30A	D25

Electrical Specifications

Contact

Rating: 30 Amps up to 300 VAC or 28 VDC resistive load, 5 Amps @ 600 VAC resistive. 1 HP at 120 thru 600 VAC motor load. 10 Amps at 120 VAC tungsten load.
Material: Silver cadmium oxide gold flashed 1/4” dia.

Coil

Coil Voltages: See Chart
Resistance: DC coil resistance to 40,000 ohms
Duty Cycle: Continuous

Operational Characteristics

Timing Value: . . . . . **Operate Time** 18 mS max
Release Time 30 mS max

Insulation Characteristics

Dielectric Strength: 1000 VAC RMS between open contacts
3000 VAC RMS between all other mutually insulated conductive materials

Environmental Characteristics

Operating: –30°C to +50°C (AC), –30°C to +65°C (DC)

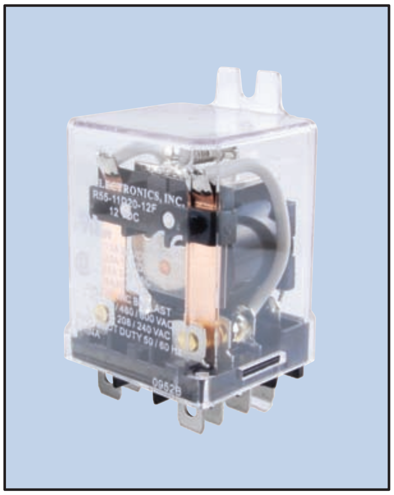
Weight

Std: 3 oz (85 grams)

R55 Series

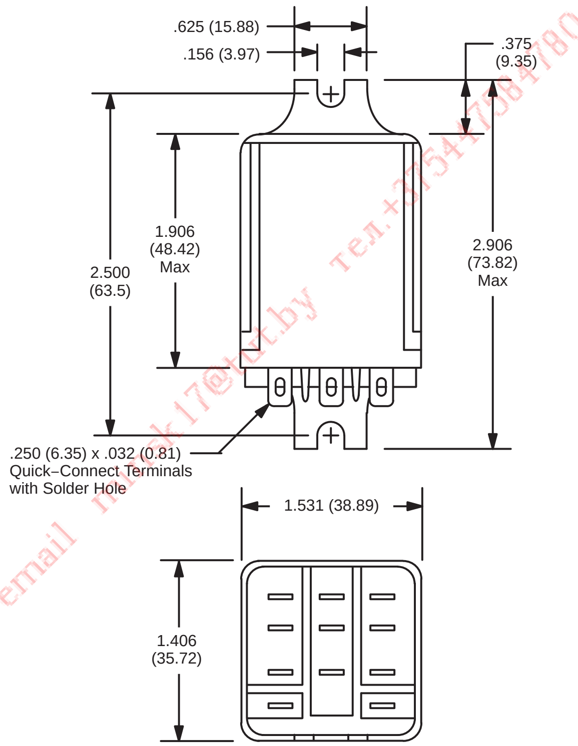
Features

- Clear See–Thru Cover
- Flange Mount
- .250” (6.35mm) Quick Connect Terminals also Suitable for Soldering
- Heavy Duty Contacts

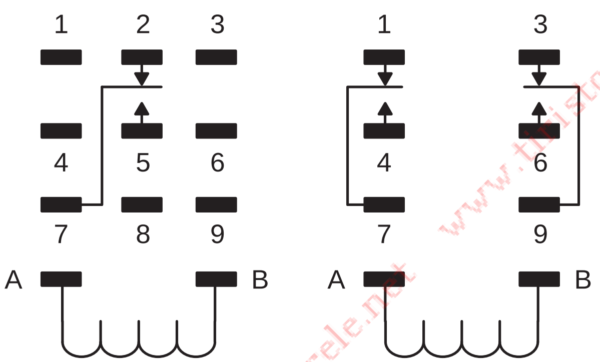


General Purpose, 25 Amp, SPDT & DPDT, AC & DC Relays for Alarm Controls, Vending Machines.

D26



SPDT, 1 Form “C” DPDT, 2 Form “C”



AC OPERATED						
NTE Type No.	Nom. Volt.	Contact Arr.	Coil Res. Ohms (Typ)	Nom. Power	Max. Contact Cur. @ 28VDC or 300VAC	Diag No.
R55–5A20–24F	24VAC	SPDT	—	3.0VA	25A	D26
R55–5A20–120F	120VAC	SPDT	—	3.0VA	25A	D26
R55–11A20–24F	24VAC	DPDT	—	2.75VA	25A	D26
R55–11A20–120F	120VAC	DPDT	—	2.75VA	25A	D26
R55–11A20–240F	240VAC	DPDT	—	2.75VA	25A	D26
DC OPERATED						
R55–5D20–12F	12VDC	SPDT	120	1.2W	25A	D26
R55–5D20–24F	24VDC	SPDT	472	1.2W	25A	D26
R55–11D20–12F	12VDC	DPDT	100	1.5W	25A	D26
R55–11D20–24F	24VDC	DPDT	400	1.5W	25A	D26

Electrical Specifications

Contact

Rating: 25 Amps, 1 HP @ 120 VAC, 13A @ 28 VDC resistive, 20A @ 15 VDC resistive, 25A @ 300 VAC resistive, 5A @ 600 VAC resistive
Material: Silver cadmium oxide gold flashed 1/4”

Coil

Coil Voltages: See Chart

Insulation Characteristics

Dielectric Strength

Across Open Contacts: 1000 VRMS
Pole To Adjacent Pole: 2200 VRMS
Contacts/Coil To Frame: 1600 VRMS

Environmental Characteristics

Operating: –30°C to +50°C (AC), –30°C to +60°C (DC)
Storage: –30°C to +100°C

Weight

Std: 3.3 oz (94 grams) approx

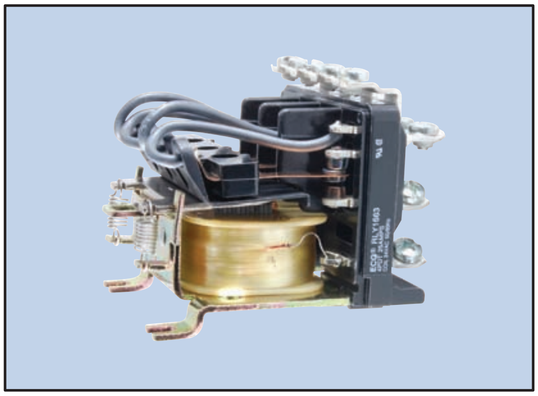
RLY16/17 Series

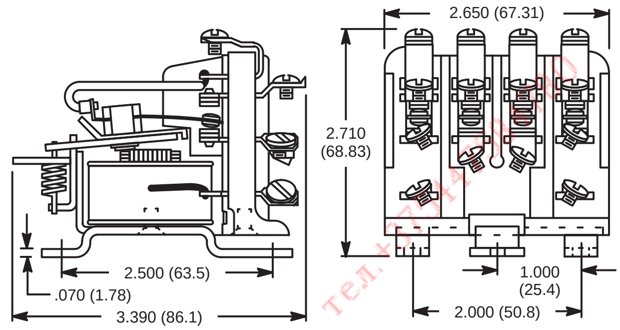
Heavy Duty, Open Frame, 25 Amp, 4PDT, AC & DC Power Relays.

D76

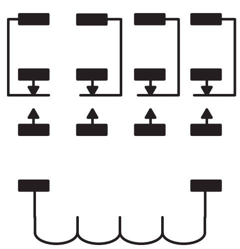
Features

- Single or Polyphase Service
- Buzz–Free, Shaded AC Coil
- High Dielectric Strength
- Arc–Over Barrier Between Each Contact





4PDT, 4 Form "C"



AC OPERATED						
NTE Type No.	Nom. Volt.	Contact Arr.	Coil Res. Ohms (Typ)	Approx. Nom. Power	Max. Contact Cur. @ 277VAC	Diag No.
RLY1663	24VAC	4PDT	5	14 VA	25A	D76
RLY1665	120VAC	4PDT	120	14 VA	25A	D76
RLY1666	240VAC	4PDT	600	14 VA	25A	D76
DC OPERATED						
RLY1762	12VDC	4PDT	30	4.4W	25A	D76
RLY1763	24VDC	4PDT	130	4.4W	25A	D76

ACCESSORIES			
STYLES	DESCRIPTION	CONTACT ARR.	NTE TYPE NO.
DUST COVER	PLASTIC	4PDT	RLY9166

Electrical Specifications

Contact

Rating: 25 Amp @ 277 VAC max, 10 Amp @ 28 VDC
1 HP @ 120/240 VAC, Single Phase
Material: Silver–cadmium oxide
Resistance: 100m Max

Coil

Coil Voltages: See Chart
Duty Cycle: Continuous
Resistance: See Chart

Operational Characteristics

Must Operate Voltage
AC Coil: 85% of nominal voltage @ +25°C
DC Coil: 75% of nominal voltage @ +25°C
Timing Value: . . . Operate Time: 25 mS max
Release Time: 25 mS max

Insulation Characteristics

Dielectric Strength
Between All Elements and GND: 2000Vrms Min.
Insulation Resistance: 1000MΩ Min.

Environmental Characteristics

Operating
AC: –55°C to +45°C @ nominal coil power
DC: –55°C to +55°C @ nominal coil power

Life

Mechanical: 10,000,000 operations (under rated load)
Electrical: 100,000 operations (under rated load)

Mounting

Std: One front key–hole and two rear channel slots for #8–32 screws

Weight

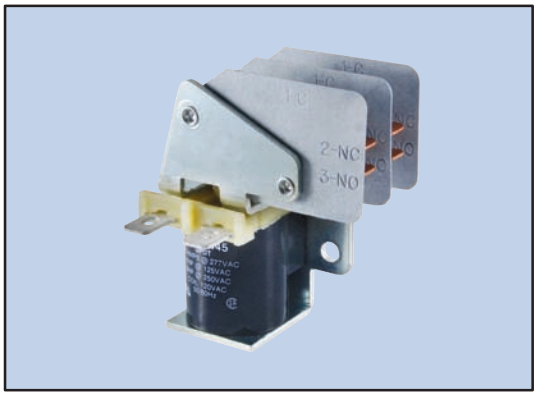
Std: 14 oz (397 grams) approx.

RLY74/75 Series

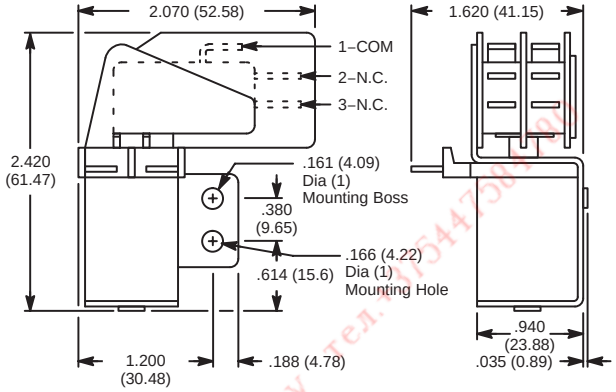
Industrial SPDT and DPDT, 20 Amp Power Relays.

Features

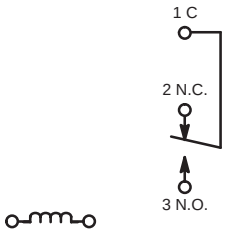
- Rated for Locked Rotor Applications
- Heavy Duty
- Multicontact
- .250” (6.35mm) Quick Connect Terminals



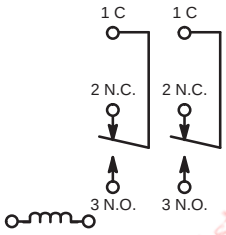
D71



SPDT, 1 Form “C”



DPDT, 2 Form “C”



AC OPERATED						
NTE Type No.	Nom. Volt.	Contact Arr.	Coil Res. Ohms (Typ)	Approx. Nom. Power	Max. Contact Cur. @ 28VDC 277VAC	Diag No.
RLY7423	24VAC	SPDT	35	4 VA	20A	D71
RLY7425	120VAC	SPDT	800	4 VA	20A	D71
RLY7443	24VAC	DPDT	35	4 VA	20A	D71
RLY7446	240VAC	DPDT	3200	4 VA	20A	D71
DC OPERATED						
RLY7522	12VDC	SPDT	50	3.0W	20A	D71
RLY7523	24VDC	SPDT	200	3.0W	20A	D71
RLY7543	24VDC	DPDT	130	4.5W	20A	D71

Note 1. Relay is designed for operation with plunger either vertical or horizontal; however, the relay **is not** designed for operation in an upside–down position.

Electrical Specifications

Contact

Rating: 20 Amp @ 277 VAC
60 LRA, 12 FLA @ 125 VAC
48 LRA, 8 FLA @ 240 VAC
Pilot Duty: 360 VAC @ 125/250 VAC
Contact Horsepower Rating: 1 HP @ 125 VAC, 2 HP @ 250 VAC
Material: Silver and silver–cadmium oxide

Coil

Coil Voltages: See Chart
Resistance: See Chart

Operational Characteristics

Must Operate Voltage
AC Coil: 85% of nominal voltage @ +25°C
DC Coil: 75% of nominal voltage @ +25°C

Insulation Characteristics

Dielectric Strength
Initial Breakdown Voltage: 1560V RMS, 60Hz
Insulation Resistance: Class B (130°C)

Environmental Characteristics

Operating: –10°C to +65°C

Life

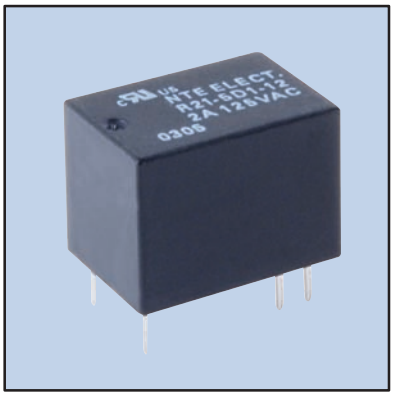
Mechanical: 1 million operations/hour
Electrical: 50,000 operations/hour (under rated load)

R21 Series

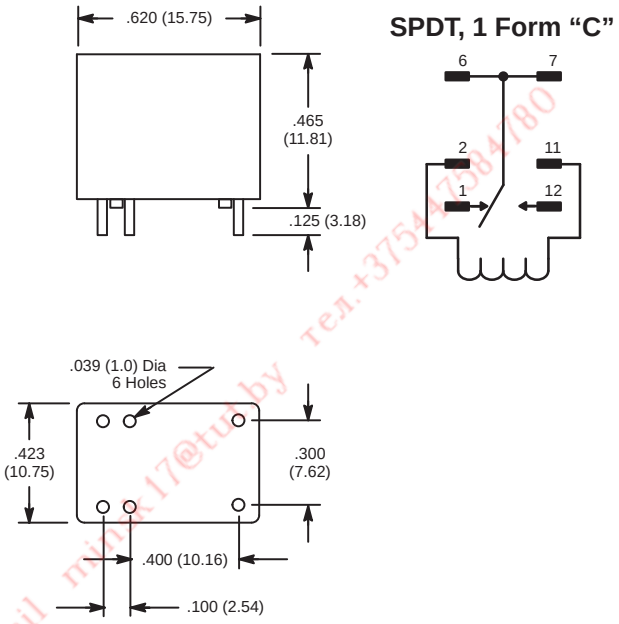
Subminiature, 1 Amp & 2 Amp, SPDT, DC Power, Printed Circuit Mount Relays

Features

- Subminiature Size for High Density Packaging
- Epoxy Sealed
- Class B Insulation



D81



DC OPERATED						
NTE Type No.	Nom. Voltage	Contact Arr.	Coil Res. Ohms (Typ)	Nom. Power	Max. Contact Cur. @ 30VDC or 125VAC	Diag No.
R21–5D1–12	12VDC	SPDT	700	200mW	1A	D81
R21–5D1–24	24VDC	SPDT	2800	200mW	1A	D81
R21–5D2–5/6	6VDC	SPDT	100	360mW	2A	D81
R21–5D2–12	12VDC	SPDT	400	360mW	2A	D81
R21–5D2–24	24VDC	SPDT	1600	360mW	2A	D81

Electrical Specifications

Contact

Rating: See chart
Contact Material: Silver nickel, gold plated
Contact Resistance: 0.1 Ohms Max. initial

Coil

Coil Voltages: See Chart
Drop–out Voltage: Greater than 10% of nominal coil voltage
Resistance: See Chart

Operational Characteristics

Timing Value . . . . . Operate Time: Approx 5 mS
Release Time: Approx 1 mS
} at nominal coil voltage

Insulation Characteristics

Dielectric Strength

Contact To Coil: 1250 VRMS
Across Open Contacts: 750 VRMS
Insulation Resistance: 100 megohms Min. @ 500 VDC

Environmental Characteristics

Operating: –25°C to +95°C (1A Type)
–25°C to +85°C (2A Type)
Mechanical Life: 100,000,000 operations min

Weight

Std: 3.5 gram approx.

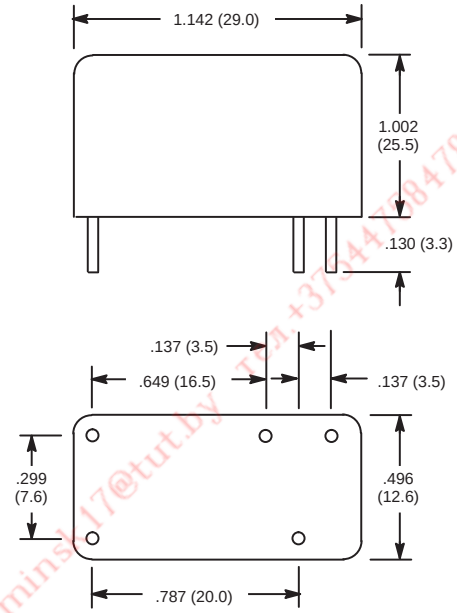
R22 Series

Slimline 16 Amp SPST–NO & SPDT Relays Designed for use in TVs, Door Openers, & Security Systems.

Features

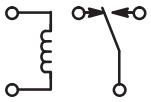
- Sealed Construction
- Long Life
- Small Size
- Low Coil Power
- PC Board Mount
- TV–5 Type Power Relay

D51



SPST–NO, 1 Form "A"

SPDT, 1 Form "C"



DC OPERATED						
NTE Type No.	Nom. Voltage	Contact Arr.	Coil Res. Ohms (Typ)	Nom. Power	Max. Contact Make Cur. @ 30VDC or 120VAC (Note 1)	Diag No.
R22–1D16–3	3VDC	SPST–NO	12.5	720mW	16A	D51
R22–1D16–5/6	5/6VDC	SPST–NO	47	540mW	16A	D51
R22–1D16–12	12VDC	SPST–NO	270	540mW	16A	D51
R22–1D16–24	24VDC	SPST–NO	1100	540mW	16A	D51
R22–1D16–48	48VDC	SPST–NO	4400	540mW	16A	D51
R22–5D16–3	3VDC	SPDT	12.5	720mW	16A	D51
R22–5D16–5/6	5/6VDC	SPDT	47	540mW	16A	D51
R22–5D16–12	12VDC	SPDT	270	540mW	16A	D51
R22–5D16–24	24VDC	SPDT	1100	540mW	16A	D51
R22–5D16–48	48VDC	SPDT	4400	540mW	16A	D51

Note 1. The maximum contact make current is defined as the maximum permitted current for 4 seconds duration with 10% duty cycle immediately after contact closure.

ACCESSORIES		
MOUNTING STYLES	DESCRIPTION	NTE TYPE NO.
PC MOUNT	5–PIN SLIM LINE	R95–133
DIN RAIL MOUNT	5–PIN SLIM LINE	R95–130

Electrical Specifications

Contact

Rating: 12 Amp (Continuous, Note 2) @ 250 VAC
Contact Material: AgCdo
Contact Resistance: 100M Max.

Note 2. Continuous contact current is defined as the maximum current a relay contact may carry continuously without exceeding temperature limits.

Coil

Coil Voltages: See Chart
Pick–up Voltage: 80% of rated voltage
Drop–out Voltage: 5% of rated voltage
Max Allowable Voltage: 110% of rated voltage

Operational Characteristics

Timing Value . . . . . Operate Time: 30 mS Max
Release Time: 8 mS Max

Insulation Characteristics

Dielectric Strength
Contact To Coil: 500 VRMS (1 Min)
Across Open Contacts: 1000 VRMS (1 Min)
Insulation Resistance: 100 MΩ Min. @ 500 VDC

Environmental Characteristics

Operating: –30°C to +70°C
Mechanical Life: 10,000,000 operations min

Weight

Std: 13 gram approx.

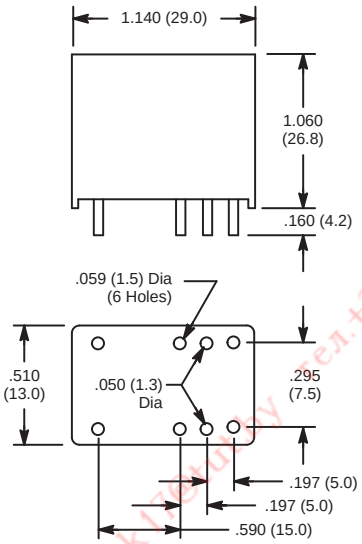
R23 Series

Miniature, 20 Amp, SPDT, DC Power, Printed Circuit Mount Relays

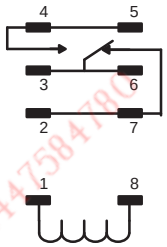
Features

- Low Cost
- Epoxy Sealed
- Class B Insulation

D82



SPDT, 1 Form "C"



Terminal No.	Dimensions (Tol.: 0.005 (0.13)
1, 2, 4, 5, 7, 8	0.018 (0.457) x 0.038 (0.965)
3, 6	0.011 (0.279) x 0.038 (0.965)

Electrical Specifications

Contact

Rating: 20 Amp @ 277 VAC/24 VDC, 1 HP @ 240 VAC
Contact Material: Silver cadmium oxide
Contact Resistance: 50 Milliohms Max. initial

Coil

Coil Voltages: See Chart
Drop–out Voltage: Greater than 10% of nominal coil voltage
Resistance: See Chart

Operational Characteristics

Timing Value . . . . . Operate Time: Approx 8 mS
Release Time: Approx 5 mS
} at nominal coil voltage

Insulation Characteristics

Dielectric Strength
Contact To Coil: 5000 VRMS
Across Open Contacts: 1000 VRMS
Insulation Resistance: 100 megohms Min. @ 500 VDC, 50% RH

Environmental Characteristics

Operating: –40°C to +90°C
Mechanical Life: 50,000,000 operations min

Weight

Std: 18.5 gram approx.

DC OPERATED

NTE Type No.	Nom. Voltage	Contact Arr.	Coil Res. Ohms (Typ)	Nom. Power	Max. Contact Cur. @ 24VDC or 277VAC	Diag No.
R23–5D20–6	6VDC	SPDT	69	270mW	20A	D82
R23–5D20–12	12VDC	SPDT	275	270mW	20A	D82
R23–5D20–24	24VDC	SPDT	1100	270mW	20A	D82

ACCESSORIES

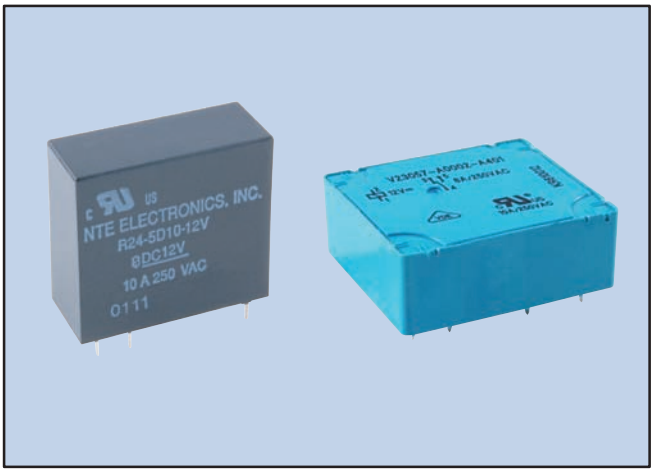
MOUNTING STYLES	DESCRIPTION	NTE TYPE NO.
PC MOUNT	8–PIN BLADE	R95–132

R24 Series

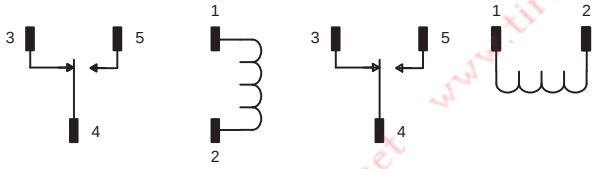
8 Amp & 10 Amp, SPDT Epoxy Sealed Power Relay.

Features

- Epoxy Sealed for Wave Soldering & Cleaning
- Upright (V Suffix) or Flat–Pack (FP Suffix) Types
- High Dielectric – 4000 VRMS between Control and Switching Circuits
- Cut–Off Nib after PCB Washing
- 94 V–0 Enclosure

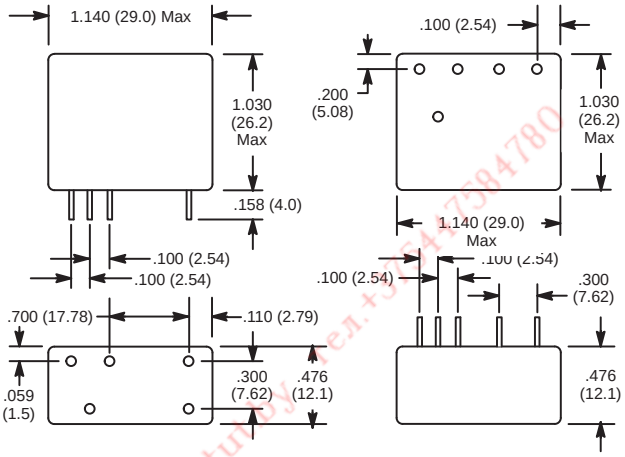


SPDT, 1 Form "C"



DC OPERATED						
NTE Type No.	Nom. Voltage	Contact Arr.	Coil Res. Ohms (Typ)	Nom. Power	Max. Contact Cur. @ 28VDC or 120VAC	Diag No.
R24–5D10–6V	6VDC	SPDT	58	600mW	10A	D15a
R24–5D10–6FP	5/6VDC	SPDT	80	600mW	8A	D15b
R24–5D10–12V	12VDC	SPDT	215	600mW	10A	D15a
R24–5D10–12FP	12VDC	SPDT	330	600mW	8A	D15b
R24–5D10–24V	24VDC	SPDT	740	600mW	10A	D15a
R24–5D10–24FP	24VDC	SPDT	1200	600mW	8A	D15b

D15a **D15b**



Cut–off nib after PCB washing to extend contact life and lower operating temperature.

Electrical Specifications

Contact

Rating Resistive Load:
10 Amp @ 380 VAC max switching (Upright)
8 Amp @ 250 VAC max switching (Flat–Pack)
Contact Material: Silver Cadmium Oxide (Upright)
Silver, Gold Flashed (Flat–Pack)
Contact Resistance: .03 Ohms Max. initial (Upright)
.05 Ohms Max. initial (Flat–Pack)

Coil

Coil Voltages: See Chart
Pick–up Voltage: 80% of nom voltage or less @ 25°C
Drop–out Voltage: 10% of actual pull–in (min)
Resistance: See chart
Min Sensitivity: 400 mW
Nominal Power: 600 mW

Operational Characteristics

Timing Values . . . . . Operate Time: Approx 6 mS (Upright)
Approx 15 mS (Flat–Pack)
Release Time: Approx 2 mS (Upright)
Approx 10 mS (Flat–Pack)
Max Switching Rate: 5 operations per second

Insulation Characteristics

Dielectric Strength
Contact To Coil: 4000 VRMS
Across Open Contacts: 1000 VRMS

Resistance:

Contact to Coil/Frame: 1000 megohms min.
Across Open Contacts: 500 Megohms min.
Coil To Frame: 1000 megohms Min.

Environmental Characteristics

Operating: –55°C to +70°C
Mechanical Life: 5 x 10^6 operations min

Weight

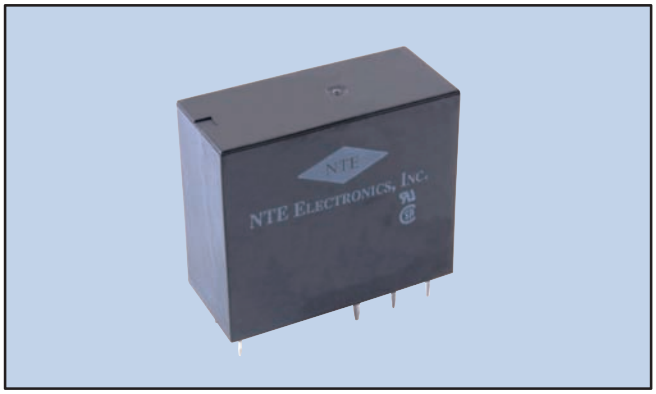
Std: 15 gram approx.

PC Mount Relays

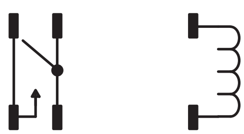
R25 Series

Features

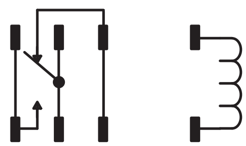
- Epoxy Sealed for Wave Soldering & Cleaning
- Upright Package Type
- Suitable for 5mm Grid Pattern
- Immersion Proof



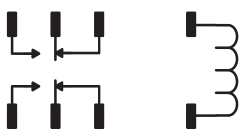
SPST–NO, 1 Form "A"



SPDT, 1 Form "C"



DPDT, 2 Form "C"



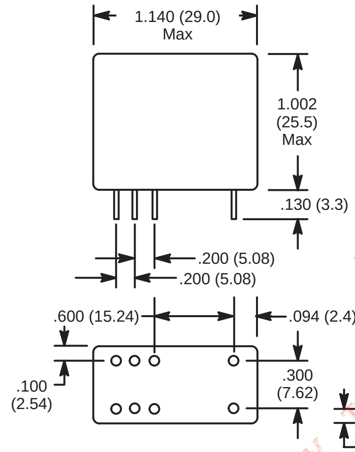
NTE Type No.	Nom. Voltage	Contact Arr.	Coil Res. Ohms (Typ)	Nom. Power	Max. Contact Cur. @ 28VDC or 120VAC	Diag No.
AC OPERATED						
R25–5A16–24	24VAC	SPDT	280	–	16A	D39a
R25–5A16–120	120VAC	SPDT	5600	–	16A	D39a
R25–11A10–24	24VAC	DPDT	280	–	10A	D39a
R25–11A10–120	120VAC	DPDT	5600	–	10A	D39a
DC OPERATED						
R25–1D16–5/6	5/6VDC	SPST–NO	68	500mW	16A	D39b
R25–1D16–12	12VDC	SPST–NO	270	500mW	16A	D39b
R25–1D16–24	24VDC	SPST–NO	1100	500mW	16A	D39b
R25–1D16–48	48VDC	SPST–NO	4200	500mW	16A	D39b
R25–5D16–5/6	5/6VDC	SPDT	68	500mW	16A	D39a
R25–5D16–12	12VDC	SPDT	270	500mW	16A	D39a
R25–5D16–24	24VDC	SPDT	1100	500mW	16A	D39a
R25–5D16–48	48VDC	SPDT	4200	500mW	16A	D39a
R25–11D10–5/6	5/6VDC	DPDT	68	500mW	10A	D39a
R25–11D10–12	12VDC	DPDT	270	500mW	10A	D39a
R25–11D10–24	24VDC	DPDT	1440	400mW	8A	D83b
R25–11D10–48	48VDC	DPDT	4200	500mW	10A	D39a

ACCESSORIES

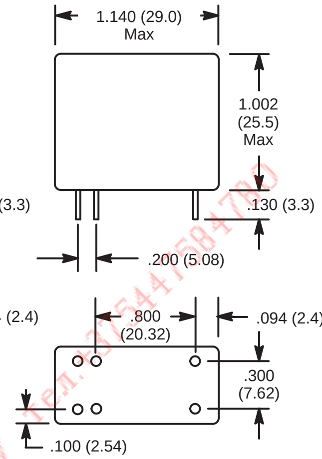
MOUNTING STYLES	DESCRIPTION	NTE TYPE NO.
PC MOUNT	8–PIN	R95–132
DIN RAIL MOUNT	8–PIN	R95–131

8 Amp, 10 Amp & 16 Amp PC Mountable Relays.

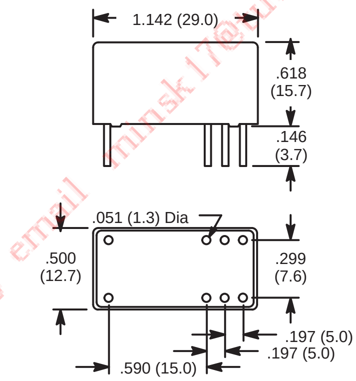
D39a



D39b



D83b



Electrical Specifications

Contact

Rating Resistive Load: 16 Amp @ 250/440 VAC, 10 Amp @ 250/440 VAC, 8 Amp @ 240VAC **
Contact Material: Silver Alloy, AgNi **
Contact Resistance: 100m Max Initial

Coil

Coil Voltages: See Chart
Pick–up Voltage: 80% of rated voltage
Drop–out Voltage: 10% of rated voltage, 15% of rated voltage **
Resistance: See chart
Nominal Power: See Chart

Operational Characteristics

Timing Values . . . . . Operate Time: Approx 8 mS, 20ms **
Release Time: Approx 5 mS, 10ms **
Max Switching Rate: 20 operations per second

Insulation Characteristics

Dielectric Strength
Contact To Coil: 4000 VRMS, 5000 VRMS **
Across Open Contacts: 1000 VRMS, 2500VRMS **

Environmental Characteristics

Operating: –40°C to +70°C
Mechanical Life: 30 x 10^6 operations min, 5,000,000 operations **

Weight

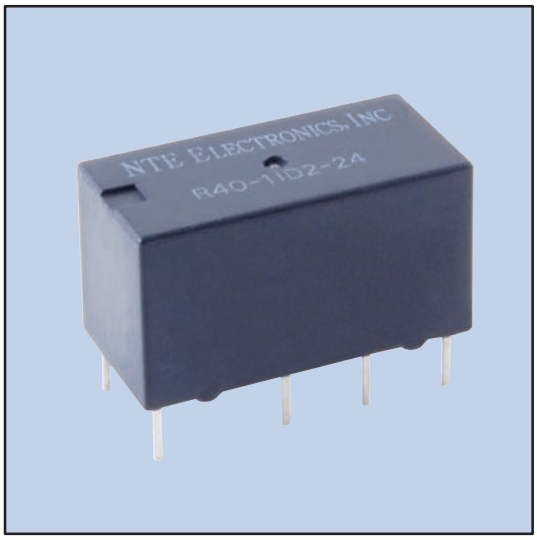
Std: 18 gram approx., 10 gram approx. **

** **R25–11D10–24 ONLY**

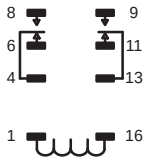
R40 Series

Features

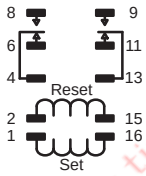
- Ultra–Sensitive Coil
- Epoxy Sealed
- Standard 0.1” DIP Terminal
- FCC Pt.68
- Dual Coil, Latching Type (C)



DPDT, 2 Form “C”



DPDT, 2 Form “C” (Dual Coil)



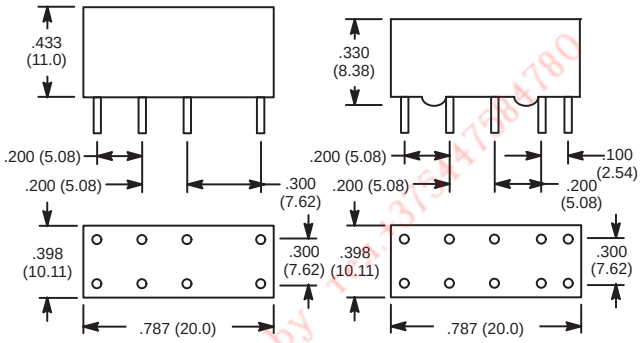
DC OPERATED						
NTE TYPE No.	Nom. Voltage	Contact Arr.	Coil Res. Ohms (Typ)	Nom. Power	Max. Contact Cur. @ 28VDC or 120VAC	Diag No.
R40–11D2–5/6	5/6VDC	DPDT	167	150mW	2A	D34
R40–11D2–5/6C	5/6VDC	DPDT	140*	180mW	2A	D34a
R40–11D2–12	12VDC	DPDT	960	150mW	2A	D34
R40–11D2–12C	12VDC	DPDT	800*	180mW	2A	D34a
R40–11D2–24	24VDC	DPDT	2880	200mW	2A	D34
R40–11D2–24C	24VDC	DPDT	3200*	180mW	2A	D34a
R40–11D2–48	48VDC	DPDT	7680	300mW	2A	D34

* Each Coil.

ACCESSORIES		
MOUNTING STYLES	DESCRIPTION	NTE TYPE NO.
DIP PC Mount	16–Lead DIP	NTE416
Wire Wrap Leads	16–Lead DIP	NTE436W16

DPDT, 2 Amp, Sensitive Coil, Single Contact PC Mountable Relay for use in Telecommunications, Computer Peripherals, and Security Equipment.

D34 **D34a**



Electrical Specifications

Contact

Rating: 2 Amp @ 120 VAC, 28 VDC (Note: U.L for 1 Amp **Only**)
Contact Material: Gold Clad Palladium Rutenium Alloy
Contact Resistance: 100MΩ Max.

Coil

Coil Voltages: See Chart
Pick–up Voltage: 70% of rated voltage
Max Allowable Voltage: 130% of rated voltage

Operational Characteristics

Timing Value . . . . . Operate Time: 4.5 mS approx.
Release Time: 1.5 mS approx.
Bounce Time: 3.5 mS approx. (Non–Latching)
50 mS approx. (Latching)
Set Time: 5 mS approx. (DPDT, Latching)
7 mS approx. (4PDT, Latching)
Reset Time: 5 mS approx. (DPDT, Latching)
7 mS approx. (4PDT, Latching)

Insulation Characteristics

Dielectric Strength
Contact To Coil: 1000 VRMS
Across Open Contacts: 1000 VRMS
Insulation Resistance: 100 MΩ Min. @ 500 VDC

Environmental Characteristics

Operating: –40°C to +65°C
Mechanical Life: 10,000,000 operations min
Electrical Life: 300,000 @ 2A, 30 VDC
500,000 @ 0.5A, 120 VAC

Weight

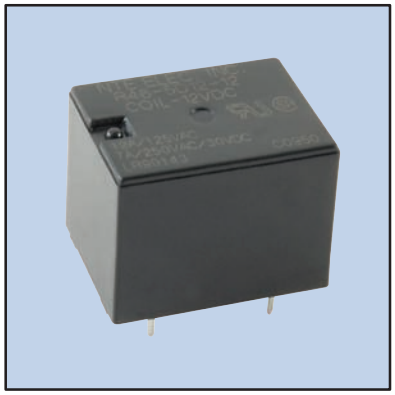
Std: 6 gram approx.

R46 Series

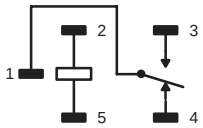
General Purpose, 5 and 12 Amp, DC SPDT Relays ideal for Security Equipment, Household Electrical Appliances, Garage Door Openers and Audio Equipment.

Features

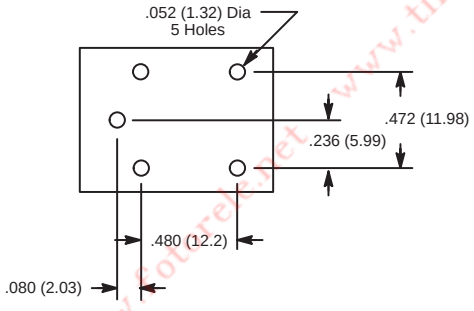
- All Sealed and Resistant to Wave Soldering & Cleaning
- Low Profile
- Less than 0.53 Cubic Inches



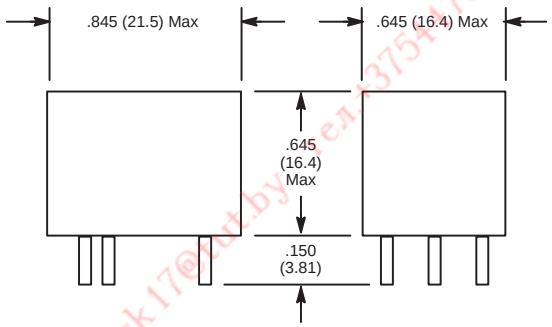
SPDT, 1 Form "C"



Mounting Holes
(Bottom View)



D23



DC OPERATED						
NTE Type No.	Nom. Volt.	Contact Arr.	Coil Res. Ohms (Typ)	Nom. Power	Max. Contact Cur. @ 30VDC or 120VAC	Diag No.
R46–5D3–12	12VDC	SPDT	400	360mW	5A	D23
R46–5D3–48	48VDC	SPDT	6400	360mW	5A	D23
R46–5D12–6	6VDC	SPDT	100	360mW	12A	D23
R46–5D12–12	12VDC	SPDT	400	360mW	12A	D23
R46–5D12–24	24VDC	SPDT	1600	360mW	12A	D23
R46–5D12–48	48VDC	SPDT	6400	360mW	12A	D23

Electrical Specifications

Contact
Rating: 5A at 120VAC, 5A at 30VDC
12A at 120VAC
Material: AgCdO

Coil
Coil Voltages: See Chart
Pick–up Voltages: 75% of nominal DC
Drop–out Voltages: 10% min of rated voltage
Resistance: See Chart

Operational Characteristics
Timing Value: . . . . . Operate Time: 10 mS max
Release Time: 10 mS max

Insulation Characteristics
Dielectric Strength
Between Coil & Contacts: 1500 VAC
Between Contacts of Same Polarity: 750 VAC
Resistance: 100 megohms min. @ 500 VDC

Environmental Characteristics
Operating: –40°C to +85°C

Life
Mechanical: 10,000,000 operations min

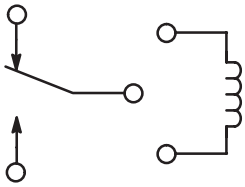
Weight
Std: 0.42 oz (12 grams) approx.

R48 Series

Features

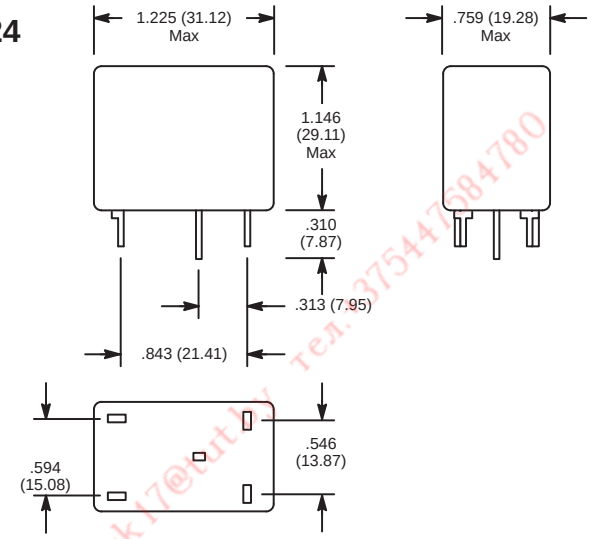
- PC Mountable
- Only 1.1 Cubic Inches
- Long Life
- Low Power Coil Types (L–suffix)

SPDT, 1 Form "C"



Miniature, General Purpose, 5 Amp & 10 Amp, DC, SPDT Relays for TV Remote Control, Burglar Alarms, Timers, Garage Door Openers.

D24



All terminals are .056 (1.42) x .025 (0.64)

Recommended PC Board holes are .067 (1.7) Dia.

DC OPERATED						
NTE Type No.	Nom. Volt.	Contact Arr.	Coil Res. Ohms (Typ)	Nom. Power	Max. Contact Cur. @ 28VDC or 120VAC	Diag No.
R48–5D5–6L	5/6VDC	SPDT	340	110mW	5A	D24
R48–5D5–12L	12VDC	SPDT	1350	100mW	5A	D24
R48–5D5–24L	24VDC	SPDT	5400	100mW	5A	D24
R48–5D10–6	5VDC	SPDT	100	110mW	10A	D24
R48–5D10–12	12VDC	SPDT	600	110mW	10A	D24
R48–5D10–24	24VDC	SPDT	2400	250mW	10A	D24

Electrical Specifications

Contact

Rating: 5 Amp 120/240 VAC
10 Amp 28 VDC resistive load
Material: Silver, gold plated
(R48–5D5–12L, R48–5D5–24L, R48–5D10–24)
Silver alloy
(R48–5D5–6L, R48–5D10–6, R48–5D10–12)

Coil

Coil Voltages: See Chart
Pick–up Voltages: 80% of nominal Coil Vltg.
Drop–out Voltages: 10% of actual pick–up (min.)
Resistance: See Chart

Operational Characteristics

Timing Value . . . . . Operate Time: 25 mS
Release Time: 3 mS typ.

Insulation Characteristics

Dielectric Strength
Contact To Coil Voltages: 1500 VRMS
Across Open Contacts: 500 VRMS
Coil To Frame: 1500 VRMS
Resistance: 1000 megohms min.
@ 500 VDC

Environmental Characteristics

Operating: –55°C to +85°C
Soldering: 270°C (518°) max

Life

Mechanical: 10,000,000 operations

Weight

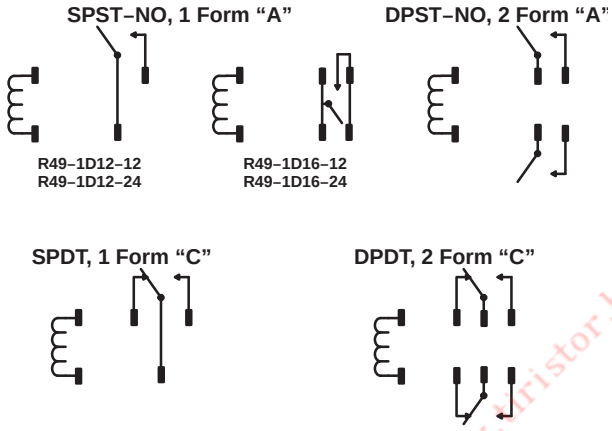
Std: 1.5 oz (42 grams) approx

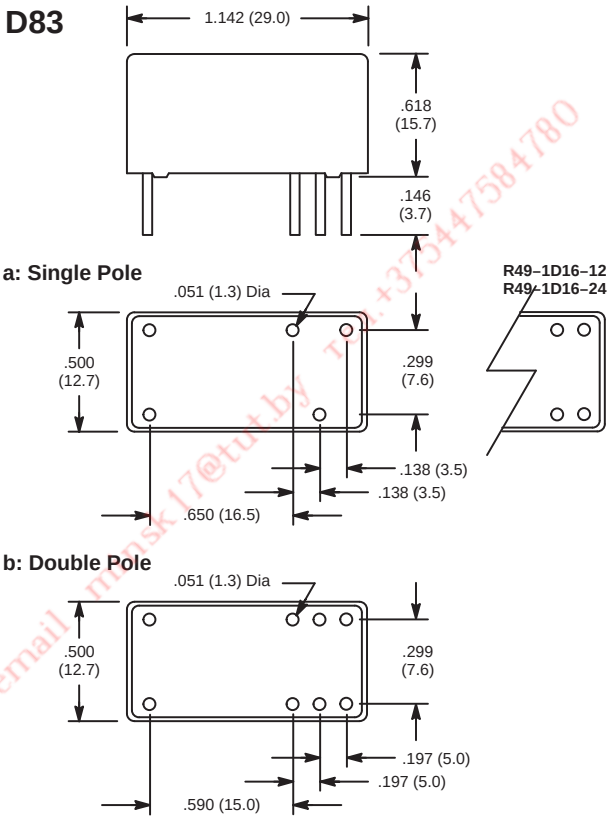
R49 Series

Low Height, Sealed, 8 Amp, 12 Amp, and 16 Amp, DC, Printed Circuit Mount Relays

Features

- Low Height
- Plastic Sealed
- SPST–NO, DPST–NO, SPDT, & DPDT Types





DC OPERATED						
NTE Type No.	Nom. Voltage	Contact Arr.	Coil Res. Ohms (Typ)	Nom. Power	Max. Contact Cur. @ 240VAC	Diag No.
R49–7D8–12	12VDC	DPST–NO	360	400mW	8A	D83b
R49–7D8–24	24VDC	DPST–NO	1440	400mW	8A	D83b
R49–11D8–12	12VDC	DPDT	360	400mW	8A	D83b
R49–11D8–24	24VDC	DPDT	1440	400mW	8A	D83b
R49–1D12–12	12VDC	SPST–NO	360	400mW	12A	D83a
R49–1D12–24	24VDC	SPST–NO	1440	400mW	12A	D83a
R49–5D12–12	12VDC	SPDT	360	400mW	12A	D83a
R49–5D12–24	24VDC	SPDT	1440	400mW	12A	D83a
R49–1D16–12	12VDC	SPST–NO	360	400mW	16A	D83a
R49–1D16–24	24VDC	SPST–NO	1440	400mW	16A	D83a
R49–5D16–12	12VDC	SPDT	360	400mW	16A	D83a
R49–5D16–24	24VDC	SPDT	1440	400mW	16A	D83a

ACCESSORIES		
MOUNTING STYLES	DESCRIPTION	NTE TYPE NO.
PC Mount	5–Pin	R95–133
	8–Pin	R95–132
Din Rail Mount	5–Pin	R95–130
	8–Pin	R95–131

NOTE: No sockets are available for the 16 Amp devices.

Electrical Specifications

Contact

Rating: See Chart
Contact Material: AgNi10
Contact Resistance: 100 Milliohms Max. initial

Coil

Coil Voltages: See Chart
Drop–out Voltage: 10% of rated voltage
Resistance: See Chart

Operational Characteristics

Timing Value . . . . . Operate Time: Approx 20 mS
Release Time: Approx 10 mS

Insulation Characteristics

Dielectric Strength
Contact To Coil: 5000 VRMS
Across Open Contacts: 1000 VRMS
Insulation Resistance: 100 megohms Min. @ 500 VDC, 50% RH

Environmental Characteristics

Operating: –40°C to +85°C
Mechanical Life: 10,000,000 operations min

Weight

Std: 10 gram approx.

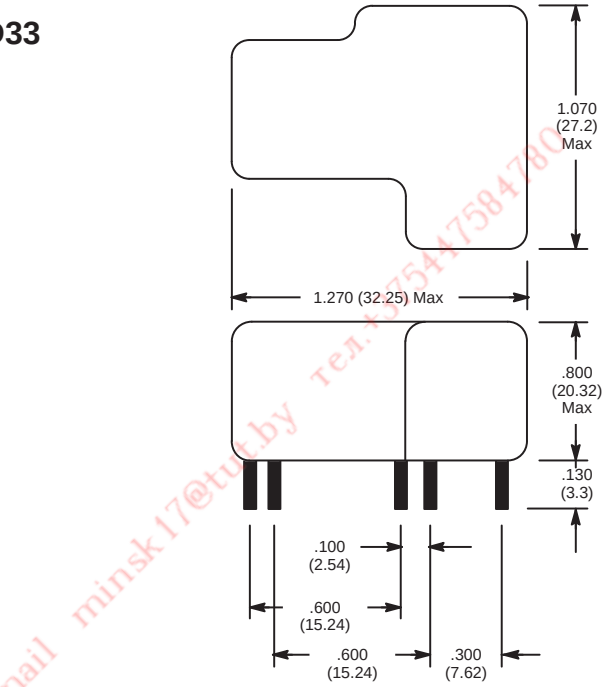
R53 Series

Miniature 30 Amp & 20 Amp Industrial Relays for Automotive Controls, Industrial Timers, Process Controls.

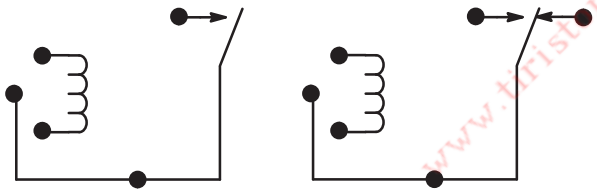
Features

- P.C. Board Mountable
- Miniature Size
- Epoxy Sealed
- Vented Cover–Fully Enclosed
- SPST & SPDT Versions
- Cut–off Nib for Vent Hole

D33



SPST–NO, 1 Form "A" SPDT, 1 Form "C"



DC OPERATED						
NTE Type No.	Nom. Volt.	Contact Arr.	Coil Res. Ohms (Typ)	Nom. Power	Max. Contact Cur. @ 28VDC or 240VAC	Diag No.
R53–1D30–6	6VDC	SPST–NO	40	900mW	30A	D33
R53–1D30–12	12VDC	SPST–NO	155	900mW	30A	D33
R53–1D30–24	24VDC	SPST–NO	660	900mW	30A	D33
R53–5D20–6	6VDC	SPDT	40	900mW	20A	D33
R53–5D20–12	12VDC	SPDT	155	900mW	20A	D33
R53–5D20–24	24VDC	SPDT	660	900mW	20A	D33
R53–5D20–48	48VDC	SPDT	2550	900mW	20A	D33
R53–5D20–110	110VDC	SPDT	13,450	900mW	20A	D33

Electrical Specifications

Contact

Rating: 1 Form A (SPST), 30 Amps at 240 VAC,
1 Form C (SPDT), 20 Amps at 240 VAC.

Coil

Coil voltages: See Chart
Coil resistances: 900mW Nominal

Operational Characteristics

Timing valves: Operate & Release 10–15 mS

Insulation Characteristics

Dielectric strength: 1500 VRMS, 60Hz./1 sec

Environmental Characteristics

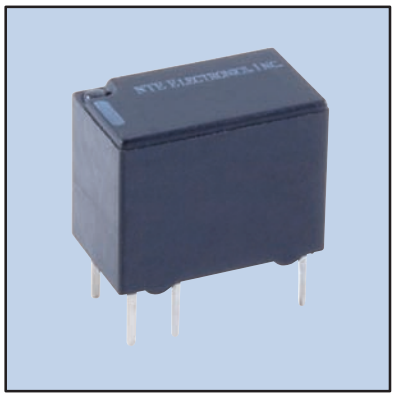
Ambient temperature range: –55°C to +85°C

R70 Series

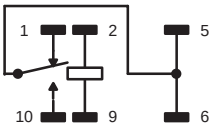
Subminiature, SPDT, 1 Amp Relay for Telecommunications, Computer/ Peripheral Equipment and Interface Applications.

Features

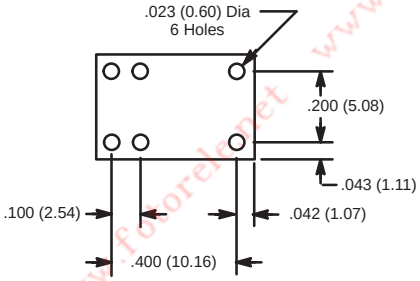
- High Sensitivity
- Small Size
- Fully–Sealed Construction
- Low Power Consumption



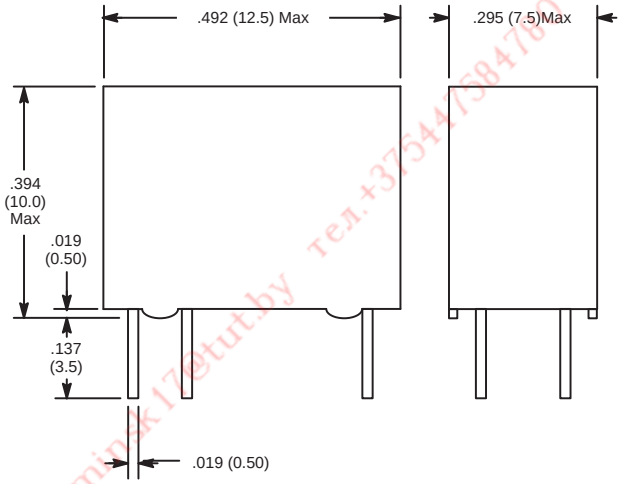
SPDT, 1 Form “C”



Mounting Holes
(Bottom View)



D44



DC OPERATED						
NTE Type No.	Nom. Volt.	Contact Arr.	Coil Res. Ohms (Typ)	Approx. Nom. Power	Max. Contact Cur. @ 24VDC or 125VAC	Diag No.
R70–5D1–3	3VDC	SPDT	60	150mW	1A/0.5A	D44
R70–5D1–5	5VDC	SPDT	166.7	150mW	1A/0.5A	D44
R70–5D1–6	6VDC	SPDT	240	150mW	1A/0.5A	D44
R70–5D1–12	12VDC	SPDT	960	150mW	1A/0.5A	D44
R70–5D1–24	24VDC	SPDT	3,840	150mW	1A/0.5A	D44

Electrical Specifications

Contact
Rating: 0.5A at 125VAC, 1A at 24VDC
Material: Ag (Au clad)

Coil
Coil Voltages: See Chart
Pick–up Voltages: 80% of rated voltage
Drop–out Voltages: 10% of rated voltage
Resistance: See Chart

Operational Characteristics
Timing Value: . . . . . Operate Time: 5 mS max
Release Time: 5 mS max

Insulation Characteristics
Dielectric Strength
Between Coil & Contacts: 1000 VAC
Between Contacts of Same Polarity: 400 VAC
Resistance: 100 megohms max.

Environmental Characteristics
Operating: –30°C to +70°C

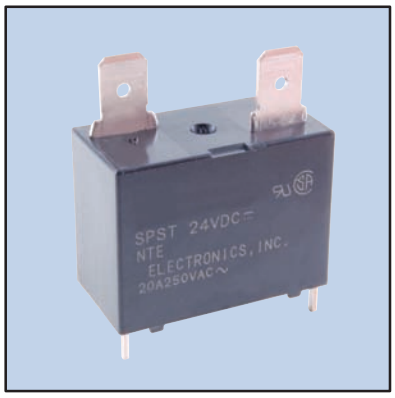
Life
Mechanical: 5,000,000 operations min (at 36,000 operations/hr)

Weight
Std: 0.08 oz (2.2 grams) approx.

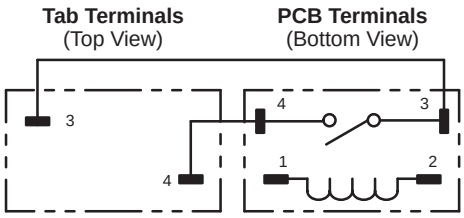
R71 Series

Features

- Semi–Sealed Construction
- Miniature Power Relay Ideal for Motor Switching in Appliances and HVAC Equipment



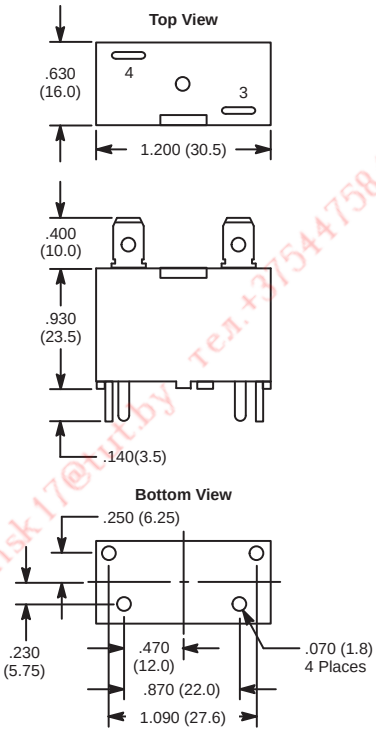
SPST–NO, 1 Form "A"



DC OPERATED						
NTE Type No.	Nom. Voltage	Contact Arr.	Coil Res. Ohms (Typ)	Nom. Power	Max. Contact Cur. @ 250VAC	Diag No.
R71–1D20–5	5VDC	SPST–NO	27	900mW	20A	D84
R71–1D20–12	12VDC	SPST–NO	160	900mW	20A	D84
R71–1D20–24	24VDC	SPST–NO	640	900mW	20A	D84

Miniature, Semi–Sealed, 20 Amp, SPST–NO, DC Power, Printed Circuit Mount w/Quick Connect Relays for High Inrush Compressor Loads

D84



Electrical Specifications

Contact

Rating: Inrush 80 Amp (cos∅ 0.7) 0.35/20 Amp steady state (cos∅ 0.9)
Carry Current: 20 Amp
Contact Material: $AgSnO_2$
Contact Resistance: 0.1 Ohms Max. initial

Coil

Coil Voltages: See Chart
Pick–Up Voltage: Less than 70% of nominal coil voltage
Drop–out Voltage: Greater than 10% of nominal coil voltage
Resistance: See Chart

Operational Characteristics

Timing Value . . . . . Operate Time: Approx 20 mS
Release Time: Approx 10 mS
} at nominal coil voltage

Insulation Characteristics

Dielectric Strength

Contact To Coil: 4500 VRMS
Across Open Contacts: 1000 VRMS
Insulation Resistance: 1000 megohms Min. @ 500 VDC

Environmental Characteristics

Operating: –25°C to +60°C with no icing
Mechanical Life: 2,000,000 operations min

Weight

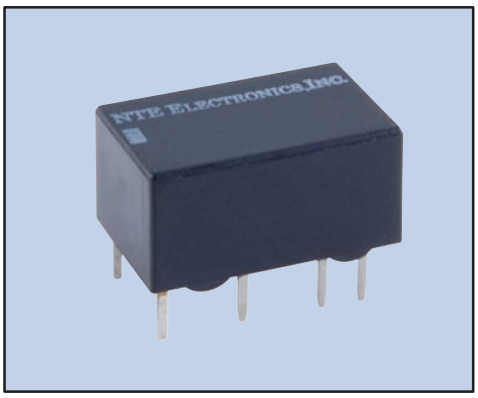
Std: 23 gram approx.

R72 Series

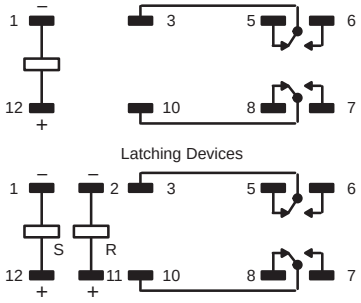
Subminiature, DPDT, 1 Amp Relay for Office Automation and Test and Measurement.

Features

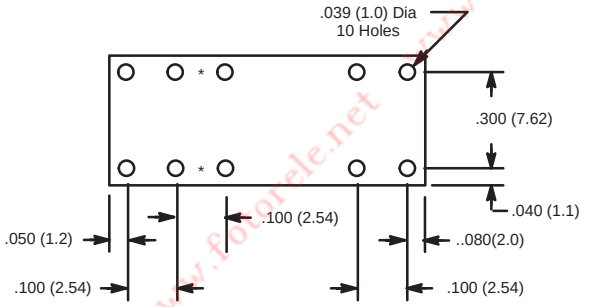
- High Sensitivity
- Small Size
- Low Power Consumption
- Fully Sealed Construction
- Latching Type (C–Suffix)



DPDT, 2 Form "C"



Mounting Holes
(Bottom View)



* For Latching Devices ONLY

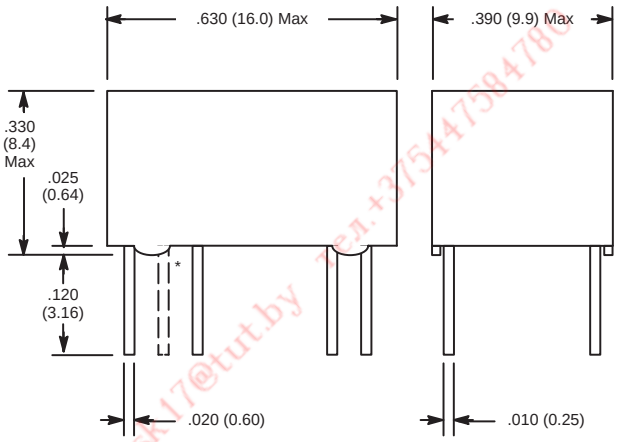
DC OPERATED

NTE Type No.	Nom. Volt.	Contact Arr.	Coil Res. Ohms (Typ)	Approx. Nom. Power	Max. Contact Cur. @ 30VDC or 30VAC	Diag No.
R72–11D1–6C	6VDC	DPDT	180	200mW	1A/0.5A	D45
R72–11D1–12	12VDC	DPDT	720	200mW	1A/0.5A	D45
R72–11D1–12C	12VDC	DPDT	720	200mW	1A/0.5A	D45
R72–11D1–24	24VDC	DPDT	2,880	200mW	1A/0.5A	D45

ACCESSORIES

MOUNTING STYLES	DESCRIPTION	NTE TYPE NO.
PC MOUNT	14–Lead DIP	NTE409

D45



* For Latching Devices ONLY

Electrical Specifications

Contact
Rating: 0.5A at 30VAC, 1A at 30VDC
Material: Ag (Au clad)

Coil
Coil Voltages: See Chart
Pick–up Voltages: 70% max of rated voltage
80% max (Set, Latching)
80% max (Reset, Latching)
Drop–out Voltages: 10% min of rated voltage
Resistance: See Chart

Operational Characteristics
Timing Value: . . . . . Operate Time: 5 mS max
Release Time: 5 mS max

Insulation Characteristics
Dielectric Strength
Between Coil & Contacts: 1000 VAC
Between Set and Reset Coils: 250 VAC (Latching)
Between Contacts of Same Polarity: 750 VAC
Between Contacts of Different Polarity: 1000 VAC
Resistance: 50 megohms max.

Environmental Characteristics
Operating: –40°C to +70°C

Life
Mechanical: 50,000,000 (Latching 1,000,000) operations min (at 18,000 operations/hr)

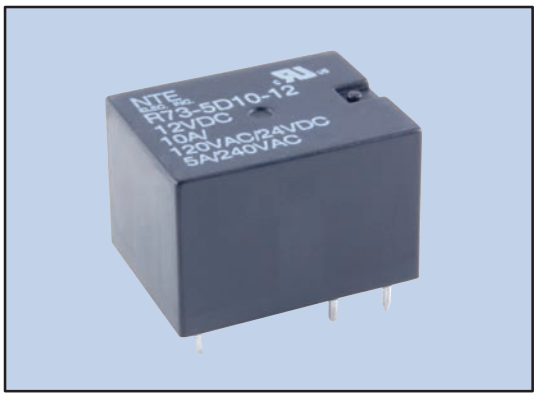
Weight
Std: 0.11 oz (3 grams) approx.

R73 Series

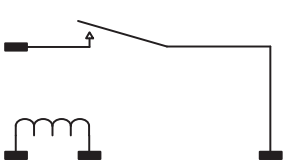
Subminiature, PC Mount, 10 Amp, SPST–NO & SPDT Relay, for Security and Telecommunication Equipment.

Features

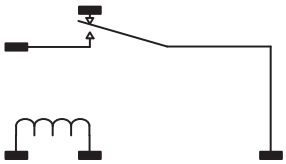
- Small Size
- Epoxy Sealed
- Standard Pin Spacing (0.1”)
- PC Board Mount



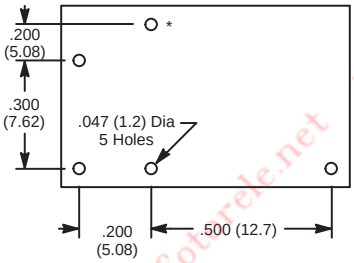
SPST–NO, 1 Form “A”



SPDT, 1 Form “C”



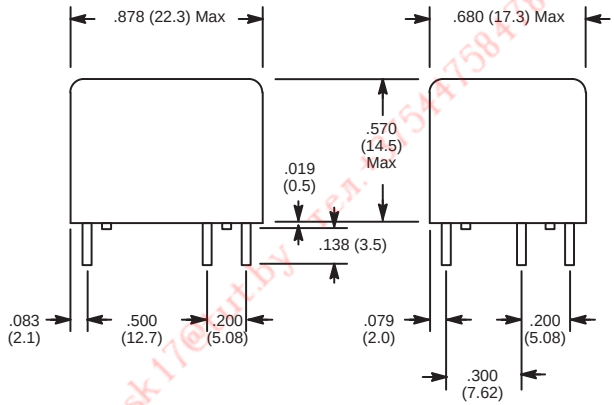
Mounting Holes
(Bottom View)



* Pin is omitted on SPST–NO devices

DC OPERATED						
NTE Type No.	Nom. Volt.	Contact Arr.	Coil Res. 10% Ohms (Typ)	Approx. Nom. Power	Max. Contact Cur. @ 28VDC or 120VAC	Diag No.
R73–1D10–3	3VDC	SPST–NO	20	450mW	10A	D49
R73–1D10–5/6	6VDC	SPST–NO	80	450mW	10A	D49
R73–1D10–12	12VDC	SPST–NO	320	450mW	10A	D49
R73–1D10–24	24VDC	SPST–NO	1280	450mW	10A	D49
R73–5D10–3	3VDC	SPDT	20	450mW	10A	D49
R73–5D10–5/6	6VDC	SPDT	80	450mW	10A	D49
R73–5D10–12	12VDC	SPDT	320	450mW	10A	D49
R73–5D10–24	24VDC	SPDT	1280	450mW	10A	D49
R73–5D10–48	48VDC	SPDT	3800	450mW	10A	D49

D49



Electrical Specifications

Contact
Rating: 10 Amp @ 120VAC/28VDC
Material: Silver cadmium oxide
Resistance: 0.06 (At Nominal Conditions)

Coil
Coil Voltages: See Chart
Pick–up Voltages: 75% max of rated voltage
Drop–out Voltages: 10% min of rated voltage
Resistance: See Chart

Operational Characteristics
Timing Value: . . . . . Operate Time: 5 mS max
Release Time: 10 mS max

Insulation Characteristics
Dielectric Strength
Between Contact and Coil: 1500 VAC
Between Contacts: 750 VAC
Insulation Resistance: 100MΩ

Environmental Characteristics
Operating: –55°C to +85°C

Life
Mechanical: 100,000 operations
Electrical: 10,000,000 operations

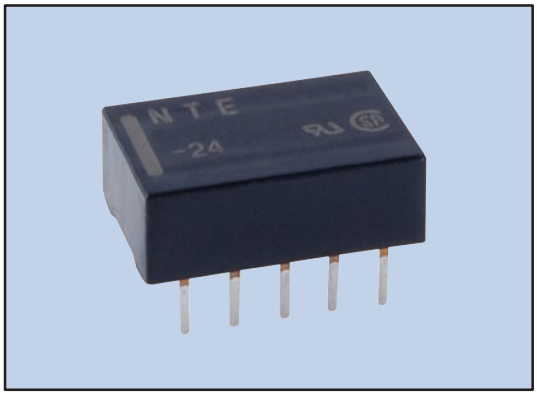
Weight
Std: 0.39 oz (11 grams) approx.

R74 Series

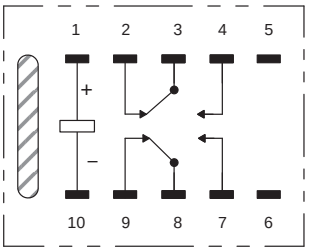
Subminiature, PC Mount, 1 Amp, DPDT Low Signal Relay.

Features

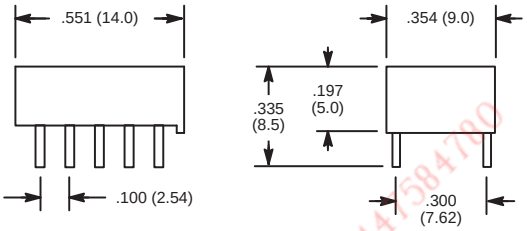
- Compact, with Low 5mm (.197") Profile
- Low Power Consumption (140mW)
- Standard Pin Spacing (0.1")
- PC Board Mount
- Surface Mount ("SM" Suffix)



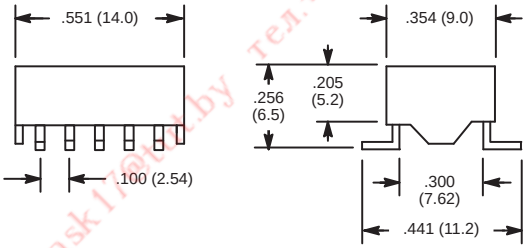
DPDT, 2 Form "C"
(Bottom View)



D52



D53



DC OPERATED						
NTE Type No.	Nom. Volt.	Contact Arr.	Coil Res. 10% Ohms (Typ)	Approx. Nom. Power	Max. Contact Cur. @ 30VDC	Diag No.
R74–11D1–3	3VDC	DPDT	64.3	140mW	1A	D52
R74–11D1–3SM	3VDC	DPDT	64.3	140mW	1A	D53
R74–11D1–5	5VDC	DPDT	178	140mW	1A	D52
R74–11D1–5SM	5VDC	DPDT	178	140mW	1A	D53
R74–11D1–6	6VDC	DPDT	257	140mW	1A	D52
R74–11D1–6SM	6VDC	DPDT	257	140mW	1A	D53
R74–11D1–12	12VDC	DPDT	1,028	140mW	1A	D52
R74–11D1–12SM	12VDC	DPDT	1,028	140mW	1A	D53
R74–11D1–24	24VDC	DPDT	2,880	200mW	1A	D52
R74–11D1–24SM	24VDC	DPDT	2,88O	200mW	1A	D53

ACCESSORIES		
MOUNTING STYLES	DESCRIPTION	NTE TYPE NO.
PC MOUNT	10–PIN DIP	NTE409 (14–Pin DIP)

Electrical Specifications

Contact
Rating: 1 Amp
Material: Ag (Au clad)
Resistance: 50mΩ (Standard), 60mΩ (Surface Mount)

Coil
Coil Voltages: See Chart
Pick–up Voltages: 75% max of rated voltage
Drop–out Voltages: 10% min of rated voltage
Resistance: See Chart

Operational Characteristics
Timing Value: . . . . . Operate Time: 3 mS max
Release Time: 2 mS max

Insulation Characteristics
Dielectric Strength
Between Contact and Coil: 1000 VAC
Between Contacts (Same Polarity): 1000 VAC
Between Contacts (Different Polarity): 750 VAC
Insulation Resistance: 1000MΩ

Environmental Characteristics
Operating: –40°C to +70°C (Standard),
–40°C to +85°C (Surface Mount)

Life
Mechanical: 36,000 operations/hour
Electrical: 1,800 operations/hour (under rated load)

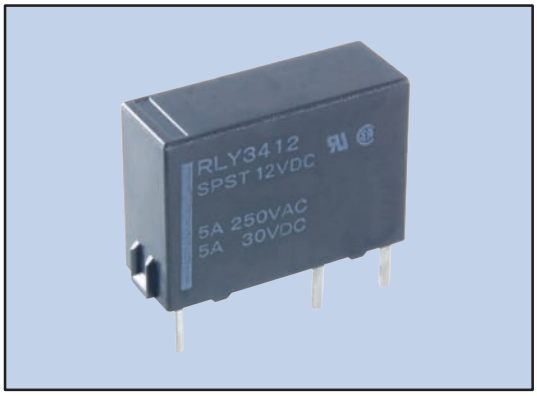
Weight
Std: 0.05 oz (1.5 grams) approx.

RLY34 Series

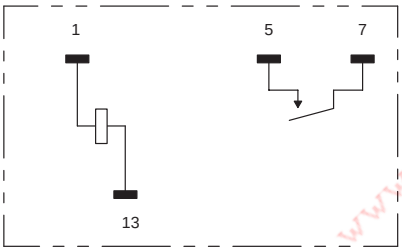
Subminiature, PC Mount, 5 Amp, SPST–NO Relay.

Features

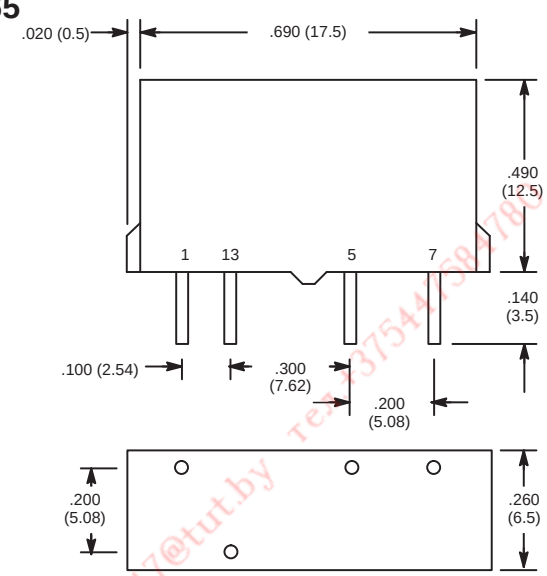
- Sealed Construction for Automatic Soldering and Cleaning
- Rated for D 150 Pilot Duty
- Standard Pin Spacing (0.1”)
- PC Board Mount



SPST–NO, 1 Form “A”
(Bottom View)



D65



DC OPERATED						
NTE Type No.	Nom. Volt.	Contact Arr.	Coil Res. Ohms (Typ)	Approx. Nom. Power	Max. Contact Cur. @ 30VDC 250VAC	Diag No.
RLY3405	5VDC	SPST–NO	125	200mW	5A	D65
RLY3412	12VDC	SPST–NO	720	200mW	5A	D65
RLY3424	24VDC	SPST–NO	2880	200mW	5A	D65

Electrical Specifications

Contact
Rating: 5 Amp @ 250 VAC, 30 VDC
Material: Ag Alloy
Resistance: 100m Max

Coil
Coil Voltages: See Chart
Pick–up Voltages: 70% max of rated voltage
Drop–out Voltages: 10% min of rated voltage
Resistance: See Chart

Operational Characteristics
Timing Value: . . . Operate Time: 10 mS max
Release Time: 10 mS max

Insulation Characteristics
Dielectric Strength
Between Contact and Coil: 3000 VAC/1 minute
Between Contacts (Same Polarity): 750 VAC/ 1 minute
Insulation Resistance: 1000MΩ Min. @ 500 VDC
Surge Withstand Voltage
Between Coil and Contacts: 6000V, 1.2 x 50μs

Environmental Characteristics
Operating: –25°C to +70°C

Life
Mechanical: 18,000 operations/hour
Electrical: 1,800 operations/hour (under rated load)

Weight
Std: 0.10 oz (3 grams) approx.

PC Mount Relays

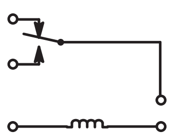
RLY39 Series

Miniature, PC Mount, 2 Amp, Multicontact Relays.

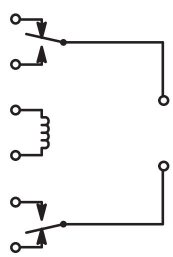
Features

- Epoxy Sealed
- Low Profile
- Immersion Proof

SPDT, 1 Form "C"
(Bottom View)



DPDT, 2 Form "C"
(Bottom View)



DC OPERATED						
NTE Type No.	Nom. Volt.	Contact Arr.	Coil Res. Ohms (Typ)	Approx. Nom. Power	Max. Contact Cur. @ 24VDC	Diag No.
RLY3920	5VDC	SPDT	75	750mW	2A	D74
RLY3922	12VDC	SPDT	440	750mW	2A	D74
RLY3923	24VDC	SPDT	1550	750mW	2A	D74
RLY3942	12VDC	DPDT	440	750mW	2A	D74a
RLY3943	24VDC	DPDT	1550	750mW	2A	D74a

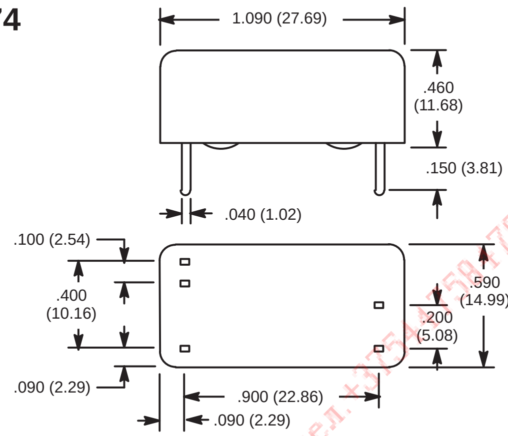
When soldering the relay to the PC board, solder temperature must not exceed +270°C, and solder time must not exceed 5 seconds. If necessary to hold the relay in place during soldering, the terminals of the coil and movable contact arm may be slightly bent after insertion through the board holes.

CAUTION: Do not bend the terminals of the stationary contact arms, as this may alter contact adjustment.

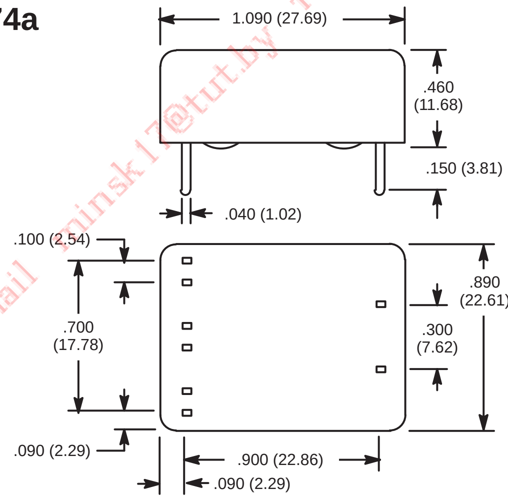
The polyester cover of the relay is bonded to the relay base, but is not hermetically sealed. Therefore, if the board on which the relay is soldered is to be cleaned by immersion, cleaning time must not exceed two minutes. If fluorocarbons, chlorinated or hydrocarbon cleaning solutions are used, the temperature of the solution must not exceed +77°C. If aqueousorganic solutions are used, temperature must not exceed +80°C.

After board cleaning, the tape on the top of the relay must be punctured before the relay is put into service. If the tape is not punctured, any normal outgassing could result in excessive contact resistance at load currents of less than the contact rating.

D74



D74a



Electrical Specifications

Contact

Rating: 2 Amp @ 24 VDC
Material: Gold Clad Silver Palladium
Resistance: 100m Max

Coil

Coil Voltages: See Chart
Pick–up Voltages: 80% of nominal voltage or less
Drop–out Voltages: 10% of nominal voltage or more
Max. Allowed Voltage: 120% of nominal voltage, duty cycle 100%
Nominal Power: 327mW max. min. sensitivity: 200mW
Resistance: See Chart

Operational Characteristics

Timing Value: . . . **Operate Time:** 4 mS max
Release Time: 10 mS max

Insulation Characteristics

Dielectric Strength
Between All Mutually Insulated Points: 500 VAC/1 minute
Insulation Resistance: 1000MΩ Min. @ 500 VDC

Environmental Characteristics

Operating: –35°C to +70°C

Life

Mechanical: 100 million operations (no load)
Electrical: 100,000 operations (under rated load)

Weight

Std: SPDT – 5.5 grams (approx.); DPDT – 9.0 grams (approx)

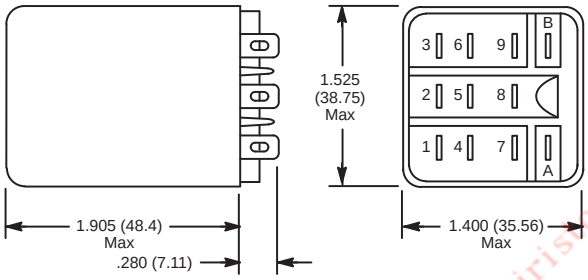
Impulse / Latching Relays

R50 Series

Features

- Magnetic Latching
- Solder/Plug–In
- .187” (4.75mm) Quick Connect Terminals
- SPDT or DPDT
- Dual Coil Version – “C” Suffix
- Non–Mechanical Latches

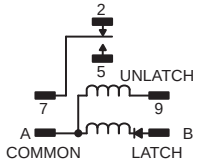
D50



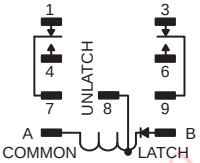
AC OPERATED						
NTE Type No.	Nom. Volt.	Contact Arr.	Coil Res. Latch/Unlatch Ohms (Typ)	Nom. Power	Max. Contact Cur. @ 28VDC or 120VAC	Diag No.
R50–5A10–120	120VAC	SPDT	2090/17430	1.7VA	10A	D50
R50–11A10–120	120VAC	DPDT	2090/17430	1.7VA	10A	D50
DC OPERATED						
R50–5D10–24	24VDC	SPDT	472/1152	1.2W	10A	D50
R50–11D10–12	12VDC	DPDT	120/275	1.2W	10A	D50
R50–11D10–12C	12VDC	DPDT	88/275	1.2W	10A	D50
R50–11D10–24	24VDC	DPDT	472/1152	1.2W	10A	D50
R50–11D10–24C	24VDC	DPDT	330/1070	1.2W	10A	D50

ACCESSORIES		
MOUNTING STYLES	DESCRIPTION	NTE TYPE NO.
SURFACE MOUNT SCREW TERMINALS	11–PIN BLADE	R95–105
PANEL MOUNT SOLDER TERM	11–PIN BLADE	R95–116
PANEL MOUNT QUICK CONNECT	11–PIN BLADE	R95–124
DIN RAIL MOUNT	11–PIN BLADE	R95–115
PC MOUNT	11–PIN BLADE	R95–123

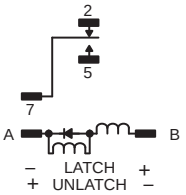
AC and DC Magnetic Latching Industrial Relay for Industrial Controls, Instrumentation.



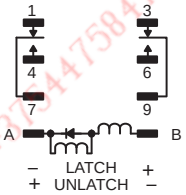
SPDT, 1 Form “C” (AC)



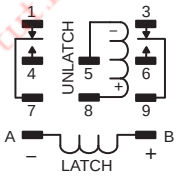
DPDT, 2 Form “C” (AC)



SPDT, 1 Form “C” (DC)



DPDT, 2 Form “C” (DC)



DPDT, 2 Form “C” (DC) Dual Coil

Operational Information

Magnetic latching is achieved by a specially designed magnetic core that makes it possible to maintain a substantial magnetic force of attraction after termination of the electrical pulse that energizes the core. There are no mechanical latches associated with this relay, nor permanent magnets. To restore the relay to its unoperated position, a short pulse of opposite polarity and lower magnitude than the operate pulse is applied to the coil or a second concentric wound coil.

Electrical Specifications

Contact

Rating: 10 Amp @ 28VDC/120/240 VAC
1/3HP @ 120VAC,
1/2HP @ 240/480/600VAC
Material: 3/16” Silver Cadmium Oxide

Coil

Coil Voltages: See Chart
Pick–up Voltages: 85% of nominal Coil Vltg. (AC)
75% of nominal Coil Vltg. (DC)
Duty Cycle: Continuous duty operation at 25% overvoltage
Resistance: See Chart

Operational Characteristics

Timing Values:
Operate Time: 15ms Nominal, 20ms Max
Release Time: 6ms Nominal, 10ms Max

Insulation Characteristics

Dielectric Breakdown: >750VAC RMS across open contacts
>2500VAC RMS all other mutually insulated elements

Environmental Characteristics

Operating: –45°C to +60°C

Life

Mechanical: 10 million operations

Weight

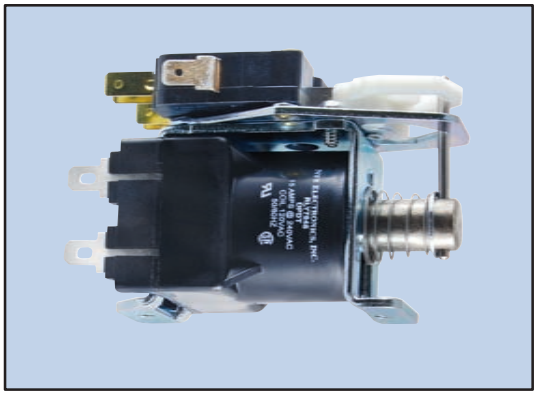
Std: 3.0 oz (84 grams) approx

RLY76/77 Series

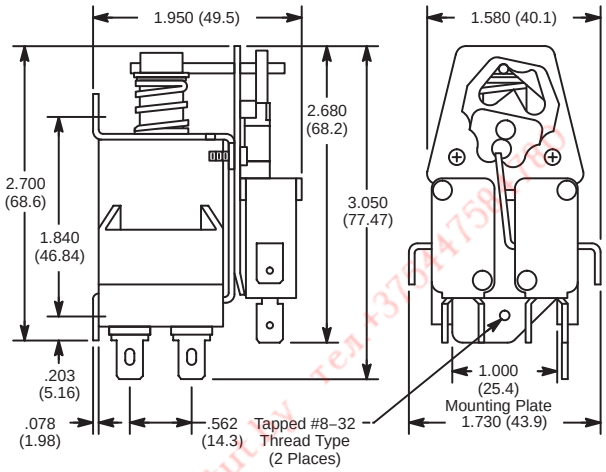
15 Amp, Bistable, DPDT, Impulse Relays.

Features

- **Quick Connect Terminals: .250" (6.35mm) *or* .187" (4.75mm) Consult factory for actual stock (See Note under drawing)**
- **Multicontact**
- **Pulse Operation**
- **Power Saving**

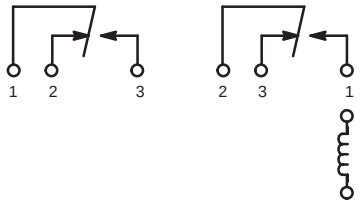


D72



* Quick Connect Terminals May be either .250in or .187in. Consult Factory for actual stock

DPDT, 2 Form "C"



AC OPERATED						
NTE Type No.	Nom. Volt.	Contact Arr.	Coil Res. Ohms (Typ)	Approx. Nom. Power	Max. Contact Cur. @ 28VDC 120VAC	Diag No.
RLY7643	24VAC	DPDT	9	9 VA	15A	D72
RLY7645	120VAC	DPDT	260	9 VA	15A	D72
DC OPERATED						
RLY7742	12VDC	DPDT	25	6.5W	15A	D72

Electrical Specifications

Contact

Rating: 15 Amp @ 125/250 VAC
Contact Horsepower Rating: 1/2 HP @ 125/250 VAC

Coil

Coil Voltages: See Chart
Resistance: See Chart

Operational Characteristics

Timing Value: . . . Operate Time: 75 mS min
Release Time: 75 mS min
Must Operate Voltage
AC Coil: 85% of nominal voltage @ +25 C
DC Coil: 75% of nominal voltage @ +25 C

Insulation Characteristics

Dielectric Strength
Initial Breakdown Voltage: 1500V RMS, 60Hz
Insulation Resistance: Class B (130°C)

Environmental Characteristics

Operating: –10°C to +60°C

Life

Mechanical: 100,000 operations
Electrical: 50,000 operations (under rated load))

Weight

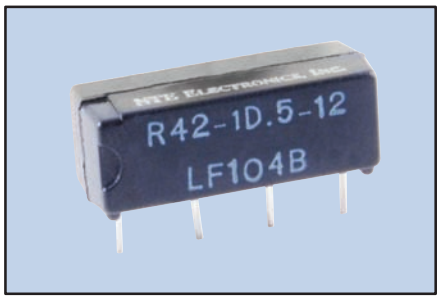
Std: 7.75 oz (241 grams) approx.

R42 Series

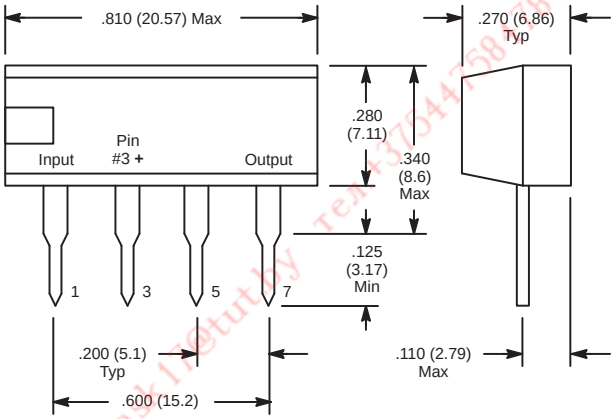
General Purpose, 500mA DC SPST–NO SIP Reed Relay.

Features

- 5 VDC Version Compatible to Operate Directly from TTL or DTL Circuits
- Internal Clamping Diode
- Flame Retardant Epoxy Package
- PC Mountable



D20



DC OPERATED								
NTE Type No.	Nom. Voltage	Contact Arr.	Coil Res. Ohms (Typ)	Nom. Pwr.	Max. Cont.	Max. Pick up	Min. Drop out	Diag No.
R42–1D .5–6	5/6 VDC	SPST–NO	500	50 mW	.5 Amp	3.8 VDC	0.5 VDC	D20
R42–1D .5–12	12 VDC	SPST–NO	850	77 mW	.5 Amp	9 VDC	1 VDC	D20
R42–1D .5–24	24 VDC	SPST–NO	2200	180 mW	.5 Amp	18 VDC	2 VDC	D20

Electrical Specifications

Contact

Rating: 0.5 Amp switching current max.
1.5 Amp carry current max.
Resistance: 200 milliohms max. initial

Coil

Coil Voltages: See Chart
Pick–up Voltage: See Chart
Drop–out Voltage: See Chart

Operational Characteristics

Timing Values . . . . . **Operate Time:** 330 μS at nominal voltage
Release Time: 150 μS at nominal voltage

Insulation Characteristics

Dielectric Strength
Across Open Contacts: 200 VDC
Contact To Contact: 1000 VDC

Environmental Characteristics

Operating: –45°C to +85°C
Storage: –60°C to +105°C

Capacitance

Across Open Contacts: 1pf
Open Contacts To Coil: 2pf

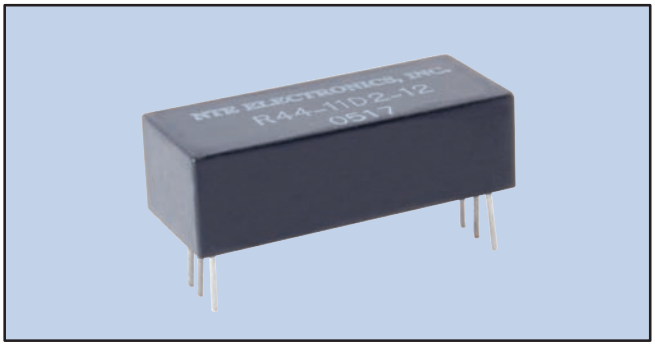
Life

Mechanical: 5 x 10^6 (50,000,000) with appropriate contact protection

R44 Series

Features

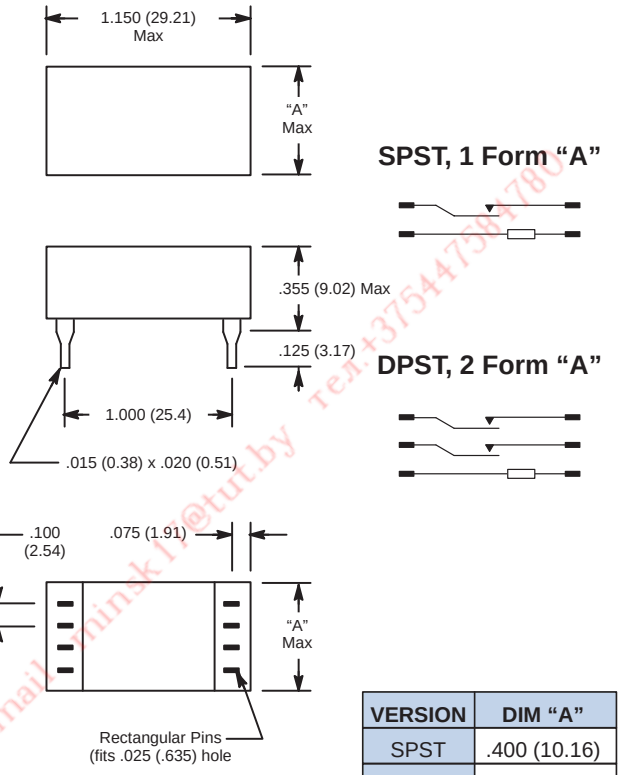
- 10 Watt Contact Rating
- Standard .1” PC Board Spacing
- Epoxy Sealed
- Magnetic Shield
- TTL & DTL Compatible



DC OPERATED						
NTE Type No.	Nom. Volt.	Contact Arr.	Coil Res. Ohms (Typ)	Nom. Power	Max. Contact	Diag No.
R44–1D2–6	5/6VDC	SPST–NO	100	360mW	.5Amp	D21
R44–1D2–12	12VDC	SPST–NO	420	360mW	.5Amp	D21
R44–1D2–24	24VDC	SPST–NO	2300	360mW	.5Amp	D21
R44–11D2–6	5/6VDC	DPST–NO	70	510mW	.5Amp	D21
R44–11D2–12	12VDC	DPST–NO	280	510mW	.5Amp	D21
R44–11D2–24	24VDC	DPST–NO	1500	510mW	.5Amp	D21

General Purpose SPST & DPST, DC Reed Relays.

D21



VERSION	DIM “A”
SPST	.400 (10.16)
DPST	.500 (12.70)

Electrical Specifications

Contact

Rating: 0.5 Amp switching current max.
2.0 Amp carry current max
200 VDC switching volts, max.
Resistance: 200 milliohms max. initial

Coil

Coil Voltages: See Chart

Operational Characteristics

Timing Values . . . . . Operate Time: 500 µS typical
Release Time: 1400 µS typical

Insulation Characteristics

Dielectric Strength
Across Open Contacts: 200 VAC min
Between Mutually Insulated Points: 500 VAC min.

Environmental Characteristics

Operating: –45°C to +85°C
Storage: –60°C to +105°C

Capacitance

Across Open Contacts: 0.3pf typ
Open Contacts To Coil: 2.0pf typ

Life

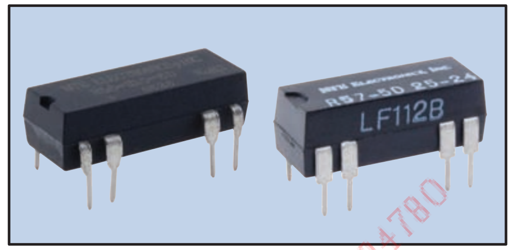
Mechanical: 10,000,000 operations at rated load

R56 & 57 Series

General Purpose DIP (Dual In–Line Package) DC Reed Relays.

Features

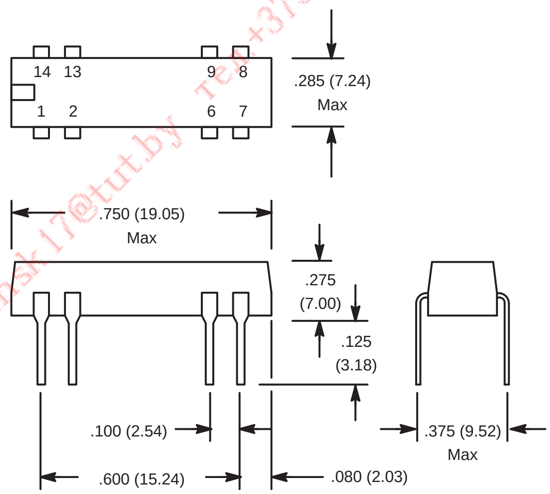
- **Standard Industry Packaging**
- **5 VDC Versions Operate Directly from DTL or TTL Circuits**
- **Internal Clamping Diode Versions (D–suffix)**
- **Flame Retardant Epoxy Case is Immersion Resistant**
- **Can be used with NTE409 Socket**



DC OPERATED

NTE Type No.	Nom. Voltage VDC	Contact Arr.	Coil Res. Ohms (typ)	Max Pickup VDC	Min. Drop Out VDC	Max. Curr. Amps	Times		Diag No.
							Max. Separate	Max. Release	
R56–1D.5–6	5	SPST–NO	500	3.8	0.5	0.50	330 s	75 s	D27C
R56–1D.5–6D	5	SPST–NO	500	3.8	0.5	0.50	330 s	150 s	D27D
R56–1D.5–12	12	SPST–NO	1200	9.0	1.0	0.50	400 s	75 s	D27C
R56–1D.5–24	24	SPST–NO	2200	18	2.0	0.50	400 s	75 s	D27C
R56–5D.5–6	6	SPDT	180	4.5	0.5	0.50	500 s	150 s	D27A
R56S–5D.5–6	5	SPDT	200	3.8	0.5	0.50	500 s	500 s	D27J
R56S–5D.5–6D	5	SPDT	200	3.8	0.5	0.50	500 s	500 s	D27K
R56–5D.5–12	12	SPDT	500	9.0	1.0	0.50	500 s	150 s	D27A
R56S–5D.5–12	12	SPDT	500	8.0	1.0	0.50	500 s	500 s	D27J
R56S–5D.5–12D	12	SPDT	500	8.0	1.0	0.50	500 s	500 s	D27K
R56–5D.5–24	24	SPDT	2200	18	2.0	0.50	700 s	150 s	D27A
R56S–5D.5–24	24	SPDT	1750	16	2.0	0.50	500 s	500 s	D27J
R56S–5D.5–24D	24	SPDT	1750	16	2.0	0.50	500 s	500 s	D27K
R56–7D.5–6	5	DPST–NO	200	3.8	0.5	0.50	700 s	75 s	D27E
R56–7D.5–6D	5	DPST–NO	200	3.8	0.5	0.50	500 s	200 s	D27F
R56–7D.5–12	12	DPST–NO	500	9.0	1.0	0.50	700 s	75 s	D27E
R56–7D.5–12D	12	DPST–NO	500	8.0	1.0	0.50	500 s	200 s	D27F
R56–7D.5–24	24	DPST–NO	2200	18	2.0	0.50	700 s	75 s	D27E
R56–7D.5–24D	24	DPST–NO	1750	16	2.0	0.50	500 s	200 s	D27F
R57–1D.5–5/6	5/6	SPST–NO	500	3.8	0.5	0.50	400 s	75 s	D27C
R57–1D.5–5/6D	5/6	SPST–NO	500	3.8	0.5	0.50	400 s	150 s	D27D
R57–1D.5–12	12	SPST–NO	1200	9.0	1.0	0.50	400 s	75 s	D27C
R57–1D.5–12D	12	SPST–NO	1200	9.0	1.0	0.50	400 s	150 s	D27D
R57–1D.5–24	24	SPST–NO	2200	18	2.0	0.50	400 s	75 s	D27C
R57–1D.5–24D	24	SPST–NO	2200	18	2.0	0.50	400 s	150 s	D27D
R57–2D.5–5/6	5/6	SPST–NC	500	3.8	0.5	0.50	450 s	75 s	D27G
R57–2D.5–5/6D	5/6	SPST–NC	500	3.8	0.5	0.50	450 s	150 s	D27H
R57–2D.5–12	12	SPST–NC	1200	9.0	1.0	0.50	450 s	75 s	D27G
R57–2D.5–12D	12	SPST–NC	1200	9.0	1.0	0.50	450 s	150 s	D27H
R57–2D.5–24	24	SPST–NC	2200	18	2.0	0.50	400 s	75 s	D27G
R57–2D.5–24D	24	SPST–NC	2200	18	2.0	0.50	400 s	150 s	D27H
R57–5D.25–5/6	5/6	SPDT	200	3.8	0.5	0.25	500 s	175 s	D27A
R57–5D.25–5/6D	5/6	SPDT	200	3.8	0.5	0.25	500 s	250 s	D27B
R57–5D.25–12	12	SPDT	500	9.0	1.0	0.25	700 s	150 s	D27A
R57–5D.25–12D	12	SPDT	500	9.0	1.0	0.25	700 s	250 s	D27B
R57–5D.25–24	24	SPDT	2200	18	2.0	0.25	700 s	150 s	D27A
R57–5D.25–24D	24	SPDT	2200	18	2.0	0.25	700 s	250 s	D27B

D27



Electrical Specifications

Contact

Rating: See Chart for switching Current
Resistance: 200 milliohms initial
Switching volts max: 100 VDC
Rating max: 0.5A = 10 VA, 0.25A = 4 VA

Insulation Characteristics

Dielectric Strength
Across Open Contacts: 200 VDC
Contact to Contact: 1000 VDC

Environmental Characteristics

Operating: –45°C to +85°C
Storage: –60°C to +105°C
Mounting Position: Any

Capacitance

Across Open Contacts: 1.0pf typical
Open Contacts to Coil: 2.0pf (SPST–NO, DPST–NO)
2.5pf (SPST–NC)
3.0pf (SPDT) typical

Life

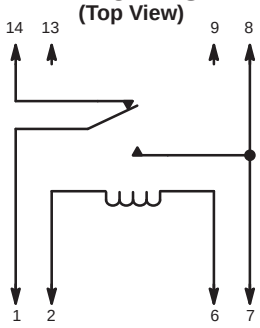
At rated load: 5 x 10^6 (with appropriate contact protection)

Weight

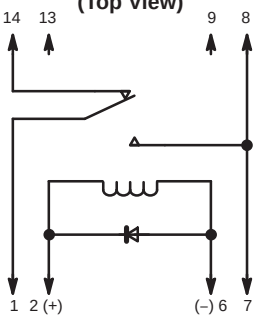
Std: 1 gram approx.

Reed Relays

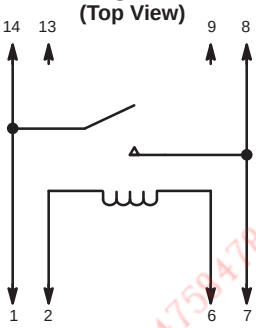
D27A
1 Form C
(Top View)



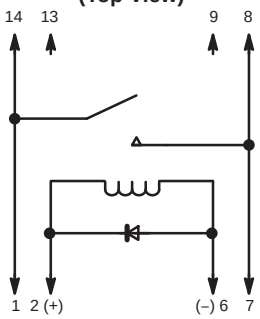
D27B
1 Form C W/Clamp Diode
(Top View)



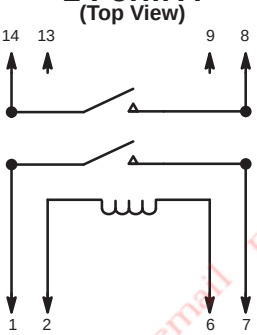
D27C
1 Form A
(Top View)



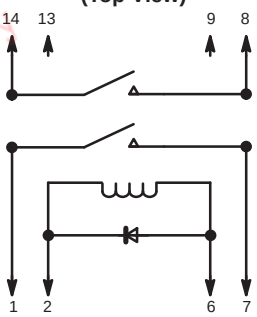
D27D
1 Form A W/Clamp Diode
(Top View)



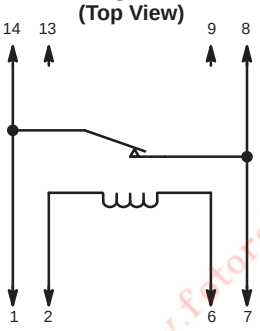
D27E
2 Form A
(Top View)



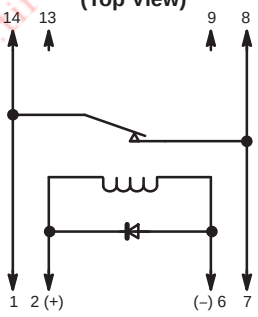
D27F
2 Form A W/Clamp Diode
(Top View)



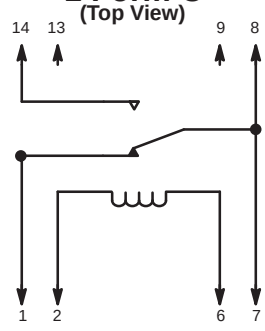
D27G
1 Form B
(Top View)



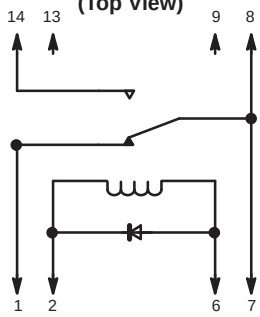
D27H
1 Form B W/Clamp Diode
(Top View)



D27J
1 Form C
(Top View)



D27K
1 Form C W/Clamp Diode
(Top View)



Automotive Relays

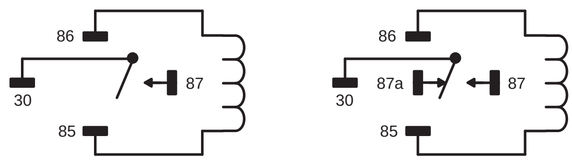
R51 Series

50 Amp and 70 Amp, SPST and SPDT Relays for use in Automotive/Marine/ Tractor/Lawn Mower/Rec. Vehicles/ Golf Cart Applications.

Features

- **.250" (6.35mm) Quick Connect Terminals**
- **Industry Standard Pinout**
- **SPST & SPDT Versions**
- **Flange Mount – "F" Suffix**
- **PC Board Mount – "P" Suffix**
- **Standard Version is IP54 Dust and Splash Protected**
- **New Weatherproof Versions (Shrouded Terminals) – "W" Suffix**

SPST–NO, 1 Form "A" SPDT, 1 Form "C"



Contact Rating @ 14VDC

Maximum Load Current	50 Amp Rated		70 Amp Rated
	SPST–NO	SPDT	SPST–NO
Resistive Load	50A	50A (NO); 30A (NC)	70A

DC OPERATED

NTE Type No.	Nom. Volt.	Contact Arr.	Coil Res. Ohms (Typ)	Nom. Power	Max. Contact Cur. @ 14VDC	Diag No.
R51–1D40–12	12VDC	SPST–NO	90	1.6W	50A	D38
R51–1D40–12F	12VDC	SPST–NO	90	1.6W	50A	D38
R51–1D40–12FW	12VDC	SPST–NO	90	1.6W	50A	D38c
R51–1D40–24	24VDC	SPST–NO	360	1.6W	50A	D38
R51–1D40–24F	24VDC	SPST–NO	360	1.6W	50A	D38
R51–1D40–24FW	24VDC	SPST–NO	360	1.6W	50A	D38c
R51–5D40–12	12VDC	SPDT	90	1.6W	50A	D38
R51–5D40–12F	12VDC	SPDT	90	1.6W	50A	D38
R51–5D40–12FW	12VDC	SPDT	90	1.6W	50A	D38c
R51–5D40–24	24VDC	SPDT	360	1.6W	50A	D38
R51–5D40–24F	24VDC	SPDT	360	1.6W	50A	D38
R51–5D40–24FW	24VDC	SPDT	360	1.6W	50A	D38c
R51–1D70–12	12VDC	SPST–NO	90	1.6W	70A	D38a
R51–1D70–12F	12VDC	SPST–NO	90	1.6W	70A	D38a
R51–1D70–12P	12VDC	SPST–NO	90	1.6W	70A	D38b
R51–1D70–24	24VDC	SPST–NO	360	1.6W	70A	D38a
R51–1D70–24F	24VDC	SPST–NO	360	1.6W	70A	D38a

ACCESSORIES

MOUNTING STYLES	DESCRIPTION	NTE TYPE NO.
PC MOUNT	4–PIN	R95–159 (70A **ONLY**)
PC MOUNT	5–PIN	R95–160 (50A **ONLY**)
WIRE LEADS	4–PIN	R95–189 (50A **ONLY**)
WIRE LEADS	5–PIN	R95–188 (50A **ONLY**)
WIRE HARNESSING	4–PIN	R95–160A (70A **ONLY**)
WIRE LEADS	4-PIN SPST-NO Weatherproof Socket	R95–190
WIRE LEADS	5-PIN SPDT Weatherproof socket	R95–191

Note 1. To ensure a weatherproof connection, R51 Series weatherproof relays (W–suffix) should be used in combination with the appropriate weatherproof socket.

Electrical Specifications

Contact

Contact Material: AgSnO alloy
Contact Rating: See Chart

Coil

Coil voltage: See Chart
Coil resistances: See Chart

Operational Characteristics

Timing Values . . . . . Operate Time: 20 mS max
Release Time: 20 mS max

Insulation Characteristics

Dielectric strength: 500 VRMS, between Contacts and Coil

Environmental Characteristics

Operating: –40°C to +125°C
Storage: –40°C to +155°C

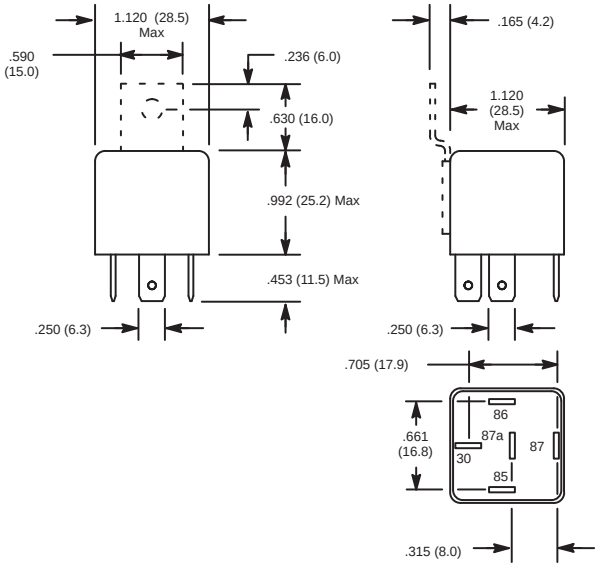
Life Expectancy

Mechanical Life: 10,000,000 operations (18,000 operations/hr)
Electrical Life: 100,000 operations (1,200 operations/hr)

Weight

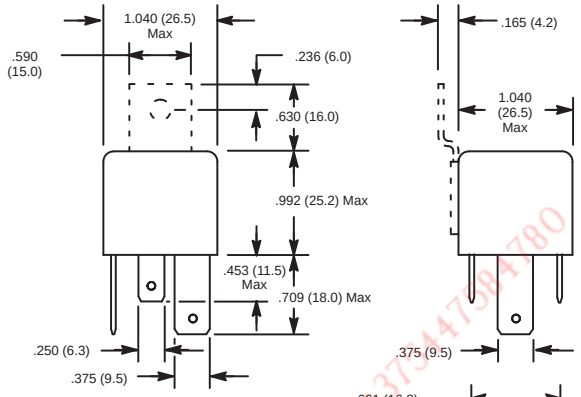
Std: 1.1 oz (31 gram) approx

D38

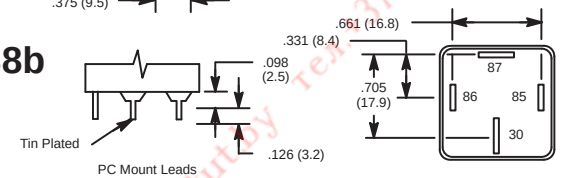


NOTE: Dotted line indicates Flange Mount Pin87a for SPDT devices **ONLY**.

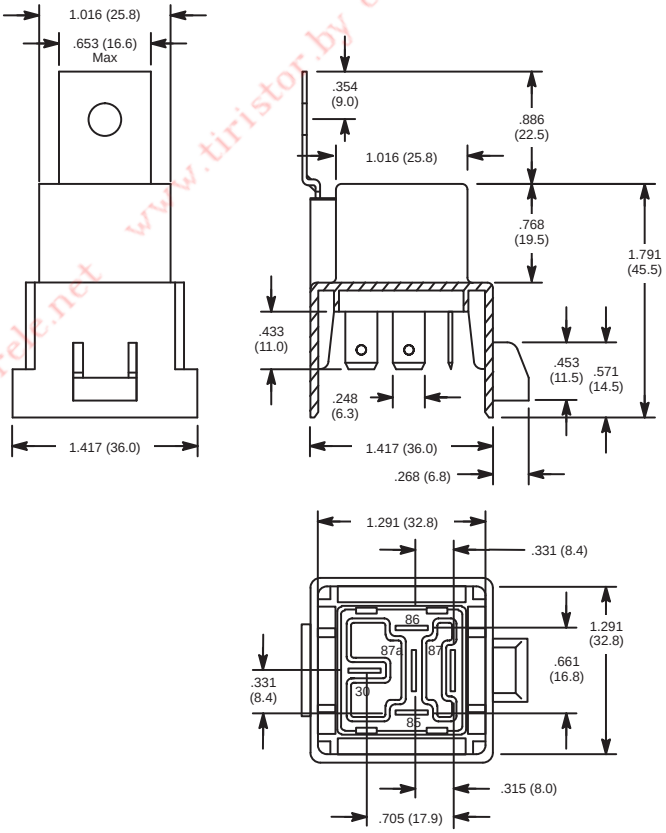
D38a



D38b



D38c

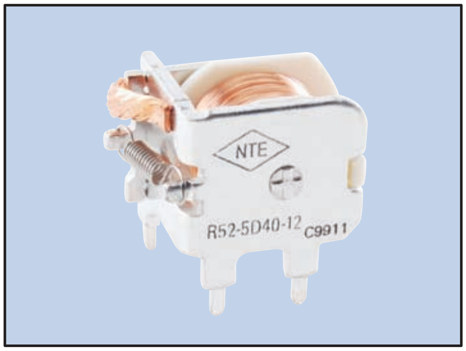


R52 Series

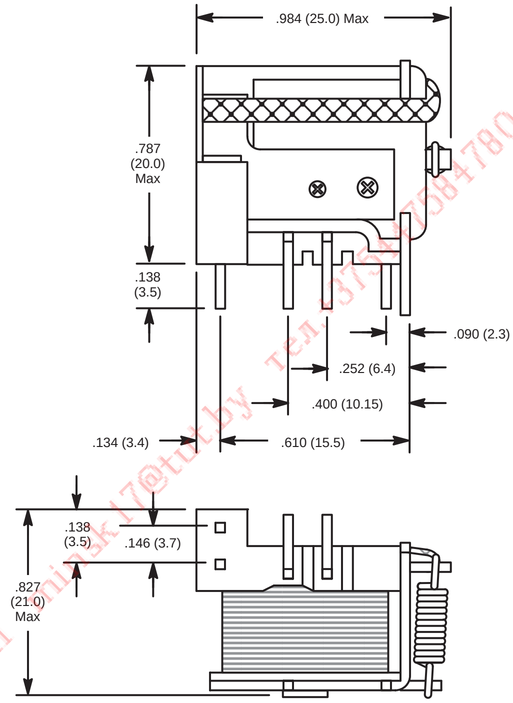
Subminiature, 40 Amp, PC Mountable, Heavy Duty Automotive Relay.

Features

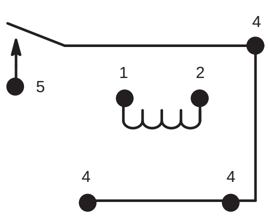
- **P.C. Board Mountable**
- **Standard U.S. Footprint**
- **Subminiature Size**
- **Open Frame**
- **SPST & SPDT Versions**



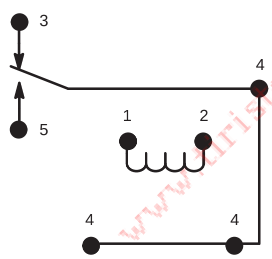
D48



SPST–NO, 1 Form “A”



SPDT, 1 Form “C”



DC OPERATED						
NTE Type No.	Nom. Volt.	Contact Arr.	Coil Res. Ohms (Typ)	Nom. Power	Max. Contact Cur. @ 14VDC	Diag No.
R52–1D40–12	12VDC	SPST–NO	120	1.2W	40A	D48
R52–5D40–12	12VDC	SPDT	120	1.2W	40A	D48

Electrical Specifications

Contact

Rating: 40 Amp @ 14VDC
Max. Switching Voltage: 60VAC, 75VDC
Resistance: 50mΩ Max
Material: $AgSnO_2$

Coil

Coil Voltages: See Chart
Pick–up Voltages: 70% of rated voltage
Drop–out Voltages: 10% of rated voltage
Max. Allowable Voltage: 120% of rated voltage
Resistance: See Chart

Operational Characteristics

Timing Values: . . . . Operate Time: 10 mS typ
Release Time: 10 mS typ

Insulation Characteristics

Dielectric Strength
Between Coil & Contacts: 750 VRMS
Between Contacts: 750 VRMS
Insulation Resistance: 100MΩ Min

Environmental Characteristics

Operating: –30°C to +85°C

Life

Mechanical: 10 x 10^6 (No Load)
Electrical: 10 x 10^4 (Resistive Load)

Weight

Std: 0.63 oz (18 grams) approx

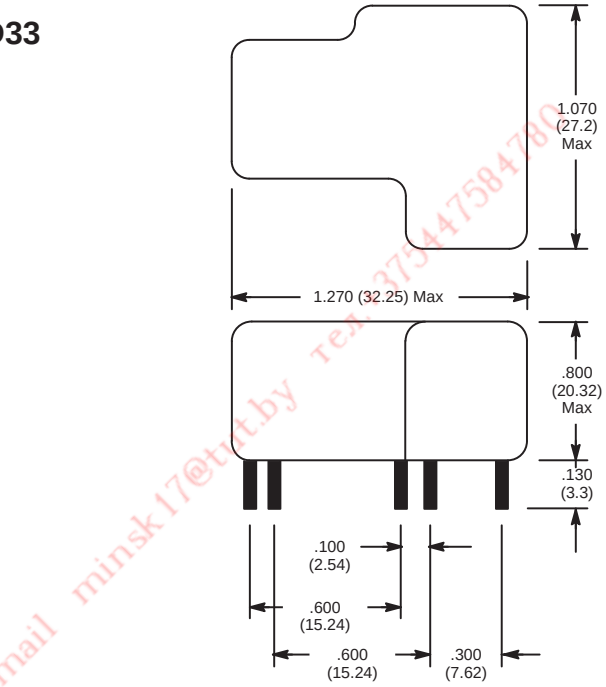
R53 Series

Features

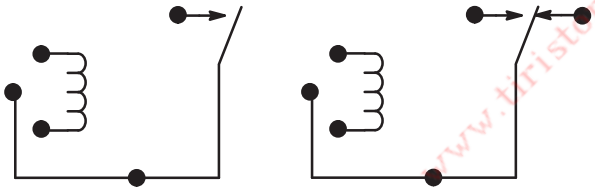
- P.C. Board Mountable
- Miniature Size
- Epoxy Sealed
- Vented Cover–Fully Enclosed
- SPST & SPDT Versions
- Cut–off Nib for Vent Hole

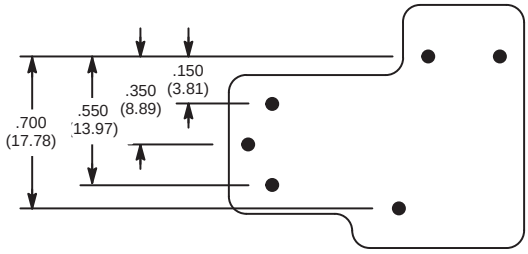
Miniature 30 Amp & 20 Amp Industrial Relays for Automotive Controls, Industrial Timers, Process Controls.

D33



SPST–NO, 1 Form "A" SPDT, 1 Form "C"





DC OPERATED						
NTE Type No.	Nom. Volt.	Contact Arr.	Coil Res. Ohms (Typ)	Nom. Power	Max. Contact Cur. @ 28VDC or 240VAC	Diag No.
R53–1D30–6	6VDC	SPST–NO	40	900mW	30A	D33
R53–1D30–12	12VDC	SPST–NO	155	900mW	30A	D33
R53–1D30–24	24VDC	SPST–NO	660	900mW	30A	D33
R53–5D20–6	6VDC	SPDT	40	900mW	20A	D33
R53–5D20–12	12VDC	SPDT	155	900mW	20A	D33
R53–5D20–24	24VDC	SPDT	660	900mW	20A	D33
R53–5D20–48	48VDC	SPDT	2550	900mW	20A	D33
R53–5D20–110	110VDC	SPDT	13,450	900mW	20A	D33

Electrical Specifications

Contact

Rating: 1 Form A (SPST), 30 Amps at 240 VAC,
1 Form C (SPDT), 20 Amps at 240 VAC.

Coil

Coil voltages: See Chart
Coil resistances: 900mW Nominal

Operational Characteristics

Timing valves: Operate & Release 10–15 mS

Insulation Characteristics

Dielectric strength: 1500 VRMS, 60Hz./1 sec

Environmental Characteristics

Ambient temperature range: –55° to +85°

Time Delay Relays – Delay on Operate

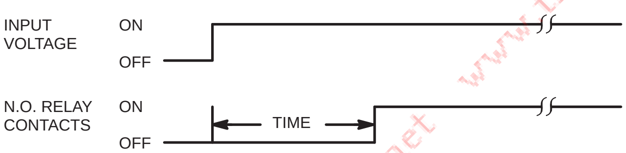
R28 Series

Features

- ± 0.1% Repeatability
- 8–Pin Octal Base
- Knob with Calibrated Scale
- 3–Timing Ranges
- Impact Proof Dust Cover
- IC Hybrid Circuitry for Timing

OPERATION

DELAY ON OPERATE– The 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.

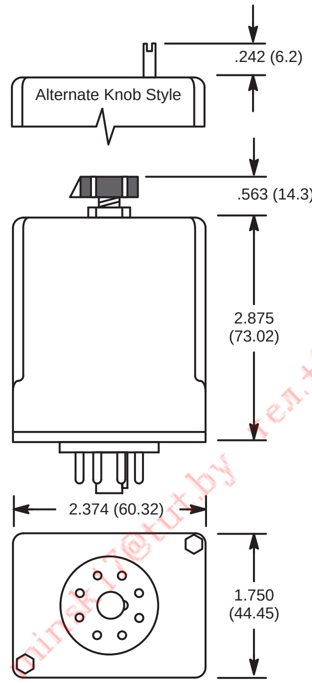


AC OPERATED					
NTE Type No.	Nom. Voltage	Contact Arr.	Input Cur. Nom.	Max. Contact Cur. @ 28VDC or 120VAC	Diag No.
R28–11A10–120K	120VAC	DPDT	20mA	10A	D16
R28–11A10–120L	120VAC	DPDT	20mA	10A	D16
R28–11A10–120M	120VAC	DPDT	20mA	10A	D16
DC OPERATED					
R28–11D10–24K	24VDC	DPDT	40mA	10A	D16
R28–11D10–24L	24VDC	DPDT	40mA	10A	D16

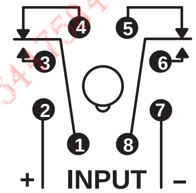
ACCESSORIES		
MOUNTING STYLES	DESCRIPTION	NTE TYPE NO.
SURFACE MOUNT	8–PIN OCTAL	R95–101
PANEL MOUNT	8–PIN OCTAL	R95–118
DIN RAIL MOUNT	8–PIN OCTAL	R95–113
DIN RAIL MOUNT	8–PIN OCTAL	R95–181

DPDT, 10 Amp AC & DC Adjustable Delay On Operate Time Delay Relays.

D16



DPDT, 2 Form "C"



Electrical Specifications

Contact

Rating: 10 Amps 120 VAC, 30 VDC–8 Amp, 1/2 HP @ 240 VAC, 1/3 HP @ 120 VAC
Life: 500,000 ops @ 120 VAC, 10A resistive
1,000,000 ops @ 120 VAC, 5A resistive
2,000,000 ops @ 120 VAC, 2A resistive
Mechanical Life: 50,000,000 operations

Input

Nominal Input voltage: See Chart
Steady state input current: See Chart

Timing

Timing adjustment modes available:
0.1 to 10 sec (K–suffix)
1.8 to 180 sec (L–suffix)
3.0 to 300 sec (M–suffix)

Repeat Accuracy

± 0.1% – constant voltage & temperature
Percent Timing change over temperature & voltage range: ± 10%
Timing tolerance at high end of range: –0, +40%
Timing tolerance at low end of range: +0, –40%
Reset Time: 100 mS max
Release Time: 100 mS max

Protection

Transient: UL508 surge test 5000V for 50 mS
Dielectric Breakdown
Coil To Contact: 1500 VAC
Across Open Contact: 1000 VAC
Noise Immunity: NEMA ICS 2–230 2500 VAC

Environmental Characteristics

Operating: –10°C to +55°C
Storage: –55°C to +85°C

Weight

Std: 4 oz (115 gram) approx.

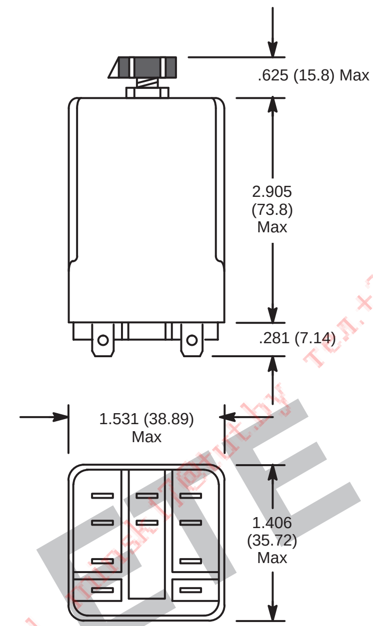
R34 Series

DPDT, 12 Amp Adjustable Delay On Operate Time Delay Relay.

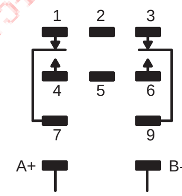
Features

- ± 0.1% Repeatability
- Socket Mount or Solderable
- .187" (4.75mm) Quick–Connect Terminals
- Knob with Calibrated Scale
- 2–Timing Ranges
- IC Hybrid Circuitry for Timing
- Impact Proof Dust Cover

D18



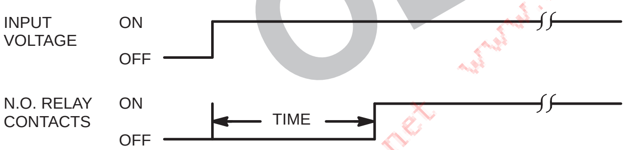
DPDT, 2 Form "C"



Note: Pin2 & Pin5 can be removed and have no electrical connection.

OPERATION

DELAY ON OPERATE– The 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.



AC OPERATED					
NTE Type No.	Nom. Voltage	Contact Arr.	Input Cur. Nom.	Max. Contact Cur. @ 28VDC or 120VAC	Diag No.
R34–11A12–120K	120VAC	DPDT	20mA	12A	D18A
R34–11A12–120L	120VAC	DPDT	20mA	12A	D18A

ACCESSORIES		
MOUNTING STYLES	DESCRIPTION	NTE TYPE NO.
SURFACE MOUNT	11–PIN BLADE	R95–105
PANEL MOUNT SOLDER TERM	11–PIN BLADE	R95–116
PANEL MOUNT QUICK CONNECT	11–PIN BLADE	R95–124
DIN RAIL MOUNT	11–PIN BLADE	R95–115
PC MOUNT	11–PIN BLADE	R95–123

Electrical Specifications

Contact

Rating: 12 Amps @ 120 VAC, 28 VDC Resistive
1/3 HP @ 120 VAC 1/2 @ 240 VAC
Life: 300,000 operations @ 120 VAC, 12 Amp resistive
5,000,000 operations @ 32 VDC, 5 Amp resistive

Input

Nominal Input voltage: 120 VAC
Steady state input current: 20mA @ 120 VAC

Timing

Timing adjustment modes available:
0.1 to 10 sec (K–suffix)
1.8 to 180 sec (L–suffix)

Repeat Accuracy

± 0.1% ±33 mS AC constant voltage & temperature
Percent Timing change over temperature & voltage range:
± 10%
Timing tolerance at high end of range: –0, +40%
Timing tolerance at low end of range: +0, –40%
Reset Time: 100 mS max

Protection

Transient: Twice normal for 1 mS
Dielectric Breakdown
Contact To Coil: 2000 VAC
Across Open Contact: 1000 VAC

Environmental Characteristics

Operating: –10°C to +55°C
Storage: –55°C to +85°C

Weight

Std: 4 oz (96 grams) approx.

Time Delay Relays – Delay on Operate

R60 Series

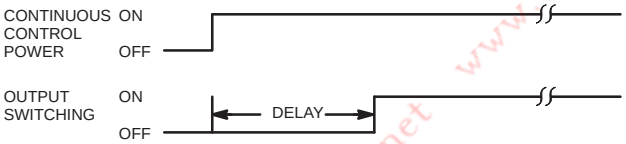
Programmable, DPDT, 10 Amp, AC or DC, Delay On Operate Time Delay Relays.

Features

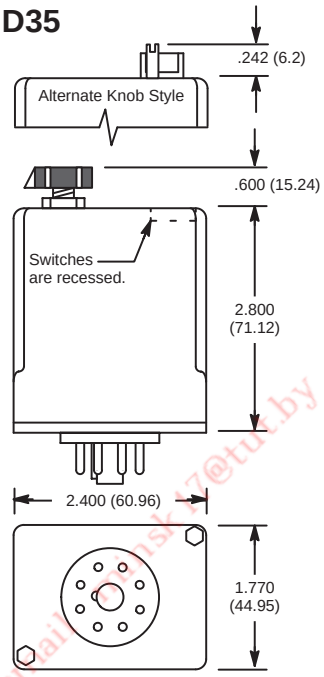
- Universal Input Voltage (U–suffix)
- 16 Time Ranges in Single Timer (0.05 sec. to 100 hrs.)
- User Sets Time Ranges
  No Math – Just Flip Switches
- Instructions Right on Unit
- Fine Tuning Knob for Precision Timing
- Pin for Pin Interchangeable with Timers
  in the Field – No Rewiring
- AC or DC Operation
- CMOS Digital Circuitry – 0.5% Repeatable Accuracy

OPERATION

DELAY ON OPERATE– The 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.

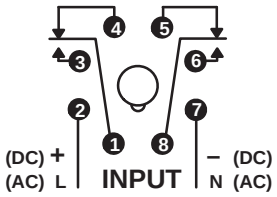


D35



1 2 3 4	Knob Style	TIME RANGE Min	Max	
	A	0.1	0.25	Seconds
	B	0.15	0.5	
	C	0.3	1.0	
	D	0.5	2.0	
	E	1.0	4.0	
	F	2.0	8.0	
	G	4.0	15	
	H	8.0	30	
	I	15	60	
	J	30	120	
	K	1.0	4.0	Minutes
	L	2.0	8.0	
	M	4.0	15	
	N	8.0	30	
	O	15	60	
	P	30	120	

DPDT, 2 Form "C"



Universal Type

Dial Setting	TIME RANGE Min	Max	
A	0.05	0.5	Seconds
B	0.1	1	
C	0.5	5	
D	1	10	
E	3	30	
F	6	60	
G	0.2	2	Minutes
H	0.5	5	
I	1	10	
J	3	30	
K	6	60	
L	0.2	2	Hours
M	0.5	5	
N	1	10	
O	2.4	24	
P	10	100	

AC or DC OPERATED					
NTE Type No.	Nom. Voltage	Contact Arr.	Input Cur. Nom.	Max. Contact Cur. @ 28VDC or 120VAC	Diag No.
R60–11AD10–12	12VAC/DC	DPDT	167mA	10A	D35
* R60–11AD10–24	24VAC/DC	DPDT	83mA	10A	D35
* R60–11AD10–120	120VAC/DC	DPDT	17mA	10A	D35
NEW R60–11AD10–U	24 – 240VAC 12 – 125VDC	DPDT	–	10A	D35

* These devices are being phased out and replace by the R60–11AD10–U.

ACCESSORIES		
MOUNTING STYLES	DESCRIPTION	NTE TYPE NO.
SURFACE MOUNT	8–PIN OCTAL	R95–101
PANEL MOUNT	8–PIN OCTAL	R95–118
DIN RAIL MOUNT	8–PIN OCTAL	R95–113
DIN RAIL MOUNT	8–PIN OCTAL	R95–181

Electrical Specifications

Contact

Rating: 10 Amps 240VAC or 30VDC, 1/3 HP, 240VAC or 120VAC Pilot Duty 345VA, 120VAC or 240VAC, 50/60Hz
Life: 500,000 (100,000 U–type) operations at full load
Mechanical Life: 7,000,000 (10,000,000 U–type) operations at no load

Input

Nominal Input voltage: See Chart
Steady state input current: See Chart

Timing

Timing adjustment modes available: See Timing Range Chart

Repeat Accuracy

± 0.5% – after established at steady temperature (4 hours)
Timing tolerance at high end of range: –0, +10%
Timing tolerance at low end of range: +0, –50%
Reset Time: 60 mS typ

Environmental Characteristics

Operating: –20°C to +55°C

Time Delay Relays – Delay on Release

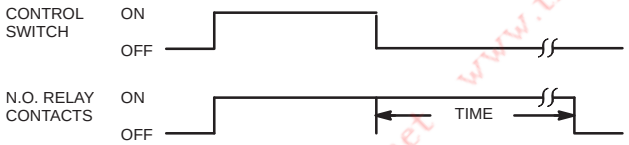
R32 Series

Features

- ± 0.1% Repeatability
- 11–Pin Octal Base
- Knob with Calibrated Scale
- 3–Timing Ranges
- Impact Proof Dust Cover
- IC Hybrid Circuitry for Timing

OPERATION

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 deenergize. Time may be reset to zero during timing by closing the control switch.

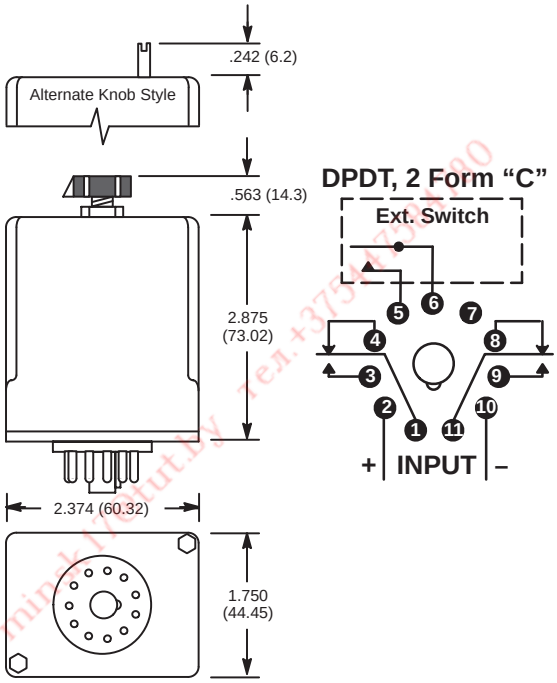


AC OPERATED					
NTE Type No.	Nom. Voltage	Contact Arr.	Input Cur. Nom.	Max. Contact Cur. @ 28VDC or 120VAC	Diag No.
R32–11A10–120K	120VAC/DC	DPDT	20mA	10A	D17A
R32–11A10–120L	120VAC/DC	DPDT	20mA	10A	D17A
R32–11A10–120M	120VAC/DC	DPDT	20mA	10A	D17A
DC OPERATED					
R32–11D10–24K	24VDC/AC	DPDT	40mA	10A	D17A
R32–11D10–24L	24VDC/AC	DPDT	40mA	10A	D17A

ACCESSORIES		
MOUNTING STYLES	DESCRIPTION	NTE TYPE NO.
SURFACE MOUNT	11–PIN OCTAL	R95–104
PANEL MOUNT	11–PIN OCTAL	R95–119
DIN RAIL MOUNT	11–PIN OCTAL	R95–114
DIN RAIL MOUNT	11–PIN OCTAL	R95–182

DPDT, 10 Amp AC & DC Adjustable Slow Release (Delay On Release) Time Delay Relays.

D17



Electrical Specifications

Contact

Rating: 10 Amps 120 VAC, 30 VDC–8 Amp, 1/2 HP @ 240 VAC, 1/3 HP @ 120 VAC
Life: 500,000 ops @ 120 VAC, 10A resistive
1,000,000 ops @ 120 VAC, 5A resistive
2,000,000 ops @ 120 VAC, 2A resistive
Mechanical Life: 50,000,000 operations

Input

Nominal Input voltage: See Chart
Steady state input current: See Chart

Timing

Timing adjustment modes available:
0.1 to 10 sec (K–suffix)
1.8 to 180 sec (L–suffix)
3.0 to 300 sec (M–suffix)

Repeat Accuracy

± 0.1% – constant voltage & temperature
Percent Timing change over temperature & voltage range:
± 10%
Timing tolerance at high end of range: –0, +40%
Timing tolerance at low end of range: +0, –40%
Reset Time: 100 mS max

Protection

Transient: UL508 surge test 5000V for 50 mS
Dielectric Breakdown
Coil To Contact: 1500 VAC
Across Open Contact: 1000 VAC
Noise Immunity: NEMA ICS 2–230 2500 VAC

Environmental Characteristics

Operating: –10°C to +55°C
Storage: –55°C to +85°C

Weight

Std: 4 oz (115 gram) approx.

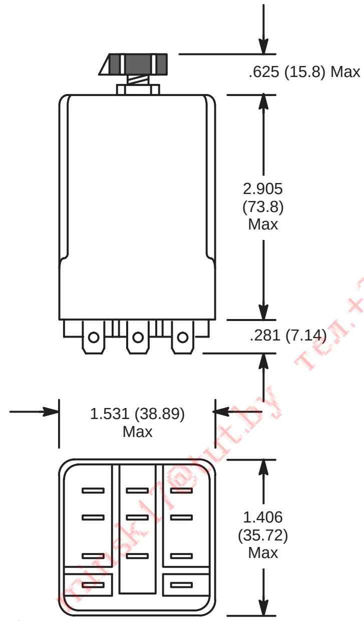
R36 Series

DPDT, 12 Amp Adjustable Delay On Release Time Delay Relay.

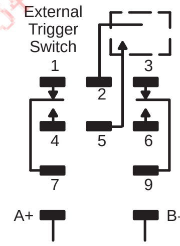
Features

- ± 0.1% Repeatability
- Socket Mount or Solderable
- .187" (4.75mm) Quick–Connect Terminals
- Knob with Calibrated Scale
- 2–Timing Ranges
- IC Hybrid Circuitry for Timing
- Impact Proof Dust Cover

D18

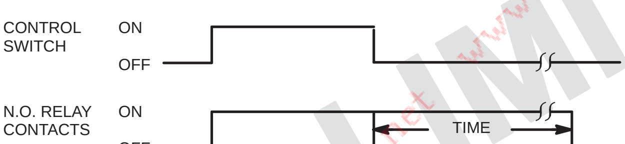


DPDT, 2 Form "C"



OPERATION

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 deenergize. Time may be reset to zero during timing by closing the control switch.



AC OPERATED					
NTE Type No.	Nom. Voltage	Contact Arr.	Input Cur. Nom.	Max. Contact Cur. @ 28VDC or 120VAC	Diag No.
R36–11A12–120K	120VAC	DPDT	20mA	12A	D18
R36–11A12–120L	120VAC	DPDT	20mA	12A	D18

ACCESSORIES		
MOUNTING STYLES	DESCRIPTION	NTE TYPE NO.
SURFACE MOUNT	11–PIN BLADE	R95–105
PANEL MOUNT SOLDER TERM	11–PIN BLADE	R95–116
PANEL MOUNT QUICK CONNECT	11–PIN BLADE	R95–124
DIN RAIL MOUNT	11–PIN BLADE	R95–115
PC MOUNT	11–PIN BLADE	R95–123

Electrical Specifications

Contact

Rating: 12 Amps @ 120 VAC, 28 VDC Resistive
1/3 HP @ 120 VAC 1/2 @ 240 VAC
Life: 300,000 operations @ 120 VAC, 12 Amp resistive
5,000,000 operations @ 32 VDC, 5 Amp resistive

Input

Nominal Input voltage: 120 VAC
Steady state input current: 20mA @ 120 VAC

Timing

Timing adjustment modes available:
0.1 to 10 sec (K–suffix)
1.8 to 180 sec (L–suffix)

Repeat Accuracy

± 0.1% ±33 mS AC constant voltage & temperature
Percent Timing change over temperature & voltage range:
± 10%
Timing tolerance at high end of range: –0, +40%
Timing tolerance at low end of range: +0, –40%
Reset Time: 100 mS max

Protection

Transient: Twice normal for 1 mS
Dielectric Breakdown
Contact To Coil: 2000 VAC
Across Open Contact: 1000 VAC

Environmental Characteristics

Operating: –10°C to +55°C
Storage: –55°C to +85°C

Weight

Std: 4 oz (96 grams) approx.

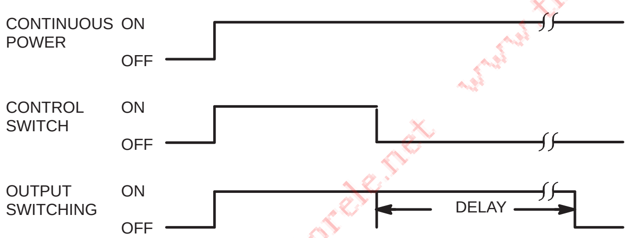
R61 Series

Features

- Universal Input Voltage (U–suffix)
- 16 Time Ranges in Single Timer (0.05 sec. to 100 hrs.)
- User Sets Time Ranges
  No Math – Just Flip Switches
- Instructions Right on Unit
- Fine Tuning Knob for Precision Timing
- Pin for Pin Interchangeable with Timers
  in the Field – No Rewiring
- AC or DC Operation
- CMOS Digital Circuitry – 0.5% Repeatable Accuracy

OPERATION

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 deenergize. Time may be reset to zero during timing by closing the control switch.



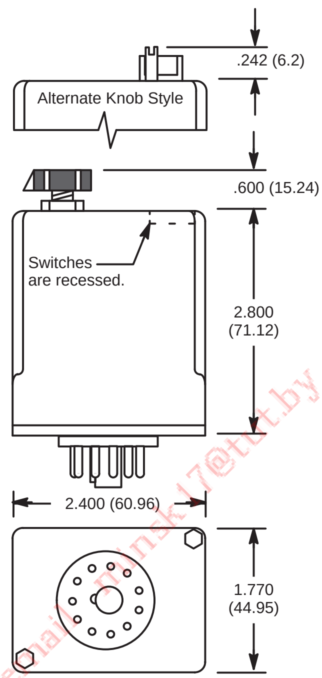
						AC or DC OPERATED		
	NTE Type No.	Nom. Voltage	Contact Arr.	Input Cur. Nom.	Max. Contact Cur. @ 28VDC or 120VAC	Diag No.
	R61–11AD10–12	12VAC/DC	DPDT	167mA	10A	D36
*	R61–11AD10–24	24VAC/DC	DPDT	83mA	10A	D36
*	R61–11AD10–120	120VAC/DC	DPDT	17mA	10A	D36
NEW	R61–11AD10–U	24 – 240VAC 12 – 125VD	DPDT	–	10A	D36

* These devices are being phased out and replace by the R61–11AD10–U.

ACCESSORIES		
MOUNTING STYLES	DESCRIPTION	NTE TYPE NO.
SURFACE MOUNT	11–PIN OCTAL	R95–104
PANEL MOUNT	11–PIN OCTAL	R95–119
DIN RAIL MOUNT	11–PIN OCTAL	R95–114
DIN RAIL MOUNT	11–PIN OCTAL	R95–182

Programmable, DPDT, 10 Amp, AC or DC, Delay On Release Time Delay Relays.

D36

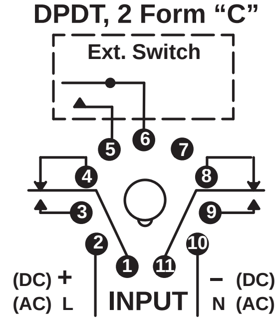


1	2	3	4	Knob Style	TIME RANGE Min	TIME RANGE Max	
↓	↓	↓	↓	A	0.1	0.25	Seconds
↑	↓	↓	↓	B	0.15	0.5	Seconds
↓	↑	↓	↓	C	0.3	1.0	Seconds
↑	↑	↓	↓	D	0.5	2.0	Seconds
↓	↓	↑	↓	E	1.0	4.0	Seconds
↑	↓	↑	↓	F	2.0	8.0	Seconds
↓	↑	↑	↓	G	4.0	15	Seconds
↑	↑	↑	↓	H	8.0	30	Seconds
↓	↓	↓	↑	I	15	60	Seconds
↑	↓	↓	↑	J	30	120	Seconds
↓	↑	↓	↑	K	1.0	4.0	Minutes
↑	↑	↓	↑	L	2.0	8.0	Minutes
↓	↓	↑	↑	M	4.0	15	Minutes
↑	↓	↑	↑	N	8.0	30	Minutes
↓	↑	↑	↑	O	15	60	Minutes
↑	↑	↑	↑	P	30	120	Minutes

Universal Type

Dial Setting	TIME RANGE Min	TIME RANGE Max	
A	0.05	0.5	Seconds
B	0.1	1	Seconds
C	0.5	5	Seconds
D	1	10	Seconds
E	3	30	Seconds
F	6	60	Seconds
G	0.2	2	Minutes
H	0.5	5	Minutes
I	1	10	Minutes
J	3	30	Minutes
K	6	60	Minutes
L	0.2	2	Hours
M	0.5	5	Hours
N	1	10	Hours
O	2.4	24	Hours
P	10	100	Hours

DPDT, 2 Form “C”



Electrical Specifications

Contact

Rating: 10 Amps 240VAC or 30VDC, 1/3 HP, 240VAC or 120VAC Pilot Duty 345VA, 120VAC or 240VAC, 50/60H_Z
Life: 500,000 (100,000 U–type) operations at full load
Mechanical Life: 7,000,000 (10,000,000 U–type) operations at no load

Input

Nominal Input voltage: See Chart
Steady state input current: See Chart

Timing

Timing adjustment modes available: See Timing Range Chart

Repeat Accuracy

0.5% – after established at steady temperature (4 hours)
Timing tolerance at high end of range: –0, +10%
Timing tolerance at low end of range: +0, –50%
Reset Time: 60 mS typ

Environmental Characteristics

Operating: –20°C to +55°C

Time Delay Relays – Interval On

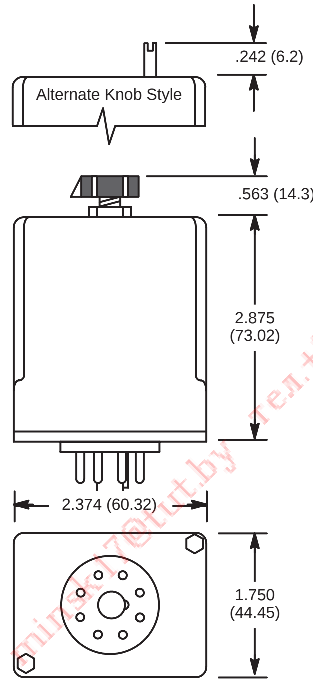
R30 Series

DPDT, 10 Amp AC & DC Adjustable Interval Time Delay Relay.

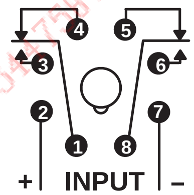
Features

- ± 0.1% Repeatability
- 8–Pin Octal Base
- Knob with Calibrated Scale
- 3–Timing Ranges
- Impact Proof Dust Cover
- IC Hybrid Circuitry for Timing

D16

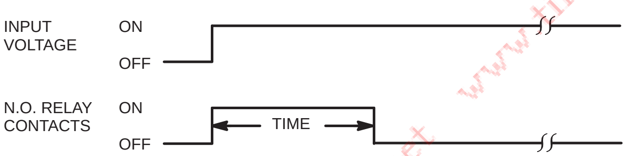


DPDT, 2 Form "C"



OPERATION

INTERVAL ON– The relay will operate immediately when the input voltage is applied. At the end of an adjustable interval the relay will release and remain in this state until re–application of the input voltage.



NTE Type No.	Nom. Voltage	Contact Arr.	Input Cur. Nom.	Max. Contact Cur. @ 28VDC or 120VAC	Diag No.
AC OPERATED					
R30–11A10–120K	120VAC	DPDT	20mA	10A	D16
R30–11A10–120L	120VAC	DPDT	20mA	10A	D16
R30–11A10–120M	120VAC	DPDT	20mA	10A	D16
DC OPERATED					
R30–11D10–24K	24VDC	DPDT	40mA	10A	D16
R30–11D10–24L	24VDC	DPDT	40mA	10A	D16

ACCESSORIES

MOUNTING STYLES	DESCRIPTION	NTE TYPE NO.
SURFACE MOUNT	8–PIN OCTAL	R95–101
PANEL MOUNT	8–PIN OCTAL	R95–118
DIN RAIL MOUNT	8–PIN OCTAL	R95–113
DIN RAIL MOUNT	8–PIN OCTAL	R95–181

Electrical Specifications

Contact

Rating: 10 Amps 120 VAC, 30 VDC–8 Amp, 1/2 HP @ 240 VAC, 1/3 HP @ 120 VAC
Life: 500,000 ops @ 120 VAC, 10A resistive
1,000,000 ops @ 120 VAC, 5A resistive
2,000,000 ops @ 120 VAC, 2A resistive
Mechanical Life: 50,000,000 operations

Input

Nominal Input voltage: See Chart
Steady state input current: See Chart

Timing

Timing adjustment modes available:
0.1 to 10 sec (K–suffix)
1.8 to 180 sec (L–suffix)
3.0 to 300 sec (M–suffix)

Repeat Accuracy

± 0.1% – constant voltage & temperature
Percent Timing change over temperature & voltage range:
± 10%
Timing tolerance at high end of range: –0, +40%
Timing tolerance at low end of range: +0, –40%
Reset Time: 100 mS max

Protection

Transient: UL508 surge test 5000V for 50 mS
Dielectric Breakdown
Coil To Contact: 1500 VAC
Across Open Contact: 1000 VAC
Noise Immunity: NEMA ICS 2–230 2500 VAC

Environmental Characteristics

Operating: –10°C to +55°C
Storage: –55°C to +85°C

Weight

Std: 4 oz (115 gram) approx.

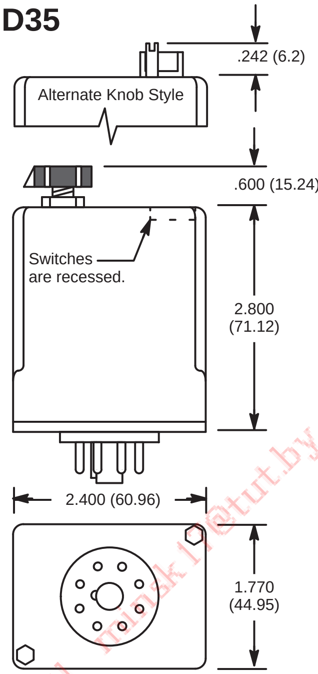
R63 Series

Programmable, DPDT, 10 Amp, AC or DC, Interval Time Delay Relays.

Features

- **Universal Input Voltage (U–suffix)**
- **16 Time Ranges in Single Timer (0.05 sec. to 100 hrs.)**
- **User Sets Time Ranges**
  No Math – Just Flip Switches
- **Instructions Right on Unit**
- **Fine Tuning Knob for Precision Timing**
- **Pin for Pin Interchangeable with Timers in the Field – No Rewiring**
- **AC or DC Operation**
- **CMOS Digital Circuitry – 0.5% Repeatable Accuracy**

D35



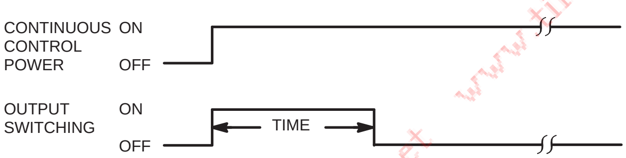
1 2 3 4	Knob Style	TIME RANGE Min	Max	
	A	0.1	0.25	Seconds
	B	0.15	0.5	
	C	0.3	1.0	
	D	0.5	2.0	
	E	1.0	4.0	
	F	2.0	8.0	
	G	4.0	15	
	H	8.0	30	
	I	15	60	
	J	30	120	
	K	1.0	4.0	Minutes
	L	2.0	8.0	
	M	4.0	15	
	N	8.0	30	
	O	15	60	
	P	30	120	

Universal Type

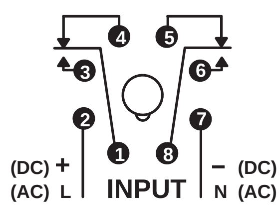
Dial Setting	TIME RANGE Min	Max	
A	0.05	0.5	Seconds
B	0.1	1	
C	0.5	5	
D	1	10	
E	3	30	
F	6	60	
G	0.2	2	Minutes
H	0.5	5	
I	1	10	
J	3	30	
K	6	60	
L	0.2	2	Hours
M	0.5	5	
N	1	10	
O	2.4	24	
P	10	100	

OPERATION

INTERVAL ON– The relay energizes and timing begins when the 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.



DPDT, 2 Form "C"



AC or DC OPERATED					
NTE Type No.	Nom. Voltage	Contact Arr.	Input Cur. Nom.	Max. Contact Cur. @ 28VDC or 120VAC	Diag No.
R63–11AD10–12	12VAC/DC	DPDT	167mA	10A	D35
* R63–11AD10–24	24VAC/DC	DPDT	83mA	10A	D35
* R63–11AD10–120	120VAC/DC	DPDT	17mA	10A	D35
NEW R63–11AD10–U	24 – 240VAC 12 – 125VDC	DPDT	–	10A	D35

* These devices are being phased out and replace by the R63–11AD10–U.

ACCESSORIES		
MOUNTING STYLES	DESCRIPTION	NTE TYPE NO.
SURFACE MOUNT	8–PIN OCTAL	R95–101
PANEL MOUNT	8–PIN OCTAL	R95–118
DIN RAIL MOUNT	8–PIN OCTAL	R95–113
DIN RAIL MOUNT	8–PIN OCTAL	R95–181

Electrical Specifications

Contact

Rating: 10 Amps 240VAC or 30VDC, 1/3 HP, 240VAC or 120VAC Pilot Duty 345VA, 120VAC or 240VAC, 50/60Hz
Life: 500,000 (100,000 U–type) operations at full load
Mechanical Life: 7,000,000 (10,000,000 U–type) operations at no load

Input

Nominal Input voltage: See Chart
Steady state input current: See Chart

Timing

Timing adjustment modes available: See Timing Range Chart

Repeat Accuracy

± 0.5% – after established at steady temperature (4 hours)
Timing tolerance at high end of range: –0, +10%
Timing tolerance at low end of range: +0, –50%
Reset Time: 60 mS typ

Environmental Characteristics

Operating: –20°C to +55°C

Time Delay Relays – Repeat Cycle

R26 Series

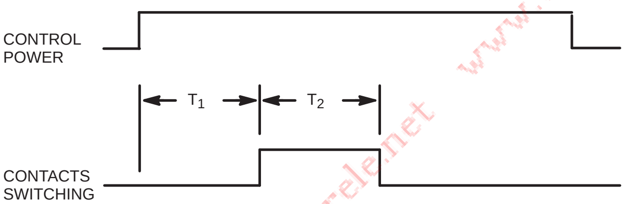
Programmable, DPDT, 10 Amp, AC or DC, Repeat Cycle Time Delay Relays (OFF Time followed by ON Time).

Features

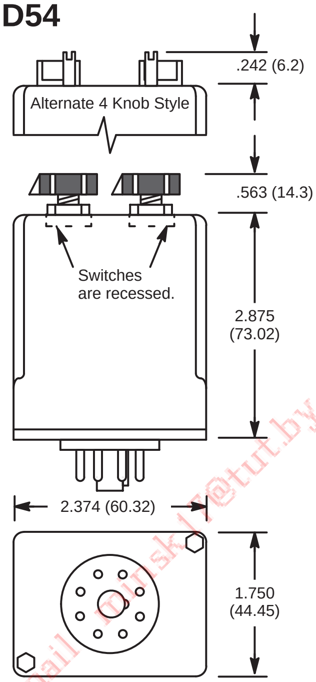
- **Universal Input Voltage (U–suffix)**
- **16 Time Ranges in Single Timer (0.05 sec. to 100 hrs.)**
- **User Sets Time Ranges**
  No Math – Just Flip Switches
- **Instructions Right on Unit**
- **Fine Tuning Knob for Precision Timing**
- **Pin for Pin Interchangeable with Timers in the Field – No Rewiring**
- **AC or DC Operation**
- **CMOS Digital Circuitry – 0.5% Repeatable Accuracy**

OPERATIONS

RECYCLE TIMING – The first delay period begins when input voltage is applied. At the end of the first delay, or "OFF" period, the internal relay pulls in, and the second delay, or "ON" period begins.When the second delay period ends, the relay drops out. This recycling sequence will continue until the removal of input voltage. When input voltage is removed, the relay drops out.



D54

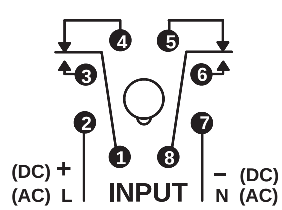


1 2 3 4	Four Knob Style	TIME RANGE Min	Max	
↓ ↓ ↓ ↓	A	0.6	2.5	Seconds
↓ ↓ ↓ ↑	B	1.5	5.0	Seconds
↓ ↓ ↑ ↓	C	2.5	10.5	Seconds
↓ ↓ ↑ ↑	D	5	21	Seconds
↓ ↑ ↓ ↓	E	10	42	Seconds
↓ ↑ ↓ ↑	F	0.4	1.4	Minutes
↓ ↑ ↑ ↓	G	0.7	2.8	Minutes
↓ ↑ ↑ ↑	H	1.5	5.5	Minutes
↑ ↓ ↓ ↓	I	3	11	Minutes
↑ ↓ ↓ ↑	J	5.5	22.5	Minutes
↑ ↓ ↑ ↓	K	11	45	Minutes
↑ ↓ ↑ ↑	L	0.4	1.5	Hours
↑ ↑ ↓ ↓	M	0.8	3.0	Hours
↑ ↑ ↓ ↑	N	1.5	6.0	Hours
↑ ↑ ↑ ↓	O	3	12	Hours
↑ ↑ ↑ ↑	P	6	24	Hours

Universal Type

Dial Setting	TIME RANGE Min	Max	
A	0.05	0.5	Seconds
B	0.1	1	Seconds
C	0.5	5	Seconds
D	1	10	Seconds
E	3	30	Seconds
F	6	60	Seconds
G	0.2	2	Minutes
H	0.5	5	Minutes
I	1	10	Minutes
J	3	30	Minutes
K	6	60	Minutes
L	0.2	2	Hours
M	0.5	5	Hours
N	1	10	Hours
O	2.4	24	Hours
P	10	100	Hours

DPDT, 2 Form "C"



AC or DC OPERATED

	NTE Type No.	Nom. Voltage	Contact Arr.	Input Cur. Nom.	Max. Contact Cur. @ 28VDC or 120VAC	Diag No.
	R26–11AD10–12	12VAC/DC	DPDT	167mA	10A	D54
*	R26–11AD10–24	24VAC/DC	DPDT	83mA	10A	D54
*	R26–11AD10–120	120VAC/DC	DPDT	17mA	10A	D54
NEW	R26–11AD10–U	24 – 240VAC 12 – 125VDC	DPDT	–	10A	D54

* These devices are being phased out and replace by the R26–11AD10–U.

ACCESSORIES

MOUNTING STYLES	DESCRIPTION	NTE TYPE NO.
SURFACE MOUNT	8–PIN OCTAL	R95–101
PANEL MOUNT	8–PIN OCTAL	R95–118
DIN RAIL MOUNT	8–PIN OCTAL	R95–113
DIN RAIL MOUNT	8–PIN OCTAL	R95–181

Electrical Specifications

Contact

Rating: 10 Amps 240VAC or 30VDC, 1/3 HP, 240VAC or 120VAC Pilot Duty 345VA, 120VAC or 240VAC, 50/60H_Z
Life: 500,000 (100,000 U–type) operations at full load
Mechanical Life: 7,000,000 (10,000,000 U–type) operations at no load

Input

Nominal Input voltage: See Chart
Steady state input current: See Chart

Timing

Timing adjustment modes available: See Timing Range Chart

Repeat Accuracy

± 0.5% – after established at steady temperature (4 hours)
Timing tolerance at high end of range: –0, +10%
Timing tolerance at low end of range: +0, –50%
Reset Time: 60 mS typ

Environmental Characteristics

Operating: –20°C to +55°C

Time Delay Relays – Repeat Cycle

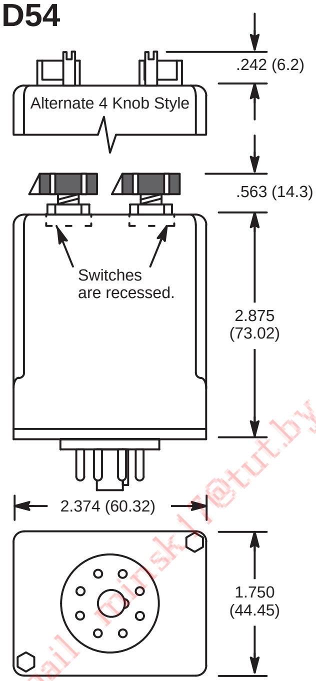
R27 Series

Features

- Universal Input Voltage (U–suffix)
- 16 Time Ranges in Single Timer (0.05 sec. to 100 hrs.)
- User Sets Time Ranges
  No Math – Just Flip Switches
- Instructions Right on Unit
- Fine Tuning Knob for Precision Timing
- Pin for Pin Interchangeable with Timers
  in the Field – No Rewiring
- AC or DC Operation
- CMOS Digital Circuitry – 0.5% Repeatable Accuracy

Programmable, DPDT, 10 Amp, AC or DC, Repeat Cycle Time Delay Relays (ON Time followed by OFF Time).

D54

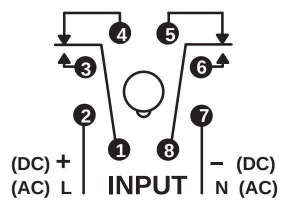


Four Knob Style	TIME RANGE Min	TIME RANGE Max	
A	0.6	2.5	Seconds
B	1.5	5.0	Seconds
C	2.5	10.5	Seconds
D	5	21	Seconds
E	10	42	Seconds
F	0.4	1.4	Minutes
G	0.7	2.8	Minutes
H	1.5	5.5	Minutes
I	3	11	Minutes
J	5.5	22.5	Minutes
K	11	45	Minutes
L	0.4	1.5	Hours
M	0.8	3.0	Hours
N	1.5	6.0	Hours
O	3	12	Hours
P	6	24	Hours

Universal Type

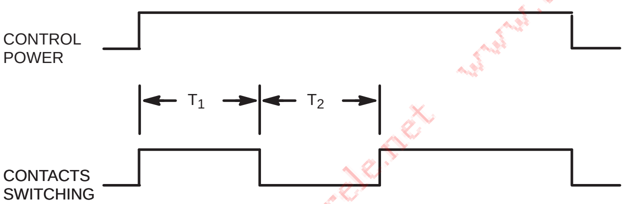
Dial Setting	TIME RANGE Min	TIME RANGE Max	
A	0.05	0.5	Seconds
B	0.1	1	Seconds
C	0.5	5	Seconds
D	1	10	Seconds
E	3	30	Seconds
F	6	60	Seconds
G	0.2	2	Minutes
H	0.5	5	Minutes
I	1	10	Minutes
J	3	30	Minutes
K	6	60	Minutes
L	0.2	2	Hours
M	0.5	5	Hours
N	1	10	Hours
O	2.4	24	Hours
P	10	100	Hours

DPDT, 2 Form "C"



OPERATIONS

RECYCLE TIMING – The first delay period begins when input voltage is applied. At the end of the first delay, or "ON" period, the internal relay pulls in, and the second delay, or "OFF" period begins.When the second delay period ends, the relay drops out. This recycling sequence will continue until the removal of input voltage. When input voltage is removed, the relay drops out.



	NTE Type No.	Nom. Voltage	Contact Arr.	Input Cur. Nom.	Max. Contact Cur. @ 28VDC or 120VAC	Diag No.
	AC or DC OPERATED					
	R27–11AD10–12	12VAC/DC	DPDT	167mA	10A	D54
*	R27–11AD10–24	24VAC/DC	DPDT	83mA	10A	D54
*	R27–11AD10–120	120VAC/DC	DPDT	17mA	10A	D54
NEW	R27–11AD10–U	24 – 240VAC 12 – 125VDC	DPDT	–	10A	D54

* These devices are being phased out and replace by the R27–11AD10–U.

MOUNTING STYLES	DESCRIPTION	NTE TYPE NO.
ACCESSORIES		
SURFACE MOUNT	8–PIN OCTAL	R95–101
PANEL MOUNT	8–PIN OCTAL	R95–118
DIN RAIL MOUNT	8–PIN OCTAL	R95–113
DIN RAIL MOUNT	8–PIN OCTAL	R95–181

Electrical Specifications

Contact

Rating: 10 Amps 240VAC or 30VDC, 1/3 HP, 240VAC or 120VAC Pilot Duty 345VA, 120VAC or 240VAC, 50/60H_Z
Life: 500,000 (100,000 U–type) operations at full load
Mechanical Life: 7,000,000 (10,000,000 U–type) operations at no load

Input

Nominal Input voltage: See Chart
Steady state input current: See Chart

Timing

Timing adjustment modes available: See Timing Range Chart

Repeat Accuracy

± 0.5% – after established at steady temperature (4 hours)
Timing tolerance at high end of range: –0, +10%
Timing tolerance at low end of range: +0, –50%
Reset Time: 60 mS typ

Environmental Characteristics

Operating: –20°C to +55°C

Time Delay Relays – Repeat Cycle

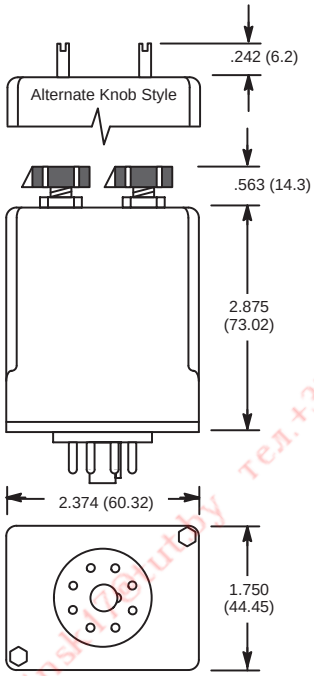
R38 Series

Features

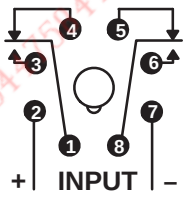
- ± 0.1% Repeatability
- 8–Pin Octal Plug–In
- Knob with Calibrated Scales
- Impact Proof Dust Cover
- 2–Timing Ranges
- IC Hybrid Circuitry for Timing

DPDT, 10 Amp Repeat Cycle Timer.

D19

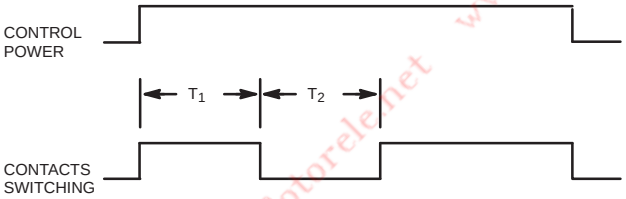


DPDT, 2 Form "C"



OPERATIONS

RECYCLE TIMING – The first delay period begins when input voltage is applied. At the end of the first delay, or "OFF" period, the internal relay pulls in, and the second delay, or "ON" period begins.When the second delay period ends, the relay drops out. This recycling sequence will continue until the removal of input voltage. When input voltage is removed, the relay drops out.



AC OPERATED

NTE Type No.	Nom. Voltage	Contact Arr.	Input Cur. Nom.	Max. Contact Cur. @ 28VDC or 120VAC	Diag No.
R38–11A10–120K	120VAC	DPDT	25mA	10A	D19
R38–11A10–120L	120VAC	DPDT	25mA	10A	D19

ACCESSORIES

MOUNTING STYLES	DESCRIPTION	NTE TYPE NO.
SURFACE MOUNT	8–PIN OCTAL	R95–101
PANEL MOUNT	8–PIN OCTAL	R95–118
DIN RAIL MOUNT	8–PIN OCTAL	R95–113
DIN RAIL MOUNT	8–PIN OCTAL	R95–181

Electrical Specifications

Contact

Rating: 10 Amp @ 120 VAC, 8 Amp @ 30 VDC
1/3 HP @ 120 VAC 1/2 @ 240 VAC
Life: 500,000 operations @ 120 VAC, 10A resistive
1,000,000 operations @ 120 VAC, 5A resistive
2,000,000 operations @ 120 VAC, 2A resistive

Input

Nominal Input voltage: 120 VAC
Steady state input current: 20mA @ 120 VAC

Timing

Timing adjustment ranges available:

On (T_1)	Off (T_2)
0.1 to 10 sec	0.1 to 10 sec (K–suffix)
3 to 300 sec	3 to 300 sec (L–suffix)

Repeat Accuracy

± 0.1% ±33 mS AC
Percent Timing change over temperature & voltage range:
± 10%
Reset Time: 100 mS max

Protection

Transient: UL 508 surge test, 5000V for 50 mS
Dielectric Breakdown
Coil To Contact: 1500 VAC
Across Open Contact: 1000 VAC

Environmental Characteristics

Operating: –10°C to +55°C
Storage: –55°C to +85°C

Weight

Std: 5 oz (132 grams) approx

Time Delay Relays – Single Shot

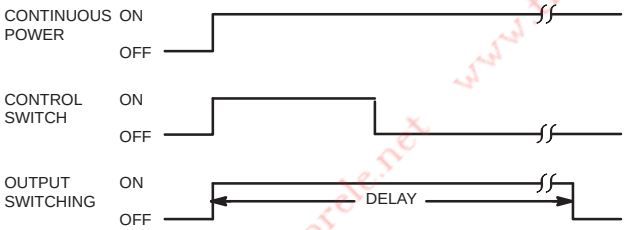
R62 Series

Features

- Universal Input Voltage (U–suffix)
- 16 Time Ranges in Single Timer (0.05 sec. to 100 hrs.)
- User Sets Time Ranges
  No Math – Just Flip Switches
- Instructions Right on Unit
- Fine Tuning Knob for Precision Timing
- Pin for Pin Interchangeable with Timers
  in the Field – No Rewiring
- AC or DC Operation
- CMOS Digital Circuitry – 0.5% Repeatable Accuracy

OPERATION

SINGLE SHOT– Upon closure of the control switch, output switch operates and time period begins. The time period is not affected by duration of the control switch closure. At the end of time period, output switch returns to normal. Continuous power must be furnished to this timer.



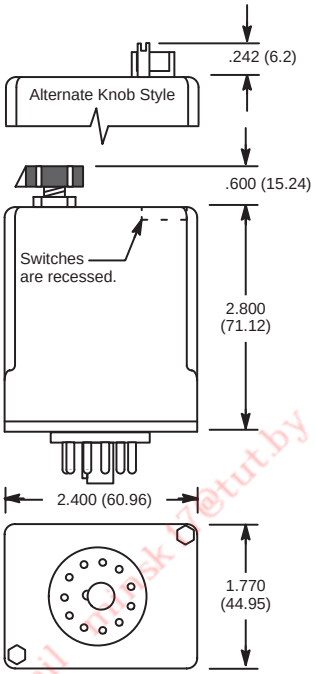
AC or DC OPERATED					
NTE Type No.	Nom. Voltage	Contact Arr.	Input Cur. Nom.	Max. Contact Cur. @ 28VDC or 120VAC	Diag No.
R62–11AD10–12	12VAC/DC	DPDT	167mA	10A	D36
* R62–11AD10–24	24VAC/DC	DPDT	83mA	10A	D36
* R62–11AD10–120	120VAC/DC	DPDT	17mA	10A	D36
NEW R62–11AD10–U	24 – 240VAC 12 – 125VDC	DPDT	–	10A	D36

* These devices are being phased out and replace by the R62–11AD10–U.

ACCESSORIES		
MOUNTING STYLES	DESCRIPTION	NTE TYPE NO.
SURFACE MOUNT	11–PIN OCTAL	R95–104
PANEL MOUNT	11–PIN OCTAL	R95–119
DIN RAIL MOUNT	11–PIN OCTAL	R95–114
DIN RAIL MOUNT	11–PIN OCTAL	R95–182

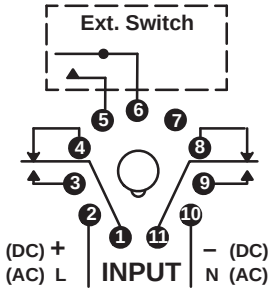
Programmable, DPDT, 10 Amp, AC or DC, Single Shot Time Delay Relays.

D36



1 2 3 4	Knob Style	TIME RANGE Min	Max	
	A	0.1	0.25	Seconds
	B	0.15	0.5	
	C	0.3	1.0	
	D	0.5	2.0	
	E	1.0	4.0	
	F	2.0	8.0	
	G	4.0	15	
	H	8.0	30	
	I	15	60	
	J	30	120	
	K	1.0	4.0	Minutes
	L	2.0	8.0	
	M	4.0	15	
	N	8.0	30	
	O	15	60	
	P	30	120	

DPDT, 2 Form "C"



Universal Type

Dial Setting	TIME RANGE Min	Max	
A	0.05	0.5	Seconds
B	0.1	1	
C	0.5	5	
D	1	10	
E	3	30	
F	6	60	
G	0.2	2	Minutes
H	0.5	5	
I	1	10	
J	3	30	
K	6	60	
L	0.2	2	Hours
M	0.5	5	
N	1	10	
O	2.4	24	
P	10	100	

Electrical Specifications

Contact

Rating: 10 Amps 240VAC or 30VDC, 1/3 HP, 240VAC or 120VAC Pilot Duty 345VA, 120VAC or 240VAC, 50/60H_Z
Life: 500,000 (100,000 U–type) operations at full load
Mechanical Life: 7,000,000 (10,000,000 U–type) operations at no load

Input

Nominal Input voltage: See Chart
Steady state input current: See Chart

Timing

Timing adjustment modes available: See Timing Range Chart

Repeat Accuracy

± 0.5% – after established at steady temperature (4 hours)
Timing tolerance at high end of range: –0, +10%
Timing tolerance at low end of range: +0, –50%
Reset Time: 60 mS typ

Environmental Characteristics

Operating: –20°C to +55°C

Time Delay Relays – Multifunction

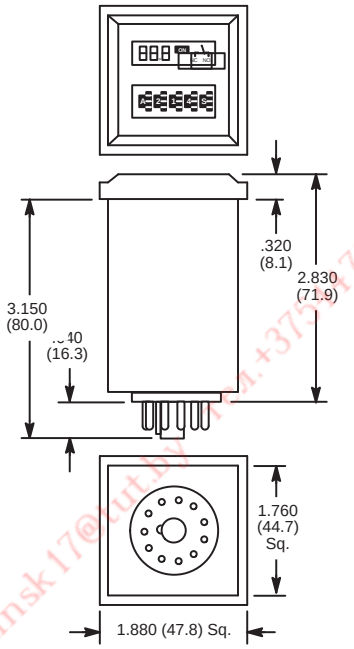
R65 Series

Features

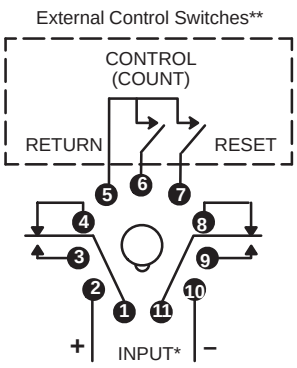
- 10 Programmable Timing Modes + 2 Counting Modes
- 0.1 sec to 9,990 hr. Programmable Timing Range
- 1 to 99,900 Counting Range
- LCD Digital Display
- Thumbwheel Switches for Programming

Programmable, DPDT, 10 Amp, AC or DC, Multifunctional, Digital Time Delay Relay/Counter.

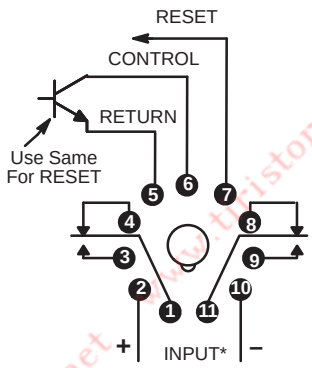
D46



DPDT, 2 Form "C"



DPDT, 2 Form "C"



* 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.

AC or DC OPERATED

NTE Type No.	Timing Adj Range	Count Range	Contact Arr.	Nom Vltg AC/DC	Nom Power	Max. Contact Cur. @ 28VDC 120VAC	Diag No.
R65–11AD10	0.1 Sec to 9,990 Hr.	1 to 99,900	DPDT	24 to 240	1W@24V 5W@120V 10W@240V	10A	D46

ACCESSORIES

MOUNTING STYLES	DESCRIPTION	NTE TYPE NO.
SURFACE MOUNT	11–PIN OCTAL	R95–104
PANEL MOUNT	11–PIN OCTAL	R95–119
DIN RAIL MOUNT	11–PIN OCTAL	R95–114
DIN RAIL MOUNT	11–PIN OCTAL	R95–182

Electrical Specifications

Contact

Rating: 10 Amps @ 30VDC or 277VAC, resistive;
1/2 HP @ 250VAC; 1/3 HP @ 120VAC
Life: 100,000 operations at minimum rated load
Mechanical Life: 10,000,000 operations

Input

Nominal Input voltage: 24 – 240V 15%, 50/60Hz AC or DC
Nominal Power: See Chart

Timing

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 Adjustments: Digital adjustment via thumbwheel switches
Tolerance: ± 0.1% ±0.05 sec
Delta Time (for AC units add 1 cycle 60Hz): ± 0.1% ±0.05 sec
Repeatability: ± 0.1% ±0.05 sec – including first cycle of operation
Reset Time (power interruption): 45mS, typ; 60mS, max
Minimum Pulse Width, Control: 50mS
Recycle Time: 45mS, typ; 60mS, max

Counting

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): 3mS
Reset: 3mS
Available Counting Functions: Operate at preset count and release at preset count

Protection

Transient: yes
Dielectric Strength
Between Open Contacts: $1000V_{rms}$, 60Hz
Between All Other Conductors: $1500V_{rms}$, 60Hz

Environmental Characteristics

Operating: –10°C to +55°C
Storage: –20°C to +70°C

Weight

Std: 4.3 oz (122 grams) approx.

Time Delay Relays – Multifunction

Programming Switch Diagram

		
Function Select	**Timer/Counter Select**	**Time Base 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	001 to 999	Timer 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 Select		**Counter Mode Select**
Counter Mode: A, D–J – Normal Count B – Divide by 10 C – Divide by 100		CO – Operate at Preset Count CR – Release at Preset Count

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

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 truns 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 of restarted by chang 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 charge of CONTROL input. If relay is on, trun–off of relay occurs at end of programmed time interval which is started or restarted by charge 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 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

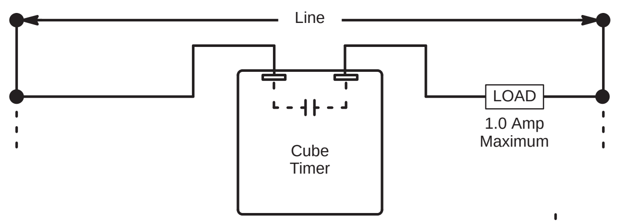
Operation is as described previously, except count is incremented for every 100 on/off input signals for a maximum presettable count of 99,900.

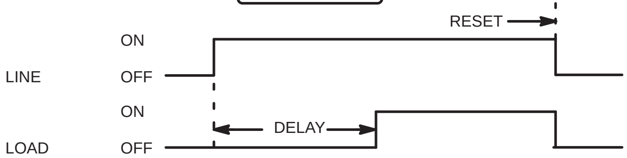
Application Guidelines

Several different basic applications of Delay–On–Operate Cube Timers are described in this section. A good understanding of how these versatile devices function and are applied is one of the utmost importance in recognizing and solving timing control problems, as well as, in selecting the correct NTE replacement in the event the original equipment part number is not listed in the Cross Reference.

Delay–On–Operate (ON Delay)

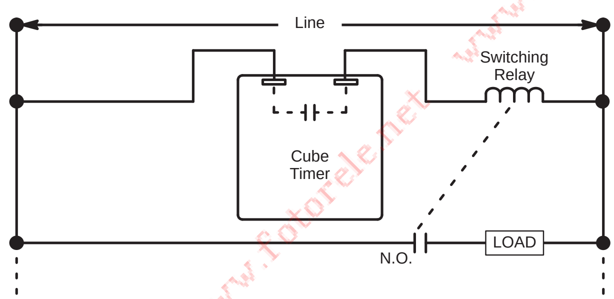
The delay period begins when input voltage is applied. At the end of the delay period, the relay will operate and will not release until input voltage is removed. Reset occurs when input voltage is reapplied.





Higher Current Applications

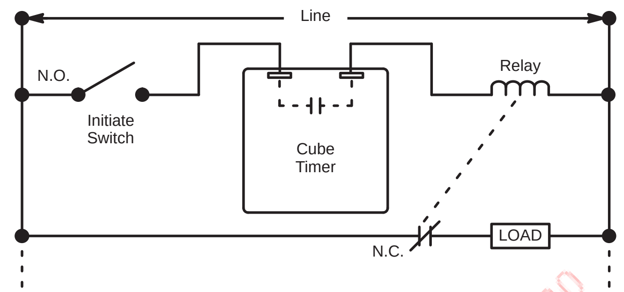
The Cube Timer cannot directly control a load current of more than 1 ampere. For higher current applications a switching relay with normally open contacts is connected as shown. With this arrangement, the load current that can be switched is determined by the contact rating of the relay, not the timer.

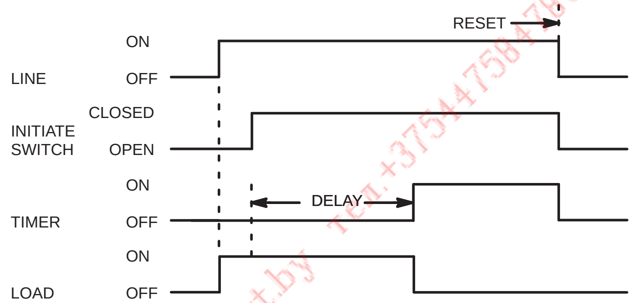


OFF Delay

The Delay–On–Operate timer can also be used to delay turn OFF. An Initiate Switch and a Normally Closed Relay are required, connected as shown in this circuit.

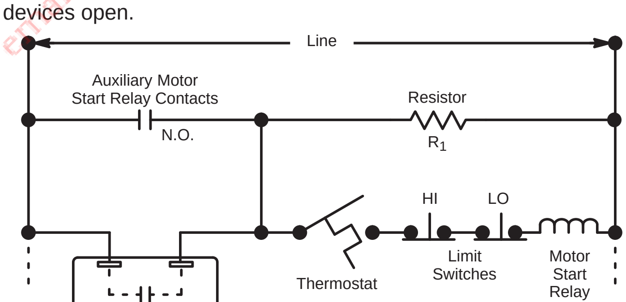
With line power applied and the Initiate Switch open, the load is energized by way of the normally closed contacts of the relay. Closing the Initiate Switch begins the time delay. At the end of the delay period, the relay contacts open and de–energize the load. To re–energize the load, the Initiate Switch must be opened which also resets the timer. Should the Initiate Switch be opened during the delay period, the timer resets and the load remains energized.





Anti–Short Cycling

Short cycling of compressors and heat pumps, as well as other motor–driven equipment (whether large or small horsepower), can cause overheating and results in permanent damage. This circuit protects in two ways by providing: 1) a start–up delay following power interruptions; 2) a start–up delay each time thermostats or other control devices open.



R_1 Value		
24 VAC	470	2W
120 VAC	6k	5W
220 VAC	12k	10W

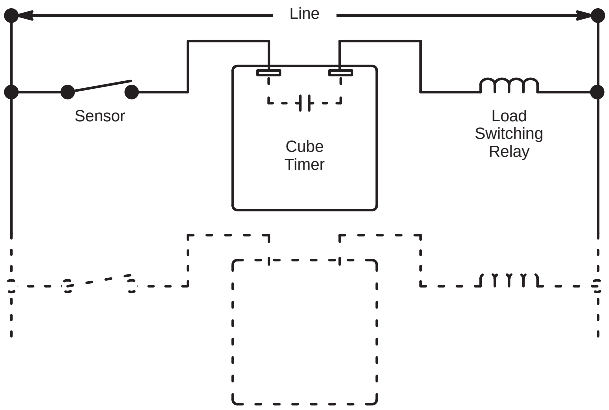
When line power is applied to the circuit, a time delay is initiated. At the end of the delay period and closure of the thermostat, the motor start–relay becomes energized. The auxiliary start–relay contacts also close, which resets the timer while keeping the load energized. If power is interrupted or the thermostat contacts or other sensors open for a short period of time, the timer will time–out before normal operation can resume. Resistor R_1 prevents false triggering and inductive latching.

Random Start and Part–Winding Start for Motors

Random and Part–Winding Start are popular methods of preventing low line voltage and excessive peak currents during equipment start–up. These conditions can damage motors and electrical systems. A common cause of low voltage is the simultaneous application of power from a common distribution system to several pieces of heavy current equipment (such as compressors, air conditioning, air circulation systems and heating devices).

Application Guidelines (Cont'd)
Random Start

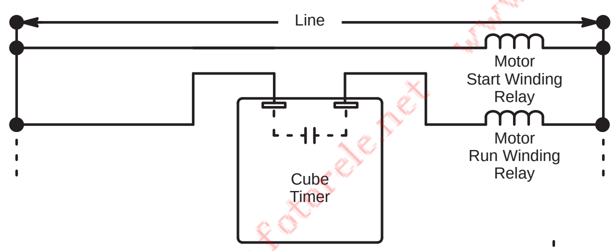
This method of preventing potentially damaging low voltage start–up uses a Cube Timer to control each piece of equipment. The timers are preset for different delay periods to stagger start–up and thereby limit the load on the line at any one time to an acceptable value.

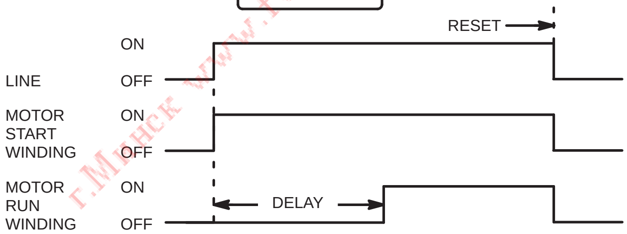


Part–Winding Start

Motors in this catagory have a special low current winding for start–up and a run winding for full power operation.

Upon application of power to the circuit, the motor start–winding relay becomes energized, the motor goes to low power, and the timer starts timing. On completion of the delay time period, the run–winding relay is energized and the motor goes to full power.

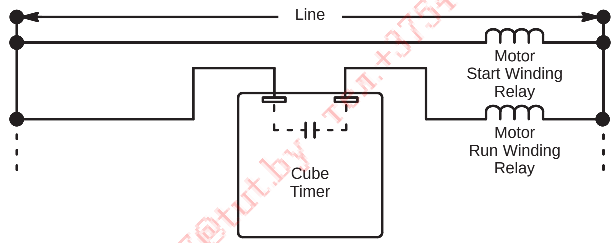




Motion Detector

Automatic assembly and processing equipment frequently use various forms of motion detectors to prevent damage to equipment or the production of defective parts. This circuit is useful when an operation must occur within a specified time. It can be used to check switches and other sensors for position condition event.

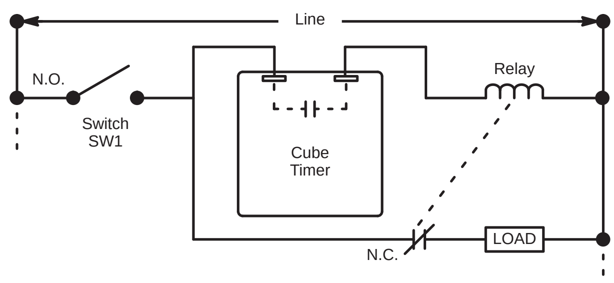
If detector switch SW1 remains in position A for longer than the preset delay time period of timer TD1, the relay becomes energized. This, in turn, removes power from the load, locks it out, and sounds an alarm until the operator can resolve the problem and restart the machine. In the same way, should switch SW1 remain in position B beyond the delay period of timer TD2, the load will be shutdown, locked out and the alarm triggered. The power for this circuit should be applied from the start control and must be present at all times during a run condition. To reset the alarm, power must be removed.

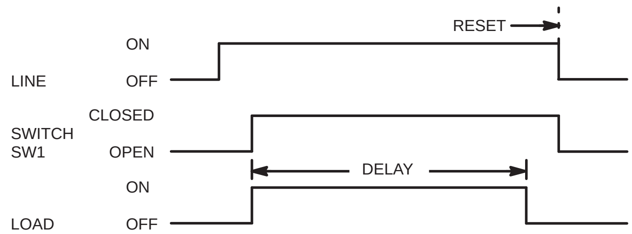


Interval Timing

While there are many different forms of interval timing, the most common function is to turn ON a load for a certain period of time. Light exposure and process control cycle timing are typical applications.

In the circuit shown, line voltage is applied at all times. Upon closure of switch SW1 the load becomes energized and the timer begins to count. When the pre–set period of time elapses, the relay energizes and the load de–energizes. To reset the timer, open switch SW1.



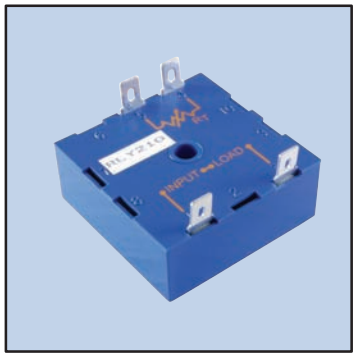


Cube Timers – Delay on Operate

RLY210 Series

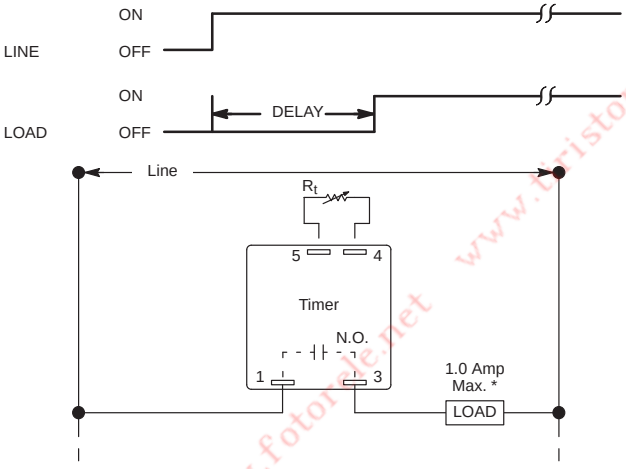
Features

- 2 x 2 Industry Standard Package
- 19–288 Volts AC or DC Operation
- 2 to 600 Seconds Timing Range
- ±2% Repeat Accuracy
- .250" Quick Connect Terminals
- Encapsulated Construction



OPERATION

DELAY ON OPERATE– The 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.



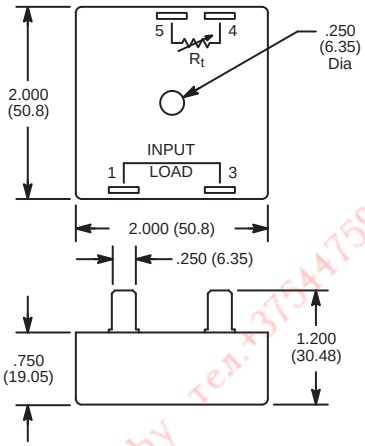
* For higher current applications connect a switching relay in series with timer in place of load.

Ratings and Specifications

Operating Voltage Range (Line): 19–288 V DC or AC (50/60Hz)
Switch Configuration: Solid State, SPST
Switching Current (Load): 40mA Amp min., 1 Amp max.
Timing Adjustment Range: 2 to 600 seconds
External Timing Resistance (Approx. 6.5kΩ/Sec.): See Tables
Repeat Accuracy: ±2%
Expected Life (Electrical): 100,000,000 operations @ rated load
Operating Temperature: –20° to +65°C
Storage Temperature: –40° to +85°C
Dielectric Breakdown Voltage Between All Elements: 1500V_{rms}
Transient Protection: 1500 V for 150µs
Mounting: One #8 or #10 Screw

External Resistor Adjustable, AC or DC, Delay on Operate, Solid State, Universal Cube Timer.

D66



Potentiometer Timing

Potentiometer Value (Ohms)	Approx. Timing Range (Sec.)
50K	2 to 10
100K	2 to 18
250K	2 to 40
500K	2 to 70

Potentiometer Value (Ohms)	Approx. Timing Range (Sec.)
1.0M	2 to 150
2.5M	2 to 300
5.0M	2 to 600

Fixed Resistor Timing

Resistor Value (Ohms)	Approx. Time * (Sec.)
1K	2
6.2K	3
13K	4
20K	5
27K	6
33K	7
39K	8
47K	9
56K	10
62K	11
68K	12
75K	13
82K	14
91K	16
100K	17
110K	18
120K	20
130K	22

Resistor Value (Ohms)	Approx. Time * (Sec.)
150K	24
160K	26
180K	30
200K	32
220K	35
240K	38
270K	42
300K	47
330K	50
360K	56
390K	60
430K	70
470K	72
510K	80
560K	86
620K	95
680K	105
750K	115

Resistor Value (Ohms)	Approx. Time * (Sec.)
820K	125
910K	140
1.0M	150
1.1M	170
1.2M	180
1.3M	190
1.5M	230
1.6M	245
1.8M	255
2.0M	300
2.2M	350
2.4M	380
2.7M	415
3.0M	465
3.3M	510
3.6M	555
3.9M	600

* Approximate – Actual time value will depend on tolerance of resistor.

Cube Timers – Delay on Operate

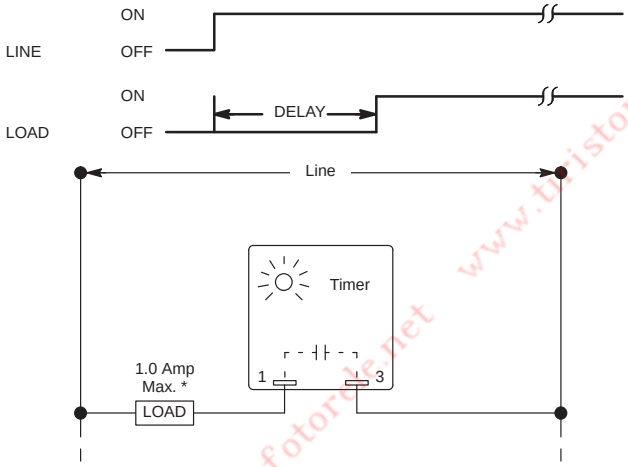
RLY220 Series

Features

- 2 x 2 Industry Standard Package
- 18–264 Volts AC or DC Operation
- 0.2 to 8 Minutes (12 to 480 Seconds) Timing Range
- ±0.5% Repeat Accuracy
- Transient Protected
- .250" Quick Connect Terminals
- Encapsulated Construction

OPERATION

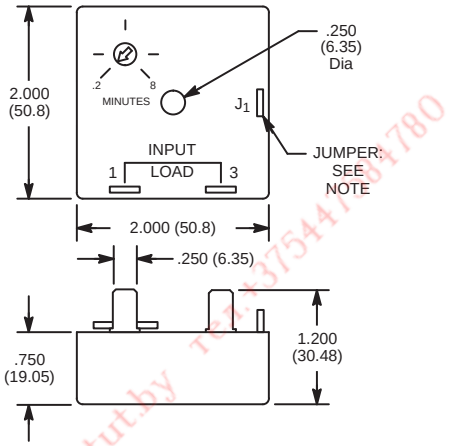
DELAY ON OPERATE– The delay period begins when input voltage is applied. At the end of the delay period, the relay will operate and will not release until input voltage is removed. Reset occurs when input voltage is reapplied.



* For higher current applications connect a switching relay in series with timer in place of load.

Knob Adjustable, AC or DC, Delay on Operate, Solid State, Universal Cube Timer.

D67



NOTE: 18–40 V AC or DC
Cut J_1 for 40–264 V AC, DC

Ratings and Specifications

Operating Voltage Range (Line):
Jumper J_1 Not Cut: 18–40 V DC or AC (50/60Hz)
Jumper J_1 Cut: 40–264 V DC or AC (50/60Hz)
Switch Configuration: Solid State, SPST
Switching Current (Load): 40mA Amp min., 1 Amp max.
Timing Adjustment Range: 0.2 to 8 minutes (12 to 480 seconds)
Repeat Accuracy: ±0.5%
Reset Time: 100ms Max.
Expected Life (Electrical): 100,000,000 operations @ rated load
Operating Temperature: –20° to +80°C
Storage Temperature: –40° to +85°C
Dielectric Breakdown Voltage Between All Elements: $1500V_{rms}$
Transient Protection: 1500 V for 150µs
Mounting: One #8 or #10 Screw

Cube Timers – Delay on Operate

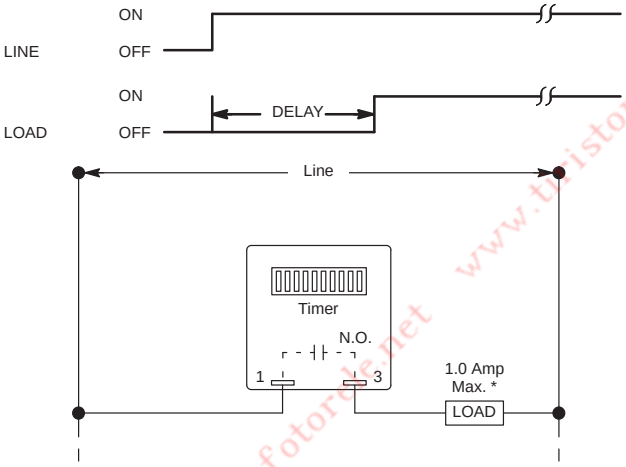
RLY230 Series

Features

- 2 x 2 Industry Standard Package
- 95–145 Volts AC Operation
- 1 to 1023 Seconds Timing Range
- ±0.1% Repeat Accuracy
- Transient Protected
- .250" Quick Connect Terminals
- Encapsulated Construction

OPERATION

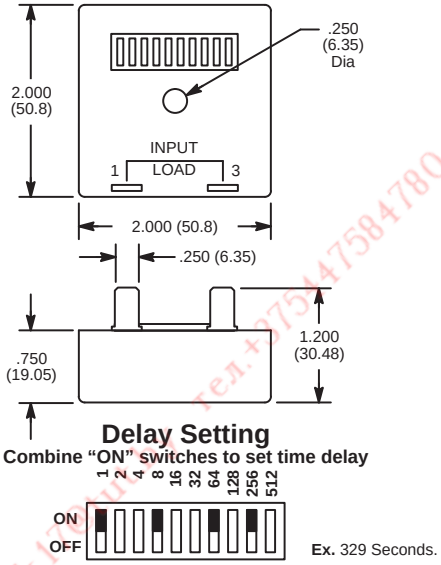
DELAY ON OPERATE– The delay period begins when input voltage is applied. At the end of the delay period, the relay will operate and will not release until input voltage is removed. Reset occurs when input voltage is reapplied.



* For higher current applications connect a switching relay in series with timer in place of load.

Binary Switch, Programmable, AC, Delay on Operate, Solid State, Universal Cube Timer.

D68



Ex. 329 Seconds.

Ratings and Specifications

Operating Voltage Range (Line): 95–145 V AC (50/60Hz)
Switch Configuration: Solid State, SPST
Switching Current (Load): 20mA Amp min., 1 Amp max.
Timing Adjustment Range: 1 to 1023 seconds
Repeat Accuracy: ±0.1%
Reset Time: 50ms Max.
Expected Life (Electrical): 100,000,000 operations @ rated load
Operating Temperature: –20° to +80°C
Storage Temperature: –30° to +85°C
Dielectric Breakdown Voltage Between All Elements: 1500V_{rms}
Transient Protection: 1500 V for 150µs
Mounting: One #8 or #10 Screw

Cube Timers – Delay on Operate

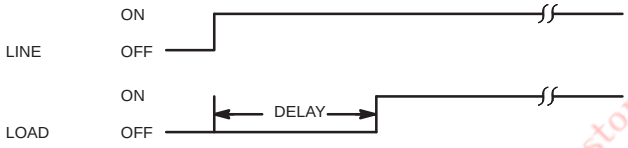
RLY260 Series

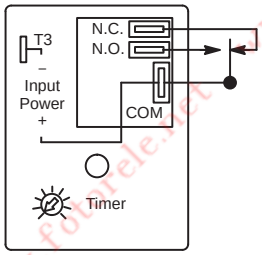
Features

- 30 Amp/2 HP Load Ratings
- No Heat Sink Required
- ±0.5% Repeat Accuracy
- .250" Quick Connect Terminals
- Transient Protected
- CMOS Digital Timing
- 2 x 3 Plastic Package

OPERATION

DELAY ON OPERATE– The 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.



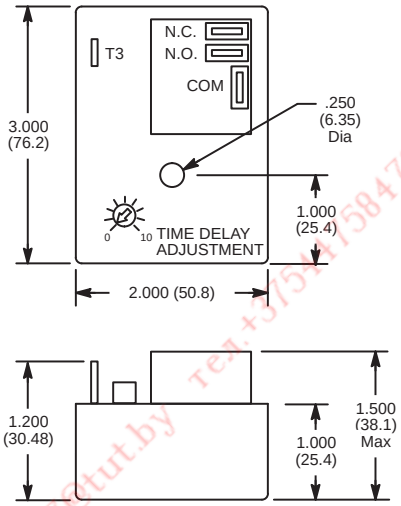


AC OPERATED					
NTE Type No.	Timing Adj. Range	Nom Voltage	Contact Arr.	Max. Contact Cur. @ 120VAC	Diag No.
RLY265L	3 to 100 sec.	120VAC	SPST	30A*	D77
RLY265N	0.3 to 10 min.	120VAC	SPST	30A*	D77
DC OPERATED					
RLY261L	3 to 100 sec.	12VDC	SPST	30A*	D77
RLY261N	0.3 to 10 min.	12VDC	SPST	30A*	D77

* Note: U.L. for 20 Amp **Only**.

Knob Adjustable, AC or DC, Delay On Operate, Electromechanical, High Power Cube Timer.

D77



Ratings and Specifications

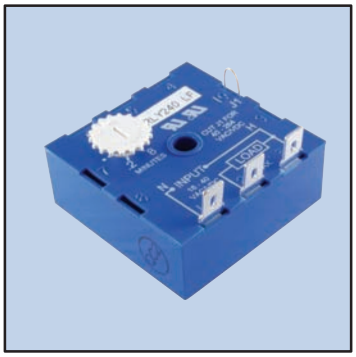
Input Operating Voltage Range (Line): 20%
AC Operating Frequency: 50/60Hz
Switch Configuration: Electromechanical, SPST
Switching Current (Load): 500 mA min., 30 Amps max.
(Note: U.L. for 20 Amp **Only**)
Repeat Accuracy: ±0.5%
Reset Time: 150ms Min.
Expected Life:
Mechanical: 10,000,000 operations
Electrical: 10,000 operations @ rated load
Operating Temperature: –40° to +80°C
Storage Temperature: –50° to +85°C
Dielectric Breakdown Voltage Between All Elements: $1500V_{rms}$
Transient Protection: 1500 V for 150µs
Mounting: One #8 or #10 Screw

Cube Timers – Interval On

RLY240 Series

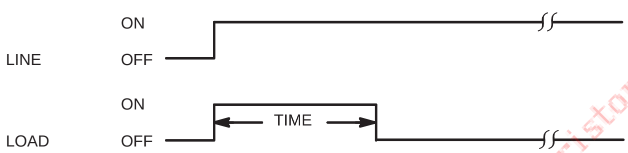
Features

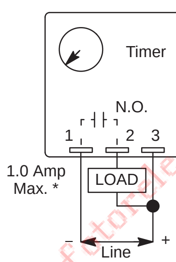
- 2 x 2 Industry Standard Package
- 19–288 Volts AC or DC Operation
- .2 to 8 Minutes Timing Range
- ±0.5% Repeat Accuracy
- Transient Protected
- CMOS Digital Timing
- .250” Quick Connect Terminals
- Encapsulated Construction



OPERATION

INTERVAL ON– The relay energizes and timing begins when the 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.

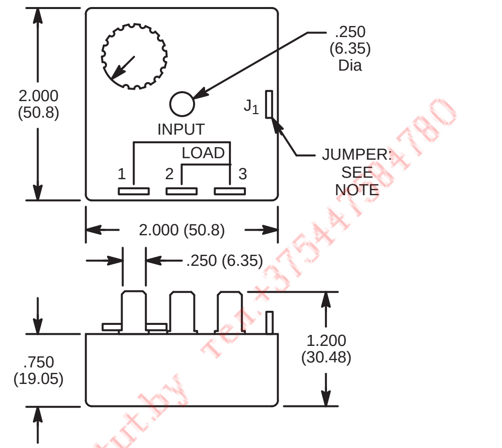




* For higher current applications connect a switching relay in series with timer in place of load.

Knob Adjustable, AC or DC, Interval On, Solid State, Universal Cube Timer.

D69



NOTE: 19–40 V AC or DC
Cut J_1 for 40–288 V AC, DC

Ratings and Specifications

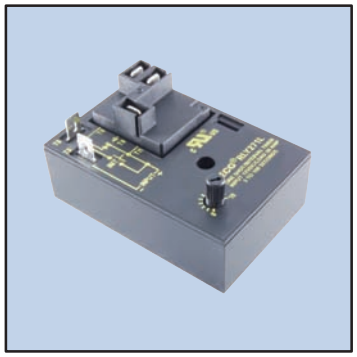
Input Operating Voltage Range (Line):
Jumper J_1 Not Cut: 19–40 V DC or AC
Jumper J_1 Cut: 40–288 V DC or AC
AC Operating Frequency: 50/60 Hz
Switch Configuration: Solid State, SPST
Switching Current (Load): 40mA Amp min., 1 Amp max.
Timing Adjustment Range: 0.2 to 8 minutes
Repeat Accuracy: ±0.5%
Reset Time: 100ms Max.
Expected Life (Electrical): 100,000,000 operations @ rated load
Operating Temperature: −20° to +80°C
Storage Temperature: −40° to +85°C
Dielectric Breakdown Voltage Between All Elements: 1500V_{rms}
Transient Protection: 1500 V for 150µs
Mounting: One #8 or #10 Screw

Cube Timers – Single Shot or Interval

RLY270 Series

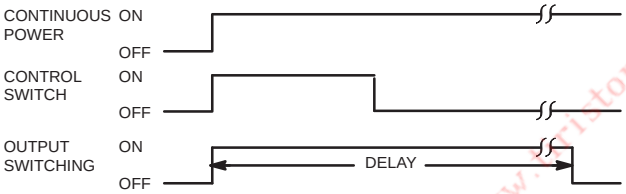
Features

- 30 Amp/2 HP Load Ratings
- No Heat Sink Required
- ±0.5% Repeat Accuracy
- .250" Quick Connect Terminals
- Transient Protected
- CMOS
- Digital Timing
- 2 x 3 Plastic Package

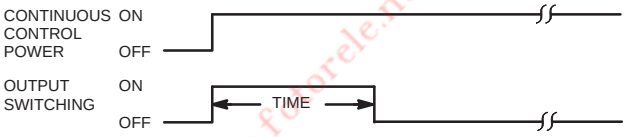


OPERATION

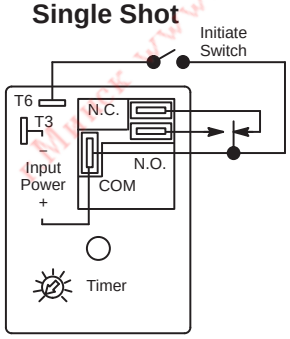
SINGLE SHOT– Upon closure of the control switch, output switch operates and time period begins. The time period is not affected by duration of the control switch closure. At the end of time period, output switch returns to normal. Continuous power must be furnished to this timer.



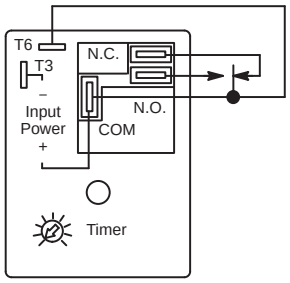
INTERVAL ON– The relay energizes and timing begins when the input voltage is applied. At the end of the time delay period the relay will de–energize. Reset is accomplished by removing, then reapplying the input voltage.



Single Shot

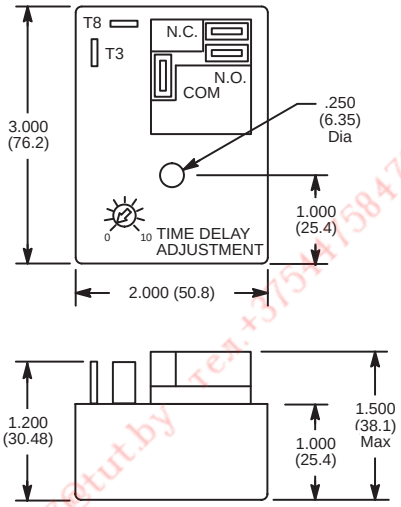


Interval



Knob Adjustable, AC or DC, Single Shot or Interval, High Power Cube Timer.

D78



AC OPERATED					
NTE Type No.	Timing Adj. Range	Nom Voltage	Contact Arr.	Max. Contact Cur. @ 120VAC	Diag No.
RLY275L	3 to 100 sec.	120VAC	SPST	30A*	D78
RLY275N	0.3 to 10 min.	120VAC	SPST	30A*	D78
DC OPERATED					
RLY271N	0.3 to 10 min.	12VDC	SPST	30A*	D78

* Note: U.L. for 20 Amp **Only**.

Ratings and Specifications

Input Operating Voltage Range (Line): ±20%
AC Operating Frequency: 50/60Hz
Switch Configuration: Electromechanical, SPST
Switching Current (Load): 500 mA min., 30 Amps max.
(Note: U.L. for 20 Amp **Only**)
Repeat Accuracy: ±0.5%
Reset Time: 150ms Min.
Expected Life:
Mechanical: 10,000,000 operations
Electrical: 10,000 operations @ rated load
Operating Temperature: –40° to +80°C
Storage Temperature: –50° to +85°C
Dielectric Breakdown Voltage Between All Elements: $1500V_{rms}$
Transient Protection: 1500 V for 150µs
Mounting: One #8 or #10 Screw

Introduction to Solid State Relays

Selecting the Proper SSR

In selecting the SSR for an application, one must consider the input, the output, the load, and the method of installation. The load power will dictate if the SSR is PC board mountable, or if it requires mounting on a heat sink. Load currents greater than 5 to 7 Amps usually require a heat sink despite the current rating of the device. For example, whereas a 10 Amp SSR may have a free air rating of 6 Amps at 40°C, a 40 Amp device in the same package has only an 8 Amp free air rating, thus both would need a heat sink to improve performance.

After selecting an SSR for suitable physical dimensions and terminals, the next parameters of concern are isolation, input drive, output voltage, and output current. Isolation and input considerations are similar to that of Electro−Mechanical relays: output parameters require choosing an SSR with an appropriate nominal voltage rating and current rating in excess of maximum load conditions, and will be sufficient in most cases, but note that the output parameters may differ from those of EMR's.

An important consideration is that of transient voltage spikes. Since transient overvoltage of blocking ratings may vary by as much as 200 Volts, a transient suppressor for protection ***will be*** necessary and the range between the SSR peak operating and blocking voltages must be adequate for the proper function of the suppressor. Even then, an actual test should be performed to determine if the product will "tolerate" over−voltage transients by firing non−destructively for the duration of the half−cycle in which the transient occurred.

If the SSR is optimized for the 120 Volt line, then operation at 24 Volts RMS can be achieved ***if*** two parameters dealing with power loss are considered − on−state voltage drop and peak repetitive turn−on voltage. The former becomes a larger proportion of the applied voltage, subtracting approximately 1.2 Volts RMS from the load. The latter does not change in amplitude, but does change in phase angle − leading to delays before turn−on each half−cycle, with a power loss up to 20% at 24 Volts RMS − suggesting that an SSR optimized for 24 Volts RMS would be a better choice.

The zero voltage point (usually greater than the peak repetitive turn−on voltage) is not a factor in power loss at low voltage, since the SSR is not much of a "zero" switch, with turn−on occuring closer to the peak, not zero, value; but with less than 24 Volts, the peak may actually become lower than the "zero voltage turn−on" and turn−on would occur totally at random.

"Turn−on" voltages of the SSR cannot be measured correctly with an RMS reading meter, because in the AC voltage waveform a discontinuity occurs at the beginning (and sometimes the end) of the half−cycle due to the output thyristor current. With a signal applied, turn−on generally occurs at the earliest possible moment in the next half−cycle, close to the peak repetitive turn−on voltage. The latest point at which an initial signal can achieve turn−on is at the maximum zero voltage turn−on value. Thus the region between these two parameters is designated the permissible switching window.

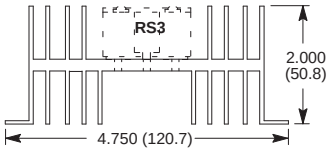
The conduction period, which represents most of the dissipation in the SSR, begins as an on−state DC voltage level followed by a slight sinusoidal AC component and is usually defined to assist in heat sink determination.

Specifications define the minimum and maximum steady−state load current values, and momentary surge current capabilities. Emphasis should be given to thermal and surge conditions in replacement.

Thermal Considerations

A proper heat sink is a most important feature and critical to the life of the SSR. Since "contact" dissipation occurs in excess of 1 Watt per Amp compared to Milliwatts per Amp for a like EMR; lack of attention to this detail can result in improper switching (lock−up) or even destruction of the SSR.

Usually a light duty aluminum extruded heatsink is used for this purpose. The NTE441A heat sink is the ideal choice and comes predrilled for a variety applications including the NTE RS3 series of SSR's. Confirmation of proper heat sink selection can be acheived by actual temperature measurement on the base plate of the SSR. A typical mounting is shown below.



The typical 1.2 Volt on−state drop across the output (at maximum current) is responsible for most of the dissipation in both AC and DC SSR's without regard to operating voltage.

At loads less than 5 Amps, free or forced air flowing around the package can be sufficient, but at higher currents the radiating surface of the SSR needs to be firmly mounted to a good heat−conducting heat sink with thermal bonding enhanced by a conductive compound. In this case the SSR's thermal resistance (R_{thCS}) is reduced to a value of 0.1°C/W or less as shown in the data.

Other data supplied defines the internal thermal values such as maximum junction temperature (T_J Max), the thermal resistance junction to case (R_{thJC}), the thermal resistance of the SSR case to ambient (R_{thCA}) for free−air, and power dissipation versus maximum current.

Protective Measures

Noise Susceptibility

Noise susceptibility depends on circuit design, sensitivity of components, and stabilization techniques.

SSR's do not fail completely due to noise, unless they mistrigger at a point in the cycle where a high surge current might occur, or less remotely, where a repetitive mistriggering of one polarity causes an inductive load to saturate and draw excess currents destructive to both load and relay.

Should they occur, other malfunctions due to noise are usually temporary in nature, and tests should be made to determine levels of susceptibility in these areas − EMI and parasitic noise.

AC SSR's using thyristors in their drive and output circuits, can latch on for a whole half−cycle, if triggered by a brief high−voltage transient; and can also mistrigger if the rate of rise (dv/dt) exceeds certain limits as discussed in the following paragraphs. Transient suppressors and RC snubbers can act as preventive measures.

Rate Effect (dv/dt)

Rate effect is caused capacitive coupling between the anode and gate, which can result in self−induced turn−on when the dv/dt limits are exceeded.

The expression dv/dt, when applied as the "static" or "off−state" dv/dt, can be understood as the maximum allowable rate of rise of voltage across the output terminals that ***will not*** turn on the SSR (a typical value is 200V/μS).

The commutating dv/dt parameter refers to a TRIAC's withstand capability to a rate of rise of reapplied voltage immediately after conduction (typical 5 to 10V/μS). In inductive loads where the current lags voltage, the TRIAC turns off at zero current, but the voltage, advancing to the next half−cycle, instantly appears across the TRIAC. This rise must be limited below the stated value or retriggering occurs, locking on the TRIAC. When the output device is a TRIAC, a snubber is essential for inductive loads; for dual SCR's as the output, the snubber improves static dv/dt.

Snubbers

The internal RC network (snubber) used in AC SSRs is a major factor in transient voltage and dv/dt suppression. For transients, it slows down the rate of rise as seen by the output device and limits the amplitude to which it might rise. The latter's protection is limited however, since a prolonged transient will "staircase" up to the blocking voltage, and a suppressor with a specific clamp voltage is recommended; the snubber then acting to hold down the leading edge of the transient and preventing overshoot.

Snubbers do give rise to a substantial AC component on off–state leakage, proportionately related to frequency – but attempts to use an SSR designed for 60Hz would increase the leakage via:

$$\frac{\text{Frequency (new) x Leakage (data)}}{\text{Frequency (old)}} = \text{Leakage (new)}$$

and one should not operate the device beyond the stated limits and expect it to work.

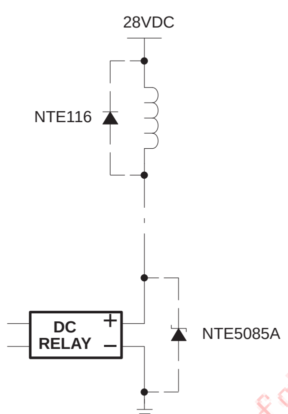
Snubber network capacitors are generally made as large as possible to enhance the dv/dt rating and transient absorption properties, and the resistors are chosen to limit the capacitor discharge current during the turn–on interval.

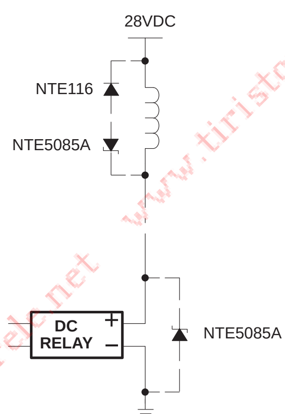
Parameters affecting use due to snubber values are the dv/dt (static) rating (typ 200V/µS) and the power factor rating (typ 0.5V/µS).

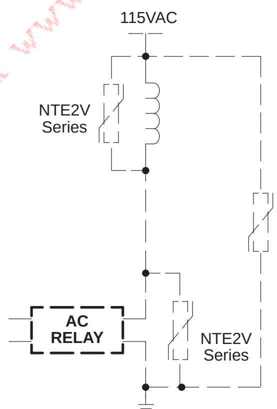
Suppressors

As stated earlier, snubbers are limited in handling overvoltage transients and a clamping device is required. Devices such as spark gaps can be used, although an easy approach is the use of zeners or MOVs.

The following diagrams illustrate typical methods of suppressing transients across the SSR output "contacts", as well as suppression of transients at the source, which can be the load itself for DC inductive type loads.







For low powered DC SSRs (less than 3 Amps, 60 Volts), a 1 Watt Zener is sometimes built–in to provide protection. An external Zener, whose V_Z is greater than the operating, but less than the breakdown of the SSR, could also be used. For high–powered DC SSRs, Zener dissipation becomes impractical and "arc–suppressor" diodes are used instead.

MOVs *

MOVs (Metal Oxide Varistors) are voltage dependent, non–linear resistors with symmetrical conductive properties. Their response is very similiar to back–to–back zener diodes. Over a wide current range, the voltage remains within a very narrow range for a specific device, and can be referred to as the "varistor voltage" for that device. Their non–linear electrical characteristics makes the device useful in voltage regulation applications, and in particular for limiting surges and transient voltages that may appear on power lines. MOVs can provide protection for SSRs, especially in hostile environments. When used across the incoming line, they suppress external transients attempting to enter the system; across the load, they suppress load generated transients; and across the SSR itself to protect it from all transient sources.

When selecting the proper MOV it is essential to determine the proper voltage rating. First determine the maximum steady–state operating voltage of the circuit where the MOV will be connected. Care must be taken to use the upper tolerance limit of the voltage source. e.g., for a 220VAC line, a 10% high line condition should be assumed, resulting in 242 volts. Once the level is determined, refer to table data titled "Maximum Continuous Voltage" and select a MOV having the nearest greater value to this level. The voltage across a vasistor and the current through it are related by a power law $I=kV^{\propto}$. The exponent $\propto$ will typically have values 25 to 50 or more.

A 30 Joule unit is sufficient for brief spikes across a load impedance in series with the MOV, which also acts as a current limiter. For MOVs directly across a power line, a larger (300 to 600 Joules) device is required to absorb high energy line transients since the current limiting impedance is represented by only the generating source and the wiring.

The MOV can also be used effectively across loads such as transformers and switching power supplies to absorb fast spikes that could be fed back into the primary (SSR load) wiring.

* See NTE1V and 2V series MOV's in our Semiconductor Technical Guide and Cross Reference catalog

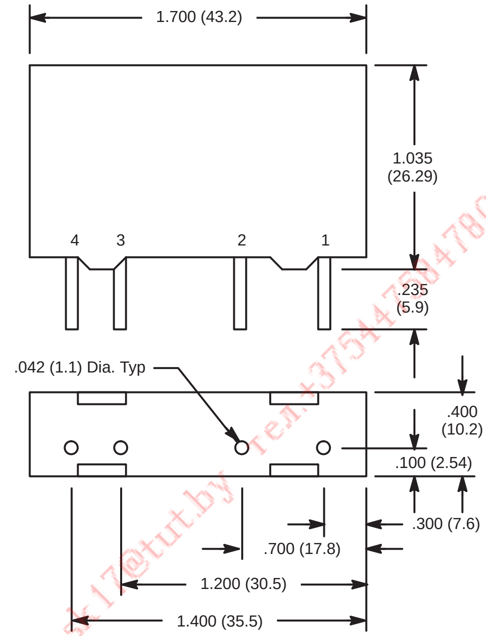
RS1–1D4–21

Printed Circuit Board Mountable Solid State Relay, 4 Amp.

Features

- Thick Film Hybrid Construction
- High Current Thyristor for 100A Surge Capability
- 4KV Optical Isolation

D30



Tolerance: 0.020 (0.50)

Input Specifications

Control Voltage: 3–24VDC
Min Turn on Voltage: 3.0VDC
Max Input Voltage: 24VDC
Drop Out Voltage: 1.0VDC
Max Input Current: 25mADC
Nom Input Resistance: 1K Ohms

Output Specifications

Max Output Voltage: 280VAC
Max Output Current: 4A @ 20°C Ambient
Nom LIne Voltage: 240Vrms
Min LIne Voltage: 24Vrms
Max LIne Voltage: 280Vrms
Max Peak Off–State Vltg: 600V peak
Static (Off–State) dv/dt: 200V/µs

Electrical Specifications

Max On–State Current: 3.5A
Min On–State Current: 0.5A
Max 1–Cycle Surge: 100A
On State Voltage Drop: 1.6V peak
Max On–State Leakage: 6.0mArms

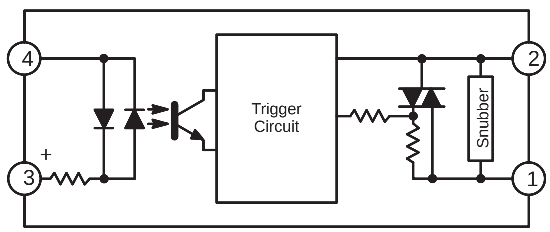
Environmental Characteristics

Operating: –30°C to +80°C
Storage: –40°C to +100°C

Operational Characteristics

Response Time: 0.5 Cycle
Capacitance Input to Output: 8pf Max
Line Freq Range: 47 to 63 Hz

Equivalent Circuit

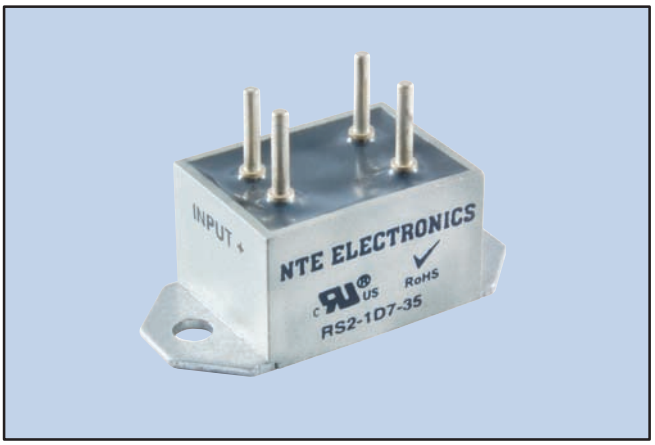


ACCESSORIES		
MOUNTING STYLES	DESCRIPTION	NTE TYPE NO.
DIN RAIL MOUNT	2–POSITION SOCKET	RLY9142

RS2 Series

Features

- Compatible with TTL Gates
- Push–On Connector Terminals
- Mounts on a TO3 Transistor Heat Sink



Input Specifications

Control Voltage:
RS2–1D7–33 . . . . . 5VDC
RS2–1D7–35 . . . . . 12VDC
Max Pick–up Voltage:
RS2–1D7–33 . . . . . 4.3VDC
RS2–1D7–35 . . . . . 10.3VDC
Min Drop–out Voltage: 1.5VDC
Max Input Current: 15mADC

Output Specifications

Nom. Off–State Voltage: 120V (RMS)
Non–Repetitive Peak Voltage: 400V
Min–Max Off–State Voltage: 20V to 260V (RMS)
Rated Load Current: 7A (RMS)
Min. Load Current: 20mA (RMS)
Non–Repetitive Surge Current: 50A
Max. Off–State Leakage Current: 100 A (RMS)
Max. On–State Voltage: 1.8V (RMS)

Electrical Specifications

Operational Characteristics

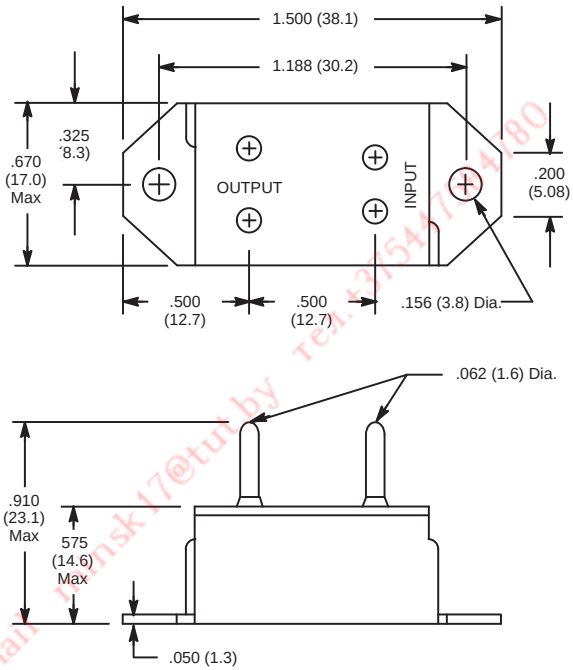
Response Time: Turn–On . . . . 16mS Max
Turn–Off . . . . 60mS Max
Max. Rate of Rise of Off–State Voltage:
Blocking 100V/µS
Commutating 4V/µS
Dielectric Strength (Input–Output Isolation): 2500VAC
Insulation Resistance (@ 500VDC): 10,000MΩ
Max. I^2t for Fusing (8.3mS): 24

Environmental Characteristics

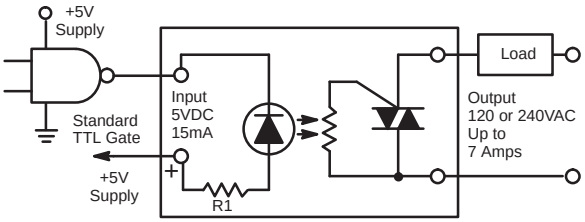
Operating: –40°C to +65°C
Storage: –40°C to +100°C

Printed Circuit Board Mountable Solid State Relay, 7 Amp.

D37



Schematic showing typical TTL input connections

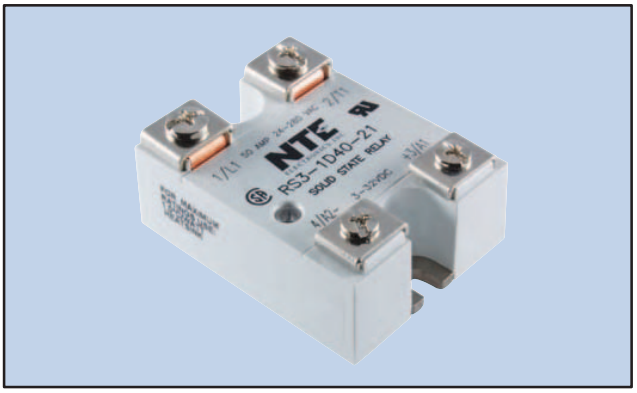


RS3 Series

Panel Mount, Heavy Duty, SPST–NO, Solid State AC and DC Power Relays, 10 Amp to 75 Amp.

Features

- AC and DC Models
- Back–to–Back Dual SCRs (Non–Suffix)
- Internal Snubbers on AC & DC Models
- TRIAC Versions (T–Suffix)
- Random Switching (R–Suffix)
- MOSFET DC Versions (M–Suffix)
- LED Input Status Indicator on Some Models



Ratings

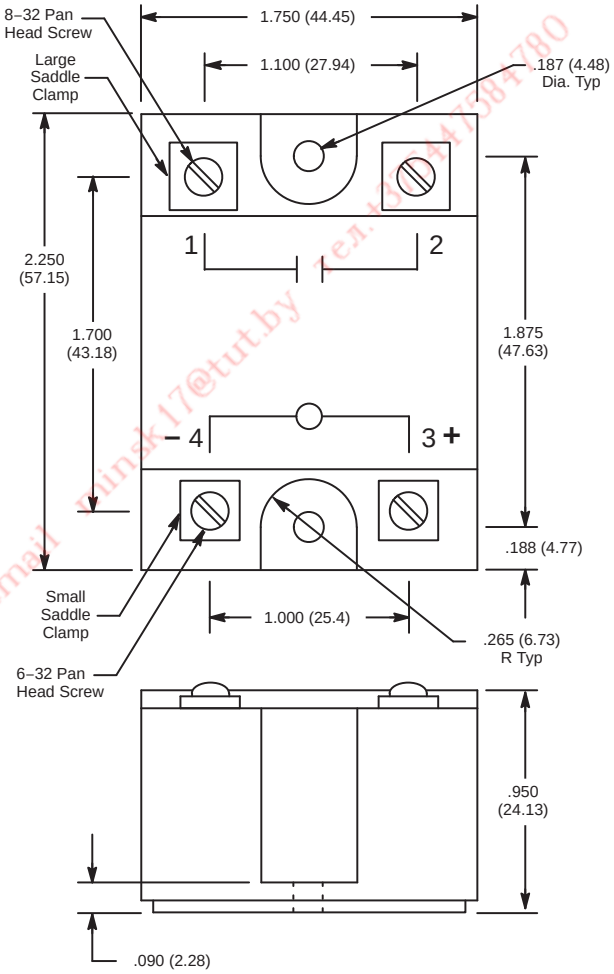
INPUT PARAMETERS				
NTE TYPE No.	Control Signal Range	Must Operate Voltage	Must Release Voltage	Input Current
RS3–1D10–51	3–32VDC	3VDC	1VDC MIN	22mA MAX
RS3–1D10–51R	3–32VDC	3VDC	1VDC MIN	3.4mA TYP
RS3–1A10–52*	100–280VAC	80VAC	20VAC MIN	—
RS3–1A25–42	90–280VAC	90VAC	10VAC MIN	2mA MAX
RS3–1D25–24T	3–32VDC	3VDC	1VDC	4mA MAX
RS3–1A40–22	90–280VAC	90VAC	10VAC MIN	2mA MAX
RS3–1D40–41	3–32VDC	3VDC	1VDC MIN	4mA MAX
RS3–1D40–21*	3–32VDC	—	—	14mA MAX
RS3–1D40–21R*	3–32VDC	—	—	15mA MAX
RS3–1A75–22	90–280VAC	90VAC	10VAC MIN	2mA MAX
RS3–1D75–21*	3–32VDC	—	—	34mA MAX
RS3–1D75–41*	3–32VDC	—	—	34mA MAX
RS3–1D12–41M**	3.5–32VDC	3.5VDC	1VDC MIN	1.6mA MAX
RS3–1D40–41M**	3.5–32VDC	3.5VDC	1VDC MIN	1.6mA MAX

* Contains LED Input Status Indicator
** Does NOT meet CSA approval.

OUTPUT PARAMETERS				
NTE TYPE No.	Line Voltage Range	Max On–State Current	Max 1–Cycle Surge	On–State Voltage Drop
RS3–1D10–51	24–240VAC	10A	40A	1.5V
RS3–1D10–51R	24–240VAC	10A	40A	1.5V
RS3–1A10–52*	24–330VAC	10A	40A	1.5V
RS3–1A25–42	48–240VAC	25A	245	1.6V
RS3–1D25–24T	48–280VAC	25A	215	1.6V
RS3–1A40–22	48–240VAC	40A	245	1.6V
RS3–1D40–41	80–530VAC	40A	600	1.6V
RS3–1D40–21*	24–280VAC	50A	450	1.6V
RS3–1D40–21R*	24–280VAC	45A	450	1.6V
RS3–1A75–22	48–280VAC	75A	950	1.6V
RS3–1D75–21*	24–280VAC	75A	700	1.6V
RS3–1D75–41*	36–530VAC	75A	700	1.6V
RS3–1D12–41M**	0–100VDC	12A	28	1.6V
RS3–1D40–41M**	0–100VDC	40A	106	2.1V

* Contains LED Input Status Indicator
** Does NOT meet CSA approval.
Note 1. Can be used with R95–186, R95–187 or NTE441A Heat Sink.
Note 2. Dust Cover R95–184 Available.

D31



Products and specifications subject to change without notice

Electrical Specifications

Environmental Characteristics

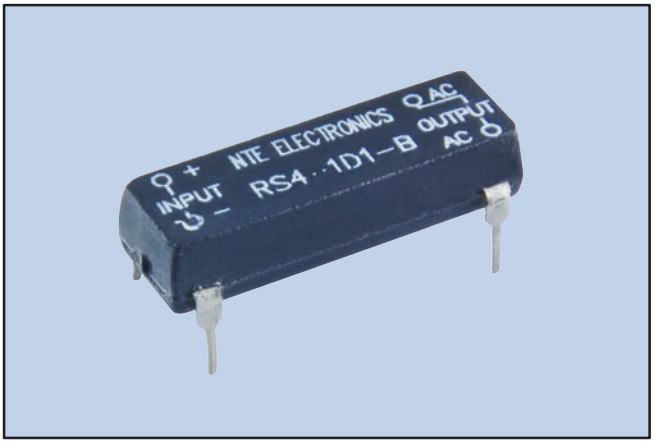
Operating: –40°C to +80°C

ACCESSORIES		
MOUNTING STYLES	DESCRIPTION	NTE TYPE NO.
PANEL MOUNT	HEAT SINK	R95–186 R95–187
	DUST COVER	R95–184

RS4 Series

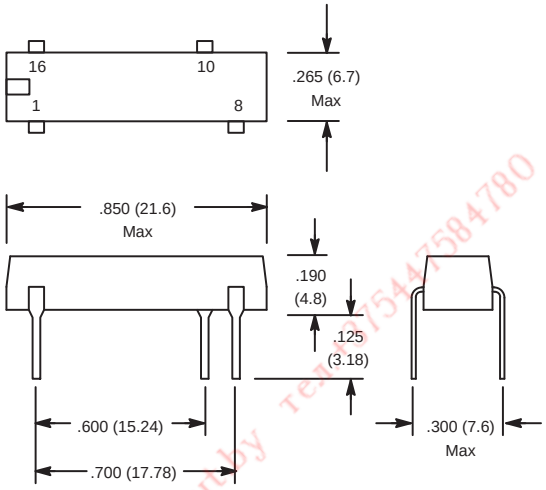
Features

- Current or Voltage Input Types
- SCR Output
- Zero Crossing Switching
- Standard 16–Lead DIP Type Package with 4 Pins

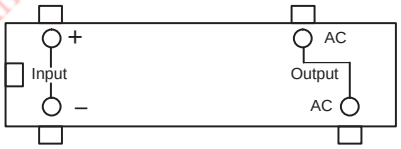


Printed Circuit Board Mountable Solid State Relay, 1 Amp.

D63



Pin Connection Diagram



Input Specifications

RS4–1D1–A (Current Input Type)

Control Current Range: 10–35mA
Must Turn–On Current: 10mA
Must Turn–Off Current: 1mA

RS4–1D1–B (Voltage Input Type)

Control Voltage Range: 3.5–10VDC
Nom. Input Impedance: 270Ω
Typ. Input Current (@ 5VDC): 15mA
Must Turn–On Voltage: 3.5VDC
Must Turn–Off Voltage: 1.0VDC

Output Specifications

Operating Voltage Range: 20–280V (RMS)
Load Current Range: 0.01–1.0A (RMS)
Transient Over–Voltage: 600V (Peak)
Max. Surge Current (16.6ms): 30A (Peak)
Min. Off–State dv/dt: 500V/μs at max. rated voltage
Max. Off–State Leakage Current: 0.01mA (RMS) at rated voltage
Max. On–State Voltage Drop: 1.2V (Peak) at rated current
Max. Turn–On Time: 1/2 cycle
Max. Turn–Off Time: 1/2 cycle
Power Factor (Min.) with Max. Load: 0.5

Electrical Specifications

Dielectric Strength (Input–Output Isolation): 3750V (RMS)
Min. Insulation Resistance (@ 500VDC): 10^9 Ω
Max. Capacitance (Input–Output): 2.0pF

Environmental Characteristics

Operating: –30°C to +80°C
Storage: –30°C to +125°C

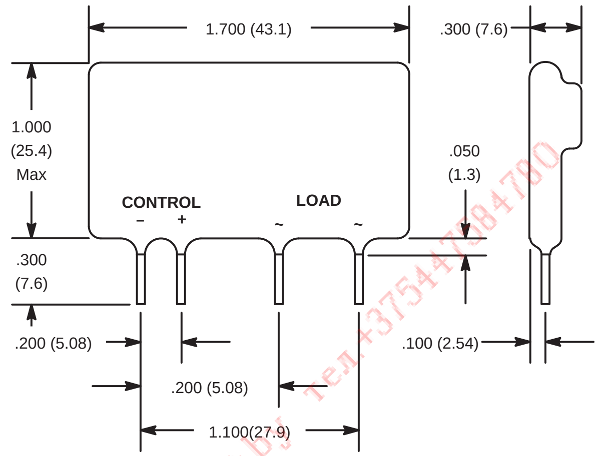
RS5 Series

Features

- Output – SCR AC Switch
- Input – DC or AC Control
- Ultra–High Surge Current Rating
- Available in:
  - Zero–Cross (RS5–1D5–21)
  - Random Turn–On (RS5–1D5–21R)

Printed Circuit Board Mountable Solid State Relay, 5 Amp, SPST–NO.

D81



Input Specifications

Control Voltage Range: 3–15VDC
Must Operate Voltage: 3.0VDC
Must Release Voltage: 1.0VDC
Nominal Input Impedance: 300Ω
Typ. Input Current (@ 5VDC): 15mA

Output Specifications

Load Voltage Range (@ 47–63Hz): 12–280V (RMS)
Transient Overvoltage: 600V (Peak)
Load Current Range: 0.06–5A (RMS)
Max. Surge Current (16.6ms): 250A (Peak)
Max. Off–State Leakage Current: 0.1mA (RMS) at rated voltage
Min. Off–State dv/dt:: 500V/μs at max. rated voltage
Max. On–State Voltage Drop: 1.4V (Peak) at rated current
Max. Turn–On Time: 1/2 cycle
Max. Turn–Off Time: 1/2 cycle
Max. I^2t for Fusing (8.3ms): 260A^2s
Power Factor (Min.) with Max. Load: 0.5

Descriptions

ZERO CROSS – This type of relay has a zero cross detector on the output stage of the relay. This means that the relay will "monitor" the load signal and when this signal gets to the zero volt (amplitude), the relay will trigger after the control voltage has been applied. This will usually take about 8.3msec in a 60Hz signal. These type of relays are mainly used to switch resistive or capacitive loads.

RANDOM TURN–ON – This type of relay does not contain a zero cross detector. Therefore, as soon as you connect a control signal, the relay will immediately turn–on at any phase of the load sine wave. The relay will trigger in a maximum time of 20μsec after the control voltage has been applied. These relays are mainly used to switch inductive loads.

Electrical Specifications

Dielectric Strength (50/60Hx Input/Output/Base): 4000V (RMS)
Min. Insulation Resistance (@ 500VDC): 10^9 Ω
Max. Capacitance (Input/Output): 10pF

Environmental Characteristics

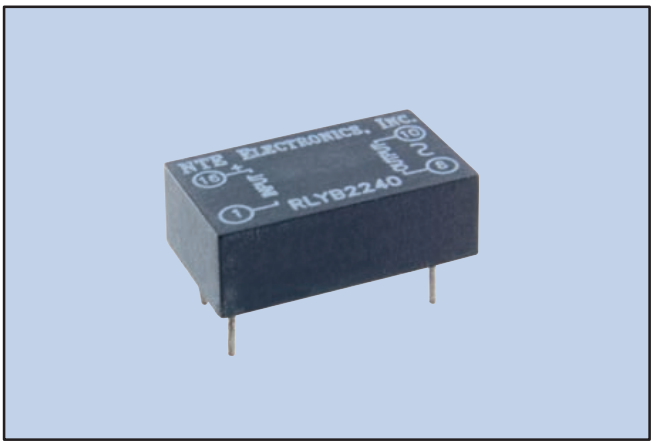
Operating: –30°C to +80°C
Storage: –30°C to +125°C

RLB2240

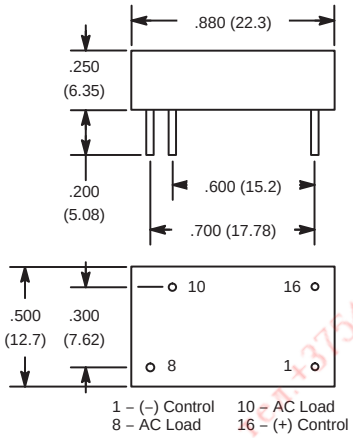
PC Board Mountable, SPST–NO Solid State Relay, 1.5 Amp

Features

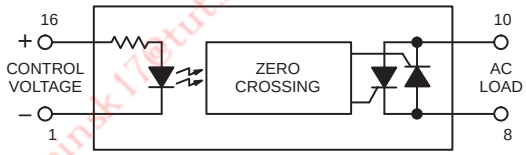
- Logic Compatible Inputs
- 4000V_{rms} Optical Isolation
- Zero Voltage Switching
- PC Mountable



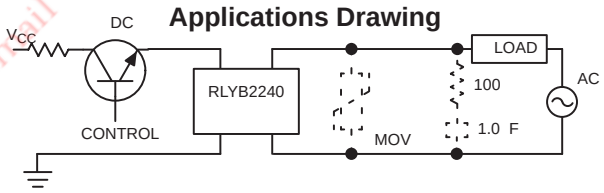
D73



Schematic



Applications Drawing



Note: Under certain low power factor load conditions, it may be advisable to connect an RC snubber network across the relay output. A snubber is also useful in the event of severe high voltage line spikes. While these do not generally cause damage to the relay, they may induce false cycle turn–on.

Input Specifications

Nom. Input Voltage: 5VDC
Max. Input Current: 16mA
Must Turn–On Voltage: 4VDC
Must Turn–Off Voltage: 2VDC

Output Specifications

Nom. AC Voltage RMS (20–500Hz): 240V
RMS Currernt: 1.5A
Non–Repetitive One Cycle Surge Current (60Hz): 25A (RMS)
Line Voltage Range (20–500Hz): 24–240 VAC
Off–State Current: 1000 A at nom. RMS voltage
Peak On–State Voltage (V_{TM}): 1.7V max. at rated RMS current
Peak Transient Overvoltage: 500V

Electrical Specifications

Dielectric Strength
Input To Output: 4000 VRMS
Terminals to Tab/Case: 4000 VRMS
Max. Rate of Rise Off–State Voltage (dv/dt): 200V/μs
Capacitance (Input–Output): 3.0pF typ.
Response Time: 1/2 Cycle of operating frequency max.

Environmental Characteristics

Operating: –25°C to +85°C
Storage: –25°C to +150°C

Introduction to Input/Output Modules

General Information

An I/O module is a special type of solid−state relay used in the industrial control area. Process controllers, with their tailored loads and sensing switches, require the advanced technology of the solid−state relay to interface with their computerized machines.

A popular package for the I/O module is the plug−in replacement type, with part numbers being common among manufacturers. The modules are self−contained, can be mounted individually, or plugged into mounting bases for multiple use. Pin−outs are generally compatible among manufacturers, but comparing the data sheets is a wise decision in making replacements.

There are four basic types of I/O modules:

- AC input to logic (NTE's RIM−IAC series)
- DC input to logic (NTE's RIM−IDC series)
- Logic to AC output (NTE's RIM−OAC series)
- Logic to DC output (NTE's RIM−ODC series)

All modules are photoisolated for electrical isolation between logic circuits and power lines, and have a single Form A (SPST) output.

Input modules are unique, in that they perform a reverse relay function, returning data from field contacts and loads to a computing source. Power−level control signals are converted into clean logic−level signals by these modules.

Input circuits accept the AC signal, rectify and filter it, while the DC signals are current−limited to provide a wide range of control voltages. Signals that are thus conditioned, are photocoupled through drivers to logic outputs which can sink (open−collector) enough current to match any practical logic family.

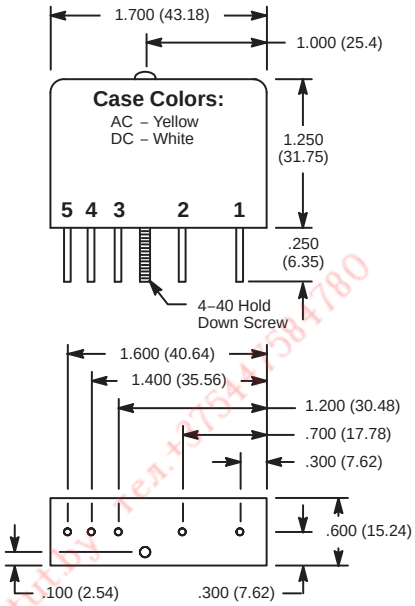
Output modules function as usual AC and DC solid−state devices, driven by either TTL logic (in sink mode) or, if buffered, directly by CMOS logic. AC modules include zero voltage turn−on to reduce surges, and zero current turn−off for inductive load switching. DC modules include a zener diode for transient−voltage protection.

RIM Series

Input Digital Modules
D28

Features

- 4KV Optical Isolation
- Industry Standard Packaging
- Plugs into Standard I/O Module Mounting Board
- Industry Standard Color Code (AC=Yellow, DC=White)
- AC & DC Types



INPUT SPECIFICATIONS

NTE Type No.	Nominal Input Voltage	Input Voltage		Input Control Max mA	Drop Out Current	Allowable Input For NO Output	Diag No.
		Min	Max				
RIM–IAC5	120 VAC	90 Vrms	140 Vrms	10	2.5mA	3.0mA	D28A
RIM–IAC15	120 VAC	90 Vrms	140 Vrms	10	2.5mA	3.0mA	D28A
RIM–IAC5A	240 VAC	180 Vrms	280 Vrms	10	1.5mA	2.0mA	D28A
RIM–IAC15A	240 VAC	180 Vrms	280 Vrms	10	1.5mA	2.0mA	D28A
RIM–IAC24A	240 VAC	180 Vrms	280 Vrms	10	1.5mA	2.0mA	D28A
RIM–IDC5	5 – 28 VDC	10 VDC	36 VDC	34	1.0mA	1.5mA	D28B
RIM–IDC24	5 – 28 VDC	3.3 VDC	32 VDC	34	1.0mA	1.5mA	D28B

OUTPUT SPECIFICATIONS

NTE Type No.	Nom. Logic Supply Vltg.	Logic Supply Vltg.		Max Logic Supply Current	Maximum Output		Max Output Leakage Curr.	Max Output Vltg. Drop	Diag No.
		Min	Max		Volts	Current			
RIM–IAC5	5.0 VDC	2.75 VDC	6 VDC	16mA DC	30 VDC	50mA ADC	10 A DC	200mV DC	D28A
RIM–IAC15	15 VDC	12 VDC	18 VDC	16mA DC	30 VDC	50mA ADC	10 A DC	200mV DC	D28A
RIM–IAC5A	5 VDC	2.75 VDC	6 VDC	16mA DC	30 VDC	50mA ADC	10 A DC	200mV DC	D28A
RIM–IAC15A	15 VDC	12 VDC	18 VDC	16mA DC	30 VDC	50mA ADC	10 A DC	200mV DC	D28A
RIM–IAC24A	24 VDC	20 VDC	30 VDC	16mA DC	30 VDC	50mA ADC	10 A DC	200mV DC	D28A
RIM–IDC5	5 VDC	2.75 VDC	6 VDC	16mA DC	30 VDC	50mA ADC	10 A DC	200mV DC	D28B
RIM–IDC24	24 VDC	20 VDC	30 VDC	16mA DC	30 VDC	50mA ADC	10 A DC	200mV DC	D28B

Diagram A – AC Input

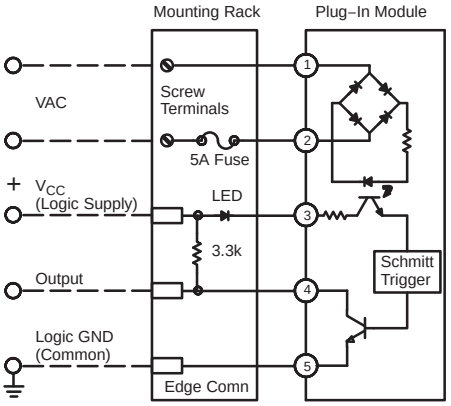
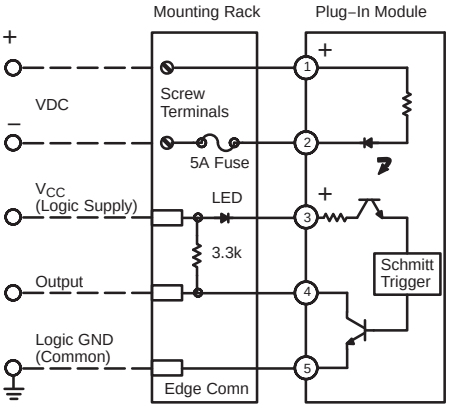


Diagram B – DC Input



Electrical Specifications

Environmental

Operating: –30°C to +80°C
Storage: –40° to +100°C

Operational Characteristics

Max Turn–On Time: 20ms (AC Modules), 1ms (DC Modules)
Max Turn–Off Time: 30ms (AC Modules), 1ms (DC Modules)

Insulation Characteristics

Input to Output Isolation Voltage: 4000 VRMS

ACCESSORIES

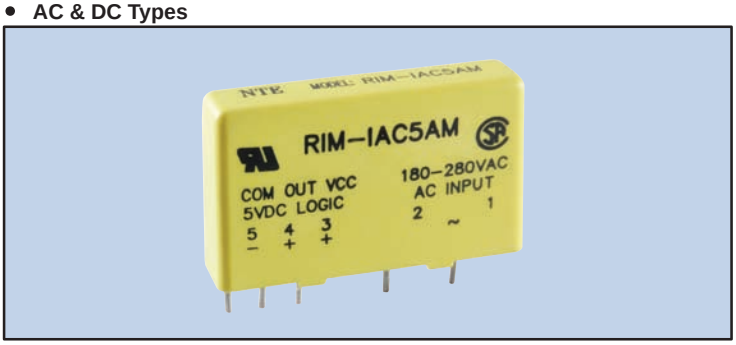
MOUNTING STYLES	DESCRIPTION	NTE TYPE NO.
DIN RAIL MOUNT	2–POSITION SOCKET	RLY9142

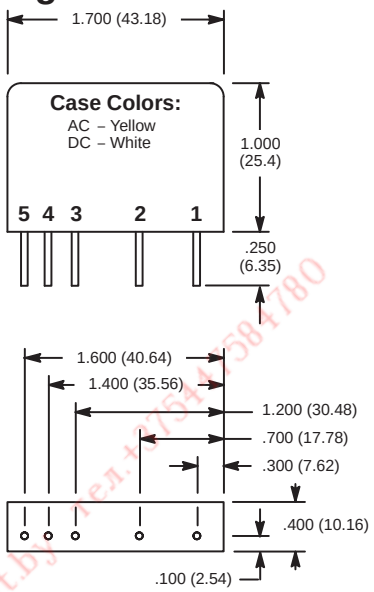
RIM Series

Slimline Input Digital Modules
D47

Features

- 4KV Optical Isolation
- Slimline Packaging
- Plugs into Standard I/O Module Mounting Board
- Industry Standard Color Code (AC=Yellow, DC=White)
- AC & DC Types





INPUT SPECIFICATIONS

NTE Type No.	Nominal Input Voltage	Input Voltage		Input Control Max mA	Drop Out Current	Allowable Input For NO Output	Diag No.
		Min	Max				
RIM–IAC5M	120 VAC	90Vrms	140Vrms	10.0	1.5mA	2.0mA	D47A
RIM–IAC15M	120 VAC	90Vrms	140Vrms	10.0	1.5mA	2.0mA	D47A
RIM–IAC5AM	240 VAC	180Vrms	280Vrms	10.0	1.0mA	1.5mA	D47A
RIM–IAC15AM	240 VAC	180Vrms	280Vrms	10.0	1.0mA	1.5mA	D47A
RIM–IAC24AM	240 VAC	180Vrms	280Vrms	10.0	1.0mA	1.5mA	D47A
RIM–IDC5M	5 – 28 VDC	10 VDC	36 VDC	34.0	1.5mA	2.0mA	D47B
RIM–IDC24M	5 – 28 VDC	10 VDC	36 VDC	34.0	1.5mA	2.0mA	D47B

OUTPUT SPECIFICATIONS

NTE Type No.	Nom. Logic Supply Vltg.	Logic Supply Vltg.		Max Logic Supply Current	Maximum Output		Max Output Leakage Curr.	Max Output Vltg. Drop	Diag No.
		Min	Max		Volts	Current			
RIM–IAC5M	5.0 VDC	3.5 VDC	6 VDC	16mADC	30 VDC	50mA	10 ADC	0.4VDC	D47A
RIM–IAC15M	15 VDC	12 VDC	18 VDC	16mADC	30 VDC	50mA	10 ADC	0.4VDC	D47A
RIM–IAC5AM	5 VDC	3.5 VDC	6 VDC	16mADC	30 VDC	50mA	10 ADC	0.4VDC	D47A
RIM–IAC15AM	15 VDC	12 VDC	18 VDC	16mADC	30 VDC	50mA	10 ADC	0.4VDC	D47A
RIM–IAC24AM	24 VDC	20 VDC	30 VDC	16mADC	30 VDC	50mA	10 ADC	0.4VDC	D47A
RIM–IDC5M	5 VDC	3.5 VDC	6 VDC	16mADC	30 VDC	50mA	10 ADC	0.4VDC	D47B
RIM–IDC24M	24 VDC	20 VDC	30 VDC	16mADC	30 VDC	50mA	10 ADC	0.4VDC	D47B

Diagram A – AC Input

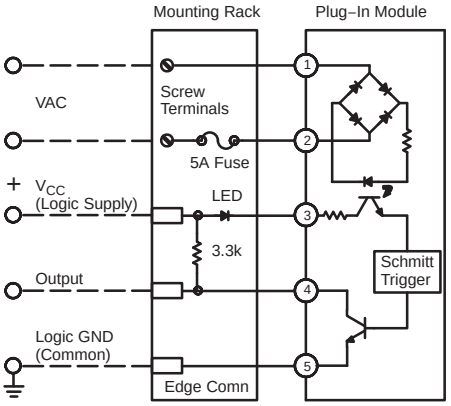
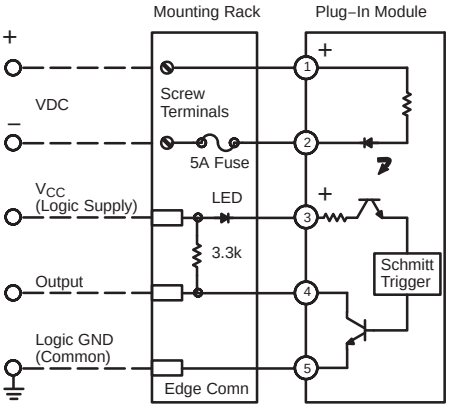


Diagram B – DC Input



Electrical Specifications

Environmental

Operating: 0°C to +80°C
Storage: –40°C to +125°C

Operational Characteristics

Max Turn–On Time: 20ms (AC Modules)
100 s (DC Modules)
Max Turn–Off Time: 20ms (AC Modules)
100 s (DC Modules)

Insulation Characteristics

Input to Output Isolation Voltage: 4000 VRMS

ACCESSORIES

MOUNTING STYLES	DESCRIPTION	NTE TYPE NO.
DIN RAIL MOUNT	2–POSITION SOCKET	RLY9142

RIM Series

Features

- AC & DC Types
- 4KV Optical Isolation
- Industry Standard Packaging
- Plugs into Standard I/O Module Mounting Board
- Industry Standard Color Code (AC=Black, DC=Red)

INPUT SPECIFICATIONS							
NTE Type No.	Nom. Input Vltg.	Min Turn–on Vltg.	Max Input Vltg.	Drop–Out Vltg.	Max Input Curr.	Nom. Input Res.	Diag No.
RIM–OAC5	5 VDC	2.5 VDC	8.0 0VDC	1 VDC	20mA	220 Ohms	D29A
RIM–OAC15	15 VDC	9.0 VDC	18 VDC	1 VDC	16mA	1K Ohms	D29A
RIM–OAC24	24 VDC	18 VDC	32 VDC	1 VDC	14mA	2K Ohms	D29A
RIM–OAC5A	5 VDC	2.5 VDC	8.0 VDC	1 VDC	20mA	200 Ohms	D29A
RIM–OAC15A	15 VDC	9.0 VDC	18 VDC	1 VDC	16 mA	1K Ohms	D29A
RIM–OAC24A	24 VDC	18 VDC	32 VDC	1 VDC	14mA	2K Ohms	D29A
RIM–ODC5	5 VDC	2.75 VDC	8.0 VDC	1 VDC	18mA	250 Ohms	D29B
RIM–ODC15	15 VDC	9.0 VDC	18 VDC	1 VDC	16mA	1K Ohms	D29B
RIM–ODC24	24 VDC	18 VDC	32 VDC	1 VDC	13mA	2K Ohms	D29B

OUTPUT SPECIFICATIONS								
NTE Type No.	Nom. Line Vltg.	Line Voltage		On–State Current		Peak On–State Voltage	Max Surge Current	Diag No.
		Min	Max	Min	Max			
RIM–OAC5	120 Vrms	12 Vrms	140 Vrms	50mA	3.5A	1.6V Peak	100 A Peak	D29A
RIM–OAC15	120 Vrms	12 Vrms	140 Vrms	50mA	3.5A	1.6V Peak	100 A Peak	D29A
RIM–OAC24	120 Vrms	12 Vrms	140 Vrms	50mA	3.5A	1.6V Peak	100 A Peak	D29A
RIM–OAC5A	240 Vrms	24 Vrms	280 Vrms	50mA	3.5A	1.6V Peak	100 A Peak	D29A
RIM–OAC15A	240 Vrms	24 Vrms	280 Vrms	50mA	3.5A	1.6V Peak	100 A Peak	D29A
RIM–OAC24A	240 Vrms	24 Vrms	280 Vrms	50mA	3.5A	1.6V Peak	100 A Peak	D29A
RIM–ODC5	5–48VDC	3 VDC	60 VDC	10mA	3.0A	1.5V Peak	5.0 ADC	D29B
RIM–ODC15	5–48VDC	3 VDC	60 VDC	10mA	3.0A	1.5V Peak	5.0 ADC	D29B
RIM–ODC24	5–48VDC	3 VDC	60 VDC	10mA	3.0A	1.5V Peak	5.0 ADC	D29B

Electrical Specifications

Environmental

Operating: –30°C to +80°C
Storage: –40°C to +100°C

Capacitance

Input to Output: 8pf Max

Insulation Characteristics

Input to Output Isolation Voltage: 4000 VRMS

ACCESSORIES		
MOUNTING STYLES	DESCRIPTION	NTE TYPE NO.
DIN RAIL MOUNT	2–POSITION SOCKET	RLY9142

Output Digital Modules

D29

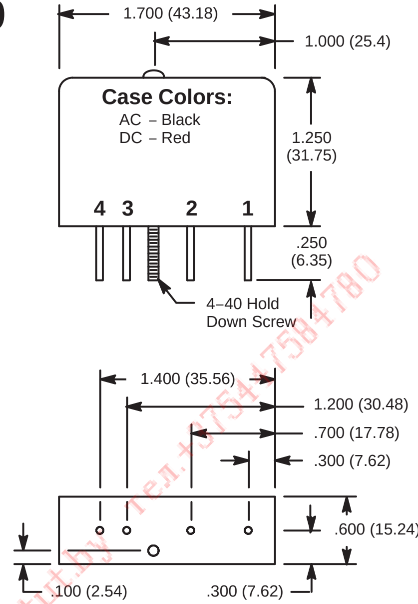


Diagram A – AC Output

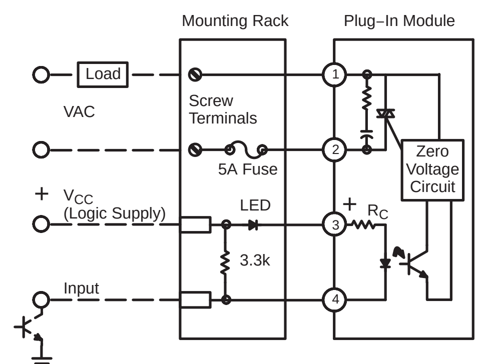
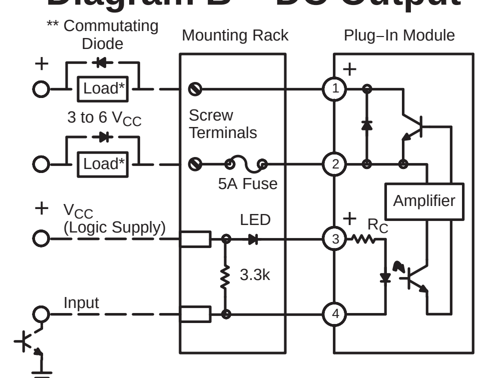


Diagram B – DC Output



* Sink or source current
** Must be used on inductive loads.

RIM Series

Features

- AC & DC Types
- 4KV Optical Isolation
- Slimline Packaging
- Plugs into Standard I/O Module Mounting Board
- Industry Standard Color Code (AC=Black, DC=Red)

INPUT SPECIFICATIONS							
NTE Type No.	Nom. Input Vltg.	Min Turn–on Vltg.	Max Input Vltg.	Drop–Out Vltg.	Typ Input Curr.	Nom. Input Res.	Diag No.
RIM–OAC5M	5 VDC	3 VDC	8 VDC	1.0VDC	20mA	220	D55A
RIM–OAC15M	15 VDC	9 VDC	18 VDC	1.0VDC	16mA	1000	D55A
RIM–OAC24M	24 VDC	18 VDC	32 VDC	1.0VDC	14mA	2200	D55A
RIM–OAC5AM	5 VDC	3 VDC	8 VDC	1.0VDC	20mA	220	D55A
RIM–OAC15AM	15 VDC	9 VDC	18 VDC	1.0VDC	16mA	1000	D55A
RIM–OAC24AM	24 VDC	18 VDC	32 VDC	1.0VDC	14mA	2200	D55A
RIM–ODC5M	5 VDC	3 VDC	8 VDC	1.0VDC	20mA	220	D55B
RIM–ODC15M	15 VDC	9 VDC	18 VDC	1.0VDC	16mA	1000	D55B

OUTPUT SPECIFICATIONS								
NTE Type No.	Nom. Line Vltg.	Line Voltage		On–State Current		Peak On–State Voltage	Max Surge Current	Diag No.
		Min	Max	Min	Max			
RIM–OAC5M	120 Vrms	12 Vrms	140 Vrms	50mA	3.0A	1.6V	80A Peak	D55A
RIM–OAC15M	120 Vrms	12 Vrms	140 Vrms	50mA	3.0A	1.6V	80A Peak	D55A
RIM–OAC24M	120 Vrms	12 Vrms	140 Vrms	50mA	3.0A	1.6V	80A Peak	D55A
RIM–OAC5AM	240 Vrms	24 Vrms	280 Vrms	50mA	3.0A	1.6V	80A Peak	D55A
RIM–OAC15AM	240 Vrms	24 Vrms	280 Vrms	50mA	3.0A	1.6V	80A Peak	D55A
RIM–OAC24AM	240 Vrms	24 Vrms	280 Vrms	50mA	3.0A	1.6V	80A Peak	D55A
RIM–ODC5M	5–48VDC	3 VDC	60 VDC	20mA	3.0A	1.5V	5A (1sec)	D55B
RIM–ODC15M	5–48VDC	3 VDC	60 VDC	20mA	3.0A	1.5V	5A (1sec)	D55B

Electrical Specifications

Environmental

Operating: 0°C to +80°C
Storage: –40°C to +125°C

Capacitance

Input to Output: 8pF Max

Insulation Characteristics

Input to Output Isolation Voltage: 4000 VRMS

ACCESSORIES		
MOUNTING STYLES	DESCRIPTION	NTE TYPE NO.
DIN RAIL MOUNT	2–POSITION SOCKET	RLY9142

Slimline Output Digital Modules

D55

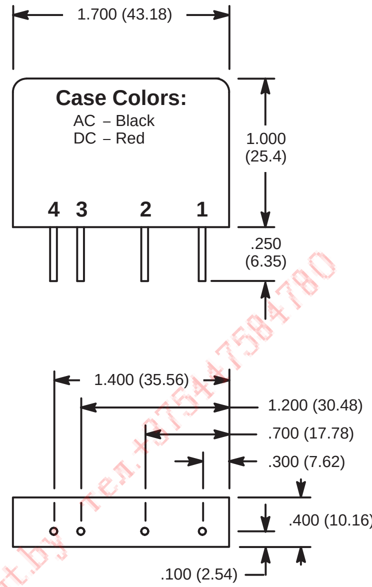


Diagram A – AC Output

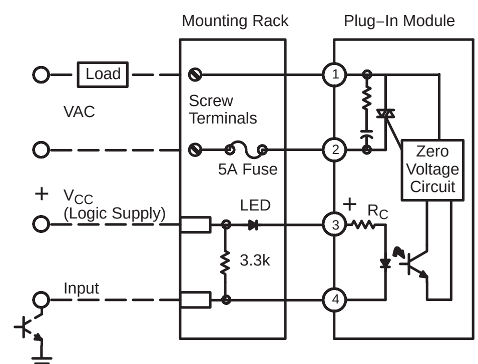
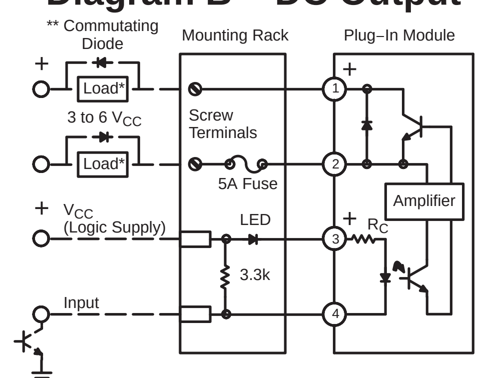


Diagram B – DC Output



* Sink or source current
** Must be used on inductive loads.

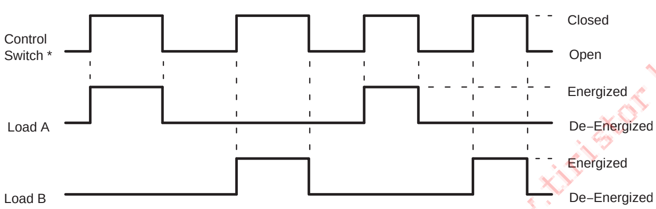
R66 Series (Includes RLY300)

Features

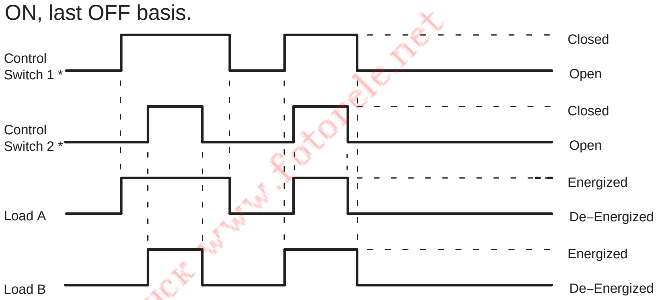
- For Duplex Loads
- Transient Protection
- LED Indicates Output Relay Status
- Compact 8–Pin Octal Plug–In Case

OPERATION

Alternating Relays are used in special applications where the optimization of load usage is required by equalizing the run time of two loads. This alternating action is initiated by a control switch, such as a float switch, manual switch, timing relay, pressure switch, or other isolated contact. each time the initiating switch is opened, the relay contacts will change state alternating the two loads.



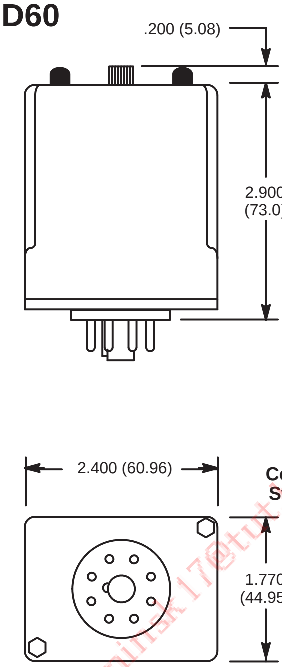
Alternating Relays with cross–wired contacts can operate as normal alternating relays when one control switch is used. If a second lag switch is used, the relay will simultaneously operate two loads on a first ON, last OFF basis.



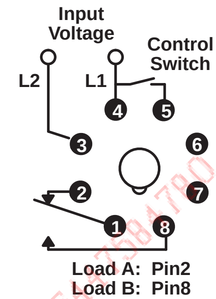
* With voltage applied

Alternating, 10 Amp, AC, SPDT & DPDT Cross–Wired Contact Relays.

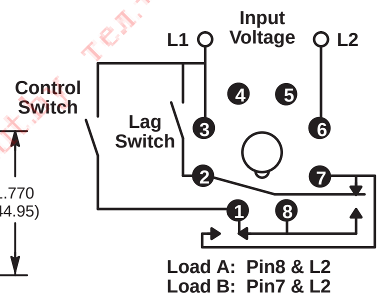
D60



SPDT, 1 Form "C"



DPDT Cross–Wired 2 Form "C"



Electrical Specifications

Contact

Rating: 10 Amps resistive at 240VAC, 1/2 HP at 240VAC, 10 Amps resistive at 30VDC
Life: 500,000 operations at full load
Mechanical Life: 7,000,000 operations at no load

Operational Characteristics

Voltage Tolerances: +10%, −15% at 50/60Hz
Power Required: 3VA

Protection

Transient: 10,000V for 20µs
Indicator LED: 2 LED's marked LOAD A and LOAD B

Environmental Characteristics

Operating: −28°C to +65°C

AC OPERATED

NTE Type No.	Nom. Voltage	Input Current	Contact Arr.	Max. Contact Cur. @ 30VDC or 240VAC	Diag No.
RLY314	24VAC	125mA	SPDT	10A	D60
R66–5A10–120	120VAC	25mA	SPDT	10A	D60
R66–5A10–240	240VAC	125mA	SPDT	10A	D60
RLY352	24VAC	125mA	DPDT (Cross–Wired)	10A	D60
R66–11CA10–120	120VAC	25mA	DPDT (Cross–Wired)	10A	D60
R66–11CA10–240	240VAC	125mA	DPDT (Cross–Wired)	10A	D60

ACCESSORIES

MOUNTING STYLES	DESCRIPTION	NTE TYPE NO.
SURFACE MOUNT	8–PIN OCTAL	R95–101
PANEL MOUNT	8–PIN OCTAL	R95–118
DIN RAIL MOUNT	8–PIN OCTAL	R95–113

Special Function – Voltage Monitoring

R67 Series

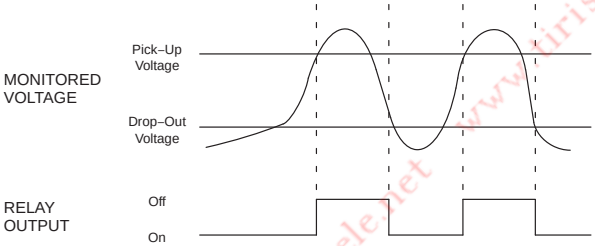
Features

- **Monitors AC Single Phase and DC Voltages**
- **Wide Range of User–Adjustable Pick–Up and Drop–Out Settings**
- **LED Indicates Output Relay Status**
- **Compact 8–Pin Octal Plug–In Case**

OPERATION

Voltage Monitor Relays provide protection to equipment where an over or under voltage condition is potentially damaging. They monitor either AC single phase (50–400Hz) or DC voltages. No supply (input) voltage is required.

The pick–up voltage setting is user–adjustable from 85–115% of the nominal voltage rating. As standard, the drop–out voltage setting is fixed at 3% below the pick–up voltage setting. The relay is energized when the monitored voltage is above the pick–up setting. The relay de–energizes when the monitored voltage is below the drop–out setting.

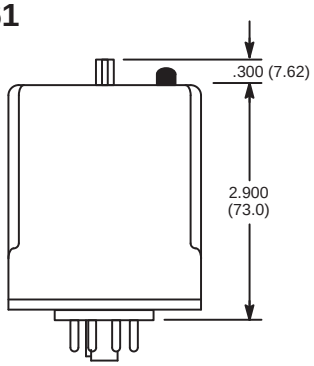


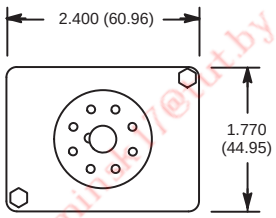
AC OPERATED						
NTE Type No.	Nom. Voltage	Contact Arr.	Pick–up Voltage Range	Drop–out Voltage Range*	Max. Contact Cur. @ 30VDC or 240VAC	Diag No.
R67–11A10–24	24VAC	DPDT	21–27V	20–26V	10A	D61
R67–11A10–120	120VAC	DPDT	102–138V	99–134V	10A	D61
DC OPERATED						
R67–11D10–24	24VDC	DPDT	21–27V	20–26V	10A	D61

* Fixed at 3% below the pick–up setting.

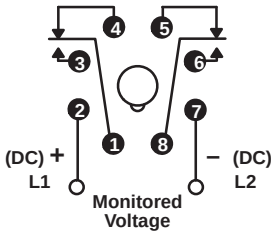
Voltage Monitoring, DPDT, 10 Amp, AC & DC Relay.

D61





DPDT, 2 Form "C"



Electrical Specifications

Contact

Rating: 10 Amps resistive at 240VAC, 1/2 HP at 240VAC, 10 Amps resistive at 30VDC
Life: 500,000 operations at full load
Mechanical Life: 7,000,000 operations at no load

Operational Characteristics

Voltage Settings: . . Pick–up: Adjustable from 85–115% of nom
Drop–out: Fixed at 3% below pick–up setting
Setting Accuracy: +0%, –5% min; +5%, –0% max
Timing Values: . . . . Operate Time: 50 mS
Release Time: 50 mS
Power Required: 3VA

Protection

Transient: 10,000V for 20μs
Indicator LED: Red LED on when relay is energized
Reset: Automatic

Environmental Characteristics

Operating: –28°C to +65°C

ACCESSORIES		
MOUNTING STYLES	DESCRIPTION	NTE TYPE NO.
SURFACE MOUNT	8–PIN OCTAL	R95–101
PANEL MOUNT	8–PIN OCTAL	R95–118
DIN RAIL MOUNT	8–PIN OCTAL	R95–113

R68 Series

Features

- Universal Voltage – Works on Any 208–480V System
- Protects Against:
  - ⇒ Phase Loss
  - ⇒ Phase Reversal
  - ⇒ Phase Unbalance (Adjustable 2–10%)
  - ⇒ Undervoltage (Adjustable 80–95%)
  - ⇒ Overvoltage (Fixed at 110%)
- User–Selectable Phase Unbalance and Undervoltage Settings
- User–Adjustable Time Delay Drop–Out on Undervoltage
- LED Indicates both Normal and Fault Conditions
- Compatible with most Wye or Delta Systems
- Compact 8–Pin Octal Plug–In Case

LED Status Table *

LED Status	Indicator
Green Steady	Normal/Relay ON
Green Flashing	Power Up/Restart Delay
Red Steady	Unbalance
Red Flashing	Undervoltage/Overvoltage
Amber Steady	Reversal
Amber Flashing	Loss
Green/Red Alternating	Undervoltage/Overvoltage Trip Pending
Red/Amber Alternating	Nominal Voltage Set Error

* This table is on the side of all units for easy reference.

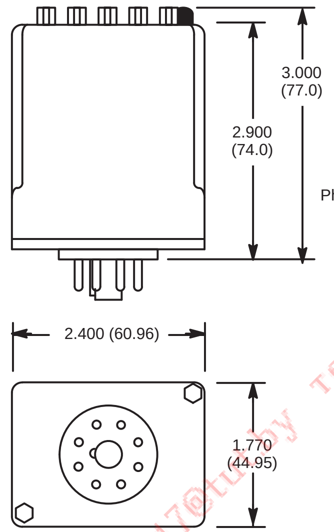
OPERATION

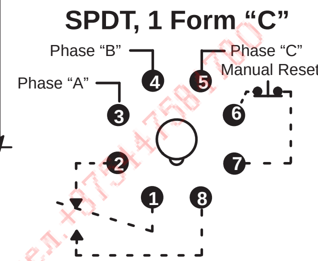
Phase Monitoring Relays will protect against premature equipment failure caused by voltage faults on three–phase systems. These devices protect against unbalanced voltages or single phasing regardless of any regenerative voltages. The relay is energized when the phase sequence and all voltages are correct. Any one of four fault conditions will de–energize the relay. Re–energization is automatic upon correction of the fault. An LED indicates normal and tripped conditions.

AC OPERATED						
NTE Type No.	Nom. Voltage	Contact Arr.	Adjustable Under Voltage Drop–out	Input Cur. Nom.	Max. Contact Cur. @ 30VDC or 240VAC	Diag No.
R68–5A10–480	208–480VAC	SPDT	80–95% nom. vltg.	50mA Max.	10A	D62

Phase Monitoring, SPDT, 10 Amp, AC Relay.

D62





Electrical Specifications

Contact

Rating: 10 Amps resistive at 240VAC/30VDC, 1/2 HP at 120/240VAC
Life: 100,000 operations at full load
Mechanical Life: 10,000,000 operations at no load

Input

Nominal Input voltage: See Chart
Steady state input current: See Chart

Operational Characteristics

Response Times: . . **Power Up:** 2 sec. fixed
Restart After Fault: 1–300 sec. adjustable
Drop–Out Due Fault:
Phase Loss & Reversal: 100ms fixed
Phase Unbalanced: 2 sec. fixed
Undervoltage: 0.1 – 20 sec. adjustable
Overvoltage: Fixed Time Based on Inverse Time Curve

Hysteresis: 2 – 3%
Load (Burden): Less than 3VA

Protection

Indicator LED: See LED Status table
Reset: Automatic upon correction of fault. When a N.C. switch is wired across the manual reset terminals (Pin5 & Pin6), the unit switches to manual reset mode and remote manual reset is available.

Environmental Characteristics

Operating: –28°C to +65°C

ACCESSORIES		
MOUNTING STYLES	DESCRIPTION	NTE TYPE NO.
SURFACE MOUNT	8–PIN OCTAL	R95–101
PANEL MOUNT	8–PIN OCTAL	R95–118
DIN RAIL MOUNT	8–PIN OCTAL	R95–113

Circuit Breakers

R58 Series

Features
- .250” (6.35mm) Quick Connect Terminals
- Cannot be Manually Tripped
- Visual Trip Indicator
- Push Button to Reset Breaker

NOTE: Indicator plate shown may NOT be available on all devices.

NTE Type No.	Current Rating Amps	Maximuml Resistance Ohms
R58–1A	1.0	1.35 (Typ)
R58–2A	2.0	0.32 (Typ)
R58–3A	3.0	0.225
R58–4A	4.0	0.225
R58–5A	5.0	0.225
R58–6A	6.0	0.175
R58–7A	7.0	0.175
R58–8A	8.0	0.175
R58–10A	10.0	0.125
R58–12A	12.0	0.050
R58–15A	15.0	0.040
R58–20A	20.0	0.030
R58–25A	25.0	0.020
R58–30A	30.0	0.020
R58–35A	35.0	0.020

Trip Times

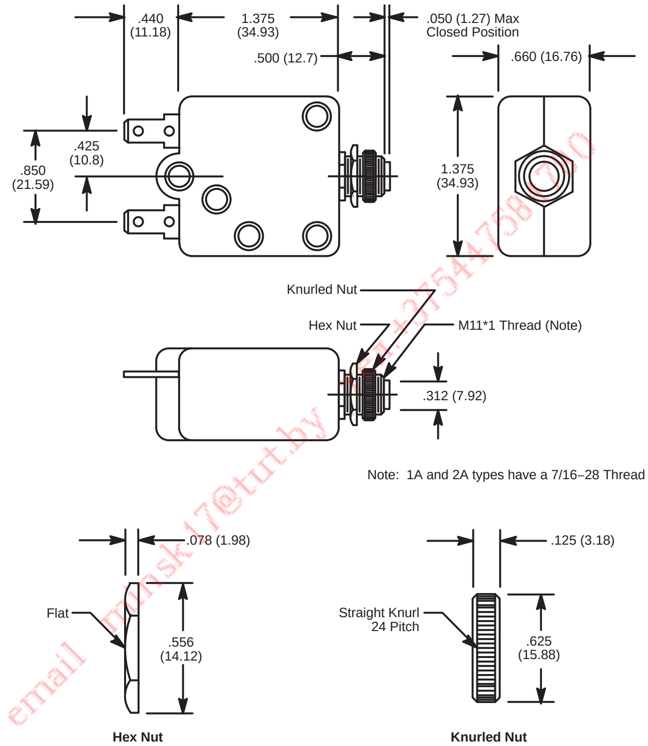
1 to 4 Amp Types		5 to 35 Amp Types	
Rated Load	Trip Times	Rated Load	Trip Times
100%	No Trip	100%	No Trip
145%	Trip in 1 Hour	145%	Trip in 1 Hour
200%	10 to 45 Sec.	200%	6.0 to 30 Sec.
400%	3.0 to 14.0 Sec.	400%	1.6 to 4.5 Sec.
600%	1.4 to 7.0 Sec.	600%	0.60 to 1.7 Sec.
800%	0.75 to 4.3 Sec.	800%	0.25 to 0.90 Sec.
1000%	0.50 to 3.4 Sec.	1000%	0.15 to 0.65 Sec.

ACCESSORIES	
NTE TYPE NO.	DESCRIPTION
R58–Boot (Note 1)	Protective Boot w/M11 Thread, Clear Silicon, Waterproof

Note 1. Not for use with 1A and 2A types.

Thermal Circuit Breaker

D40



Electrical Specifications

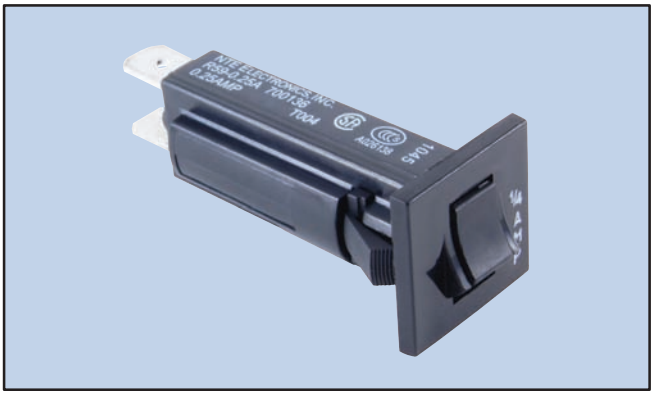
Electrical Characteristics (@ 25°C)
Calibration: Will continuously carry 100% of rating.
May trip between 101% and 144%, but must trip at 145% of rating at +25°C
Maximum Operating Voltages: 50 VDC; 250 VAC, @ 50/60 Hz
Dielectric Strength: 1500VAC RMS
Resettable Overload Capacity: Ten times rated current
Interrupt Capacity:
2000 Amps at 50 VDC
1000 Amps at 250 VAC

Mechanical Characteristics
Termination: .250 (6.35) Quick Connect Terminals
Shock: Withstands to 10 g
Endurance Cycling: Over 1000 cycles at 200% of rated load.
Vibration: Withstands to 10 g at 10 to 55 Hz.
Weight: Less than 1.5 ozs. (42.5 g)

R59 Series

Features

- Replaces Slow Blow Glass Cartridge Fuse
- .250” (6.35mm) Quick Connect Terminals
- Snap–In Mounting
- Visual Trip Indicator
- Push Button to Reset Breaker



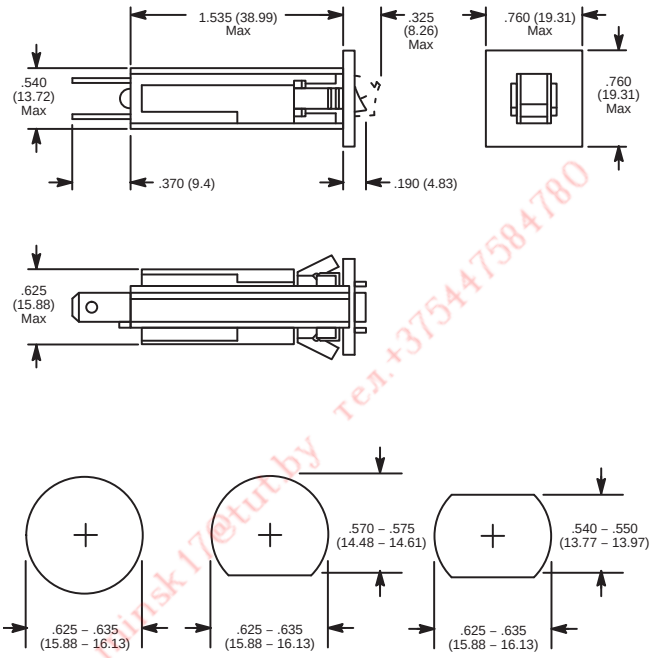
NTE Type No.	Current Rating Amps	Typical Resistance Ohms
R59–0.25A	0.25	14.0
R59–0.5A	0.50	3.55
R59–1A	1.0	0.89
R59–2A	2.0	0.17
R59–3A	3.0	0.069
R59–4A	4.0	0.043
R59–5A	5.0	0.030
R59–6A	6.0	0.026
R59–7A	7.0	0.017
R59–8A	8.0	0.016
R59–10A	10.0	0.011
R59–12A	12.0	0.009
R59–15A	15.0	0.007
R59–20A	20.0	0.007

Trip Times

0.25 to 2 Amp Types		3.0 to 20 Amp Types	
Rated Load	Trip Times	Rated Load	Trip Times
100%	No Trip	100%	No Trip
175%	Trip in 1 Hour	135%	Trip in 1 Hour
200%	4.5 to 28.0 Sec.	200%	2.2 to 15.0 Sec.
400%	1.0 to 6.5 Sec.	400%	0.55 to 1.8 Sec.
600%	0.4 to 4.0 Sec.	600%	0.27 to 0.7 Sec.
		800%	0.17 to 0.45 Sec.
		1000%	0.12 to 0.3 Sec.

Thermal Circuit Breaker, Fuse Holder Type

D41



Recommended Panel Cutouts
Recommended Panel Thickness: .032 – .062 (.813 – 1.574)

Electrical Specifications

Electrical Characteristics (@ 25°C)

Calibration: Will continuously carry 100% of rating.
0.25 to 2 Amp types: May trip between 101% and 174%, but must trip at 175% of rating within one hour at +25°C
3.0 to 20 Amp types: May trip between 101% and 134%, but must trip at 135% of rating within one hour at +25°C
Maximum Operating Voltages: 32 VDC; 250 VAC, @ 50/60 Hz
Dielectric Strength: 1500VAC RMS
Resettable Overload Capacity:
0.25 to 2 Amp types: Six times rated current
3.0 to 20 Amp types: Ten times rated current
Reset Time:
0.25 to 2 Amp types: 180 seconds max.
3.0 to 20 Amp types: 10 to 60 seconds typ.
Interrupt Capacity: 1000 Amps @ 250 VAC, 50/60 Hz. and 32 VDC in accordance with UL standard 1077

Mechanical Characteristics

Termination: .250 (6.35) Quick Connect Terminals
NOTE: Soldering to terminals is not recommended.
Mounting: Snaps into panel from front
(See Recommended Panel Cutouts)
Weight: 0.35 ozs. (10 g) approx.

RB Series

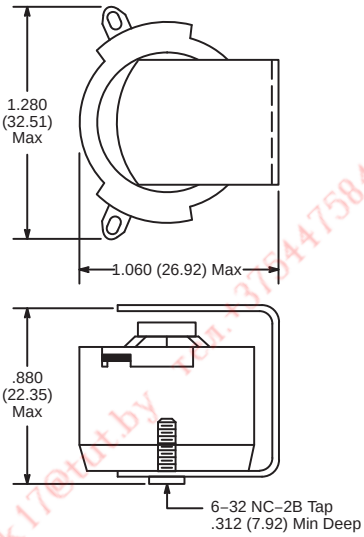
Features

- Operates on 50Hz or 60Hz AC Voltage
- Will Operate Continuously Without Overheating
- Easy Single Screw Mounting

AC OPERATED				
NTE Type No.	Nominal Voltage	Resistance Ohms ±10%	Nominal Coil Power	Diag No.
RB–12	12VAC	20	3.0VA	D56
RB–24	24VAC	80	3.0VA	D56
RB–120	120VAC	2025	3.0VA	D56
RB–240	240VAC	8000	3.0VA	D56

AC Buzzer, Typical Applications Include Toasters, Ovens, Alarms, and Signaling Devices.

D56



Electrical Specifications

Coil Data

Coil Voltages: AC Only: Up to 277 Volts/60Hz

Operate Data

Operating Voltage: ±15% of Nominal
Sound Pressure Level: (Nominal Voltage)
93 dBA at 15 cm (Average)
74 dBA at 1.0 Meters (Average)

Insulation Characteristics

Dielectric Strength
Between all Elements: 1000 VRMS, 60Hz

Environmental Characteristics

Operating Ambient: –45°C to +110°C
Coil Temperature Rise: (25°C Ambient – Continuous Duty)
45°C Approx. @ 60Hz – Use at 50Hz will Cause Slight Increase in Coil Rise

Mechanical Data

Terminals: Pierced solder lugs .187" x .020"

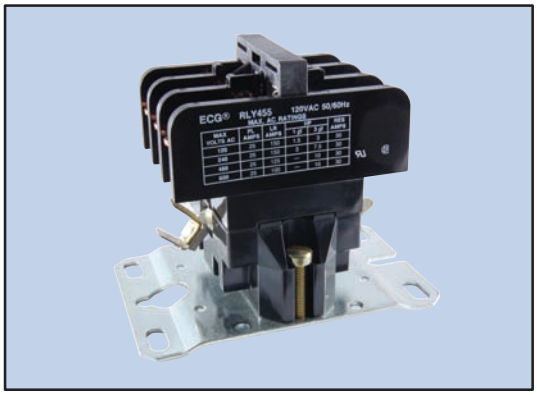
Weight

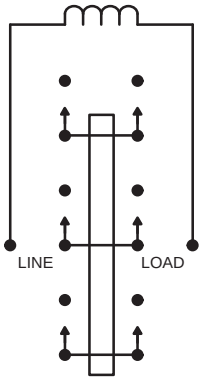
Std: 31 gram approx.

RLY400 Series

Features

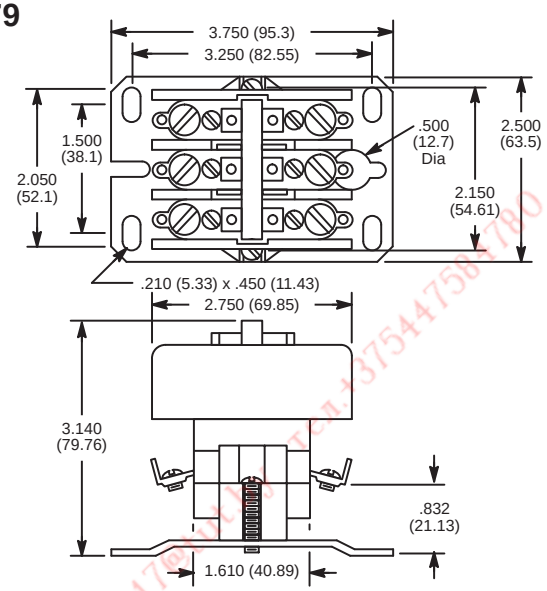
- Straight Through Wiring
- Heavy Duty
- Universal Mounting Plate





Definite Purpose, 3PST–DM, 25 Amp, Magnetic Contactors

D79



AC OPERATED					
	Coils		Contacts		
NTE Type No.	Input Voltage	Nom. Power	Contact Arr.	Max. Contact Cur. @ 600VAC	Diag No.
RLY455	120 VAC	10 VA	3PST–DM	25A	D79

Motor Rating in Amps				Resistive Rating (Elect. Heat)
Full Load	Locked Rotor			
@ 600VAC	@ 240VAC	@ 480VAC	@ 600VAC	@ 600VAC
25A	150A	125A	100A	30A

Motor Horsepower Ratings			
Motor Type	@ 240VAC	@ 240VAC	@ 440–600VAC
1 2P	1.5 HP	3.0 HP	–
3 3P	3.0 HP	7.5 HP	10 HP

ACCESSORIES	
DESCRIPTION	NTE TYPE NO.
Dual .250" Quick Connect Terminals	RLY9201
Box Lug	RLY9204
Replacement Contacts	RLY9205
Auxiliary Switch	RLY9206

Electrical Specifications

Tungsten Lamp Rating: 30A, 277VAC
Electric Discharge Lamp Rating: 30A, 277VAC
Heavy Duty Pilot Rating: 720VA, 120–600VAC
(Box lug nut accessory limits voltage to 277VAC)
Min. Load Current: 1 Amp @ 120VAC
Duty: Continuous

Coil

Power ..... **Inrush:** 40VA
Steady State: 10VA
Duty: Continuous

Operational Characteristics

Timing Value ..... **Operate Time:** 25 mS
Release Time: 25 mS

Insulation Characteristics

Initial Breakdown Voltage: 2200V RMS

Environmental Characteristics

Operating: –55°C to +65°C

Life

Mechanical: 2,000,000 Operations
Electrical: 500,000 Operations @ Full Load

Note It is not recommended to mount or operate contactors upside–down.

RLY530 Series

Features

- #10–32 Combination Screw with .250” (6.35mm) QC Terminals
- Silver Cadmium Oxide Contacts
- UL 508 File No. E227250
  Class NLDX2, NLDX8

D86

AC OPERATED					
	Coils		Contacts		
NTE Type No.	Input Voltage	Nom. Sealed	Contact Arr.	Max. Contact Cur. @ 600VAC	Diag No.
RLY530–1–24	24 VAC	5.0 VA	SPST–NO	30A	D86
RLY530–1–120	120 VAC	5.0 VA	SPST–NO	30A	D86
RLY530–1–240	240 VAC	5.0 VA	SPST–NO	30A	D86
RLY530–2–24	24 VAC	6.5 VA	DPST–NO	30A	D87
RLY530–2–120	120 VAC	6.5 VA	DPST–NO	30A	D87
RLY530–2–240	240 VAC	6.5 VA	DPST–NO	30A	D87
RLY530–3–24	24 VAC	6.0 VA	3PST–NO	30A	D88
RLY530–3–120	120 VAC	6.0 VA	3PST–NO	30A	D88
RLY530–3–240	240 VAC	6.0 VA	3PST–NO	30A	D88
RLY530–3–480	480 VAC	6.0 VA	3PST–NO	30A	D88

	Motor Rating in Amps				
		Resistive	Locked Rotor		
Number of Poles	Full Load	@ 600VAC	@ 240VAC	@ 480VAC	@ 600VAC
1 & 2	30A	40A	150A	125A	100A
3	30A	40A	180A	150A	120A

Motor Horsepower Ratings				
Motor Type	@ 120VAC	@ 240VAC	@ 240/277VAC	@ 480VAC
1 1P	1 HP	2 HP	–	–
1 2P	2 HP	3 HP	–	–
1 3P	2 HP	–	5 HP	–
3 3P	–	–	10 HP	15 HP

ACCESSORIES	
DESCRIPTION	NTE TYPE NO.
Auxiliary Switch, 1 SPDT Snap Action Switch w/.250” QC Terminals	RLY9190
Auxiliary Switch, 2 SPDT Snap Action Switches w/.250” QC Terminals	RLY9191
Auxiliary Switch, 1 SPST–NO & 1 SPST–NC Switch w/.250” QC Terminals	RLY9192
Auxiliary Switch, 1 SPST–NO & 1 SPST–NC Switch w/6–32 Screw Terminals	RLY9193

Note 1. The above accessories are for use with 3–Pole contactors **ONLY**.

Definite Purpose, 30 FLA, 1 Pole, 2 Pole and 3 Pole

D87

D88

Electrical Specifications

Initial Dielectric Strength
Between Contact and Coil: 2200 VAC
Between Poles: 2200 VAC (includes shunt)
Between Open Contacts: 2200 VAC (no shunt)
Insulation System: 130°C Class B
Power Pole Terminations: #10–32 screw
Wire Size: 16–8 (must use ring terminal)
Recommended Tightening Torque: 22 in. lbs.
Quick Connects
Coil Terminals: Dual: .250” QC
Power Terminals: 1 Pole: Quad .250” QC
2 Pole: Quad .250” QC
3 Pole: Dual .250” QC

Coil

Nom Coil Resistance
1 Pole: 18Ω (24V); 420Ω (120V); 1800Ω (240V)
2 Pole: 11Ω (24V); 237Ω (120V); 1000Ω (240V)
3 Pole: 7Ω (24V); 180Ω (120V); 720Ω(240V)
Max. Pick–up Voltage: 75% of nominal or less, DC
Min Drop–out Voltage: 6–15V (24V); 20–70V (120V); 40–140V (240V)
Nom Inrush (60Hz): 28 VA (1 Pole); 30 VA (2 Pole); 60 VA (3 Pole)
Max Coil Voltage: 30V (24V); 132V (120V); 264V (240V)

Environmental Characteristics

Operating: –40°C to +65°C

Weight

1 Pole: 8.0 ozs (226.8 grams)—typical
2 Pole: 9.6 ozs (272.2 grams)—typical
3 Pole: 1 lb. (453.6 grams)—typical

Note It is not recommended to mount or operate contactors upside–down.

RLY540 Series

Features

- #14–4 Compression Lugs with .250” (6.35mm) QC Terminals
- Silver Cadmium Oxide Contacts
- UL 508 File No. E227250
  Class NLDX2, NLDX8

D86

AC OPERATED					
	Coils		Contacts		
NTE Type No.	Input Voltage	Nom. Sealed	Contact Arr.	Max. Contact Cur. @ 600VAC	Diag No.
RLY540–1–24	24 VAC	5.0 VA	SPST–NO	40A	D86
RLY540–1–120	120 VAC	5.0 VA	SPST–NO	40A	D86
RLY540–1–240	240 VAC	5.0 VA	SPST–NO	40A	D86
RLY540–2–24	24 VAC	6.5 VA	DPST–NO	40A	D87
RLY540–2–120	120 VAC	6.5 VA	DPST–NO	40A	D87
RLY540–2–240	240 VAC	6.5 VA	DPST–NO	40A	D87
RLY540–3–24	24 VAC	6.0 VA	3PST–NO	40A	D88
RLY540–3–120	120 VAC	6.0 VA	3PST–NO	40A	D88
RLY540–3–240	240 VAC	6.0 VA	3PST–NO	40A	D88
RLY540–3–480	480 VAC	6.0 VA	3PST–NO	40A	D88

	Motor Rating in Amps				
		Resistive	Locked Rotor		
Number of Poles	Full Load	@ 600VAC	@ 240VAC	@ 480VAC	@ 600VAC
1 & 2	40A	50A	200A	160A	120A
3	40A	50A	240A	200A	160A

Motor Horsepower Ratings				
Motor Type	@ 120VAC	@ 240VAC	@ 240/277VAC	@ 480VAC
1 1P	2 HP	3 HP	–	–
1 2P	2 HP	3 HP	–	–
1 3P	3 HP	–	7.5 HP	–
3 3P	–	–	10 HP	20 HP

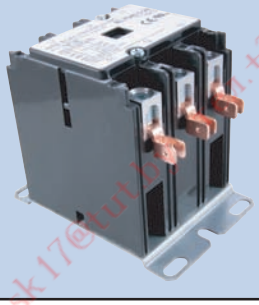
ACCESSORIES	
DESCRIPTION	NTE TYPE NO.
Auxiliary Switch, 1 SPDT Snap Action Switch w/.250” QC Terminals	RLY9190
Auxiliary Switch, 2 SPDT Snap Action Switches w/.250” QC Terminals	RLY9191
Auxiliary Switch, 1 SPST–NO & 1 SPST–NC Switch w/.250” QC Terminals	RLY9192
Auxiliary Switch, 1 SPST–NO & 1 SPST–NC Switch w/6–32 Screw Terminals	RLY9193

Note 1. The above accessories are for use with 3–Pole contactors **ONLY**.

Definite Purpose, 40 FLA, 1 Pole, 2 Pole and 3 Pole

D87

D88



Electrical Specifications

Initial Dielectric Strength
Between Contact and Coil: 2200 VAC
Between Poles: 2200 VAC (includes shunt)
Between Open Contacts: 2200 VAC (no shunt)
Insulation System: 130°C Class B
Power Pole Terminations: Box Lug
Wire Size: 14–4
Recommended Tightening Torque: 40 in. lbs.
Quick Connects
Coil Terminals: Dual: .250” QC
Power Terminals: 1 Pole: Quad .250” QC
2 Pole: Quad .250” QC
3 Pole: Dual .250” QC

Coil

Nom Coil Resistance
1 Pole: 18Ω (24V); 420Ω (120V); 1800Ω (240V)
2 Pole: 11Ω (24V); 237Ω (120V); 1000Ω (240V)
3 Pole: 7Ω (24V); 180Ω (120V); 720Ω (240V)
Max. Pick–up Voltage: 75% of nominal or less, DC
Min Drop–out Voltage: 6–15V (24V); 20–70V (120V); 40–140V (240V)
Nom Inrush (60Hz): 28 VA (1 Pole); 30 VA (2 Pole); 60 VA (3 Pole)
Max Coil Voltage: 30V (24V); 132V (120V); 264V (240V)

Environmental Characteristics

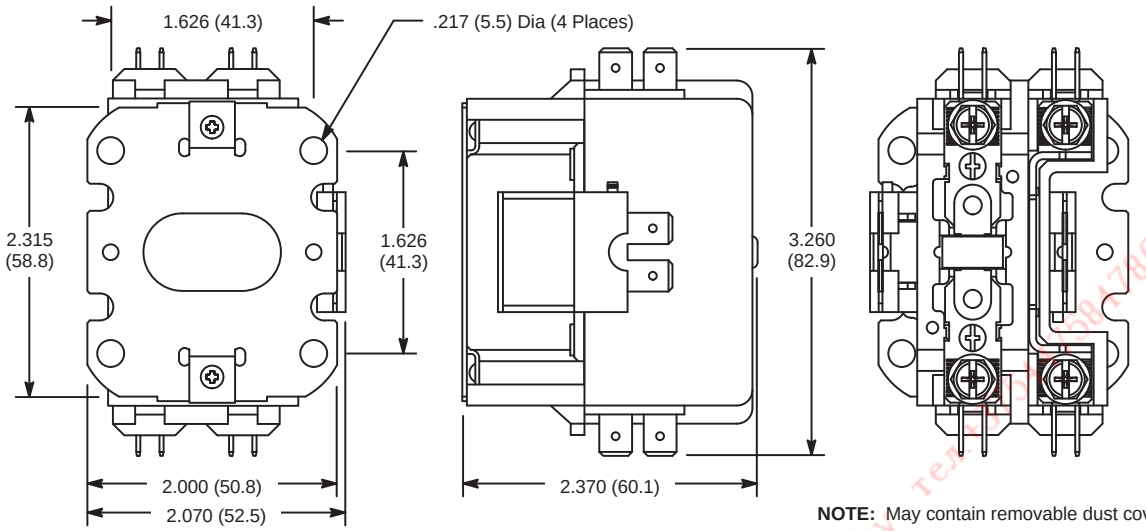
Operating: –40°C to +65°C

Weight

1 Pole: 8.0 ozs (226.8 grams)—typical
2 Pole: 9.6 ozs (272.2 grams)—typical
3 Pole: 1 lb. (453.6 grams)—typical

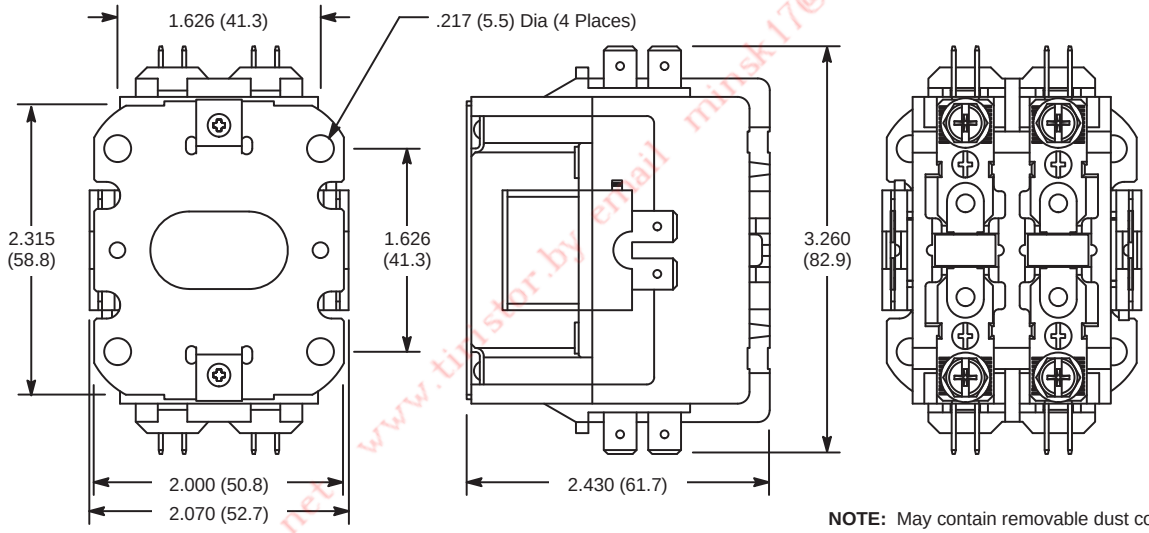
Note It is not recommended to mount or operate contactors upside–down.

D86 (1 Pole)



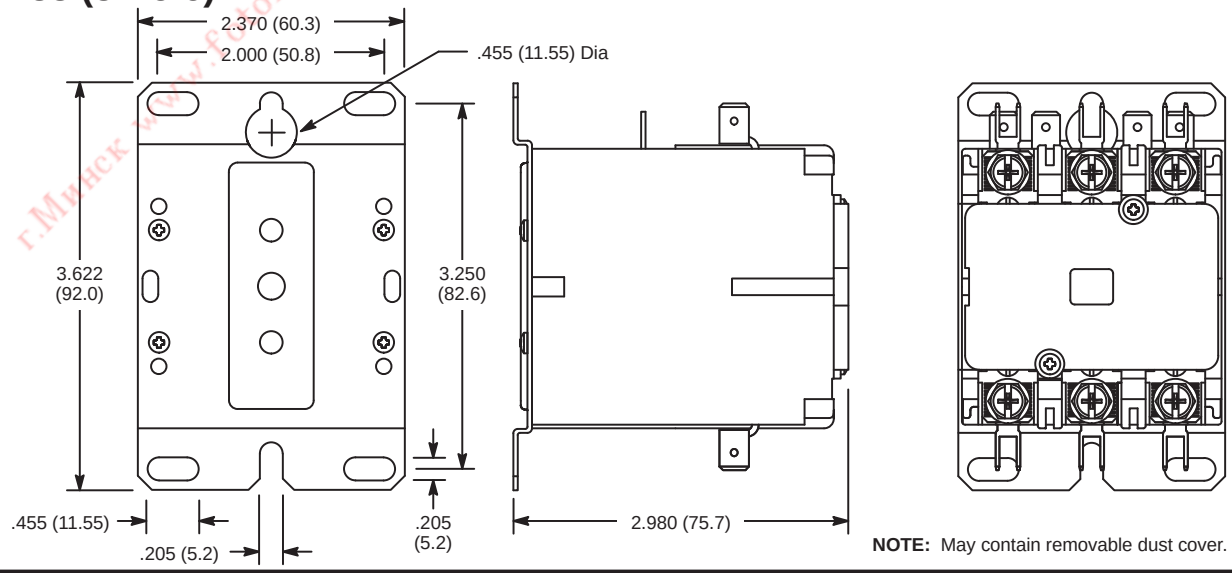
NOTE: May contain removable dust cover.

D87 (2 Pole)



NOTE: May contain removable dust cover.

D88 (3 Pole)



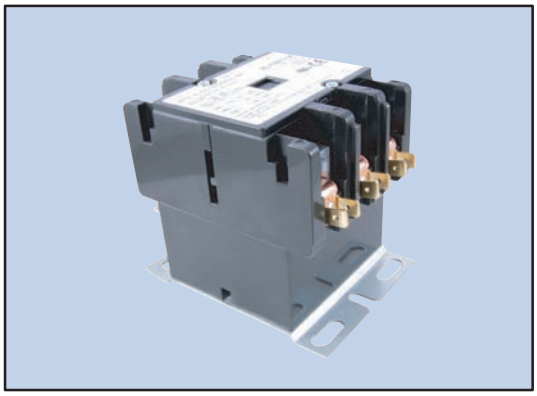
NOTE: May contain removable dust cover.

RLY550 Series

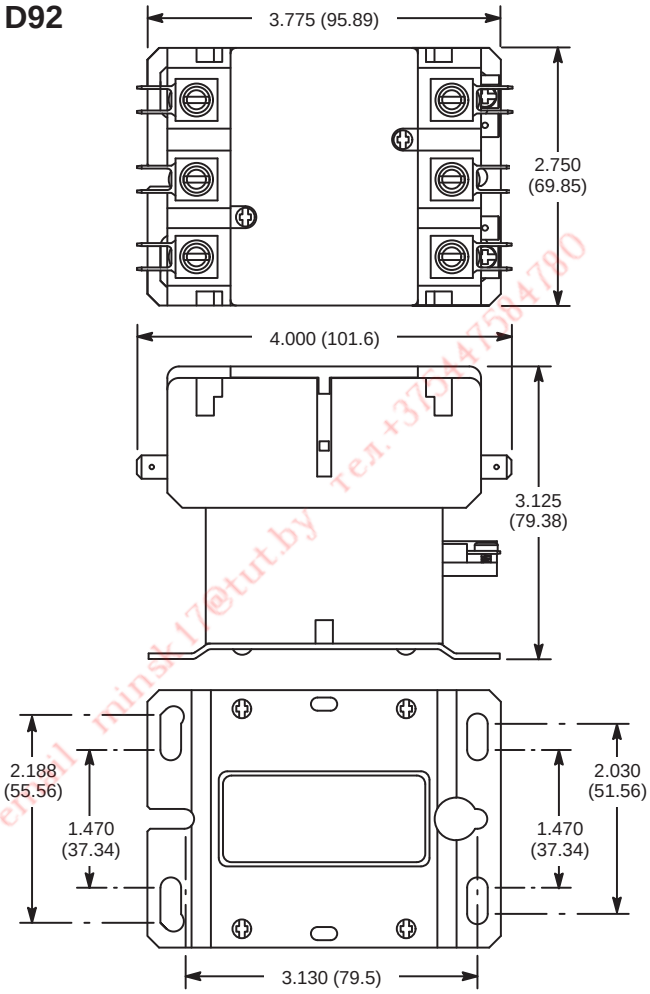
Definite Purpose, 50 FLA, 3 Pole NO

Features

- **#14–4 Compression Lugs with .250” (6.35mm) QC Terminals**
- **Silver Cadmium Oxide Contacts**
- **UL 508 File No. E227250**
  Class NLDX2, NLDX8



D92



AC OPERATED					
NTE Type No.	Coils: Input Voltage	Coils: Nom. Sealed	Contacts: Contact Arr.	Contacts: Max. Contact Cur. @ 600VAC	Diag No.
RLY550–3–24	24 VAC	13 VA	3PST–NO	50A	D92
RLY550–3–120	120 VAC	13 VA	3PST–NO	50A	D92
RLY550–3–240	240 VAC	13 VA	3PST–NO	50A	D92

Number of Poles	Motor Rating in Amps: Full Load	Resistive @ 600VAC	Locked Rotor @ 240VAC	Locked Rotor @ 480VAC	Locked Rotor @ 600VAC
3	50A	65A	300A	250A	200A

Motor Horsepower Ratings				
Motor Type	@ 120VAC	@ 240VAC	@ 480VAC	@ 600VAC
1 3P	3 HP	7.5 HP	–	–
3 3P	–	15 HP	25 HP	25 HP

ACCESSORIES	
DESCRIPTION	NTE TYPE NO.
Auxiliary Switch, 1 SPDT Snap Action Switch w/.250” QC Terminals	RLY9190
Auxiliary Switch, 2 SPDT Snap Action Switches w/.250” QC Terminals	RLY9191
Auxiliary Switch, 1 SPST–NO & 1 SPST–NC Switch w/.250” QC Terminals	RLY9192
Auxiliary Switch, 1 SPST–NO & 1 SPST–NC Switch w/6–32 Screw Terminals	RLY9193

Electrical Specifications

Initial Dielectric Strength
Between Contact and Coil: 2200 VAC
Between Poles: 2200 VAC (includes shunt)
Between Open Contacts: 2200 VAC (no shunt)
Insulation System: 130°C Class B
Power Pole Terminations: Aluminum Box Lug
Wire Size: 14–2
Recommended Tightening Torque: 50 in. lbs.
Quick Connects
Coil Terminals: Dual: .250” QC or #6–32 Screw/.250” QC
Power Terminals: Dual .250” QC

Coil

Nom Coil Resistance: 2.4Ω (24V); 45Ω (120V); 180Ω (240V)
Max. Pick–up Voltage: 75% of nominal or less, DC
Min Drop–out Voltage: 6–15V (24V); 20–70V (120V); 40–140V (240V)
Nom Inrush (60Hz): 130 VA
Max Coil Voltage: 30V (24V); 132V (120V); 264V (240V)

Environmental Characteristics

Operating: –40°C to +65°C

Weight

Std: 2 lbs (907.18 grams)—typical

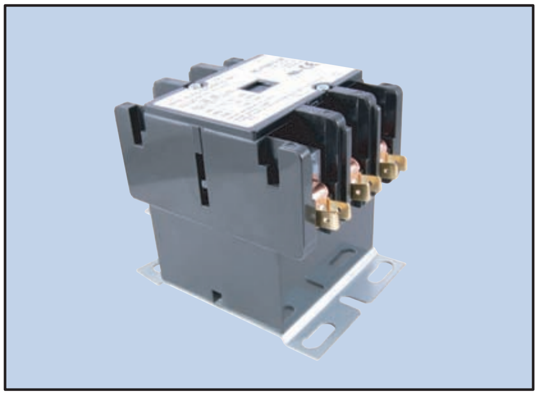
Note It is not recommended to mount or operate contactors upside–down.

RLY560 Series

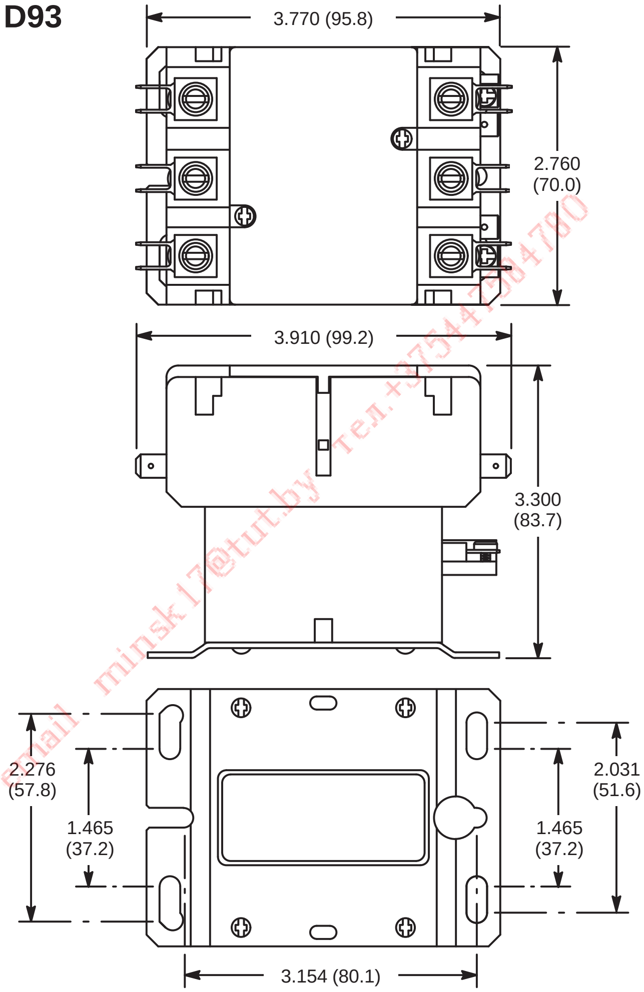
Contactors, Definite Purpose, 60 FLA, 3 Pole NO

Features

- **#14–2 Compression Lugs with .250” (6.35mm) QC Terminals**
- **Silver Cadmium Oxide Contacts**
- **UL 508 File No. E227250**
  Class NLDX2, NLDX8



D93



AC OPERATED

NTE Type No.	Coils: Input Voltage	Coils: Nom. Sealed	Contacts: Contact Arr.	Contacts: Max. Contact Cur. @ 600VAC	Diag No.
RLY560–3–480	480 VAC	13 VA	3PST–NO	60A	D93

Number of Poles	Motor Rating in Amps: Full Load	Resistive @ 600VAC	Locked Rotor @ 240VAC	Locked Rotor @ 480VAC	Locked Rotor @ 600VAC
3	60A	75A	360A	300A	240A

Motor Horsepower Ratings				
Motor Type	@ 120VAC	@ 240VAC	@ 480VAC	@ 600VAC
1 3P	5 HP	7.5 HP	–	–
3 3P	–	25 HP	30 HP	30 HP

ACCESSORIES

DESCRIPTION	NTE TYPE NO.
Auxiliary Switch, 1 SPDT Snap Action Switch w/.250” QC Terminals	RLY9190
Auxiliary Switch, 2 SPDT Snap Action Switches w/.250” QC Terminals	RLY9191
Auxiliary Switch, 1 SPST–NO & 1 SPST–NC Switch w/.250” QC Terminals	RLY9192
Auxiliary Switch, 1 SPST–NO & 1 SPST–NC Switch w/6–32 Screw Terminals	RLY9193

Electrical Specifications

Initial Dielectric Strength
Between Contact and Coil: 2200 VAC
Between Poles: 2200 VAC
Between Open Contacts: 2200 VAC
Insulation System: 130 C Class B
Power Pole Terminations: Aluminum Box Lug
Wire Size: 14–2
Recommended Tightening Torque: 50 in. lbs.
Quick Connects
Coil Terminals: Dual: .250” QC or #6–32 Screw/.250” QC
Power Terminals: Dual .250” QC

Coil

Nom Coil Restsance: 3.8 (24V); 125 (120V); 464 (240V)
Max. Pick–up Voltage: 75% of nominal or less, DC
Min Drop–out Voltage: 10% to 60% of operate voltage
Nom Inrush (60Hz): 130 VA
Max Coil Voltage: 30V (24V); 132V (120V); 264V (240V)

Environmental Characteristics

Operating: –40°C to +65°C

Weight

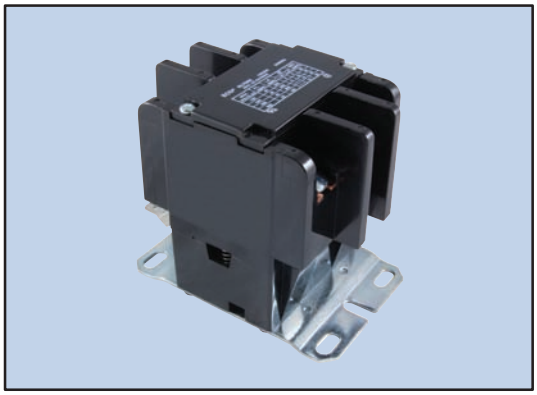
Std: 22.4 oz. (635 grams)—typical

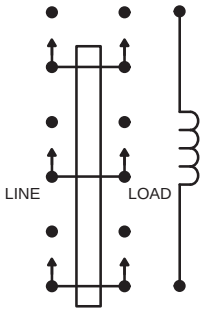
Note It is not recommended to mount or operate contactors upside–down.

RLY600 Series

Features

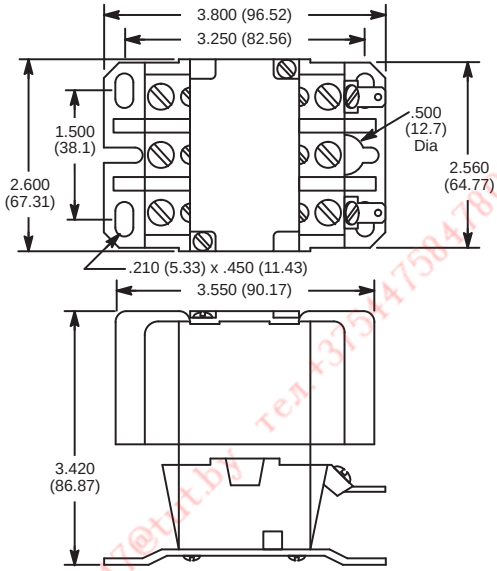
- Straight Through Wiring
- Heavy Duty
- Replaceable Contacts





Definite Purpose, 3PST–DM, 40 Amp, Magnetic Contactors

D80



Electrical Specifications

Tungsten Lamp Rating: 50A, 277VAC
Electric Discharge Lamp Rating: 50A, 277VAC (Wye)
Min. Load Current: 1 Amp @ 120VAC
Duty: Continuous

Coil

Power ..... **Inrush:** 92VA
Steady State: 12VA
Duty: Continuous

Operational Characteristics

Timing Value ..... **Operate Time:** 25 mS
Release Time: 25 mS

Insulation Characteristics

Initial Breakdown Voltage: 2200V RMS

Environmental Characteristics

Operating: –55°C to +65°C

Life

Mechanical: 2,000,000 Operations
Electrical: 200,000 Operations @ Full Load

Note It is not recommended to mount or operate contactors upside–down.

AC OPERATED

NTE Type No.	Coils: Input Voltage	Coils: Nom. Power	Contacts: Contact Arr.	Contacts: Max. Contact Cur. @ 600VAC	Diag No.
RLY655	120 VAC	12 VA	3PST–DM	40A	D80

Motor Rating in Amps				Resistive Rating (Elect. Heat)
Full Load	Locked Rotor			
@ 600VAC	@ 240VAC	@ 480VAC	@ 600VAC	@ 600VAC
40A	240A	200A	160A	50A

Motor Horsepower Ratings			
Motor Type	@ 240VAC	@ 240VAC	@ 440–600VAC
1 2P	2 HP	5 HP	–
3 3P	5 HP	10 HP	15 HP

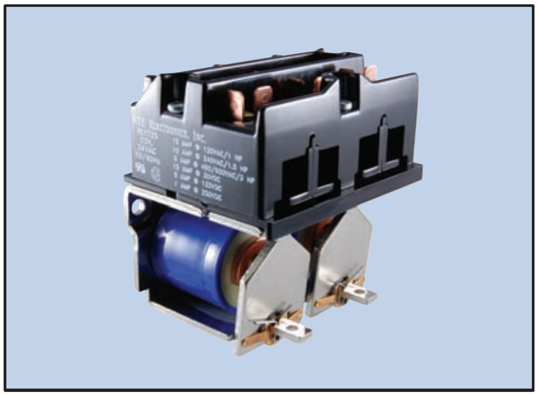
ACCESSORIES

DESCRIPTION	NTE TYPE NO.
Dual .250" Quick Connect Terminals	RLY9201
Box Lug	RLY9202
Replacement Contacts	RLY9203

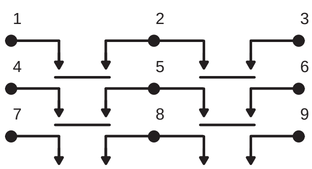
RLY700 Series

Features

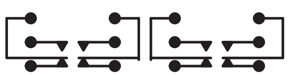
- .250” (6.35mm) Quick Connect Terminals
- Encapsulated Coils
- Mechanical Interlock, Center Off when Both Coils are Not Energized
- 2 or 4 Optional Auxiliary Switches



Contact Terminals



Auxiliary Switch Contact Terminals

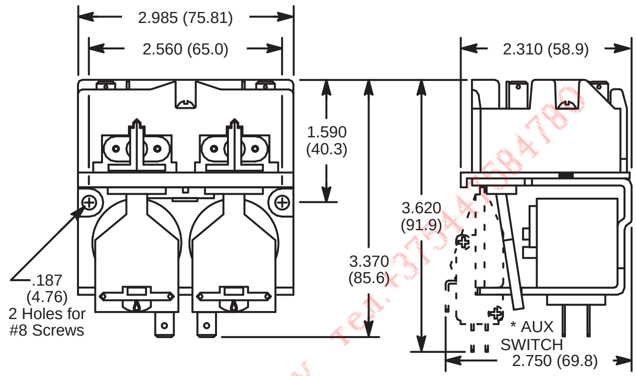


DC OPERATED				
	Coils			
NTE Type No.	Input Voltage V	Nom. Power	Resistance 10% Ohms	Diag No.
RLY715	24 DC	4.6 W	125	D75
AC OPERATED				
RLY725	24 AC	16.7 VA	4.63	D75
RLY755	120 AC	16.8 VA	125	D75

ACCESSORIES	
DESCRIPTION	NTE TYPE NO.
Auxiliary Switch, SPDT, .250” Quick Connect Terminals, 2–Switch	RLY9183
Auxiliary Switch, SPDT, .250” Quick Connect Terminals, 4–Switch	RLY9184

2–Coil, Compact Motor Reversing Contactors, 15 Amp, 6 Pole–DM (3 Per Coil)

D75



* Auxiliary switch not included.

Electrical Specifications

Contact

Rating: 15 Amp @ 120 VAC/1 HP
10 Amp @ 240 VAC/1.5 HP
5 Amp @ 480/600 VAC/3 HP
15 Amp @ 30 VDC
5 Amp @ 125 VDC
1 Amp @ 250 VDC

Material: Silver–cadmium oxide

Coil

Coil Voltages: See Chart
Pull–In Voltage: 85% of nominal or less for AC
80% of nominal or less for DC
Dropout Voltage: 10% of nominal voltage or more @ 25°C
Max. Allowed Voltage: 110% of nominal voltage
Resistance: ±10% measured @ +25°C

Operational Characteristics

Timing Value . . . . . . Operate Time: 50 mS or less } at nominal coil voltage
Release Time: 30 mS or less

Insulation Characteristics

Dielectric Strength
All Insulated Points: 2500V RMS
Insulated Resistance: 500 VDC Exceeds 1000 MΩ

Environmental Characteristics

Operating: –45°C to +50°C (AC)
–45°C to +70°C (DC)

Life

Mechanical: 5,000,000 Operations
Electrical: 100,000 Operations @ Rated Load
500,000 Operations @ 1/2 Rated Load

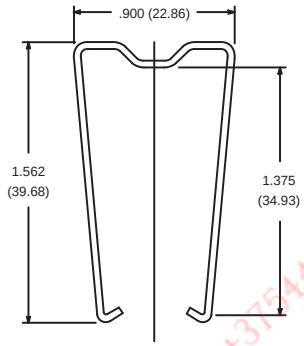
Accessories

R95–001

Hold Down Clip

For use with the following sockets:

- R95–106A (includes clip)
- R95–107
- R95–110
- R95–111
- R95–117 (Clip not included)
- R95–120
- R95–121
- R95–122
- R95–148
- R95–149
- R95–150

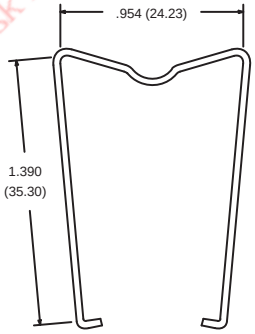


R95–003

Hold Down Clip

For use with the following sockets:

- R95–102
- R95–103

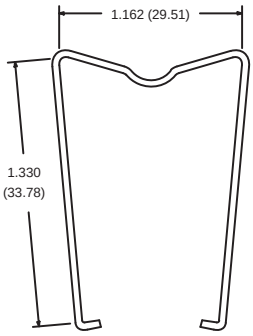


R95–004

Hold Down Clip

For use with the following sockets:

- R95–108
- R95–109



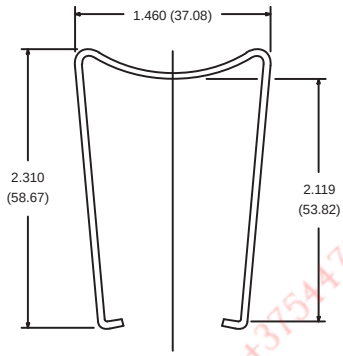
Accessories

R95–020

Hold Down Clip

For use with the following sockets:

- **R95–116**
- **R95–123**
- **R95–124**

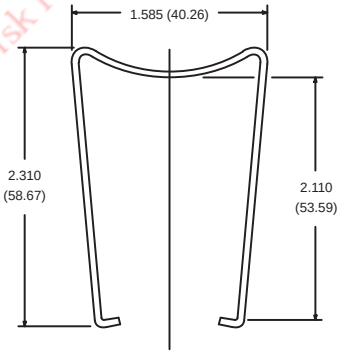


R95–021

Hold Down Clip

For use with the following sockets:

- **R95–115**



R95–101

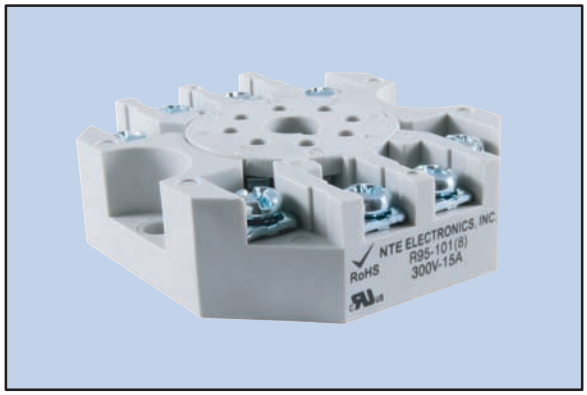
8–Pin Octal Socket

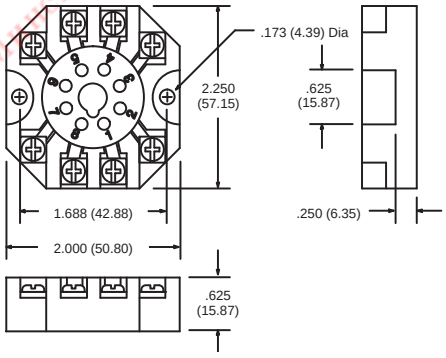
Features

- **Panel/Surface Mount**
- **Pressure Clamp Screws**
- **Screws: 6–32 x 5/16”, Steel, Nickel Plated.**

Electrical Rating:

300 Volts, 15 Amps





R95–102

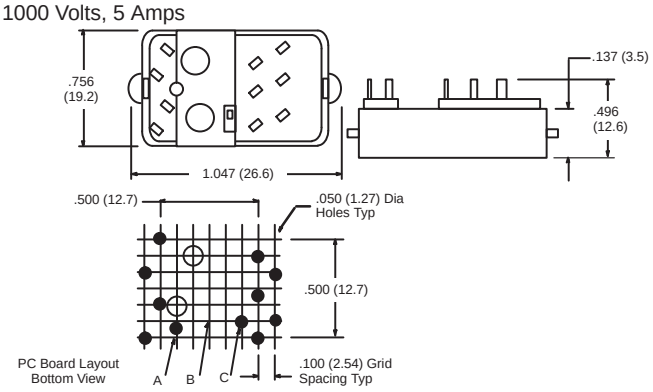
10–Pin Blade Socket

Features

- **PC Board Mount**

Electrical Rating:

1000 Volts, 5 Amps



R95–103

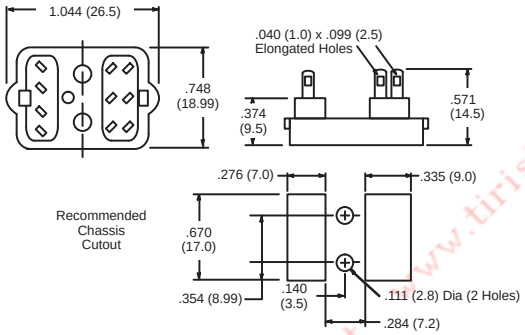
10–Pin Blade Socket

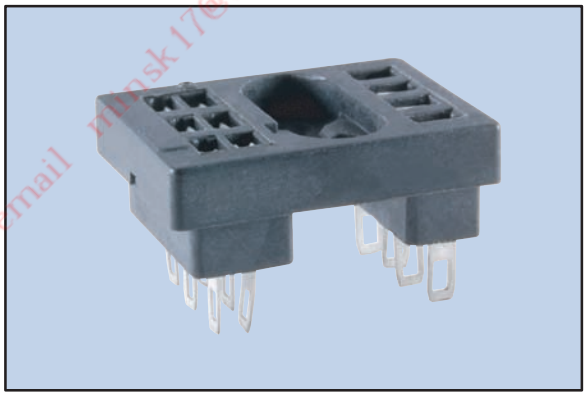
Features

- **Panel Mount**
- **Solder Terminals**

Electrical Rating:

1000 Volts, 5 Amps





R95–104

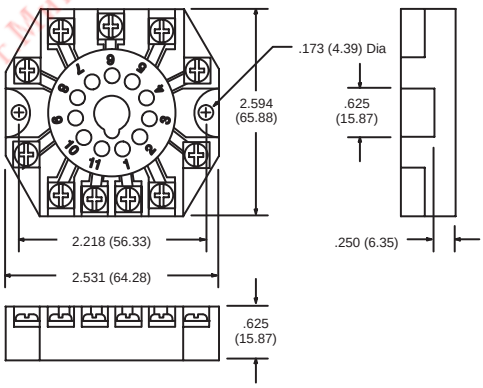
11–Pin Octal Socket

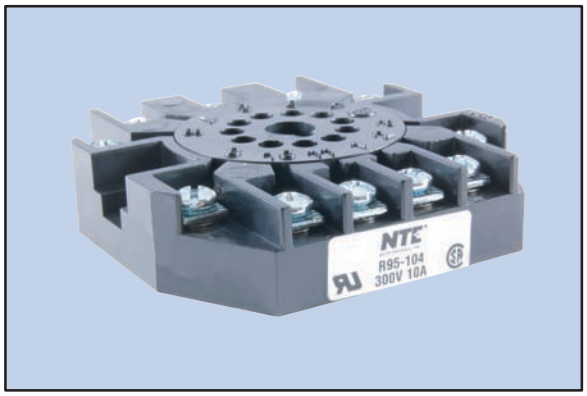
Features

- **Panel/Surface Mount**
- **Pressure Clamp Screws**
- **Screws: 6–32 x 5/16", Steel, Nickel Plated.**

Electrical Rating:

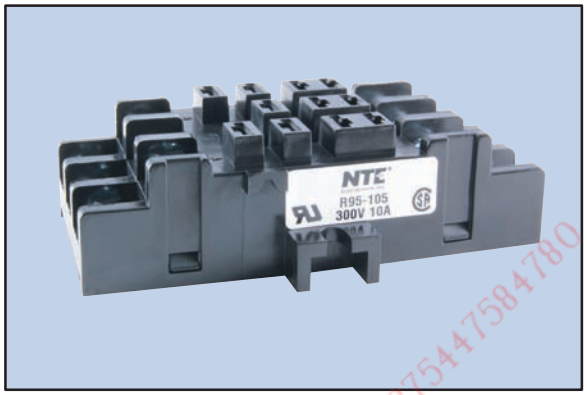
300 Volts, 10 Amps





R95–105

11–Pin Heavy Duty Square Base Socket

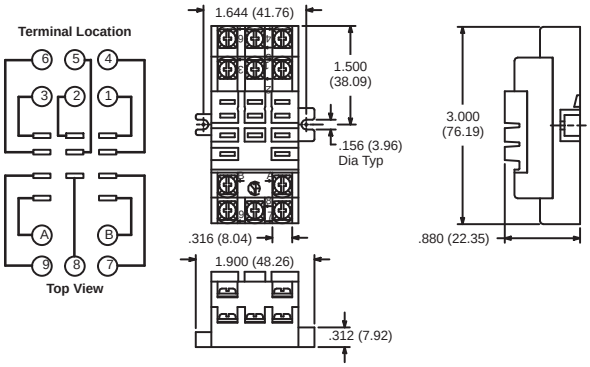


Features

- Panel/Surface Mount
- Pressure Clamp Screws
- Accepts .187” Blade Terminals
- Hold down clip supplied with socket, also available separately (R95–002)

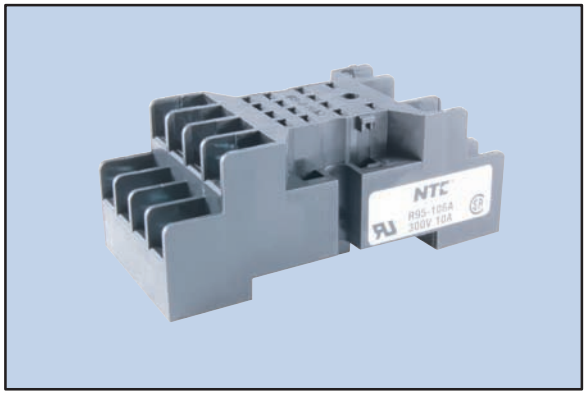
Electrical Rating:

300 Volts, 10 Amps



R95–106A

14–Pin Miniature Socket

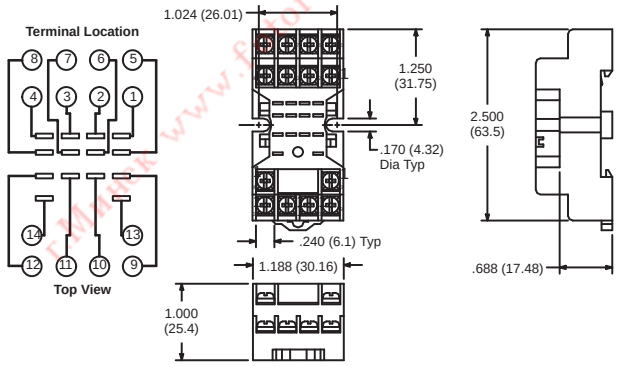


Features

- Panel/Surface Mount
- Pressure Clamp Screws
- DPDT or 4PDT
- Screws: 4–40 x 1/4” Steel, Nickel Plated
- Hold down clip supplied with socket, also available separately (R95–001)

Electrical Rating:

300 Volts, 10 Amps



R95–107

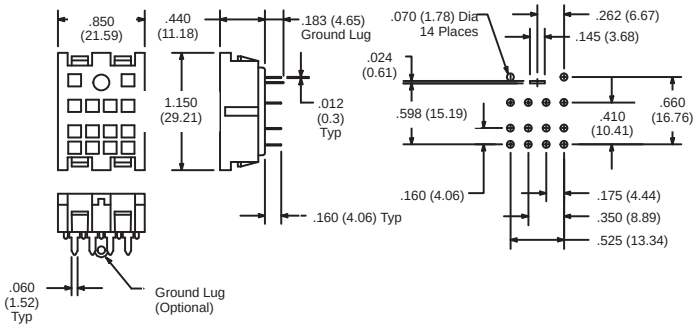
14–Pin Blade Socket

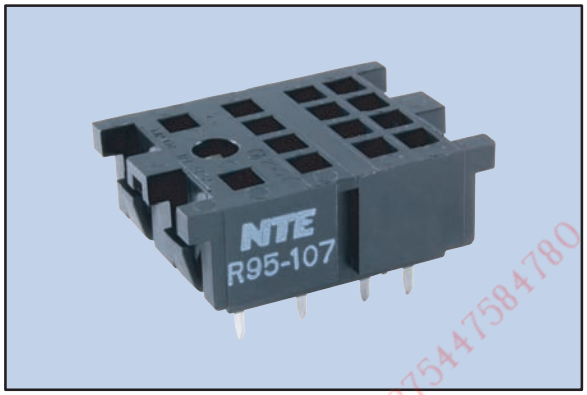
Features

- **PC Board Mount**
- **Hold down clip supplied with socket, also available separately (R95–001)**

Electrical Rating:

300 Volts, 10 Amps





R95–108

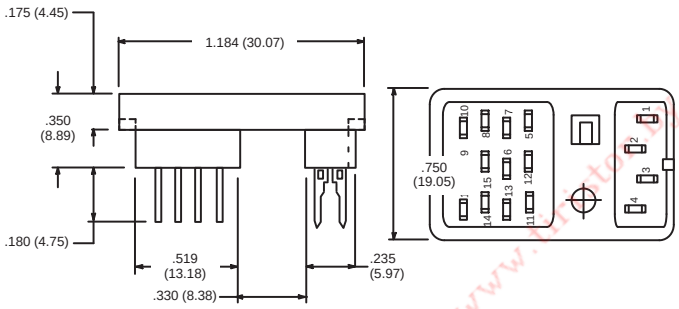
16–Pin Blade Socket

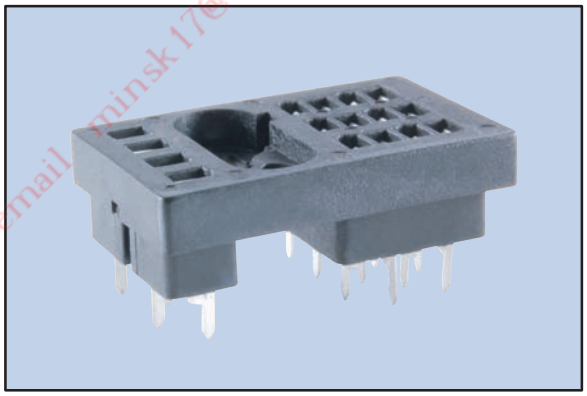
Features

- **PC Board Mount**

Electrical Rating:

1000 Volts, 10 Amps





R95–109

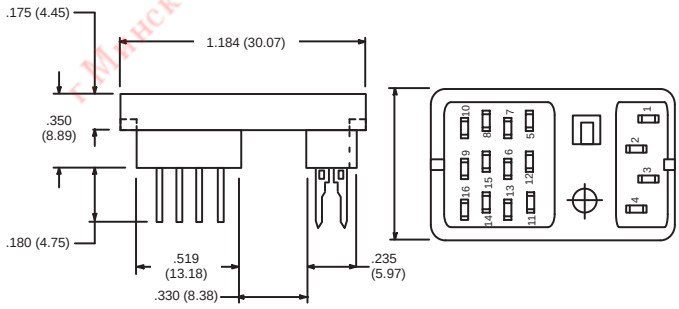
16–Pin Blade Socket

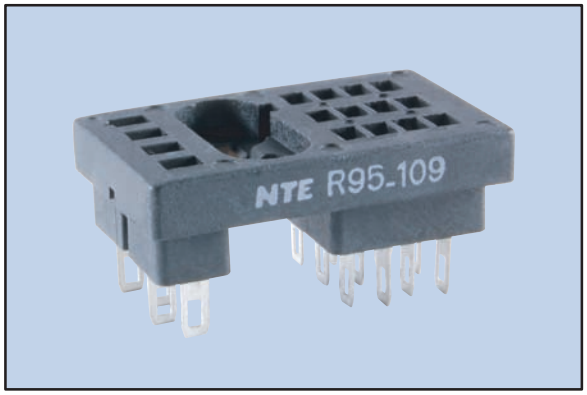
Features

- **Panel Mount**
- **Solder Terminals**

Electrical Rating:

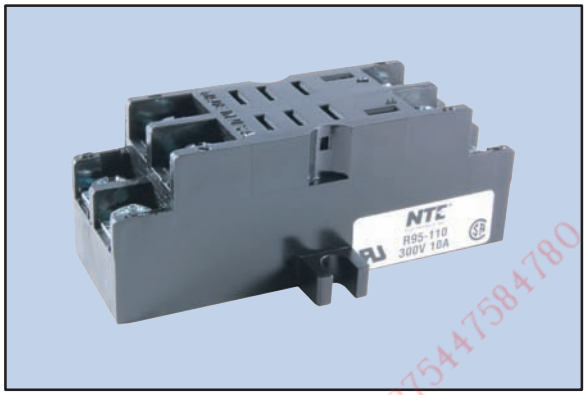
1000 Volts, 10 Amps





R95–110

8–Pin Midget Blade Socket

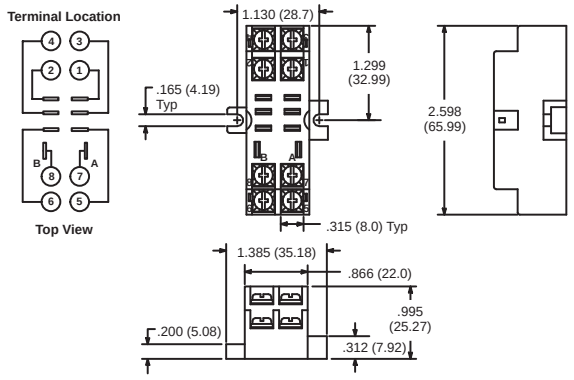


Features

- Panel/Surface Mount
- Pressure Clamp Screws
- Accepts .187” Blade Terminals
- Hold down clip supplied with socket, also available separately (R95–001)

Electrical Rating:

300 Volts, 10 Amps



R95–111

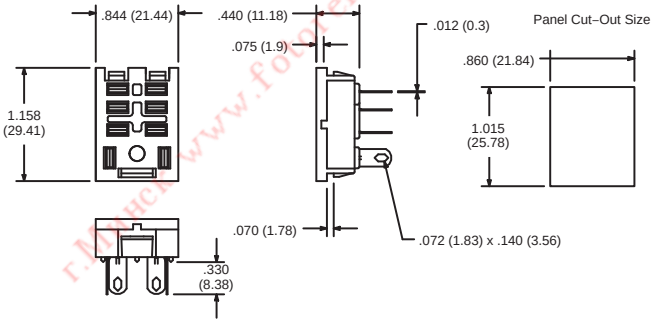
8–Pin Midget Blade Socket

Features

- Panel Mount
- Solder Terminals
- Accept .187” Blade Terminals
- Hold down clip supplied with socket, also available separately (R95–001)

Electrical Rating:

300 Volts, 10 Amps



R95–112

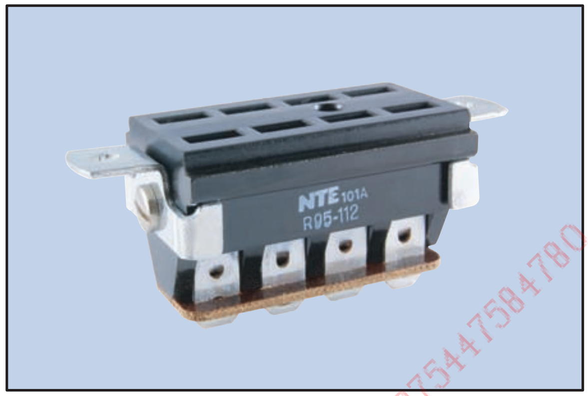
8–Pin Jones Plug Socket

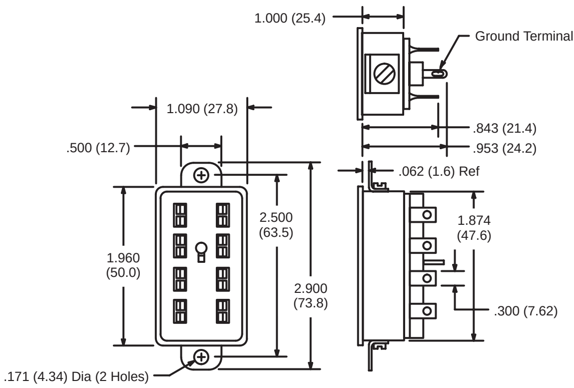
Features

- **Panel Mount**
- **Solder Terminals**
- **Accept .187” Blade Terminals**

Electrical Rating:

1100 Volts, 15 Amps





R95–113

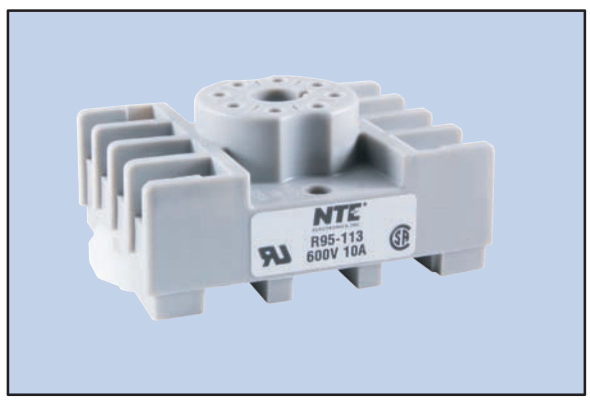
8–Pin Octal Socket

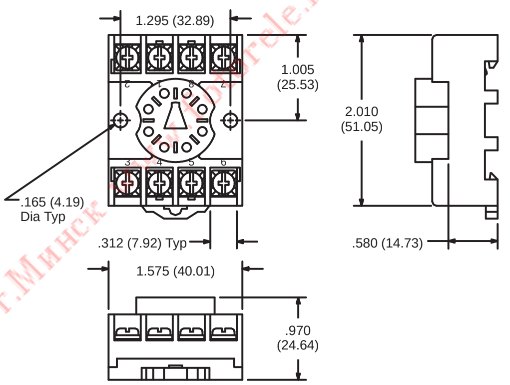
Features

- **Panel/Surface Mount**
- **DIN Rail Mountable**
- **Pressure Clamp Screws**

Electrical Rating:

600 Volts, 10 Amps





Accessories

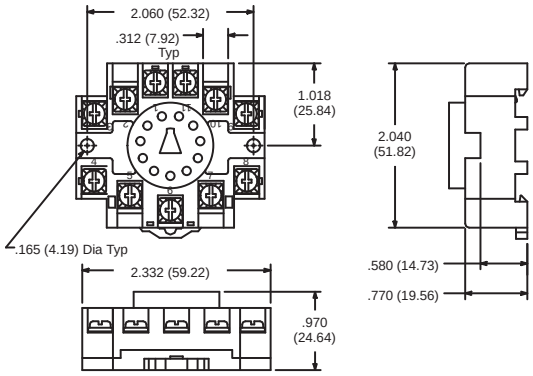
R95–114

Features

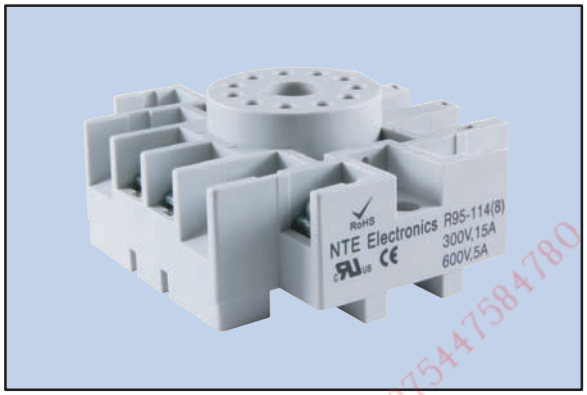
- Panel/Surface Mount
- DIN Rail Mountable
- Pressure Clamp Screws

Electrical Rating:

300 Volts, 10 Amps



11–Pin Octal Socket



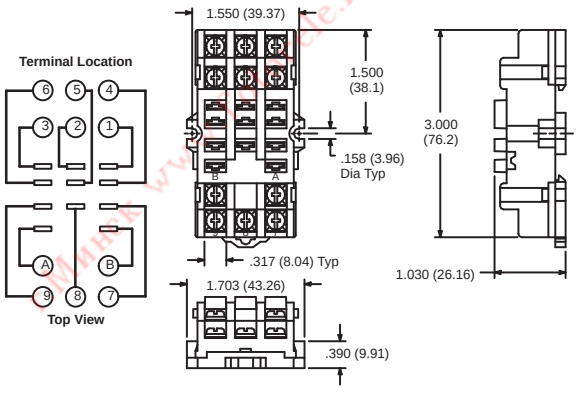
R95–115

Features

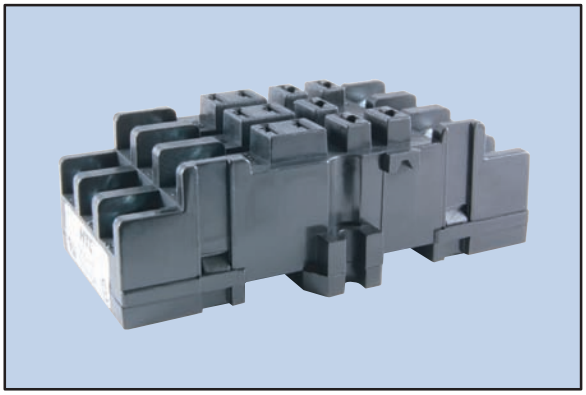
- Panel/Surface Mount
- DIN Rail Mountable
- Pressure Clamp Screws

Electrical Rating:

300 Volts, 10 Amps



11–Pin Square Base Socket



R95–116

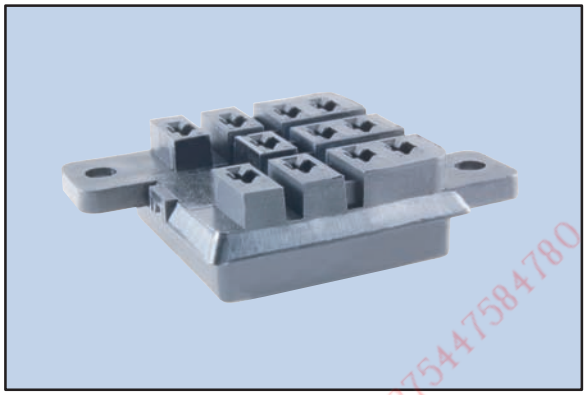
11–Pin Square Base Socket

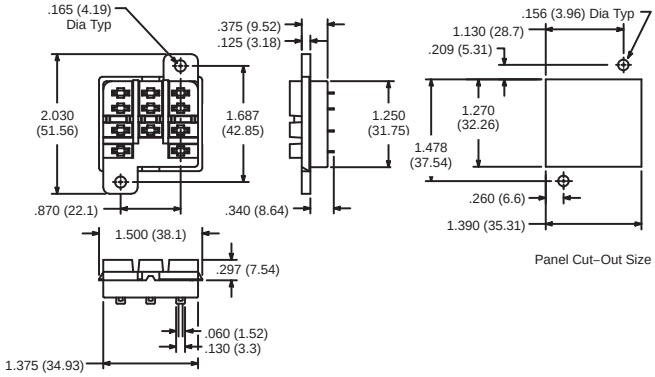
Features

- Panel Mount
- Solder Terminals
- Accepts .187” Blade Terminals
- SPDT, DPDT and 3PDT Applications

Electrical Rating:

300 Volts, 10 Amps





R95–117

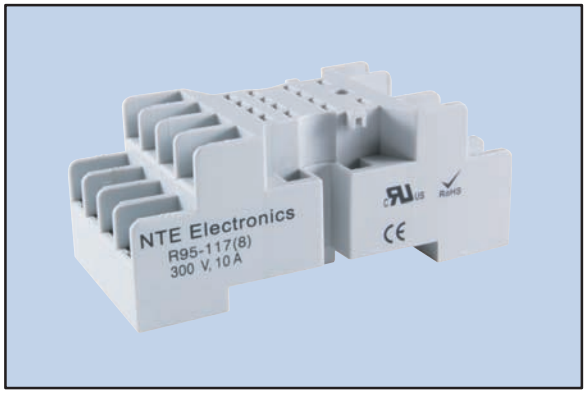
14–Pin Miniature Socket

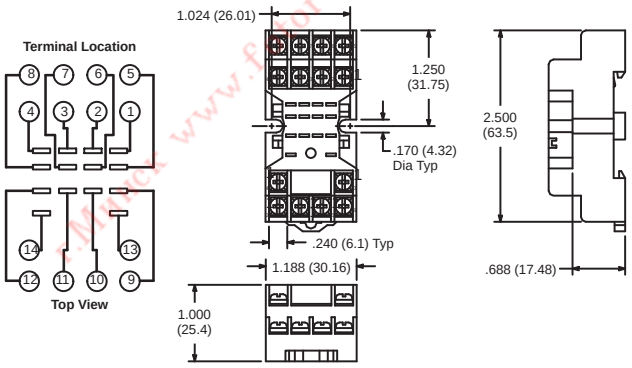
Features

- Panel Mount
- DIN Rail Mountable
- Pressure Clamp Screws
- DPDT or 4PDT
- Hold down clip not supplied with socket, available separately (R95–001)

Electrical Rating:

300 Volts, 10 Amps



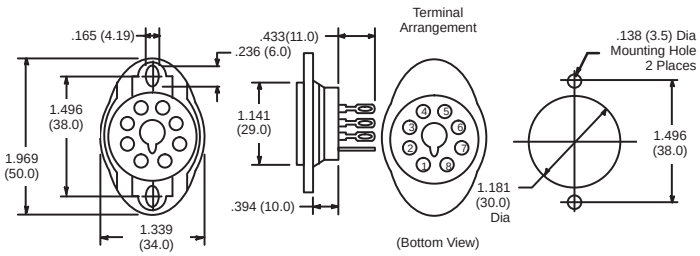


R95–118

8–Pin Octal Socket

Features
- Panel Mount
- Solder Terminals

Electrical Rating:
300 Volts, 10 Amps

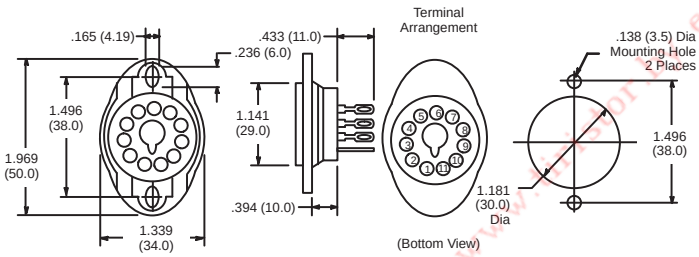


R95–119

11–Pin Octal Socket

Features
- Panel Mount
- Solder Terminals

Electrical Rating:
300 Volts, 10 Amps

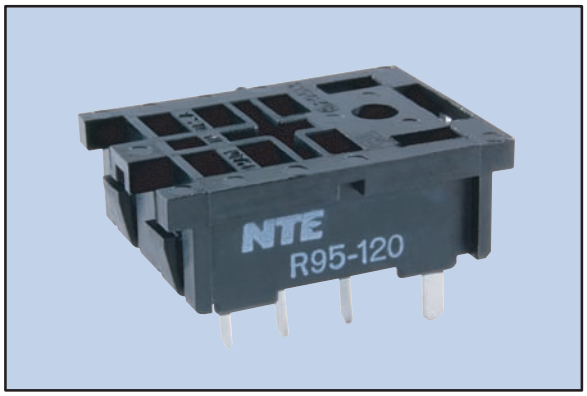


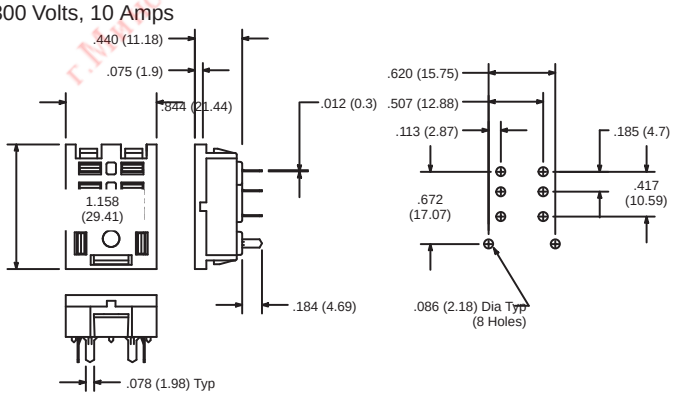
R95–120

11–Pin Midget Blade Socket

Features
- P.C. Board Mount
- Accepts .187” Blade Terminals
- Hold down clip not supplied with socket, available separately (R95–001)

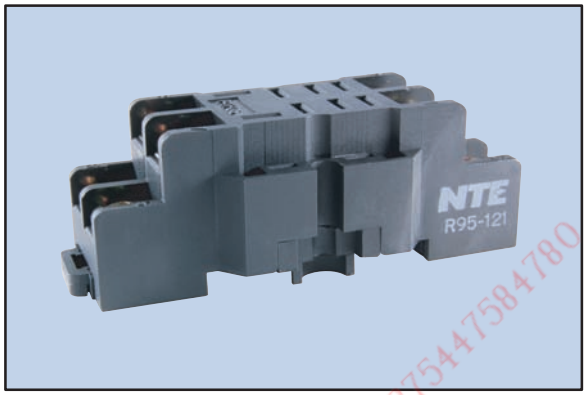
Electrical Rating:
300 Volts, 10 Amps





R95–121

8–Pin Midget Blade Socket

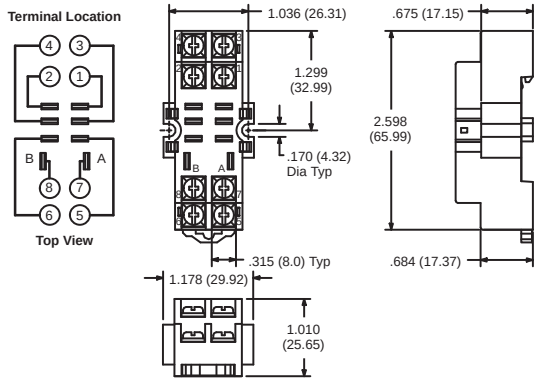


Features

- Panel/Surface Mount
- DIN Rail Mountable
- Pressure Clamp Screws
- Accepts .187” Blade Terminals
- Hold down clip not supplied with socket,available separately (R95–001)

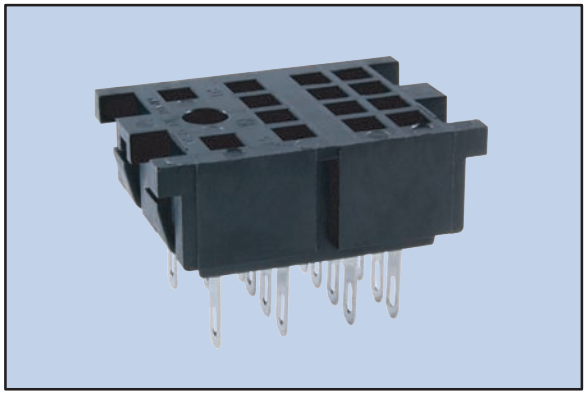
Electrical Rating:

300 Volts, 10 Amps



R95–122

14–Pin Blade Socket

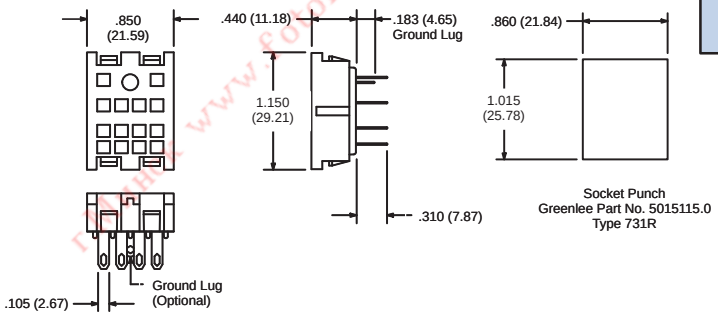


Features

- Panel Mount
- Solder Terminals
- 4PDT Applications
- Hold down clip not supplied with socket, available separately (R95–001)

Electrical Rating:

300 Volts, 10 Amps



Accessories

R95–123

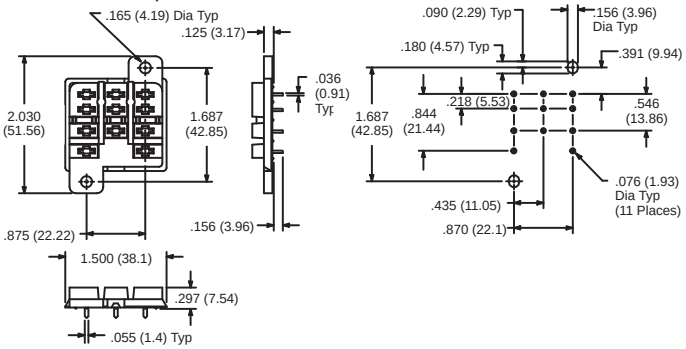
11–Pin Blade Socket

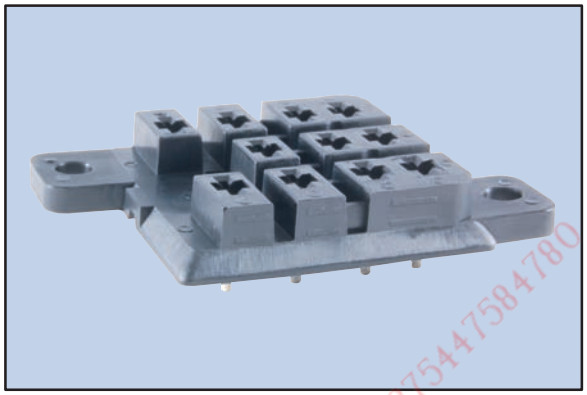
Features

- P.C. Board Mount
- Accepts .187” Blade Terminals
- 3PDT, DPDT & SPDT Applications

Electrical Rating:

300 Volts, 10 Amps





R95–124

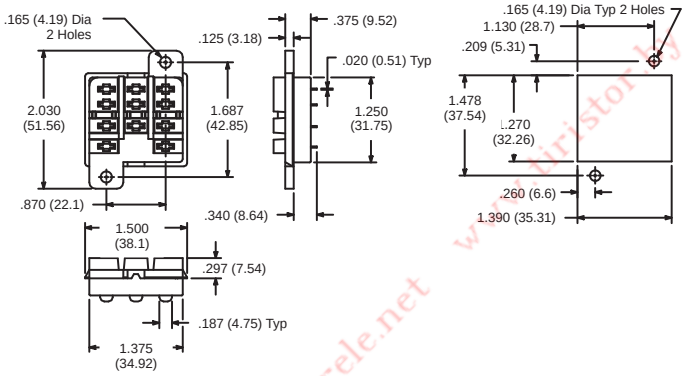
11–Pin Blade Socket

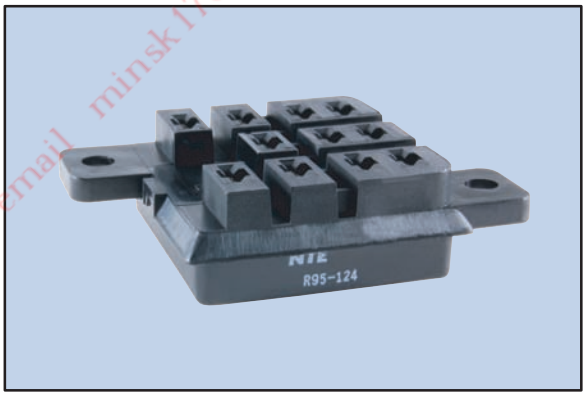
Features

- Panel Mount
- Accepts .187” Blade Terminals
- Quick disconnect terminals

Electrical Rating:

300 Volts, 10 Amps



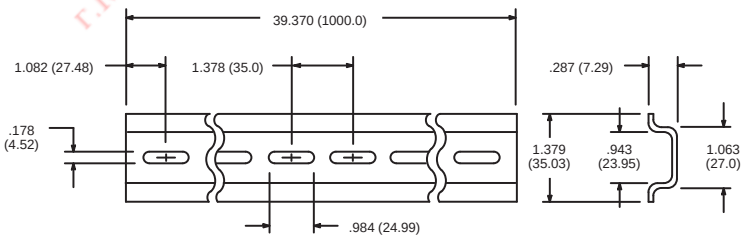


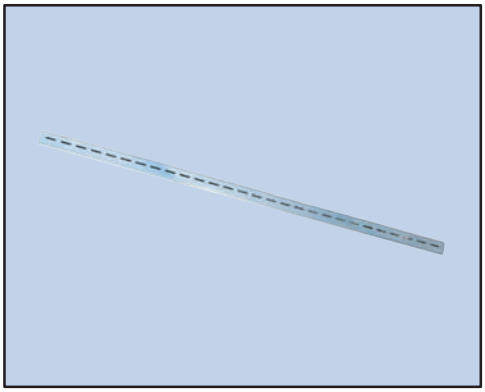
R95–125

Prepunched Aluminum DIN Rail

Features

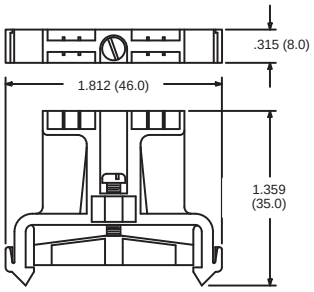
- Available in 1 Meter Lengths

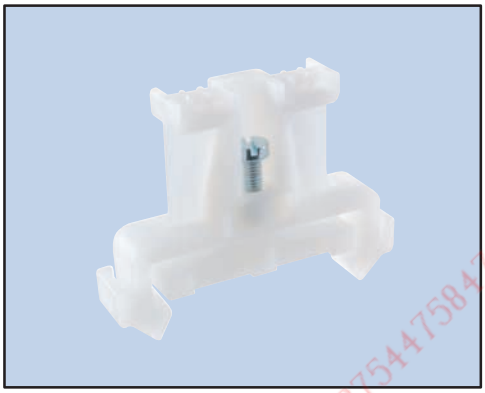




R95–126

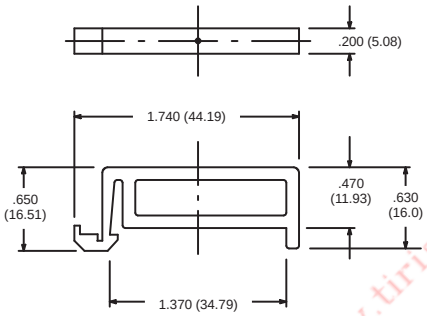
DIN Rail Pressure Clamp

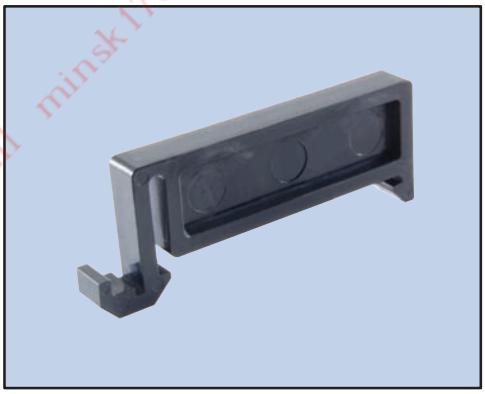




R95–127

DIN Rail Spacer



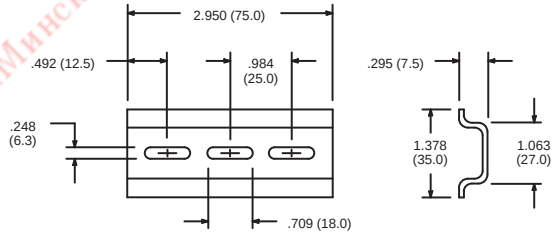


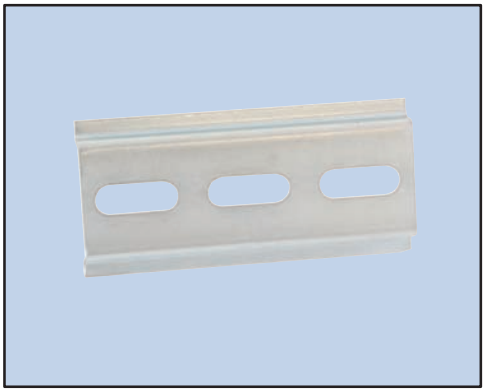
R95–128

Prepunched Steel DIN Rail

Features

- **Available in 3” Lengths**





R95–130

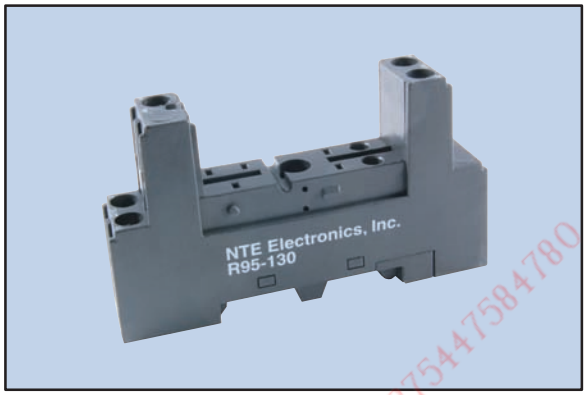
5–Pin Slim Line Socket

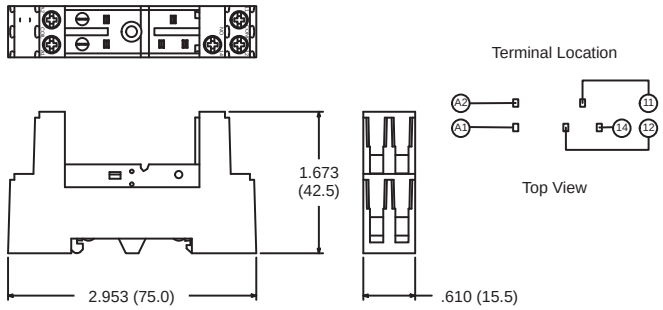
Features

- DIN Rail Mount
- Finger Safe
- SPDT Applications

Electrical Rating:

300 Volts, 12 Amps





R95–131

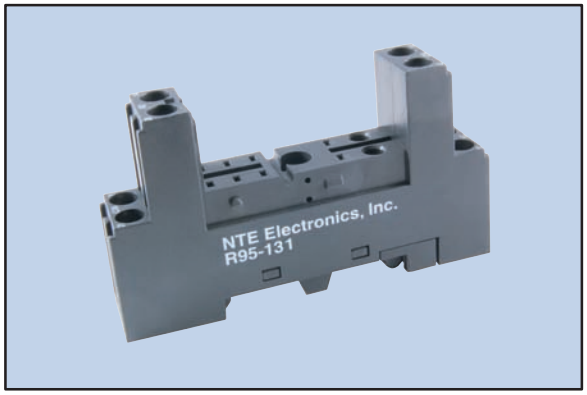
8–Pin Slim Line Socket

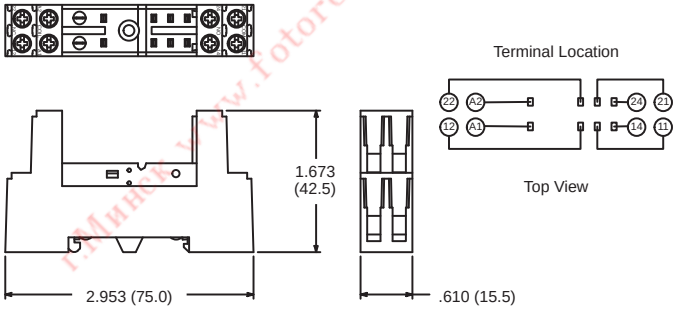
Features

- DIN Rail Mount
- Finger Safe
- DPDT Applications

Electrical Rating:

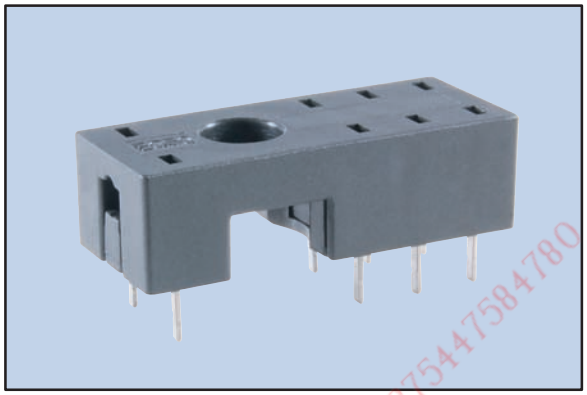
300 Volts, 12 Amps





R95–132

8–Pin Slim Line Socket

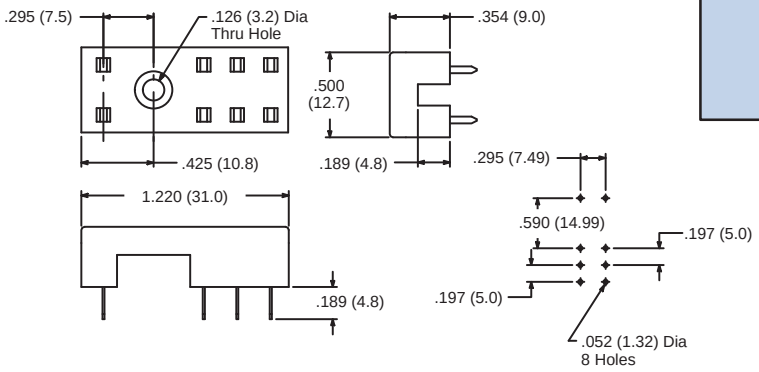


Features

- PC Board Mount
- DPDT Applications

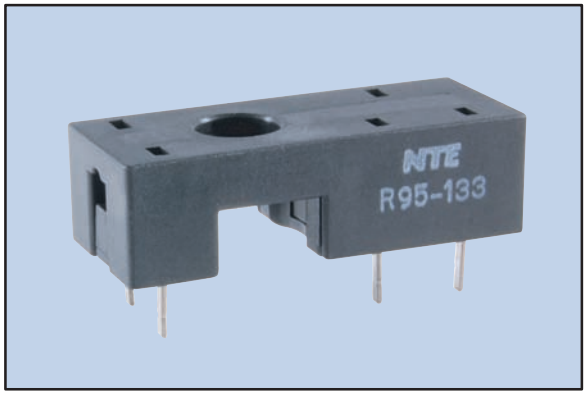
Electrical Rating:

300 Volts, 12 Amps



R95–133

5–Pin Slim Line Socket

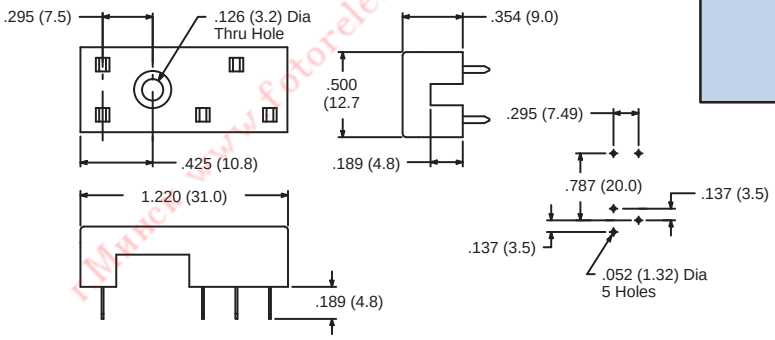


Features

- PC Board Mount
- SPDT Applications

Electrical Rating:

300 Volts, 12 Amps



R95–148

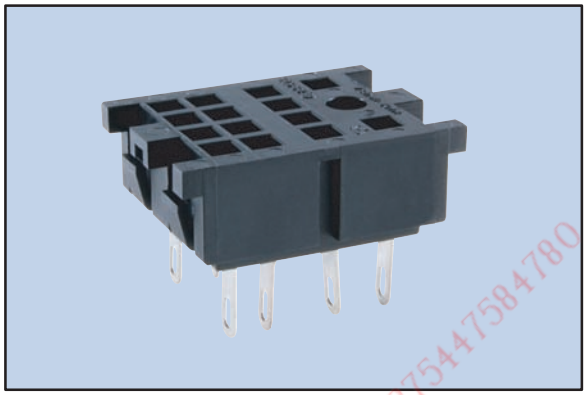
8–Pin Miniature Blade Socket

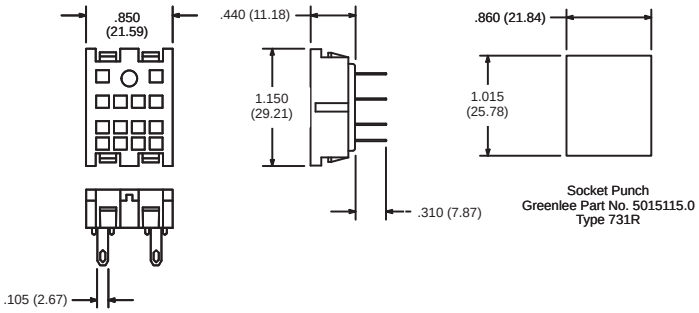
Features

- Panel Mount
- Solder Terminals, GND Lug Omitted
- DPDT Applications
- Hold down clip not supplied with socket, available separately (R95–001)

Electrical Rating:

300 Volts, 10 Amps





R95–149

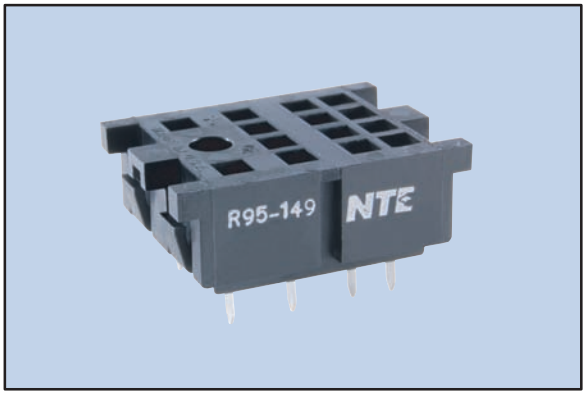
8–Pin Miniature Blade Socket

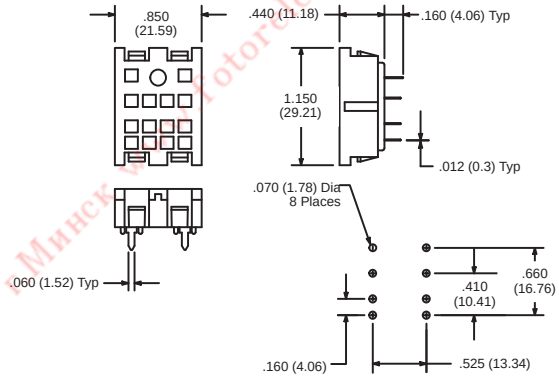
Features

- P.C. Board Mount, GND Lug Omitted
- DPDT Applications
- Hold down clip not supplied with socket, available separately (R95–001)

Electrical Rating:

300 Volts, 10 Amps

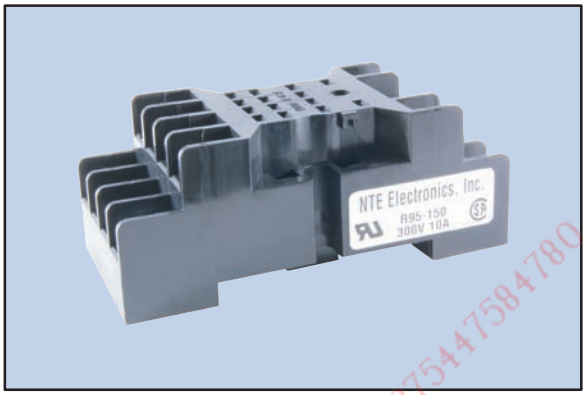




Accessories

R95–150

8–Pin Miniature Socket

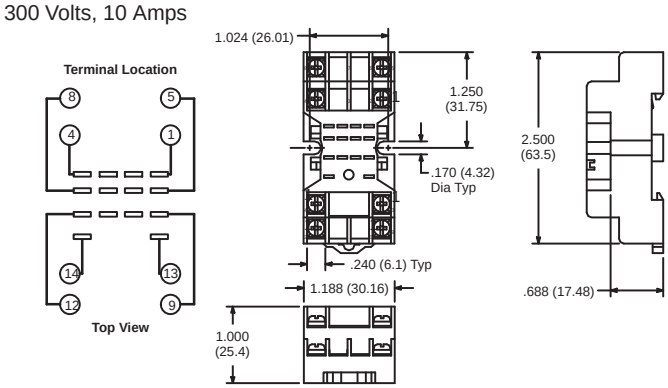


Features

- Panel Mount
- DIN Rail Mountable
- Pressure Clamp Screws
- DPDT Applications
- Hold down clip not supplied with socket, available separately (R95–001)

Electrical Rating:

300 Volts, 10 Amps

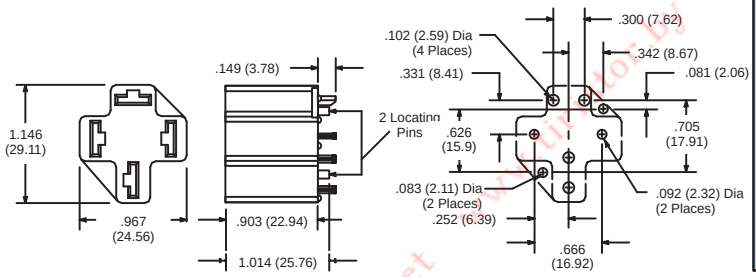


R95–159

4–Pin PC Board Socket

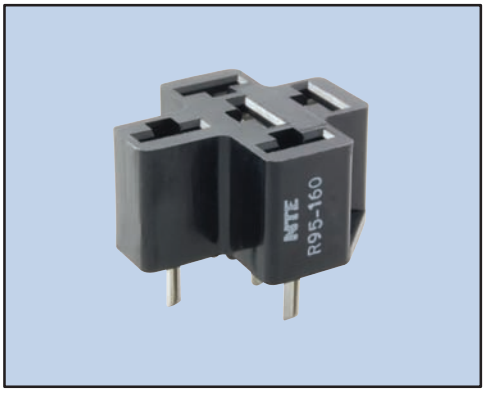
Features

- For R51 Series Automotive Relay (70 Amp ONLY)
- Continuous Temperature Rating of +130°C



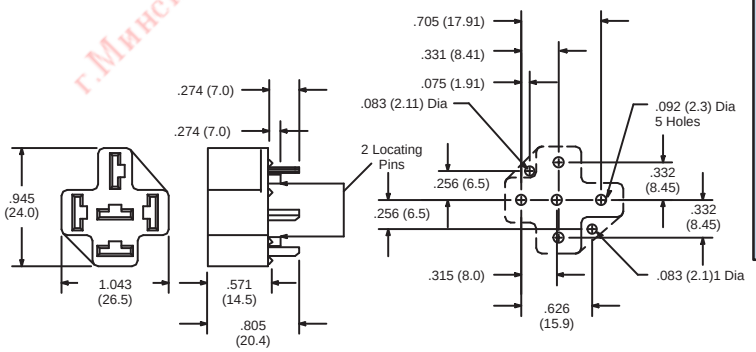
R95–160

5–Pin PC Board Socket



Features

- For R51 Series Automotive Relay (50 Amp ONLY)
- Continuous Temperature Rating of +130°C



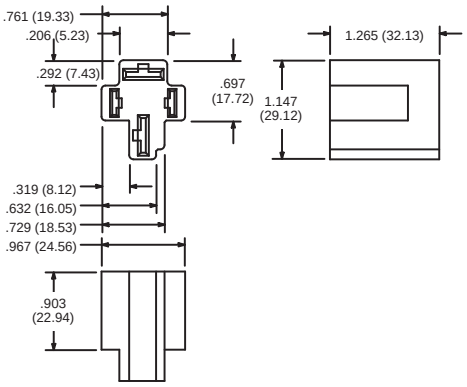
Accessories

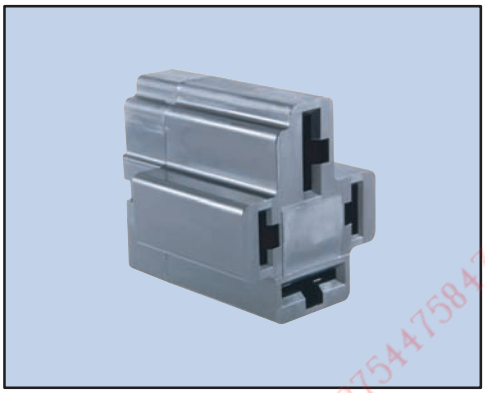
R95–160A

4–Pin Automotive High Current Socket

Features

- For R51 Series 70 Amp Automotive Relay
- Quick Connect Terminals supplied with socket



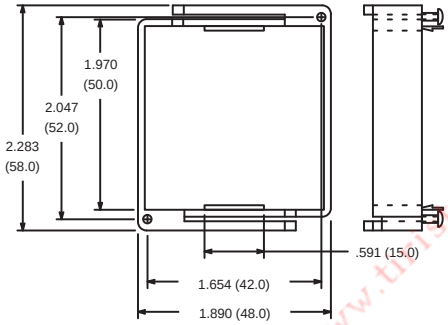


R95–161

Panel Mount Bracket

For use with the following NTE types:

- R64 Series
- R65 Series



R95–180

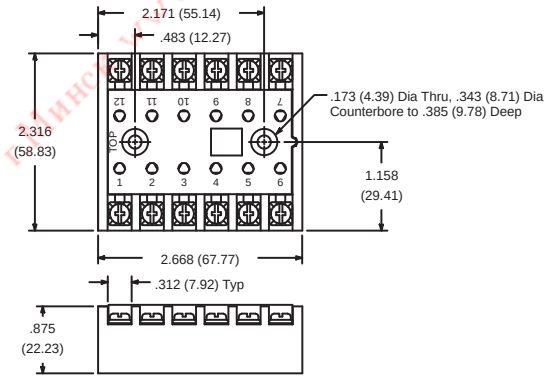
12–Pin Heavy Duty Socket

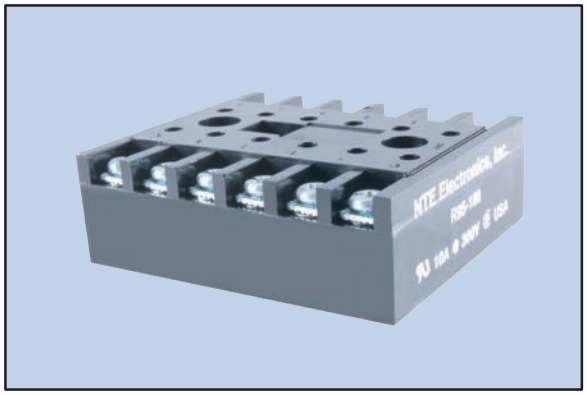
Features

- Surface Mount
- With Pressure Clamp Screws

Electrical Rating:

300Volts, 10 Amps





Accessories

R95–180A

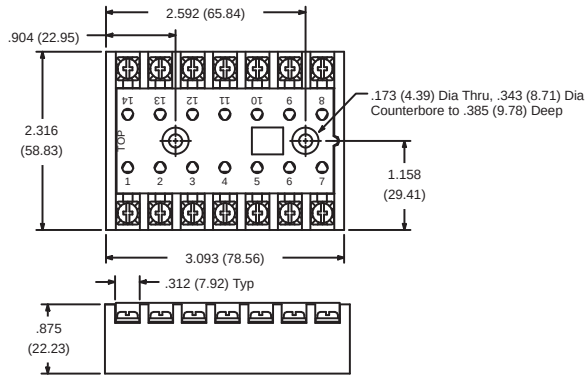
14–Pin Heavy Duty Socket

Features

- **Surface Mount**
- **With Pressure Clamp Screws**

Electrical Rating:

300 Volts, 10 Amps



R95–181

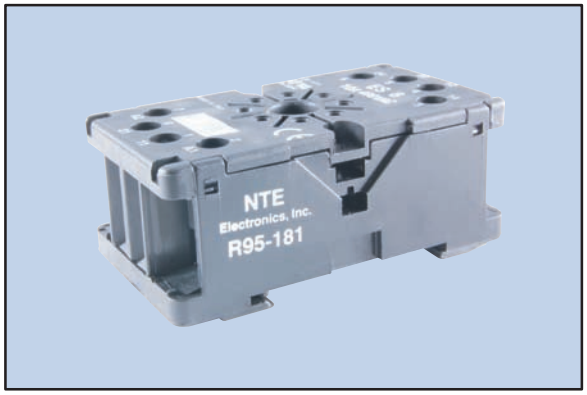
8–Pin Octal Socket

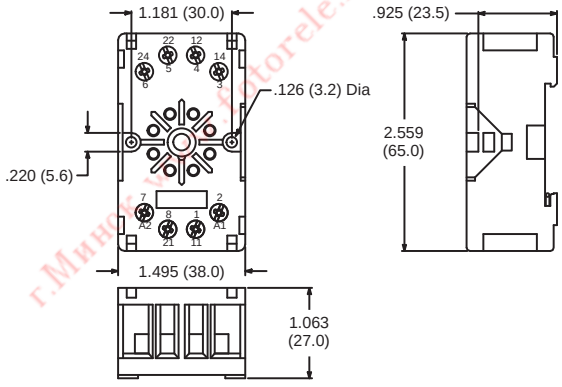
Features

- **DIN Rail Mount**
- **Finger Safe**
- **DPDT Applications**

Electrical Rating:

300 Volts (UL Rating for US), 10 Amps





Accessories

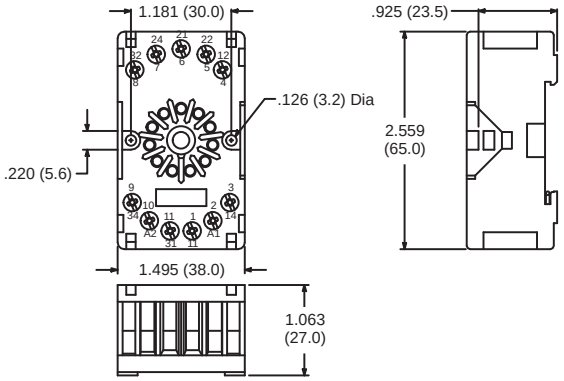
R95–182

Features

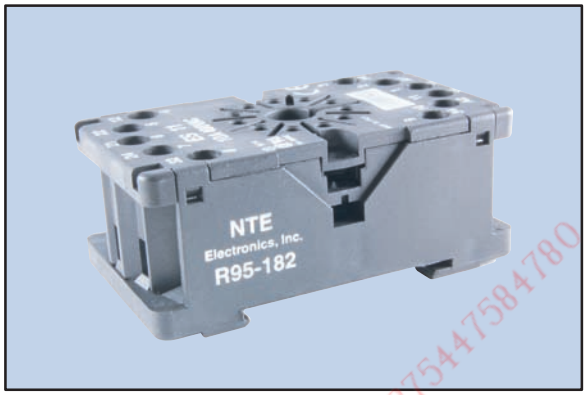
- DIN Rail Mount
- Finger Safe
- 3PDT Applications

Electrical Rating:

300 Volts (UL Rating for US), 10 Amps



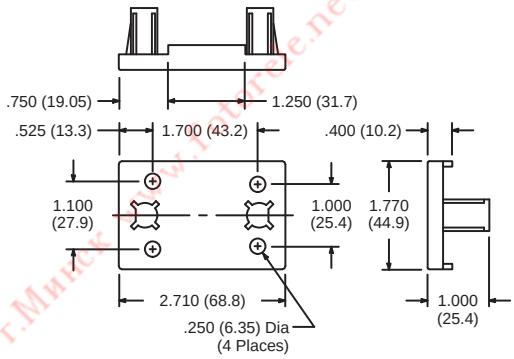
11–Pin Octal Socket



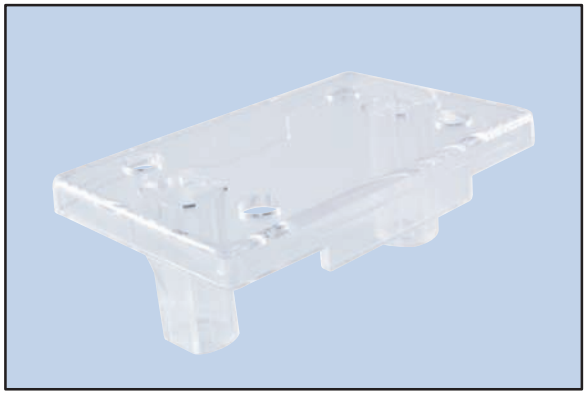
R95–184

Features

- Clear Polycarbonate
- For RS3 Type Relays

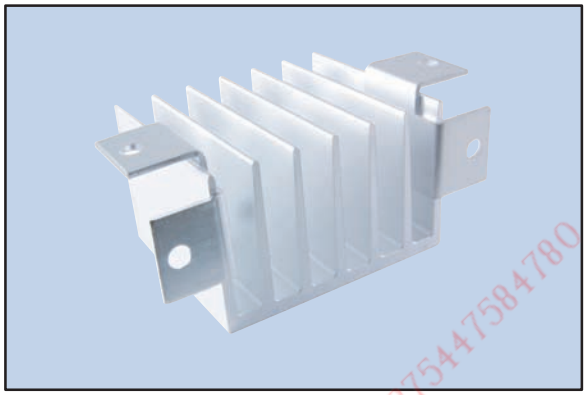


Dust Cover, Plastic



R95–186

Heat Sink for Solid State Relay

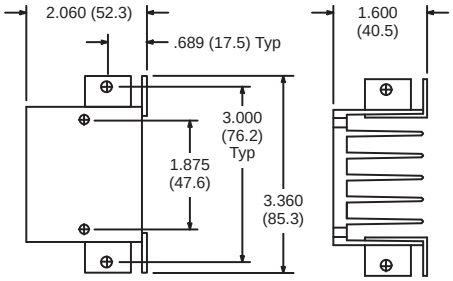


Features

- **Suitable for 1 Single or Dual Relay**
- **For RS3 Type Relays**

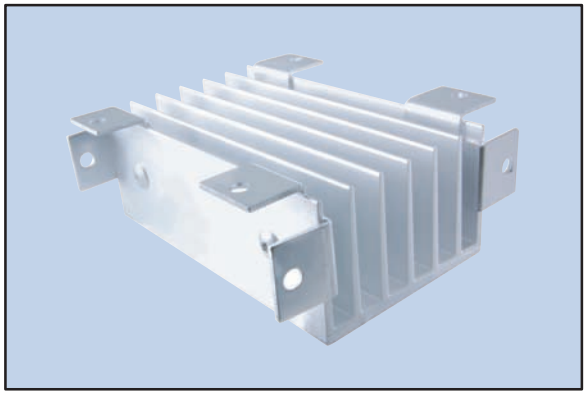
General Specifications

Thermal Resistance . . . . . 2.5°C/W
Surface Area . . . . . 521 in^2 (336 cm^2)
Heat Sink Mounting . . . . . Panel Mount
Weight . . . . . 0.22 lbs (100 grs)
Material . . . . . Aluminum
Finish . . . . . None
SSR Mounting Holes / Threads . . . . . 2 / 8 x 32
Mounting Screw Torque . . . . 15–20 in lbs (1.7–2.2 nm)
Accepts Fan . . . . . No



R95–187

Heat Sink for Solid State Relay

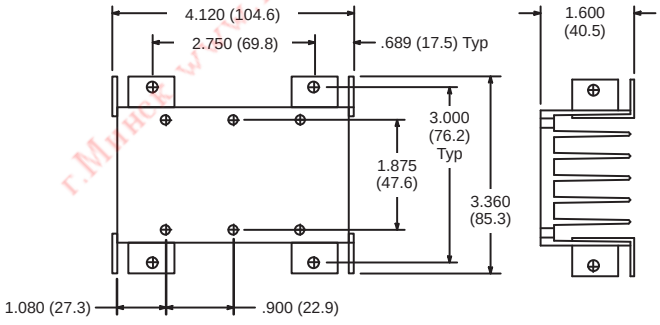


Features

- **Suitable for 1 or 2 Single or Dual Relay**
- **For RS3 Type Relays**

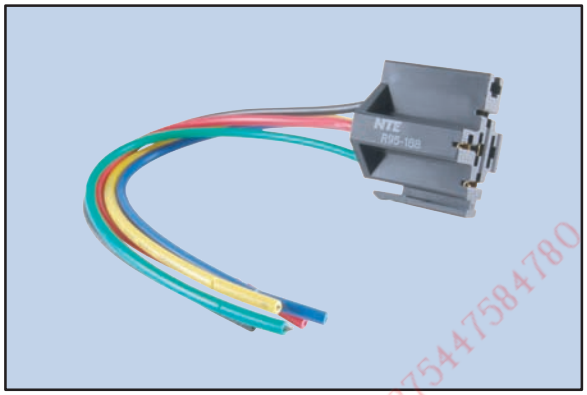
General Specifications

Thermal Resistance . . . . . 1.70°C/W
Surface Area . . . . . 102 in^2 (659 cm^2)
Heat Sink Mounting . . . . . Panel Mount
Weight . . . . . 0.43 lbs (195 grs)
Material . . . . . Aluminum
Finish . . . . . None
SSR Mounting Holes / Threads . . . . . 6 / 8 x 32
Mounting Screw Torque . . . . 15–20 in lbs (1.7–2.2 nm)
Accepts Fan . . . . . No



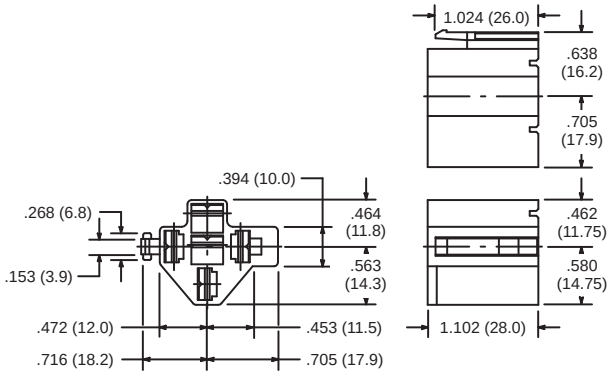
R95–188

5–Pin Automotive Socket w/Wire Leads



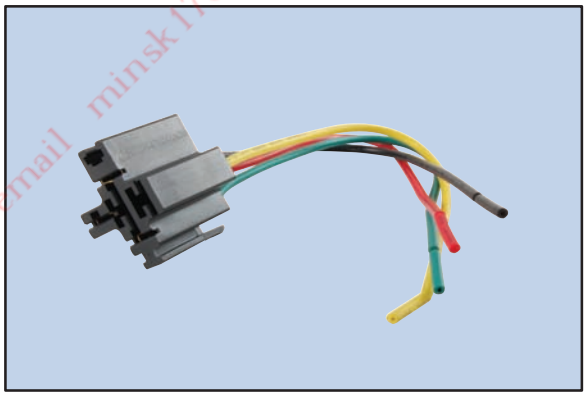
Features

- For R51 Series Relays (50 Amp ONLY)
- 6.5 Inch Wire Leads



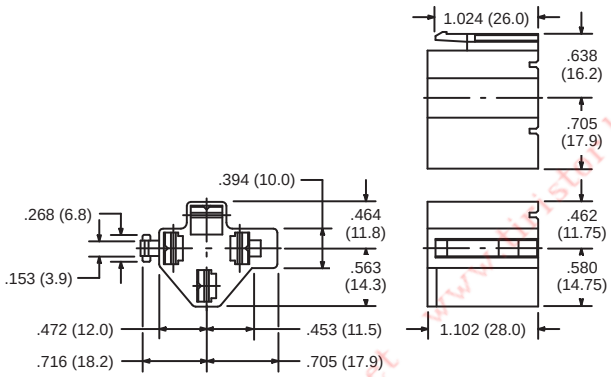
R95–189

4–Pin Automotive Socket w/Wire Leads



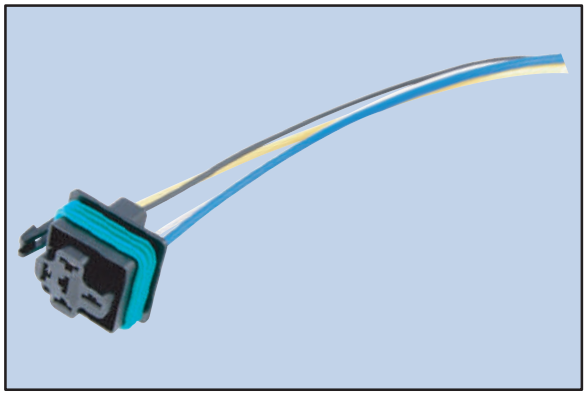
Features

- For R51 Series Relays (50 Amp, SPST–NO ONLY)
- 6.5 Inch Wire Leads



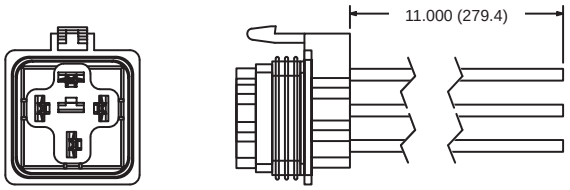
R95–190

4–Pin Weatherproof Automotive Socket w/Wire Leads



Features

- For Weatherproof R51 Series Relays
- 18 AWG Coil and 14 AWG Contacts
- 11 Inch Wire Leads



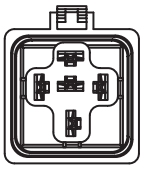
Accessories

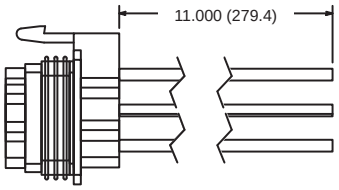
R95–191

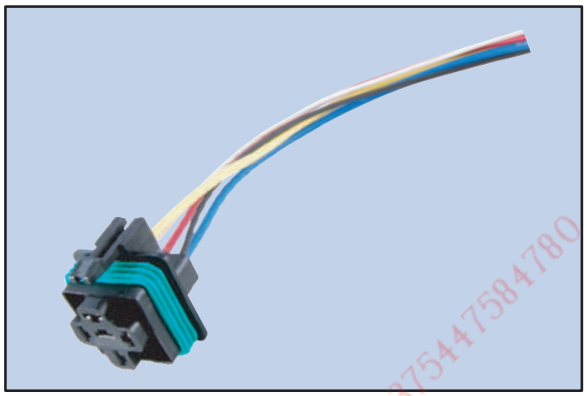
5–Pin Weatherproof Automotive Socket w/Wire Leads

Features

- For Weatherproof R51 Series Relays
- 18 AWG Coil and 14 AWG Contacts
- 11 Inch Wire Leads





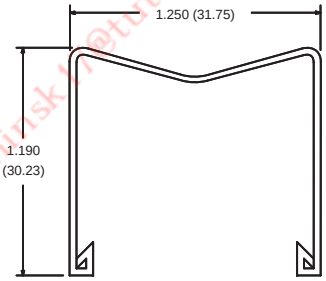


RLY9009

Hold Down Clip

For use with the following sockets:

- R95–132
- R95–133

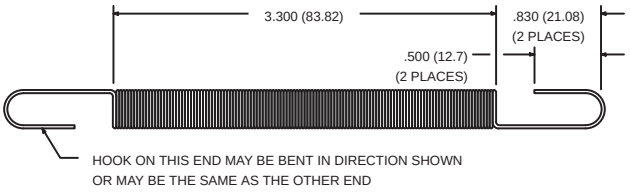


RLY9010

Hold Down Spring

For use with the following sockets:

- R95–101
- R95–102
- R95–104
- R95–113
- R95–114
- R95–115
- R95–116
- R95–117
- R95–118
- R95–119
- R95–123
- R95–124
- R95–156
- R95–159

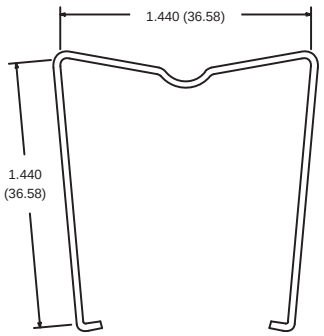


RLY9011

Hold Down Clip

For use with the following sockets:

- RLY9134
- RLY9135

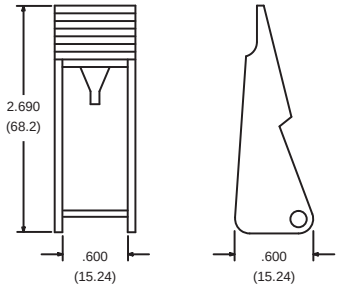


RLY9012

For use with the following sockets:

- R95–130
- R95–131

Hold Down/Ejector



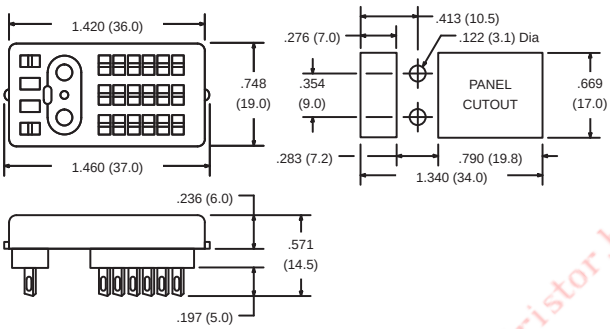
RLY9134

Features

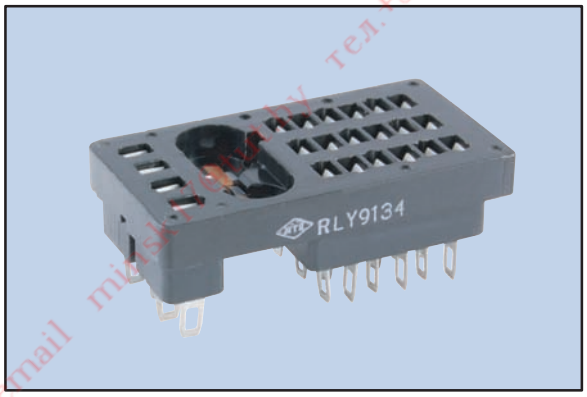
- Panel Board Mount
- Solder Terminals

Electrical Rating:

300 Volts, 10 Amps



22–Pin Blade Socket



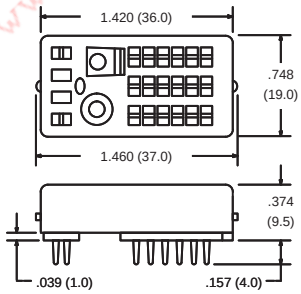
RLY9135

Features

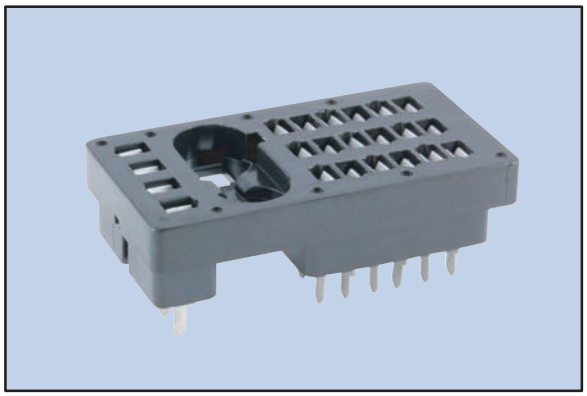
- PC Board Mount
- Solder Terminals

Electrical Rating:

300 Volts, 10 Amps

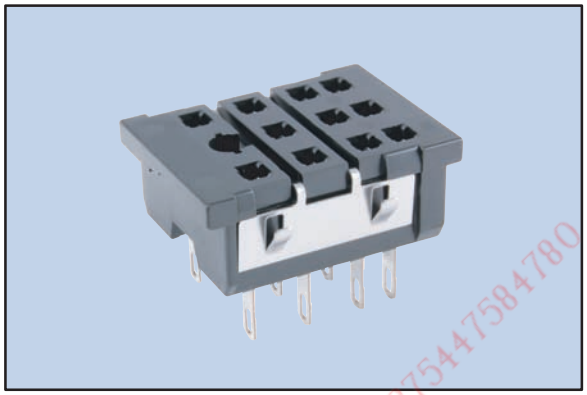


22–Pin Blade Socket



RLY9151

11–Pin Blade Socket

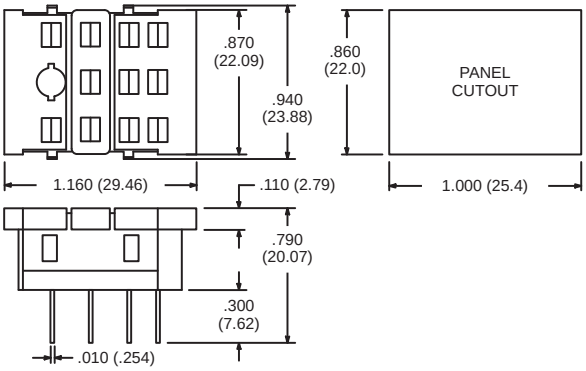


Features

- **Panel Mount**
- **Solder Terminals**

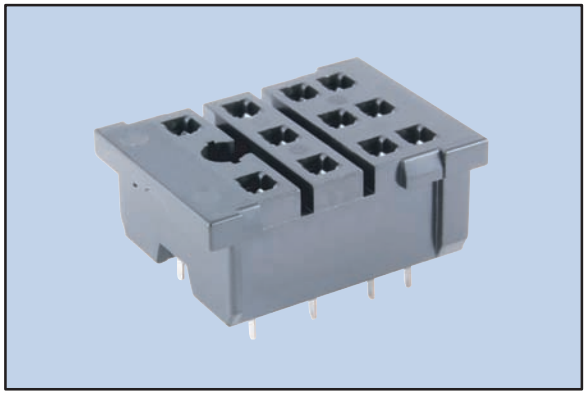
Electrical Rating:

300 Volts, 7 Amps



RLY9152

11–Pin Blade Socket

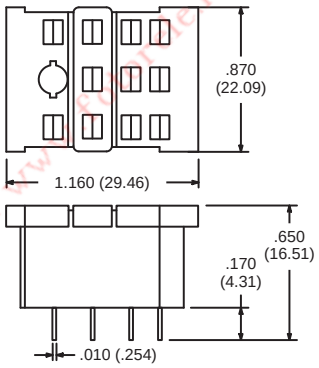


Features

- **PC Board Mount**
- **Solder Terminals**

Electrical Rating:

300 Volts, 5 Amps



RLY9153

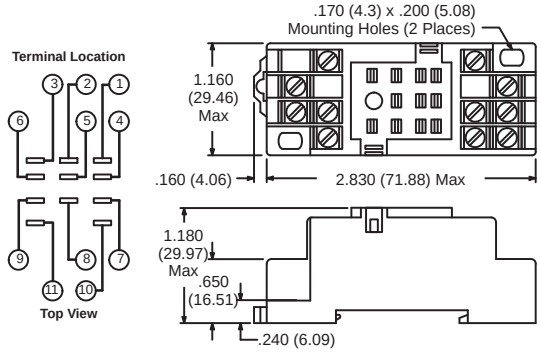
11–Pin Blade Socket

Features

- DIN Rail/Surface Mount
- Pressure Clamp Screws
- 3PDT Applications

Electrical Rating:

300 Volts, 7 Amps



RLY9154

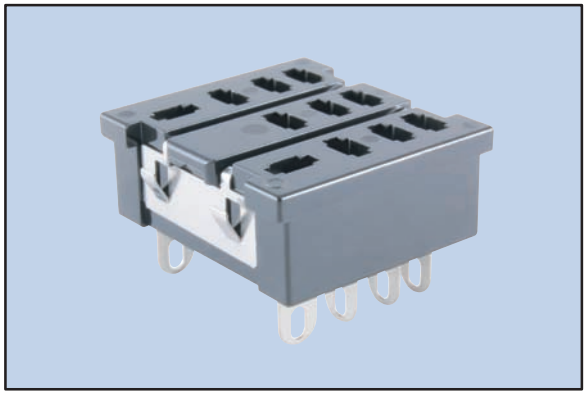
11–Pin Blade Socket

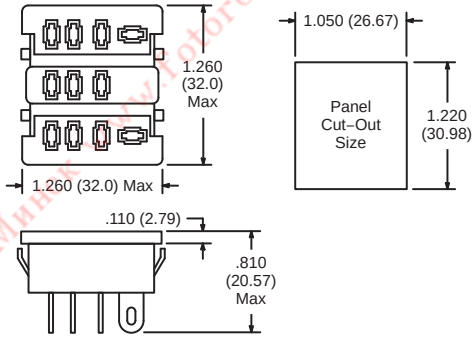
Features

- Panel Mount
- Solder Terminals
- Accepts .187” Blade Terminals
- 3PDT Applications

Electrical Rating:

300 Volts, 10 Amps





Accessories

RLY9155

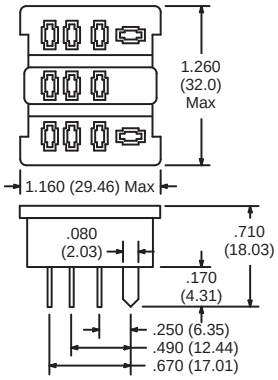
11–Pin Blade Socket

Features

- PC Board Mount
- Solder Terminals
- Accepts .187” Blade Terminals
- 3PDT Applications

Electrical Rating:

300 Volts, 10 Amps



RLY9156

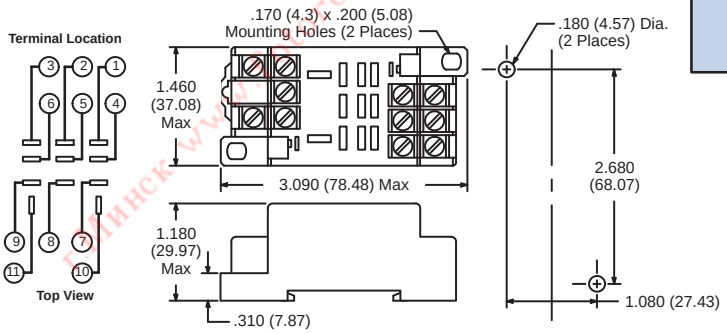
11–Pin Blade Socket

Features

- DIN Rail/Surface Mount
- Pressure Clamp Screws
- Accepts .187” Blade Terminals
- 3PDT Applications

Electrical Rating:

300 Volts, 10 Amps



RLY9157

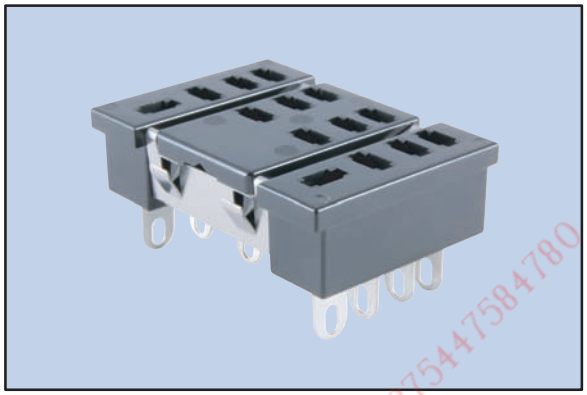
14–Pin Blade Socket

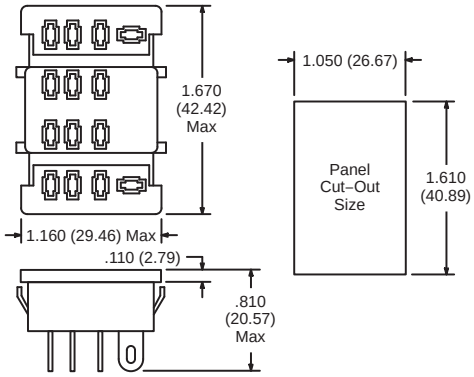
Features

- Panel Mount
- Solder Terminals
- Accepts .187” Blade Terminals
- 4PDT Applications

Electrical Rating:

300 Volts, 10 Amps





RLY9158

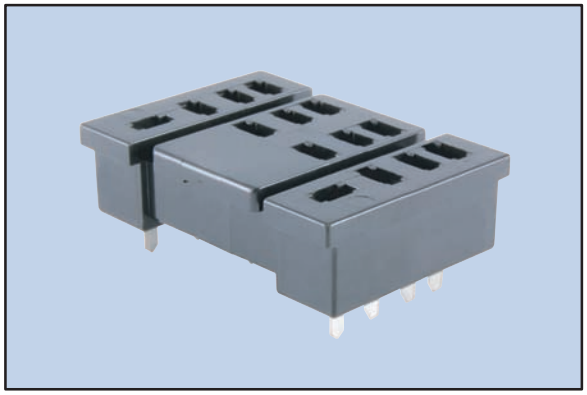
14–Pin Blade Socket

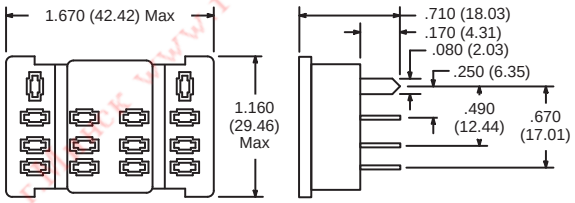
Features

- PC Board Mount
- Solder Terminals
- Accepts .187” Blade Terminals
- 4PDT Applications

Electrical Rating:

300 Volts, 10 Amps





RLY9159

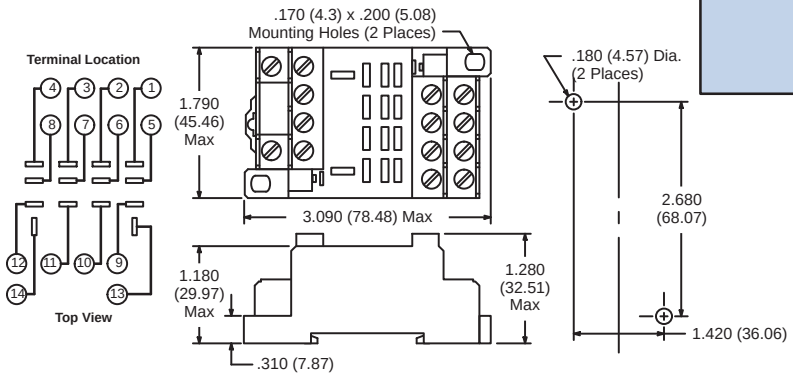
14–Pin Blade Socket

Features

- DIN Rail/Surface Mount
- Pressure Clamp Screws
- Accepts .187” Blade Terminals
- 4PDT Applications

Electrical Rating:

250 Volts, 10 Amps



RLY9165

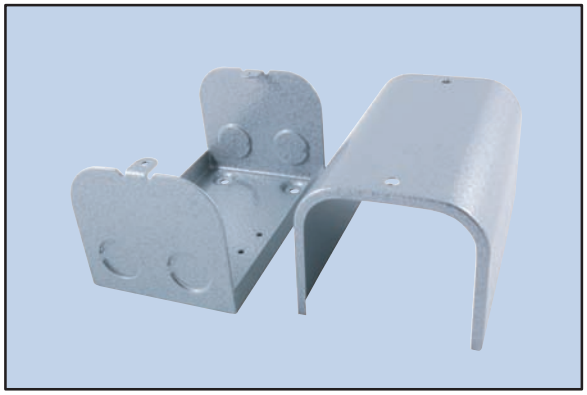
Dust Cover

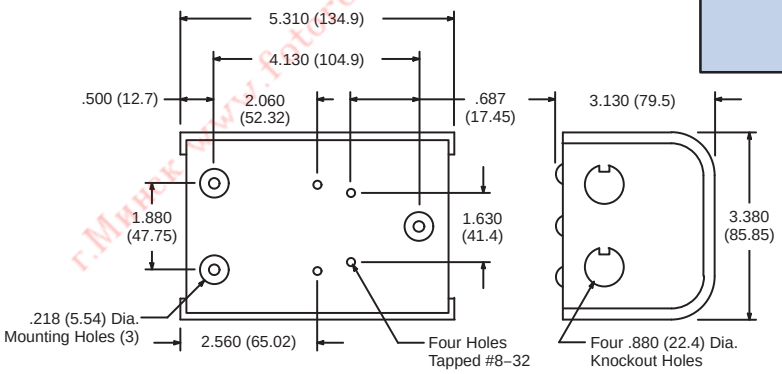
Features

- Enameled Steel Enclosure
- 4 Knockouts for 1/2” Conduit

Relay Applications:

R04 Series



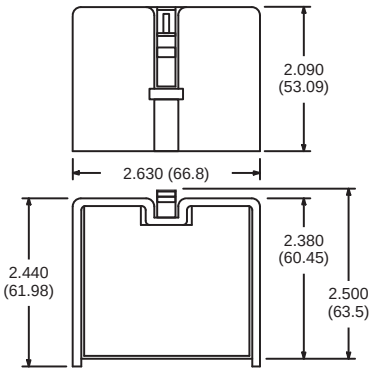


Accessories

RLY9166

Features
- **Molded Plastic**
- **Attached Retaining Clip**

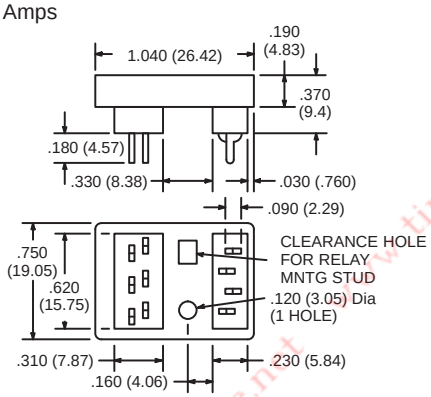
Relay Applications:
RLY16 Series
RLY17 Series



RLY9170

Features
- **PC Board Mount**
- **In–Line Solder Terminals**

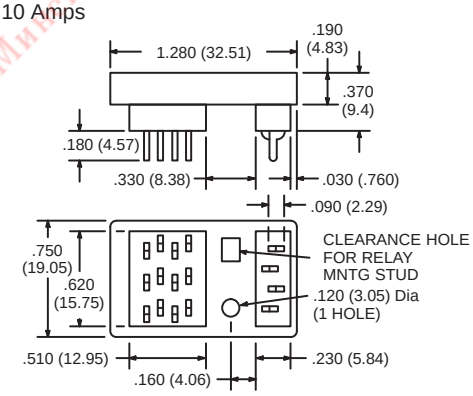
Electrical Rating:
300 Volts, 10 Amps



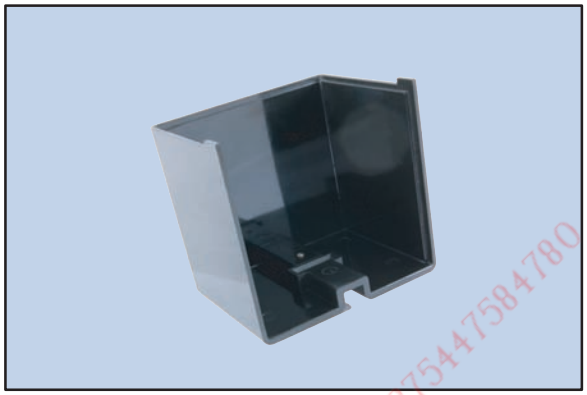
RLY9171

Features
- **PC Board Mount**
- **In–Line Solder Terminals**

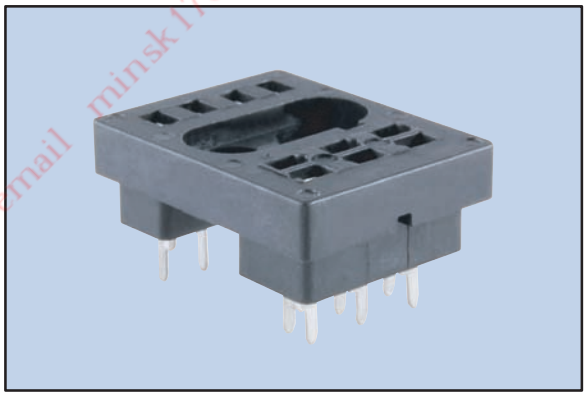
Electrical Rating:
300 Volts, 10 Amps



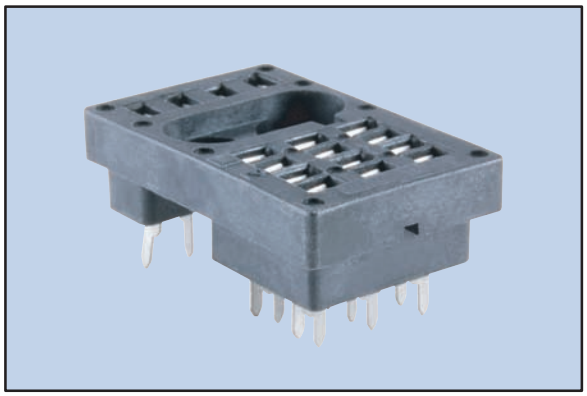
Dust Cover



10–Pin Blade Socket



16–Pin Blade Socket



Accessories

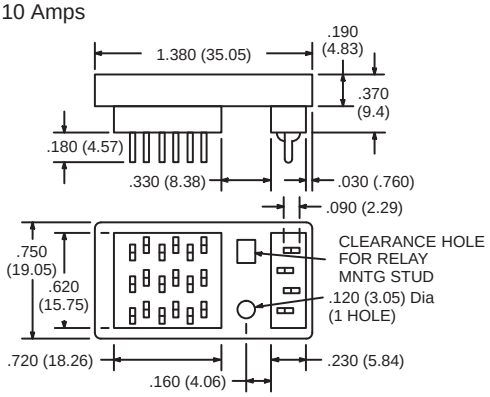
RLY9172

Features

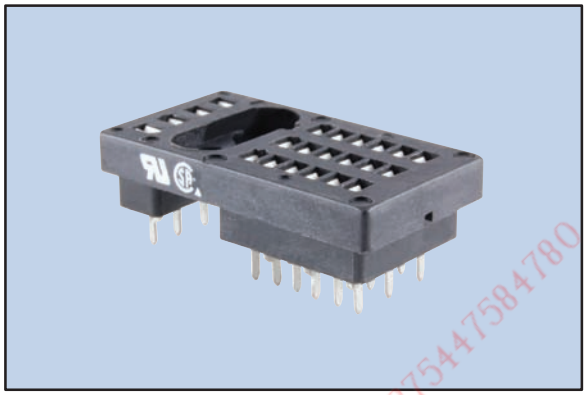
- PC Board Mount
- In–Line Solder Terminals

Electrical Rating:

300 Volts, 10 Amps



22–Pin Blade Socket



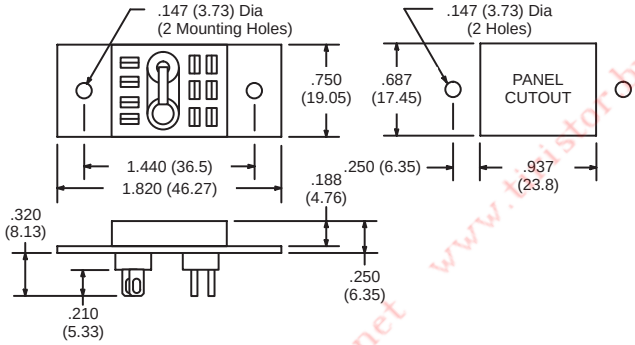
RLY9173

Features

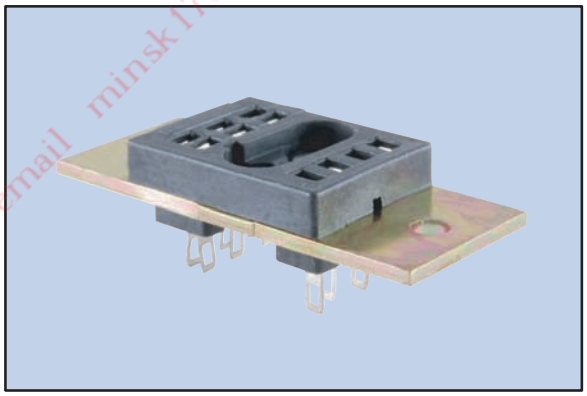
- Flange Mount
- Solder Terminals

Electrical Rating:

300 Volts, 10 Amps



10–Pin Blade Socket



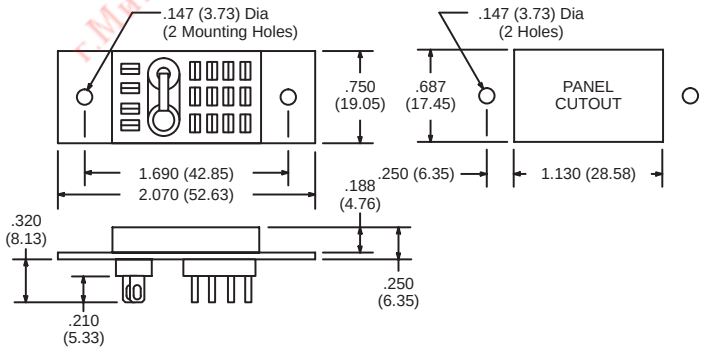
RLY9174

Features

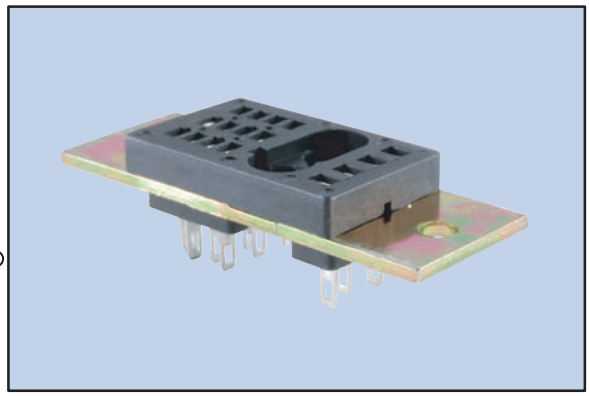
- Flange Mount
- Solder Terminals

Electrical Rating:

300 Volts, 10 Amps



16–Pin Blade Socket



RLY9183

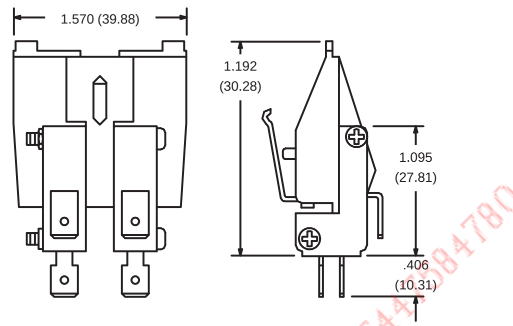
Features

- **For RLY700 Series**

Electrical Rating:

Contacts . . . . SPDT
Maximum Current . . 5A @ 125/250 VAC

2 Auxiliary Switches for Reversing Contactor Applications



RLY9184

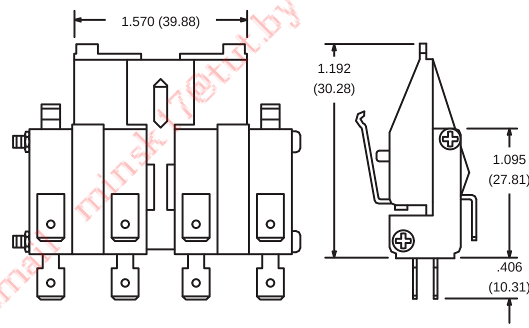
Features

- **For RLY700 Series**

Electrical Rating:

Contacts . . . . SPDT
Maximum Current . . 5A @ 125/250 VAC

4 Auxiliary Switches for Reversing Contactor Applications



RLY9190

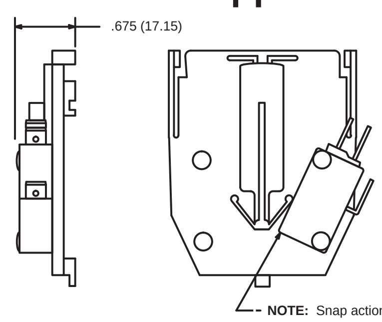
Features

- **1 SPDT Snap Action Switch w/.250" Quick–Connect Terminal**
- **For RLY530, RLY540, and RLY550 Series**

Electrical Rating:

Contacts . . . . SPDT
Maximum Current . . 10A @ 300 VAC

Auxiliary Switch for 3–Pole Definite Purpose Contactor Applications



NOTE: Snap action switch actuation force maximum 60gms

RLY9191

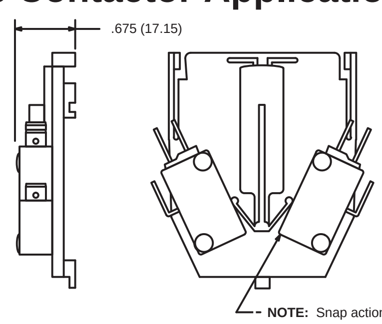
Features

- **2 SPDT Snap Action Switches w/.250" Quick–Connect Terminal**
- **For RLY530, RLY540, and RLY550 Series**

Electrical Rating:

Contacts . . . . SPDT
Maximum Current . . 10A @ 300 VAC

Auxiliary Switch for 3–Pole Definite Purpose Contactor Applications



NOTE: Snap action switch actuation force maximum 60gms

Accessories

RLY9192

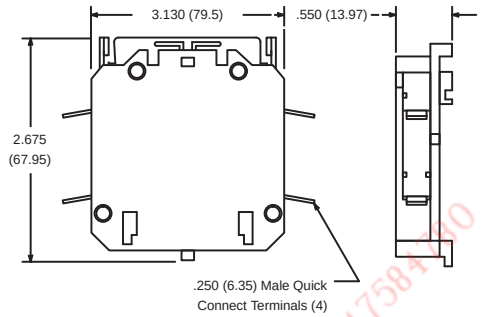
Auxiliary Switch for 3–Pole Definite Purpose Contactor Applications

Features

- **1 SPST–NO and 1 SPST–NC w/.250” Quick–Connect Terminal**
- **For RLY530, RLY540, and RLY550 Series**

Electrical Rating:

Contacts . . . . . SPST
Maximum Current . . 10A @ 600 VAC



RLY9193

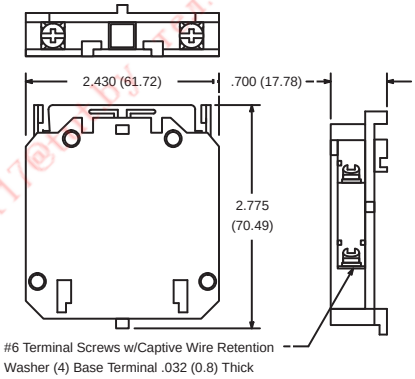
Auxiliary Switch for 3–Pole Definite Purpose Contactor Applications

Features

- **1 SPST–NO and 1 SPST–NC w/6–32 Screw Terminals**
- **For RLY530, RLY540, and RLY550 Series**

Electrical Rating:

Contacts . . . . . SPST
Maximum Current . . 10A @ 600 VAC

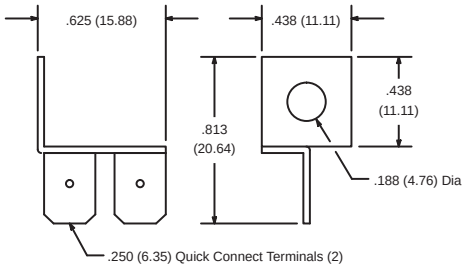


RLY9201

Dual .250” Quick Connect Terminals for Contactors

Features:

- **For RLY400 & RLY600 Series**



RLY9202

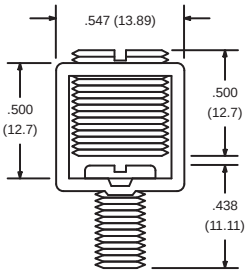
Box Lug for Contactors

Features:

- **For RLY600 Series**

Electrical Rating:

Maximum Wire Size #14 AWG



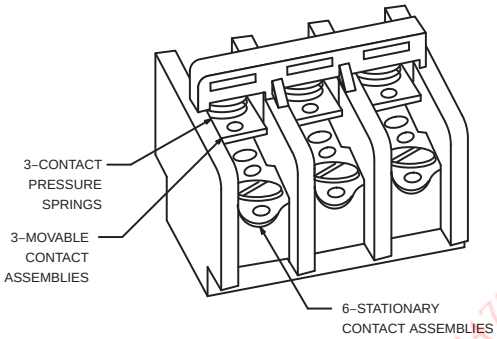
Accessories

RLY9203

Replacement Contacts for Contactors

Features:

- **For RLY600 Series**



RLY9204

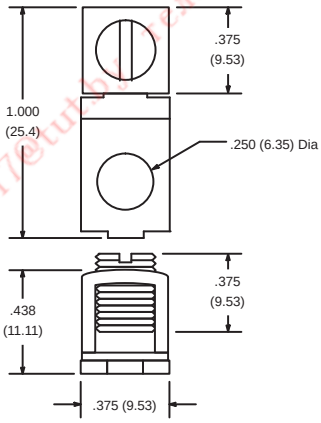
Box Lug for Contactors

Features:

- **For RLY400 Series**

Electrical Rating:

Maximum Wire Size #14 AWG

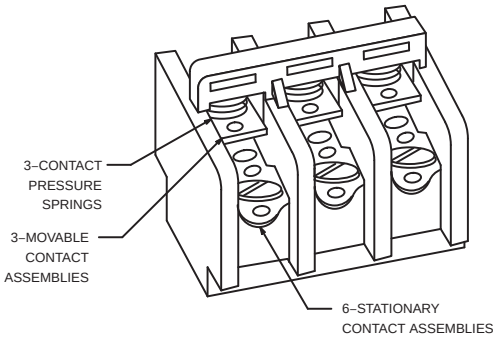


RLY9205

Replacement Contacts for Contactors

Features:

- **For RLY400 Series**



RLY9206

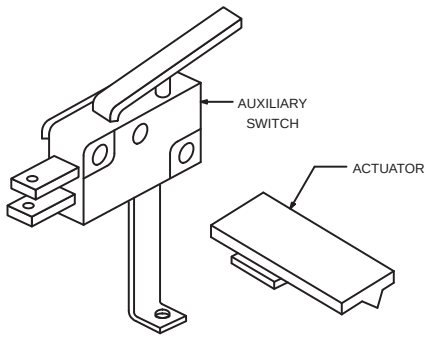
1 Auxiliary Switch for Contactor Applications

Features:

- **For RLY400 Series**

Electrical Rating:

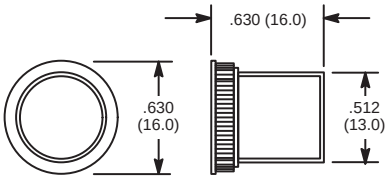
Contacts . . . . . SPDT
Maximum Current . . 10A @ 250 VAC



R58–Boot

Features

- For R58 Series Circuit Breakers
- Waterproof
- M11 Thread
- Clear Silicon

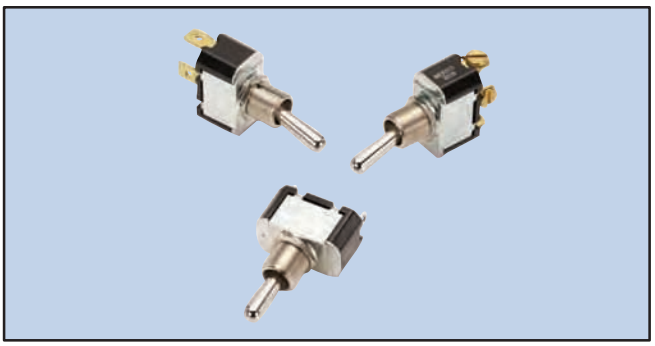


Protective Boot

Bat Handle

Features

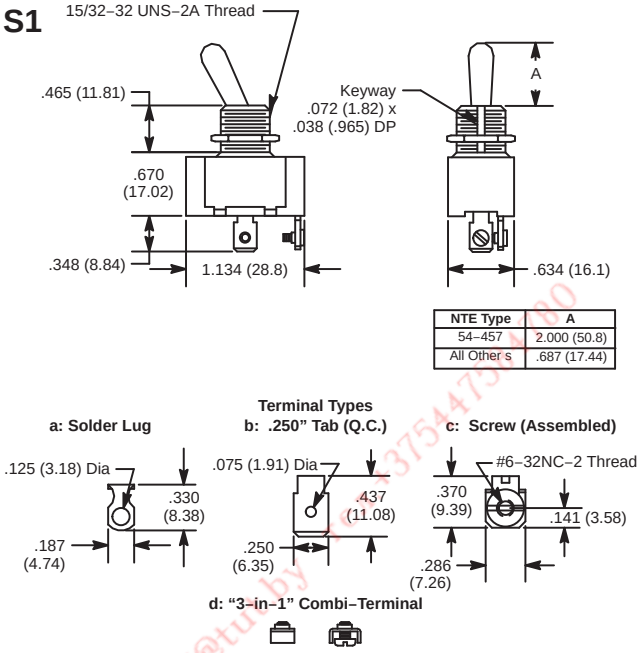
- Neoprene Seal Toggle (54–456 thru 54–459, 54–659 ONLY)
- Slow Make, Slow Break Contacts
- AC Rated, Suitable for Low Voltage DC Also
- Standard .500” Dia Mounting Hole
- Various Terminal Selections



NTE Type No.	Circuitry	Action			Actuator	Diag No.
54–001	SPST	ON	NONE	(OFF)	Brass/Nickel Plate	S1c
54–002	SPDT	(ON)	OFF	(ON)	Brass/Nickel Plate	S1c
54–006	SPST	ON	NONE	OFF	Brass/Nickel Plate	S1a
54–007	SPST	ON	NONE	OFF	Brass/Nickel Plate	S1b
54–008	SPST	ON	NONE	OFF	Brass/Nickel Plate	S1c
54–009	SPDT	ON	OFF	ON	Brass/Nickel Plate	S1b
54–010	SPDT	ON	OFF	ON	Brass/Nickel Plate	S1c
54–023	SPST	ON	NONE	OFF	Brass/Nickel Plate	S1d
54–024	SPDT	ON	NONE	ON	Brass/Nickel Plate	S1d
54–025	SPDT	ON	OFF	ON	Brass/Nickel Plate	S1d
54–456*	SPST	ON	NONE	OFF	Brass/Nickel Plate	S1c
54–457*	SPST	(ON)	NONE	OFF	Brass/Nickel Plate	S1c
54–458*	SPST	ON	NONE	OFF	Brass/Nickel Plate	S1b
54–459*	SPDT	ON	OFF	ON	Brass/Nickel Plate	S1b
54–659*	SPDT	(ON)	OFF	(ON)	Brass/Nickel Plate	S1b

SPECIAL NOTE: ( ) = Momentary Function
* Neoprene Seal Toggle

S1



NTE Type	A
54–457	2.000 (50.8)
All Other s	.687 (17.44)

Specifications

Current Rating: 15A 125VAC, 10A 250VAC, 3/4 HP 125–250VAC
Insulation Resistance: 100 Megohms (min.)
Dielectric Strength: 1000V RMS (min.)
Temperature Rating: 0° to +150°F (–17.8° to +65.6°C)
Electrical Life: 50,000 cycles maintained, 25,000 cycles momentary
Mechanical Life: 100,000 cycles
Terminal Type: Refer to Diag No. in Table
Mounting Hole: .500 (12.7)

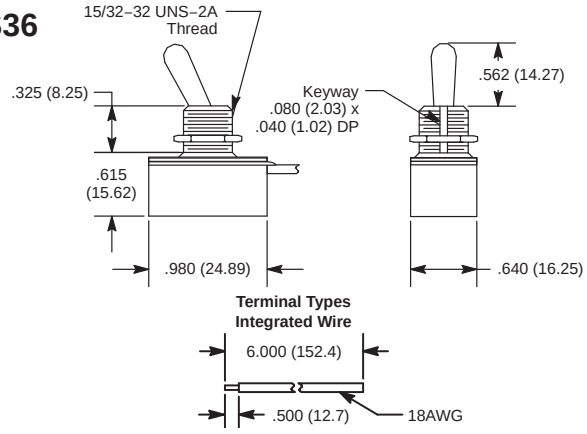
Bat Handle

Features

- Quick Make, Quick Break Wiping Action
- 6” Wire Leads
- Brass or Plastic Actuator

NTE Type No.	Circuitry	Action			Actuator	Diag No.
54–130	SPST	OFF	NONE	ON	Brass/Nickel Plate	S36
54–131	SPST	OFF	NONE	ON	Plastic	S36

S36



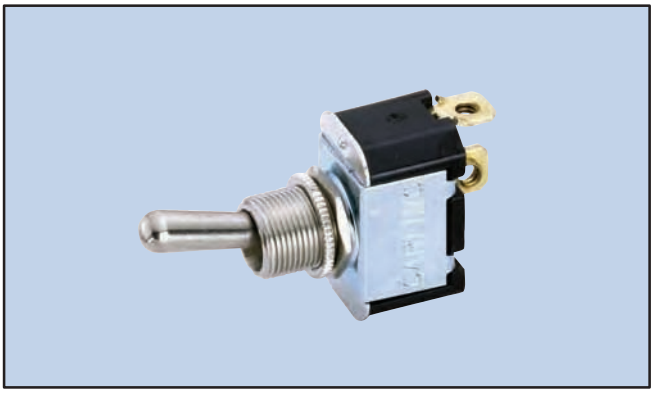
Specifications

Current Rating: 10A 250VAC, 8A 125VDC, 4A 250VDC, 1/3 HP 125VAC
Dielectric Strength: 1000V RMS (min.)
Temperature Rating: +149°F (+65°C) Max
Electrical Life: 25,000 cycles Min
Mechanical Life: 100,000 cycles
Terminal Type: Integrated Wire
Mounting Hole: .500 (12.7)

Bat Handle

Features

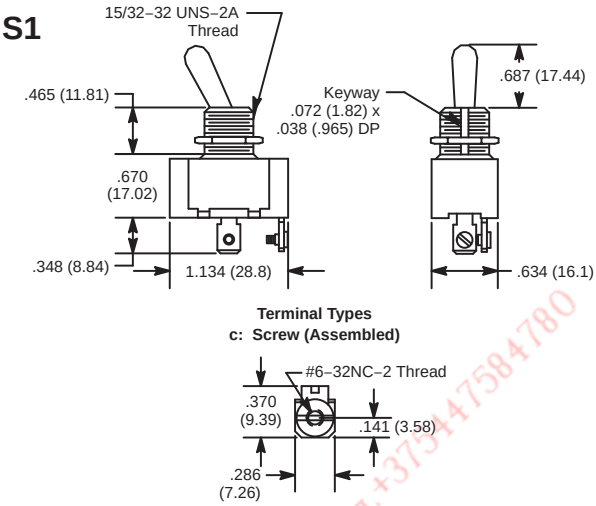
- Slow Make, Slow Break Contacts
- AC Rated, Suitable for Low Voltage DC Also
- Standard .500” Dia Mounting Hole
- Screw Mount Terminals



NTE Type No.	Circuitry	Action			Actuator	Diag No.
54–094	SPST	(ON)	NONE	OFF	Brass/Nickel Plate	S1c
54–096	SPDT	ON	NONE	ON	Brass/Nickel Plate	S1c
54–097	SPDT	ON	NONE	(ON)	Brass/Nickel Plate	S1c
54–143	SPST	ON	NONE	OFF	Brass/Nickel Plate	S1c

SPECIAL NOTE: ( ) = Momentary Function

S1



Specifications

Current Rating: 6A 125VAC, 3A 250VAC, 1/4 HP 120–240VAC
Insulation Resistance: 100 Megohms (min.)
Dielectric Strength: 1000V RMS (min.)
Temperature Rating: 0° to +150°F (–17.8° to +65.6°C)
Electrical Life: 50,000 cycles
Mechanical Life: 100,000 cycles
Terminal Type: Screw Type
Mounting Hole: .500 (12.7)

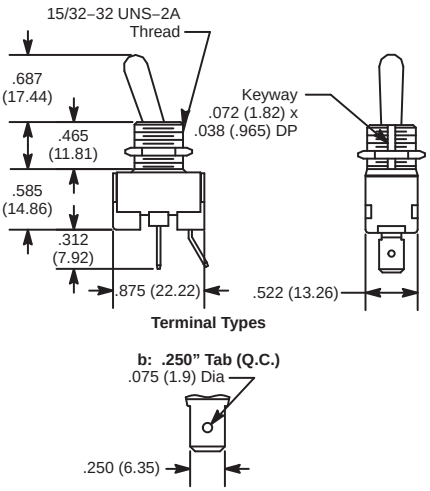
Bat Handle

Features

- AC Rated, General Purpose
- Industry Standard .500” Dia Mounting Hole
- .250” Quick Connect Terminals

NTE Type No.	Circuitry	Action			Actuator	Diag No.
54–005	SPST	ON	NONE	OFF	Brass/Nickel Plate	S3b
54–098	SPDT	ON	NONE	ON	Brass/Nickel Plate	S3b

S3



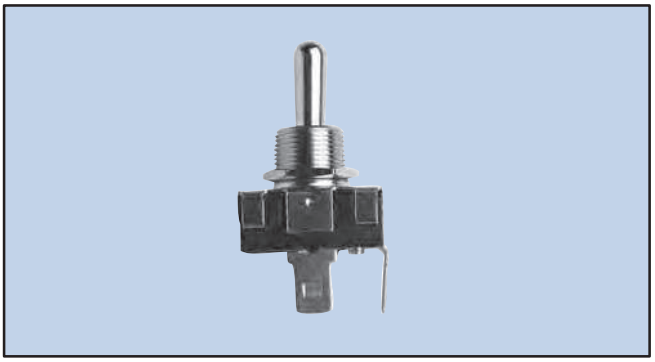
Specifications

Current Rating:
54–005: 20A 125VAC, 10A 250VAC, 1 1/2 HP 125–250VAC
54–098: 10A 125VAC, 5A 250VAC, 1/2 HP 125–250VAC
Insulation Resistance: 100 Megohms (min.)
Dielectric Strength: 1000V RMS (min.)
Temperature Rating: +32° to +185°F (0° to +85°C)
Electrical Life: 25,000 cycles
Mechanical Life: 100,000 cycles
Terminal Type: .250” Tab Q.C.
Mounting Hole: .500 (12.7)

Bat Handle

Features

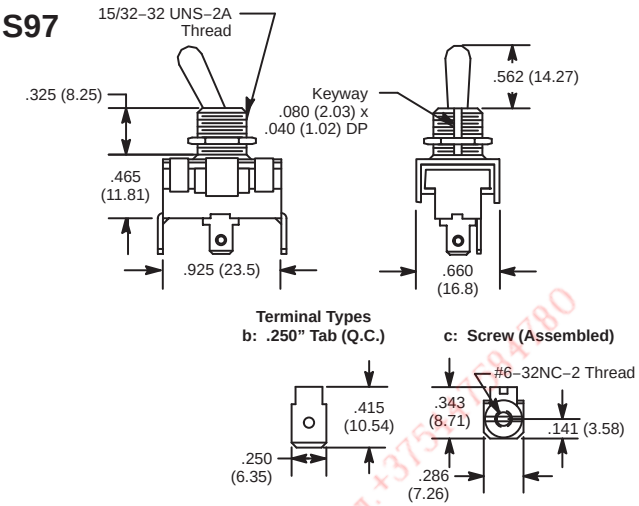
- **Slow–Make/Slow–Break Butt Contact**
- **1 HP, 125–250VAC**



NTE Type No.	Circuitry	Action			Actuator	Diag No.
54–579	SPST	ON	NONE	OFF	Nickel Plated Brass	S97b
54–580	SPST	(ON)	NONE	OFF	Nickel Plated Brass	S97b
54–581	SPST	ON	NONE	(OFF)	Nickel Plated Brass	S97b
54–582	SPDT	ON	NONE	ON	Nickel Plated Brass	S97b
54–583	SPDT	ON	OFF	ON	Nickel Plated Brass	S97b
54–584	SPDT	(ON)	NONE	ON	Nickel Plated Brass	S97b
54–585	SPDT	(ON)	OFF	ON	Nickel Plated Brass	S97b
54–586	SPDT	(ON)	OFF	(ON)	Nickel Plated Brass	S97b
54–593	SPST	ON	NONE	OFF	Nickel Plated Brass	S97c
54–594	SPST	(ON)	NONE	OFF	Nickel Plated Brass	S97c
54–595	SPST	ON	NONE	(OFF)	Nickel Plated Brass	S97c
54–596	SPDT	ON	NONE	ON	Nickel Plated Brass	S97c
54–597	SPDT	ON	OFF	ON	Nickel Plated Brass	S97c
54–598	SPDT	(ON)	NONE	ON	Nickel Plated Brass	S97c
54–599	SPDT	(ON)	OFF	ON	Nickel Plated Brass	S97c
54–600	SPDT	(ON)	OFF	(ON)	Nickel Plated Brass	S97c

SPECIAL NOTE: ( ) = Momentary Function

S97



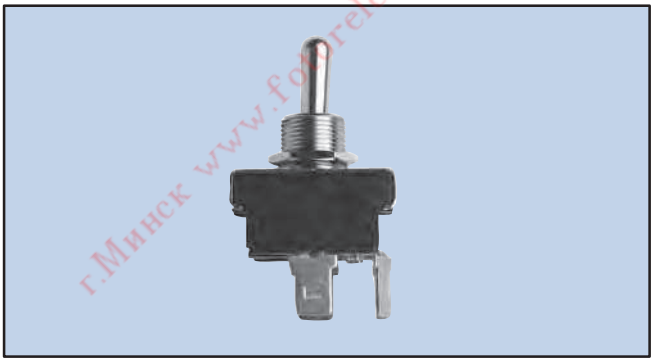
Specifications

Current Rating: 20A 125VAC, 10A 250VAC, 1 HP 125–250VAC
Insulation Resistance: 10^9 ohms (min.)
Dielectric Strength: 1500V RMS (min.)
Temperature Rating: +14° to +149°F (–10° to +65°C)
Electrical Life: 10,000 cycles (min.) at full load
Mechanical Life: 30,000 cycles (min.)
Terminal Type: Refer to Diag. No. in Table
Mounting Hole: .500 (12.7)

Bat Handle

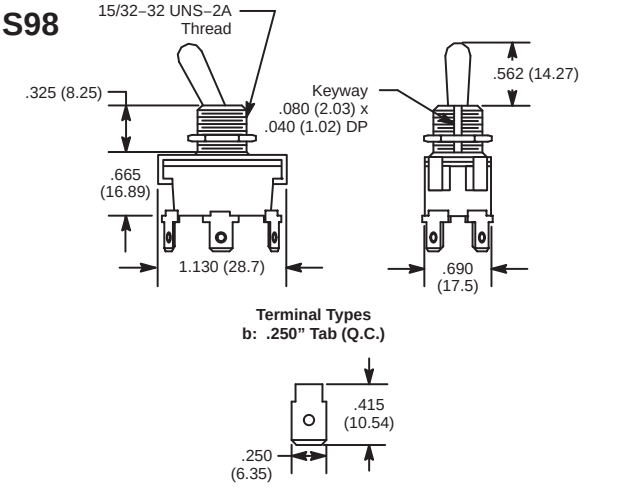
Features

- **Slow–Make/Slow–Break Butt Contact**
- **1 HP, 125–250VAC**



NTE Type No.	Circuitry	Action			Actuator	Diag No.
54–590	DPST	ON	NONE	OFF	Nickel Plated Brass	S98b
54–591	DPDT	ON	NONE	ON	Nickel Plated Brass	S98b
54–592	DPDT	ON	OFF	ON	Nickel Plated Brass	S98b

S98



Specifications

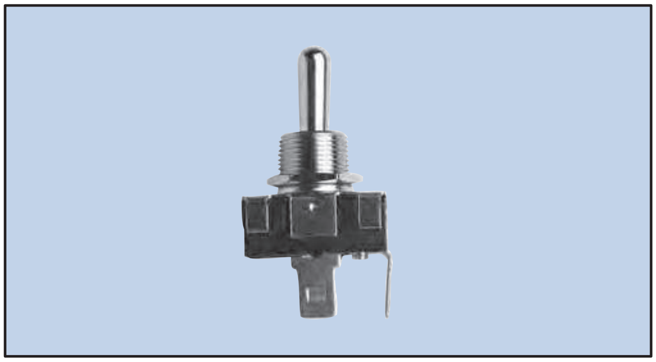
Current Rating: 20A 125VAC, 10A 250VAC, 1 HP 125–250VAC
Insulation Resistance: 10^9 ohms (min.)
Dielectric Strength: 1500V RMS (min.)
Temperature Rating: +14° to +149°F (–10° to +65°C)
Electrical Life: 10,000 cycles (min.) at full load
Mechanical Life: 30,000 cycles (min.)
Terminal Type: .250" Tab Q.C.
Mounting Hole: .500 (12.7)

Toggle Switches

Bat Handle

Features

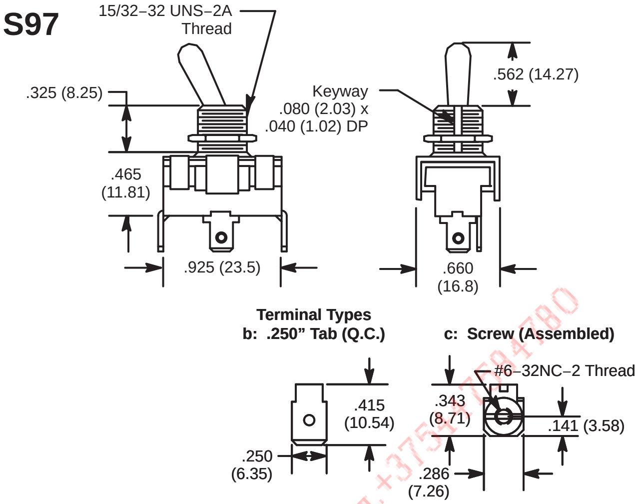
- **Slow–Make/Slow–Break Butt Contact**
- **3/4 HP, 125–250VAC**



NTE Type No.	Circuitry	Action			Actuator	Diag No.
54–610	SPST	ON	NONE	OFF	Nickel Plated Brass	S97c
54–611	SPST	(ON)	NONE	OFF	Nickel Plated Brass	S97c
54–612	SPST	ON	NONE	(OFF)	Nickel Plated Brass	S97c
54–613	SPDT	ON	NONE	ON	Nickel Plated Brass	S97c
54–614	SPDT	ON	OFF	ON	Nickel Plated Brass	S97c
54–615	SPDT	(ON)	NONE	ON	Nickel Plated Brass	S97c
54–616	SPDT	(ON)	OFF	ON	Nickel Plated Brass	S97c
54–617	SPDT	(ON)	OFF	(ON)	Nickel Plated Brass	S97c
54–619	SPST	ON	NONE	OFF	Nickel Plated Brass	S97b
54–620	SPST	(ON)	NONE	OFF	Nickel Plated Brass	S97b
54–621	SPST	ON	NONE	(OFF)	Nickel Plated Brass	S97b
54–622	SPDT	ON	NONE	ON	Nickel Plated Brass	S97b
54–623	SPDT	ON	OFF	ON	Nickel Plated Brass	S97b
54–624	SPDT	(ON)	NONE	ON	Nickel Plated Brass	S97b
54–625	SPDT	(ON)	OFF	ON	Nickel Plated Brass	S97b
54–626	SPDT	(ON)	OFF	(ON)	Nickel Plated Brass	S97b

SPECIAL NOTE: ( ) = Momentary Function

S97



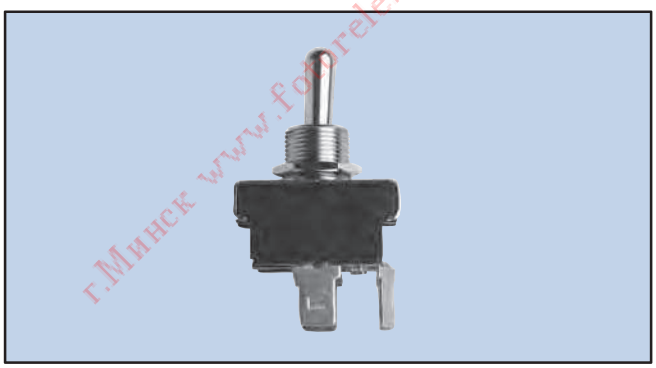
Specifications

Current Rating: 20A 125VAC, 10A 250VAC, 3/4 HP 125–250VAC
Insulation Resistance: 10^9 ohms (min.)
Dielectric Strength: 1000V RMS (min.)
Temperature Rating: +14° to +149°F (–10° to +65°C)
Electrical Life: 10,000 cycles (min.) at full load
Mechanical Life: 30,000 cycles (min.)
Terminal Type: Refer to Diag. No. in Table
Mounting Hole: .500 (12.7)

Bat Handle

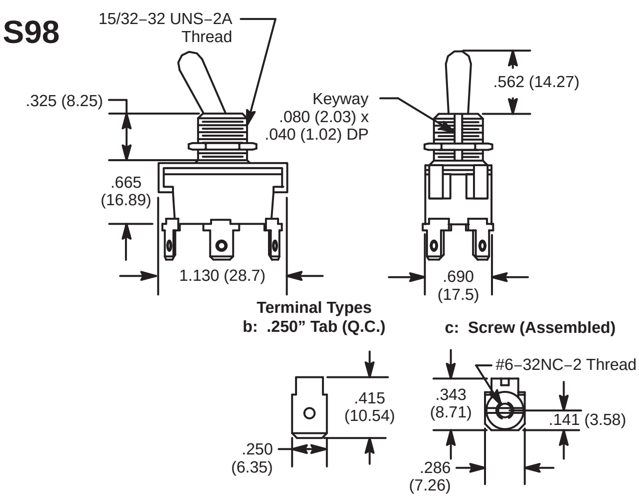
Features

- **Slow–Make/Slow–Break Butt Contact**
- **3/4 HP, 125–250VAC**



NTE Type No.	Circuitry	Action			Actuator	Diag No.
54–602	DPST	ON	NONE	OFF	Nickel Plated Brass	S98c
54–603	DPDT	ON	NONE	ON	Nickel Plated Brass	S98c
54–604	DPDT	ON	OFF	ON	Nickel Plated Brass	S98c
54–606	DPST	ON	NONE	OFF	Nickel Plated Brass	S98b
54–607	DPDT	ON	NONE	ON	Nickel Plated Brass	S98b
54–608	DPDT	ON	OFF	ON	Nickel Plated Brass	S98b

S98



Specifications

Current Rating: 20A 125VAC, 10A 250VAC, 3/4 HP 125–250VAC
Insulation Resistance: 10^9 ohms (min.)
Dielectric Strength: 1000V RMS (min.)
Temperature Rating: +14° to +149°F (–10° to +65°C)
Electrical Life: 10,000 cycles (min.) at full load
Mechanical Life: 30,000 cycles (min.)
Terminal Type: Refer to Diag. No. in Table
Mounting Hole: .500 (12.7)

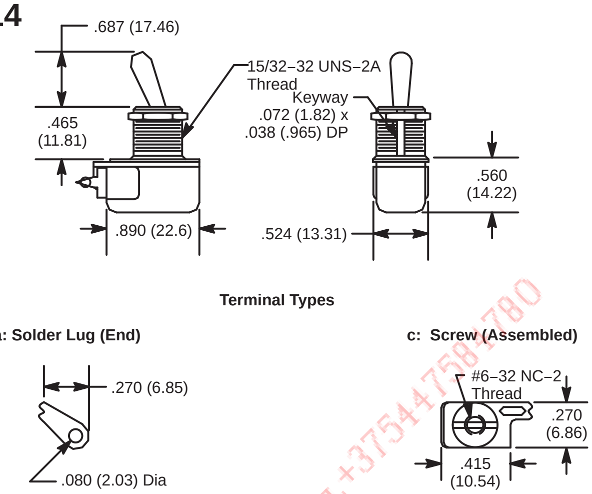
Toggle Switches

Bat Handle

Features
- Quick Make, Quick Break Contacts
- AC/DC Shallow Back Panel Applications
- Standard .500” Dia Mounting Hole

NTE Type No.	Circuitry	Action			Actuator	Diag No.
54–070	SPST	ON	NONE	OFF	Brass/Nickel Plate	S14a
54–071	SPST	ON	NONE	OFF	Brass/Nickel Plate	S14c

S14



Specifications

Current Rating: 6A 125VAC, 3A 250VAC, AC/DC
Insulation Resistance: 100 Megohms (min.)
Dielectric Strength: 1000V RMS (min.)
Temperature Rating: 0° to +150°F (–17.8° to +65.6°C)
Electrical Life: 25,000 cycles
Mechanical Life: 15,000 cycles
Terminal Type: Refer to Diag No. in Table
Mounting Hole: .500 (12.7)

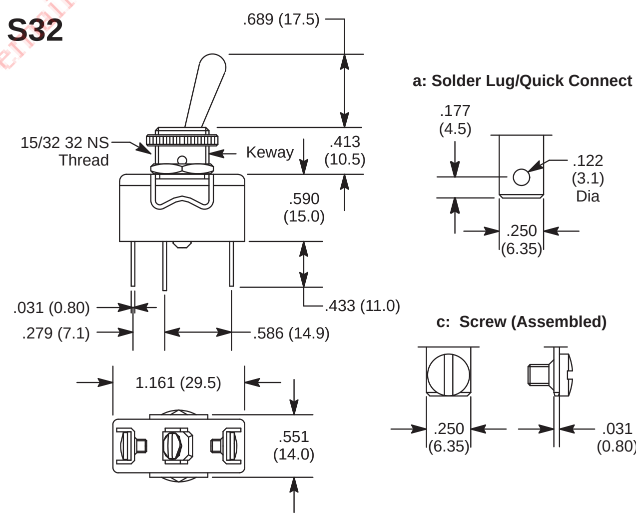
Bat Handle

Features
- Waterproof Types Available on Page 159

NTE Type No.	Circuitry	Action			Actuator	Diag No.
54–348	SPST	ON	NONE	OFF	Nickel Plated Brass	S32a
54–349	SPDT	ON	NONE	ON	Nickel Plated Brass	S32a
54–350	SPDT	ON	OFF	ON	Nickel Plated Brass	S32a
54–351	SPDT	(ON)	NONE	ON	Nickel Plated Brass	S32a
54–352	SPDT	(ON)	OFF	(ON)	Nickel Plated Brass	S32a
54–353	SPDT	ON	OFF	(ON)	Nickel Plated Brass	S32a
54–354	SPST	ON	NONE	OFF	Nickel Plated Brass	S32c
54–355	SPDT	ON	NONE	ON	Nickel Plated Brass	S32c
54–356	SPDT	ON	OFF	ON	Nickel Plated Brass	S32c
54–357	SPDT	(ON)	NONE	ON	Nickel Plated Brass	S32c
54–358	SPDT	(ON)	OFF	(ON)	Nickel Plated Brass	S32c
54–359	SPDT	ON	OFF	(ON)	Nickel Plated Brass	S32c

SPECIAL NOTE: ( ) = Momentary Function

S32



Specifications

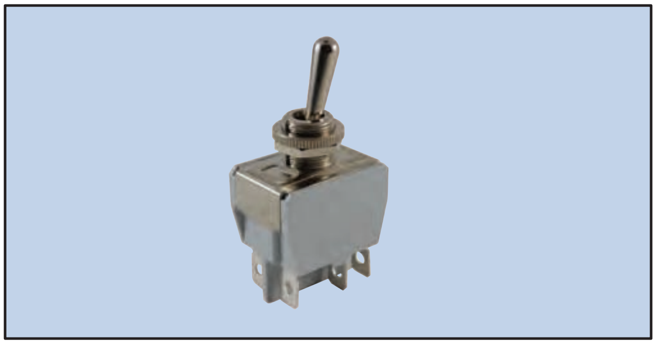
Current Rating:
Functions ON–OFF and ON–ON: 15A 250VAC or 10A 24VDC
Functions ON OFF ON: 15A 250VAC
Other Functions: 15A 125VAC, 12A 250VAC or 5A 25VDC
Insulation Resistance: 1000 Megohms (min.) at 500VDC
Dielectric Strength: 2000V RMS (min.) between terminals
Temperature Rating: –4° to +131°F (–20° to +55°C)
Electrical Life: 10,000 cycles (min.) at full load
Terminal Type: Refer to Diag No. in Table
Mounting Hole: .480 (12.2)

Toggle Switches

Bat Handle

Features

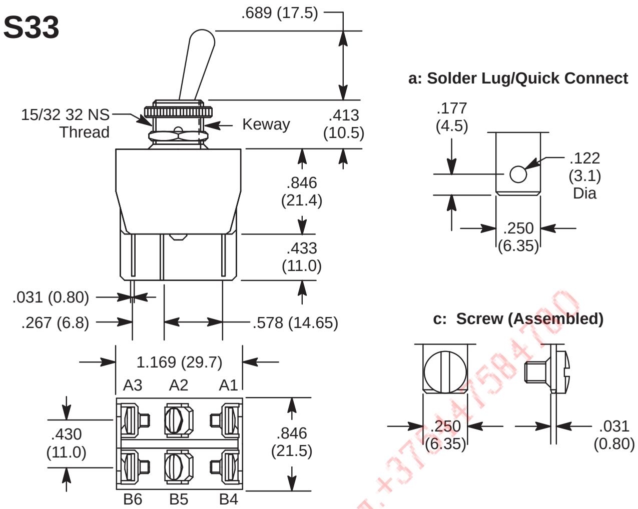
- **Waterproof Types Available on Page 159**



NTE Type No.	Circuitry	Current Rating	Action			Actuator	Diag No.
54–360	DPDT	A	ON	NONE	ON	Brass/Nickel Plate	S33a
54–361#	DPDT	D	ON	OFF	ON	Brass/Nickel Plate	S33a
54–362*#	SP3T	C	ON	ON	ON	Brass/Nickel Plate	S33a
54–363#	DPDT	C	(ON)	NONE	ON	Brass/Nickel Plate	S33a
54–364#	DPDT	C	(ON)	OFF	(ON)	Brass/Nickel Plate	S33a
54–365#	DPDT	C	ON	OFF	(ON)	Brass/Nickel Plate	S33a
54–366	DPST	A	ON	NONE	OFF	Brass/Nickel Plate	S33a
54–367	DPST	A	ON	NONE	OFF	Brass/Nickel Plate	S33c
54–369##	DPDT	A	ON	NONE	ON	Brass/Nickel Plate	S33c
54–370#	DPDT	B	ON	OFF	ON	Brass/Nickel Plate	S33c
54–371*#	SP3T	C	ON	ON	ON	Brass/Nickel Plate	S33c
54–372#	DPDT	C	(ON)	NONE	ON	Brass/Nickel Plate	S33c
54–373##	DPDT	C	(ON)	OFF	(ON)	Brass/Nickel Plate	S33c
54–374##	DPDT	C	ON	OFF	(ON)	Brass/Nickel Plate	S33c

SPECIAL NOTE: ( ) = Momentary Function
* SP in DP case.
\# UL for 10 Amp **ONLY**
\#\# UL for 12 Amp **ONLY**

S33



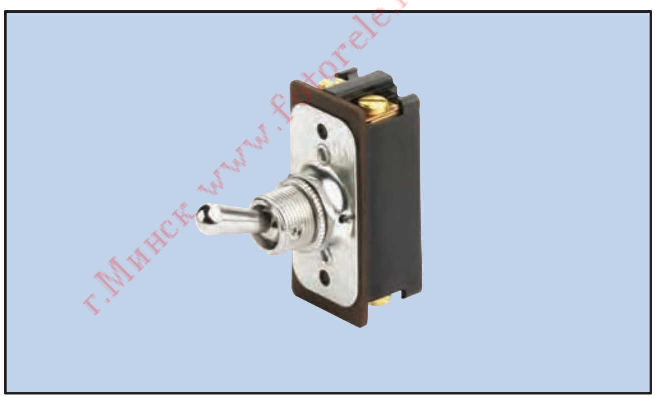
Specifications

Current Rating:
A: 15A 250VAC or 10A 24VDC, 15A 12VDC
B: 15A 250VAC
C: 15A 125VAC, 12A 250VAC or 5A 25VDC
D: 10A 125–250VAC, 1/2HP
Insulation Resistance: 1000 Megohms (min.) at 500VDC
Dielectric Strength: 2000V RMS (min.) between terminals
Temperature Rating: –4° to +131°F (–20° to +55°C)
Electrical Life: 10,000 cycles (min.) at full load
Terminal Type: Refer to Diag No. in Table
Mounting Hole: .480 (12.2)

Bat Handle

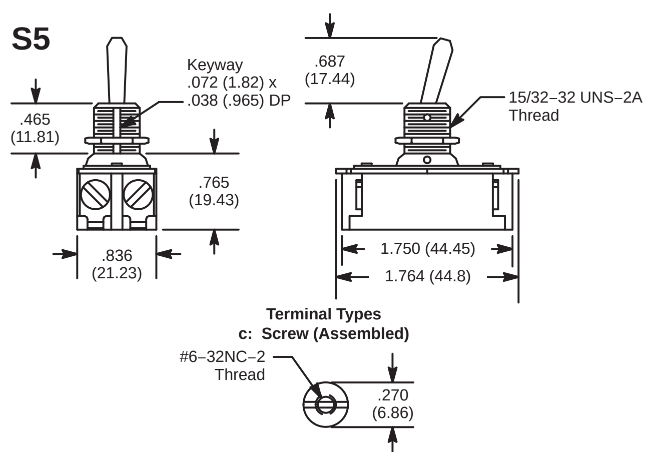
Features

- **Quick Make, Quick Break Contacts**
- **Suitable for High Amperage AC/DC Motor Control**
- **Screw Terminals**



NTE Type No.	Circuitry	Action			Actuator	Diag No.
54–055	DPST	ON	NONE	OFF	Brass/Nickel Plate	S5c
54–056	SPST	ON	NONE	OFF	Brass/Nickel Plate	S5c

S5



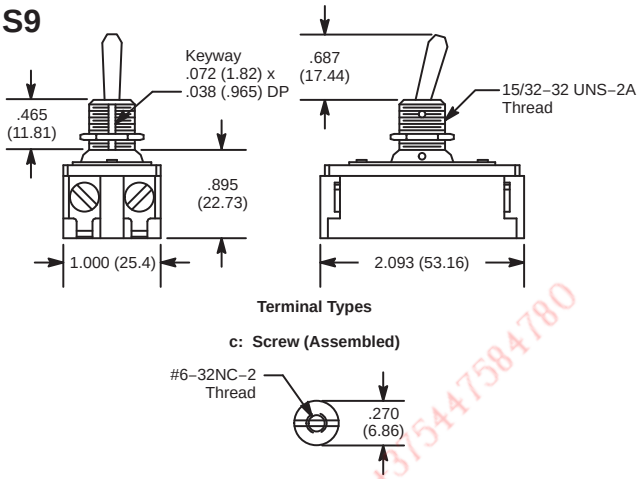
Specifications

Current Rating: 16A 125VAC, 8A 250VAC, 1 HP 125–250VAC
Insulation Resistance: 100 Megohms (min.)
Dielectric Strength: 1000V RMS (min.)
Temperature Rating: 0° to +150°F (–17.8° to +65.6°C)
Electrical Life: 25,000 cycles
Mechanical Life: 100,000 cycles
Terminal Type: Screw Type
Mounting Hole: .500 (12.7)

Bat Handle

NTE Type No.	Circuitry	Action			Actuator	Diag No.
54–057	DPST	ON	NONE	OFF	Brass/Nickel Plate	S9

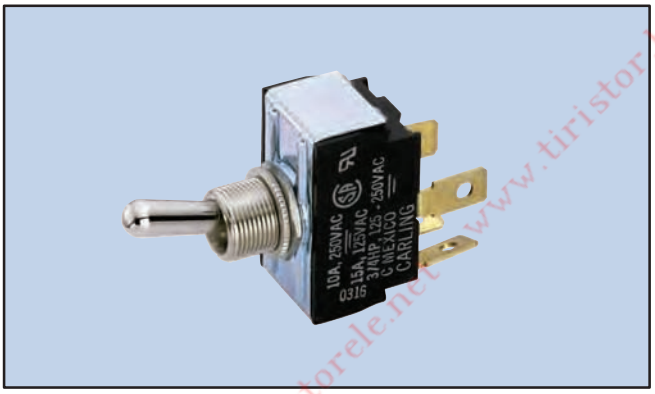
S9



Specifications

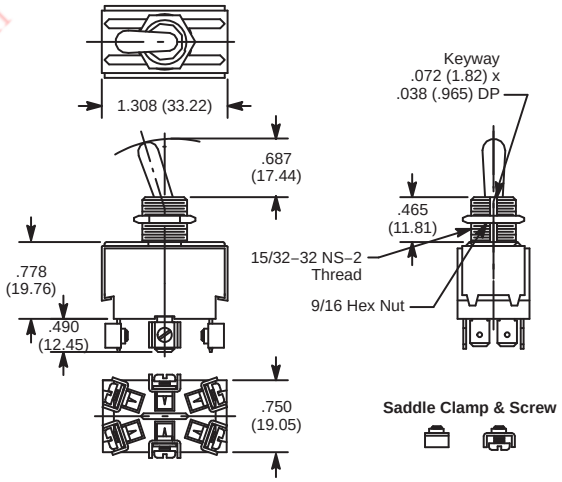
Current Rating: 20A 125VAC, 10A 250VAC, 1 1/2 HP 125–250VAC
Insulation Resistance: 100 Megohms (min.)
Dielectric Strength: 1000V RMS (min.)
Temperature Rating: 0°F to +150°F (–17.8°C to +65.6°C)
Electrical Life: 25,000 cycles
Mechanical Life: 100,000 cycles
Terminal Type: Screw Type
Mounting Hole: .500 (12.7)

Bat Handle



NTE Type No.	Circuitry	Action			Actuator	Diag No.
54–026	DPST	ON	NONE	OFF	Brass/Nickel Plate	S8
54–027	DPDT	ON	NONE	ON	Brass/Nickel Plate	S8
54–028	DPDT	ON	OFF	ON	Brass/Nickel Plate	S8

S8



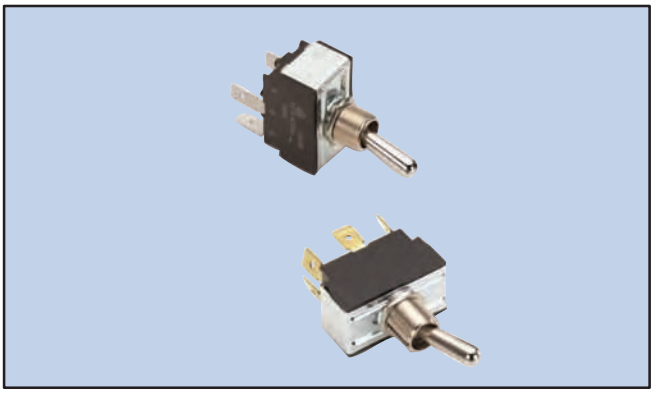
Specifications

Current Rating: 15A 125VAC, 10A 250VAC, 3/4 HP 125–250VAC
Insulation Resistance: 100 Megohms (min.)
Dielectric Strength: 1000V RMS (min.)
Temperature Rating: +32° to +185°F (0° to +85°C)
Electrical Life: 50,000 cycles
Mechanical Life: 100,000 cycles
Terminal Type: “3–in–1” Combi–Terminal
Mounting Hole: .500 (12.7)

Bat Handle

Features

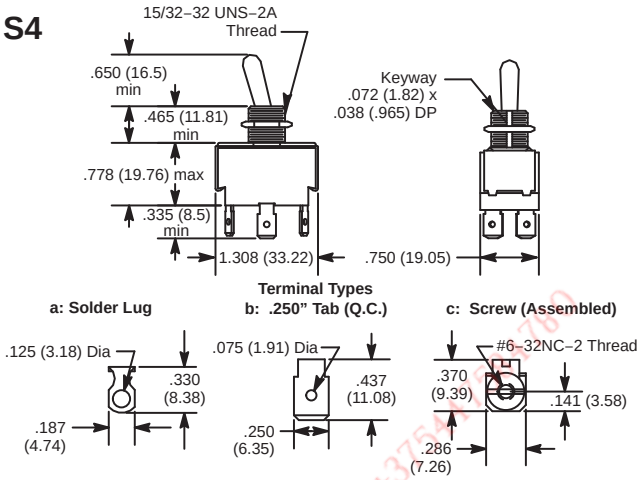
- Slow Make, Slow Break Contacts
- Heavy Duty AC Rated Also Suitable for Low Voltage DC Applications
- Industry Standard .500” Dia Mounting Hole
- Various Terminal Selections



NTE Type No.	Circuitry	Current Rating	Action			Actuator	Diag No.
54–003	DPDT	A	ON	NONE	ON	Brass/Nickel Plate	S4b
54–004	DPST	A	ON	NONE	OFF	Brass/Nickel Plate	S4b
54–011	DPST	A	ON	NONE	OFF	Brass/Nickel Plate	S4c
54–012	DPDT	A	ON	OFF	ON	Brass/Nickel Plate	S4b
54–013	DPDT	A	ON	OFF	ON	Brass/Nickel Plate	S4c
54–093	SPST	B	ON	NONE	OFF	Brass/Nickel Plate	S4c
54–095	SPDT	B	ON	OFF	ON	Brass/Nickel Plate	S4c
54–099	DPDT	E	ON	NONE	ON	Brass/Nickel Plate	S4c
54–100	DPDT	B	ON	OFF	ON	Brass/Nickel Plate	S4c
54–101	DPDT	C	ON	NONE	(ON)	Brass/Nickel Plate	S4a
54–103	SPST	A	(ON)	NONE	OFF	Brass/Nickel Plate	S4c
54–104	SPST	A	ON	NONE	(OFF)	Brass/Nickel Plate	S4c
54–137*	SPST	D	ON	NONE	OFF	Brass/Nickel Plate	S4a

SPECIAL NOTE: ( ) = Momentary Function
* SP in DP case.

S4

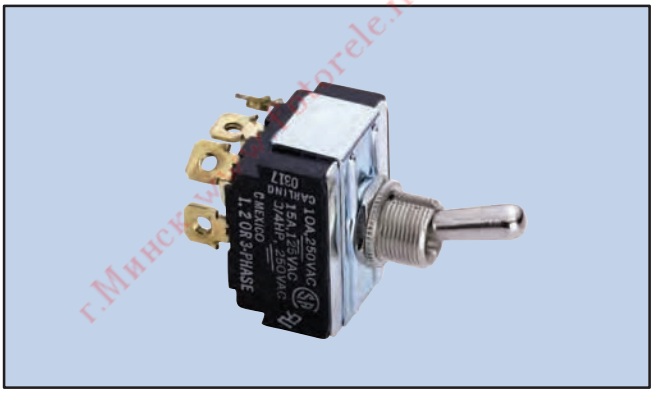


Specifications

Current Rating:
- **A:** 15A 125VAC, 10A 250VAC, 3/4 HP 125–250VAC
- **B:** 20A 125–277VAC, 1 1/2 HP 125VAC, 2 HP 250VAC
- **C:** 6A 125VAC, 3A 250VAC, 1/4HP 125–250VAC
- **D:** 20A 250VAC
- **E:** 10A 277VAC, 20A 125VAC, 1 1/2 HP 125–250VAC

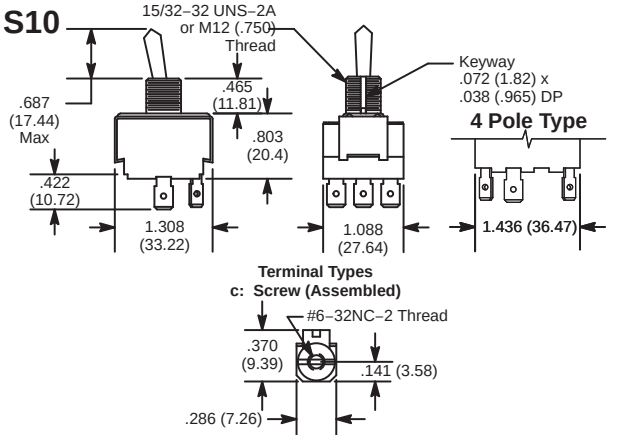
Insulation Resistance: 100 Megohms (min.)
Dielectric Strength: 1000V RMS (min.), 1500V (54–099 only)
Temperature Rating: +32° to +185°F (0° to +85°C)
Electrical Life: 25,000 cycles
Mechanical Life: 100,000 cycles
Terminal Type: Refer to Diag No. in Table
Mounting Hole: .500 (12.7)

Bat Handle



NTE Type No.	Circuitry	Action			Actuator	Diag No.
54–014	3PST	OFF	NONE	ON	Brass/Nickel Plate	S10c
54–015	3PDT	ON	OFF	ON	Brass/Nickel Plate	S10c
54–016	3PST	ON	NONE	ON	Brass/Nickel Plate	S10c
54–017	4PDT	ON	OFF	ON	Brass/Nickel Plate	S10c
54–018	4PST	OFF	NONE	ON	Brass/Nickel Plate	S10c
54–019	4PDT	ON	NONE	ON	Brass/Nickel Plate	S10c

S10



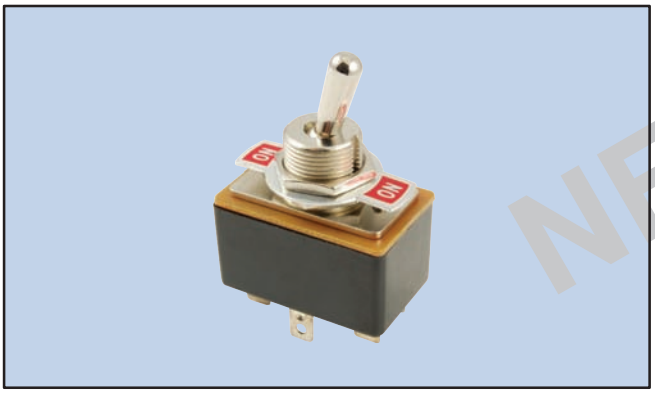
Specifications

Current Rating: 15A 125VAC, 10A 250VAC, 3/4 HP 125-250VAC, 1, 2 or 3 Phase
Insulation Resistance: 100 Megohms (min.)
Dielectric Strength: 1000V RMS (min.)
Temperature Rating: 0° to +150°F (–17.8° to +65.6°C)
Electrical Life: 50,000 cycles
Mechanical Life: 100,000 cycles
Terminal Type: Screw Type
Mounting Hole: .500 (12.7) Max.

Bat Handle w/Indicator Plate

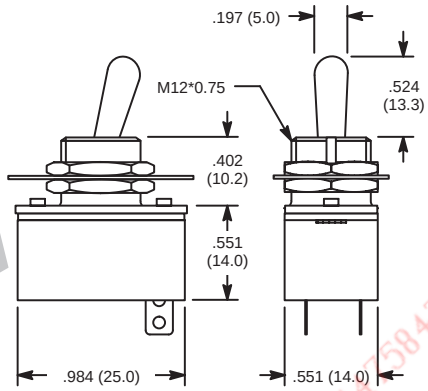
Features

- **Includes Indicator Plate**



NTE Type No.	Circuitry	Action			Actuator	Diag No.
54–717	SPST	OFF	NONE	ON	Copper Alloy/Ni Plate	S132
54–718	DPDT	ON	NONE	ON	Copper Alloy/Ni Plate	S132

S132



Specifications

Current Rating: 3A 125VAC, 1.5A 250VAC
Insulation Resistance: 100 Megohms (min.)
Dielectric Strength: 1000V RMS (min.)
Temperature Rating: –13° to +185°F (–25° to +85°C)
Electrical Life: 6,000 cycles
Mechanical Life: 10,000 cycles
Terminal Type: Solder Lug
Mounting Hole: .480 (12.2) Max.

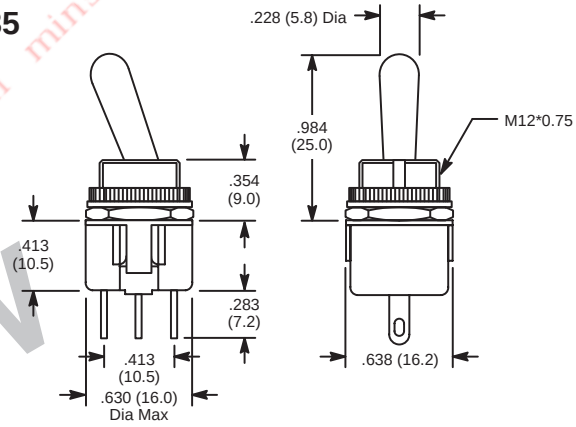
Round Hole Bat Handle

Features

- **Round Hole Type**
- **Optional Indicator Plate, 54–928**
- **Optional Waterproof Boot, 54–929**

NTE Type No.	Circuitry	Action			Actuator	Diag No.
54–722	SPDT	ON	NONE	ON	Nickel Plated Copper Alloy	S135

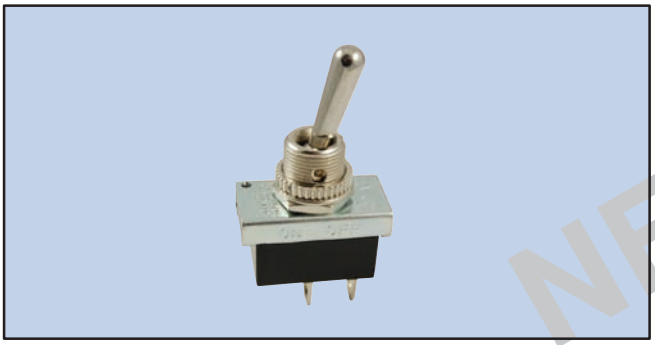
S135



Specifications

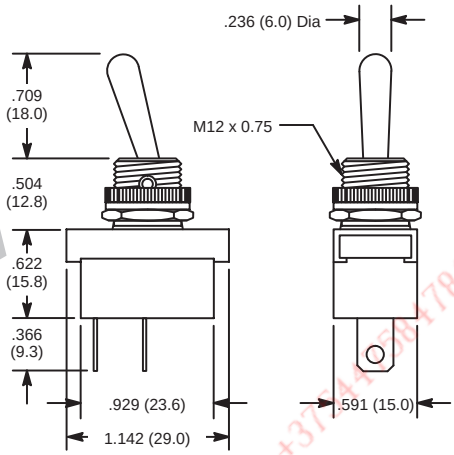
Current Rating: 6A 125VAC, 3A 250VAC
Insulation Resistance: 100 Megohms (min.)
Dielectric Strength: 1000V RMS (min.)
Temperature Rating: –4° to +185°F (–20° to +85°C)
Electrical Life: 6,000 cycles
Mechanical Life: 10,000 cycles
Terminal Type: Solder Lug
Mounting Hole: .480 (12.2) Max.

Bat Handle



NTE Type No.	Circuitry	Action			Actuator	Diag No.
54–738	SPST	ON	NONE	OFF	Chrome Plated Zinc	S142

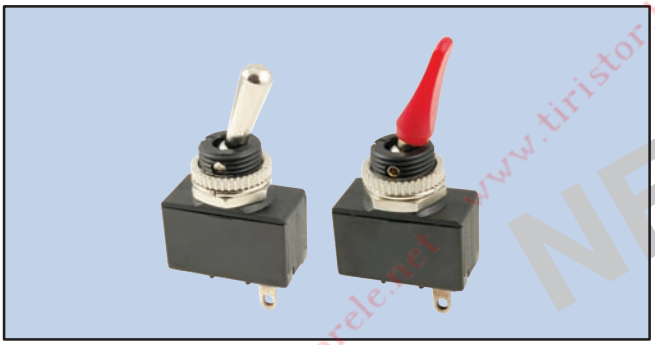
S142



Specifications

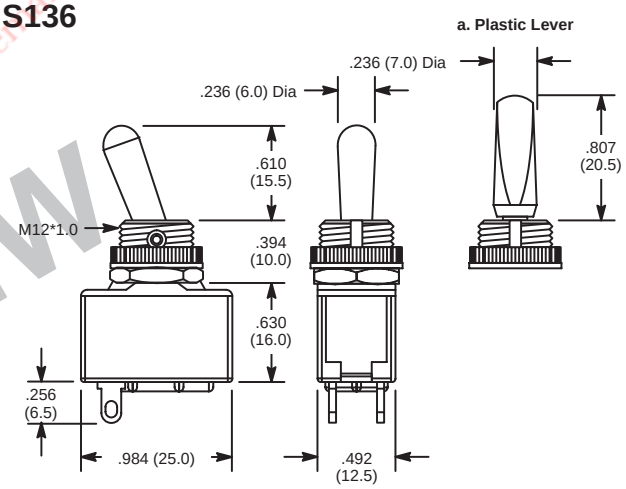
Current Rating: 10A 125VAC, 6A 250VAC
Insulation Resistance: 100 Megohms (min.) at 500VDC
Dielectric Strength: 1000V RMS (min.)
Temperature Rating: +32° to +149°F (0° to +65°C)
Electrical Life: 6,000 cycles
Mechanical Life: 10,000 cycles
Terminal Type: .250" Tab Q.C.
Mounting Hole: .480 (12.2)

Bat and Paddle Handle



NTE Type No.	Circuitry	Action			Actuator	Diag No.
54–745	SPST	ON	NONE	OFF	Nickel Plated Metal	S136
54–745–R	SPST	ON	NONE	OFF	Red ABS Resin	S136a

S136



Specifications

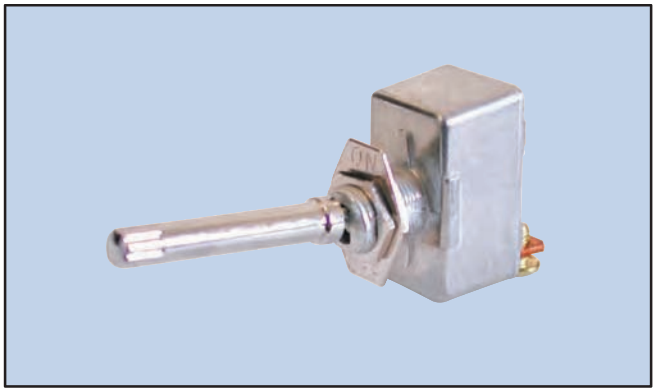
Current Rating: 6A 125VAC, 3A 250VAC
Insulation Resistance: 100 Megohms (min.) at 500VDC
Dielectric Strength: 1500V RMS (min.)
Temperature Rating: –4° to +185°F (–20° to +85°C)
Electrical Life: 6,000 cycles
Mechanical Life: 10,000 cycles
Terminal Type: Solder Lug
Mounting Hole: .472 (12.0)

Toggle Switches

Long Bat Handle

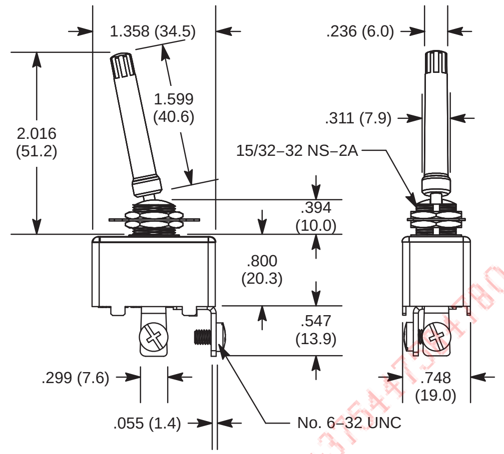
Features

- **50 Amps at 12VDC**
- **1 5/8” Long Bat Handle**
- **Screw Terminals**



NTE Type No.	Circuitry	Action			Actuator	Diag No.
54–564	SPST	ON	NONE	OFF	Chrome Plated	S29

S29



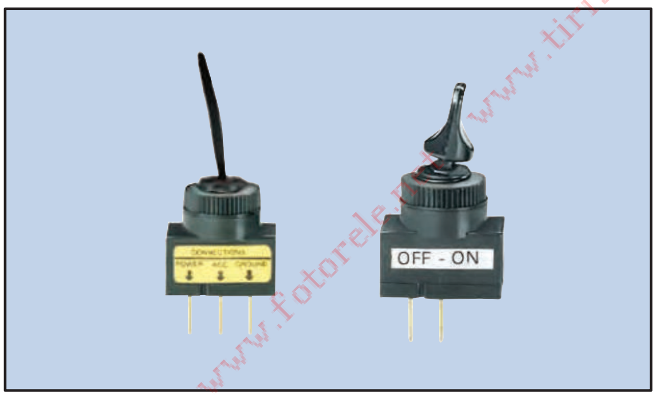
Specifications

Current Rating: 50A 12VDC
Insulation Resistance: 100 Megohms (min.) at 500VDC
Dielectric Strength: 1500V RMS (min.)
Temperature Rating: –4° to +180°F (–20° to +85°C)
Electrical Life: 25,000 cycles
Mechanical Life: 100,000 cycles
Terminal Type: Screw Type
Mounting Hole: .500 (12.7)

ON/OFF Bat Handle and Duckbill

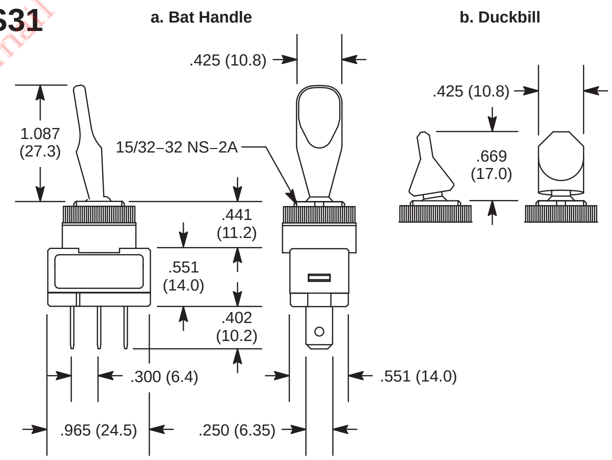
Features

- **Illuminated Types Available on Page 161**
- **Bat Handle (54–566, 54–571–2) and Duckbill (54–571) Types**
- **.250” Quick–Connect Terminals**



NTE Type No.	Circuitry	Action			Actuator	Diag No.
54–566	SPST	ON	NONE	OFF	Black Brushed Aluminum	S31a
54–571	SPST	ON	NONE	OFF		S31b
54–571–2	SPDT	ON	OFF	ON		S31a

S31



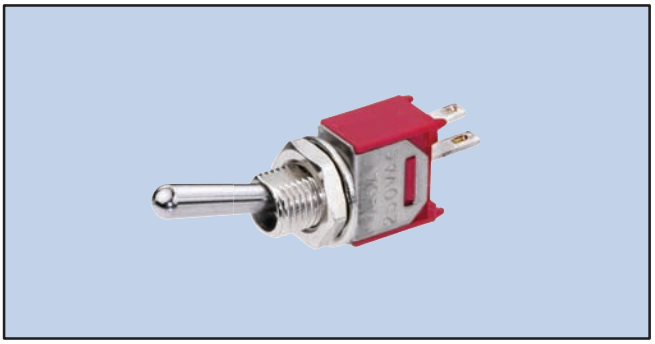
Specifications

Current Rating: 20A 12VDC
Insulation Resistance: 100 Megohms (min.) at 500VDC
Dielectric Strength: 1000V RMS (min.)
Temperature Rating: –4° to +180°F (–20° to +85°C)
Electrical Life: 25,000 cycles
Mechanical Life: 100,000 cycles
Terminal Type: .250” Tab Q.C.
Mounting Hole: .500 (12.7)

Bat Handle, Subminiature

Features

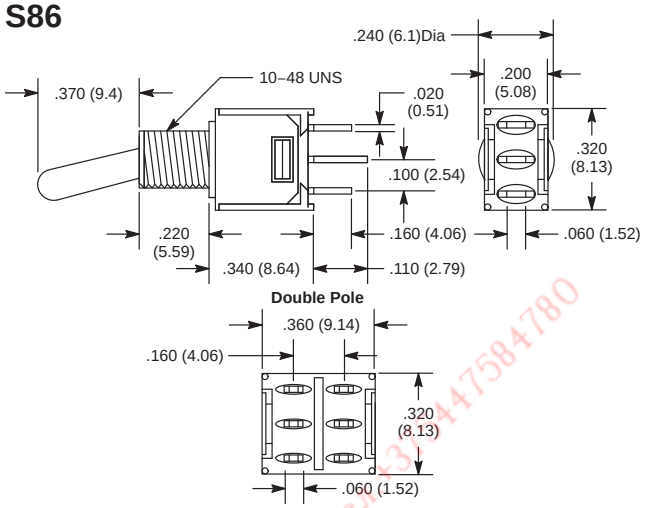
- Single and Double Pole Types
- Epoxy Sealed Terminals



NTE Type No.	Circuitry	Action			Actuator	Diag No.
54–140	SPST	ON	NONE	OFF	Chrome Plated Brass	S86
54–141	SPDT	ON	NONE	ON	Chrome Plated Brass	S86
54–142	DPDT	ON	NONE	ON	Chrome Plated Brass	S86

SPECIAL NOTE: ( ) = Momentary Function

S86



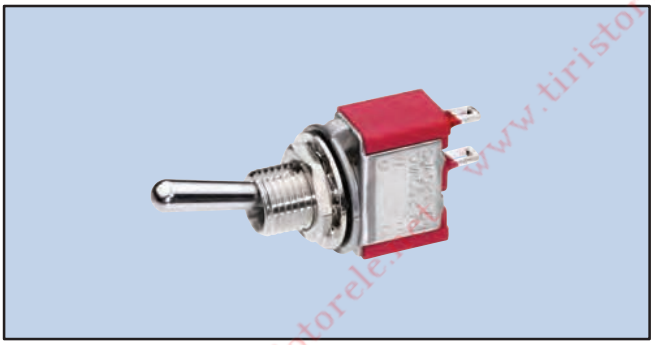
Specifications

Current Rating: 3A 120VAC or 28VDC, 1.5A 250VAC
Insulation Resistance: 1000 Megohms (min.)
Dielectric Strength: 1500V RMS (min.)
Temperature Rating: –22° to +185°F (–30° to +85°C)
Electrical Life: 30,000 cycles (min.)
Terminal Type: Solder Lug
Mounting Hole: .192 (4.9)

Bat Handle, Subminiature

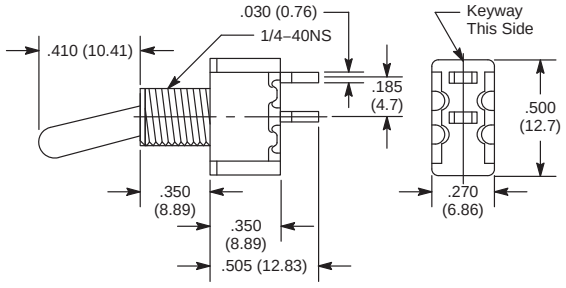
Features

- Epoxy Sealed Terminals



NTE Type No.	Circuitry	Action			Actuator	Diag No.
54–395	SPST	ON	NONE	OFF	Chrome Plated Brass	S95

S95



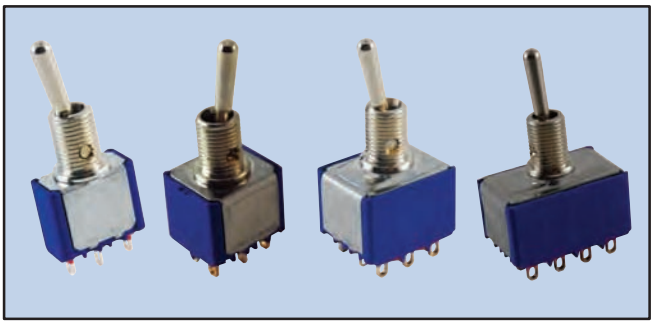
Specifications

Current Rating: 5A 120VAC or 28VDC, 2A 250VAC
Insulation Resistance: 1000 Megohms (min.)
Dielectric Strength: 1000V RMS (min.)
Temperature Rating: –22° to +266°F (–30° to +130°C)
Electrical Life: 50,000 cycles (min.)
Terminal Type: Solder Lug
Mounting Hole: .250 (6.35)

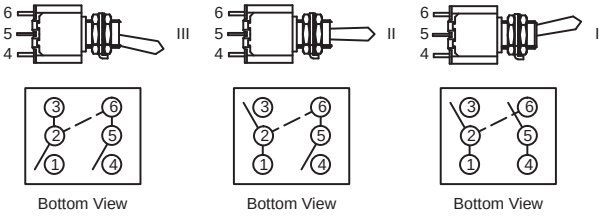
Mini Bat Handle

Features

- SP, DP, 3P & 4P Types
- Epoxy Sealed Terminals
- Typical Applications Include: Switching Power Supplies, DC–DC Converters, Motors, etc.



Wiring Diagram (54–306 Only)



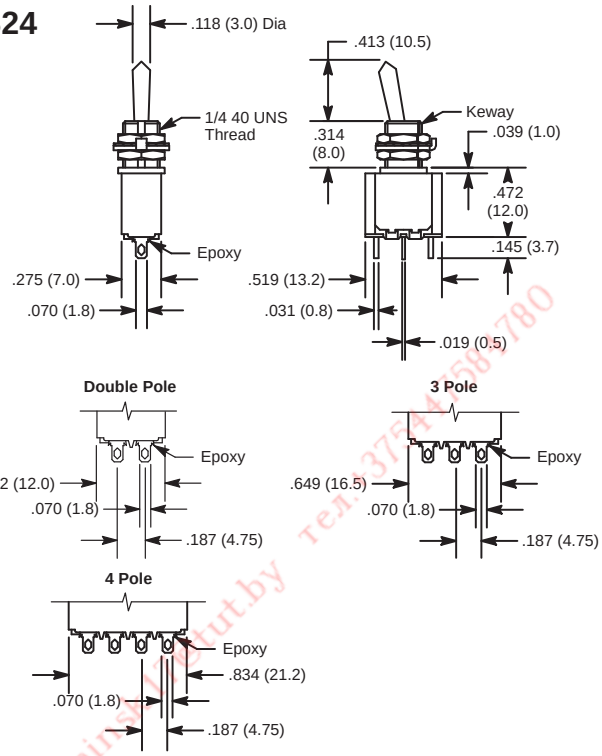
Equivalent to single pole 3 throw switch. Dotted line between terminals 2 & 6 indicate external jumpers to be added by customer.

NTE Type No.	Circuitry	Action			Actuator	Diag No.
54–301	SPDT	ON	NONE	(ON)	Chrome Plated Brass	S24
54–302	SPDT	ON	NONE	ON	Chrome Plated Brass	S24
54–303	SPDT	ON	OFF	ON	Chrome Plated Brass	S24
54–304	SPDT	ON	OFF	(ON)	Chrome Plated Brass	S24
54–305	SPDT	(ON)	OFF	(ON)	Chrome Plated Brass	S24
54–306*	SP3T	ON	ON	ON	Chrome Plated Brass	S24
54–307	DPDT	ON	NONE	ON	Chrome Plated Brass	S24
54–308	DPDT	ON	OFF	ON	Chrome Plated Brass	S24
54–309	DPDT	ON	NONE	(ON)	Chrome Plated Brass	S24
54–310	DPDT	ON	OFF	(ON)	Chrome Plated Brass	S24
54–312	4PDT	ON	NONE	ON	Chrome Plated Brass	S24
54–313	4PDT	ON	OFF	ON	Chrome Plated Brass	S24
54–314	4PDT	(ON)	OFF	(ON)	Chrome Plated Brass	S24
54–315	4PDT	ON	OFF	(ON)	Chrome Plated Brass	S24
54–316	4PDT	ON	NONE	(ON)	Chrome Plated Brass	S24
54–323	3PDT	ON	NONE	ON	Chrome Plated Brass	S24
54–324	3PDT	ON	OFF	ON	Chrome Plated Brass	S24
54–325	3PDT	(ON)	OFF	(ON)	Chrome Plated Brass	S24
54–326	3PDT	ON	OFF	(ON)	Chrome Plated Brass	S24
54–327	3PDT	ON	NONE	(ON)	Chrome Plated Brass	S24

SPECIAL NOTE: ( ) = Momentary Function
* SP in DP case.

For Economy Versions, see page 151.

S24



Specifications

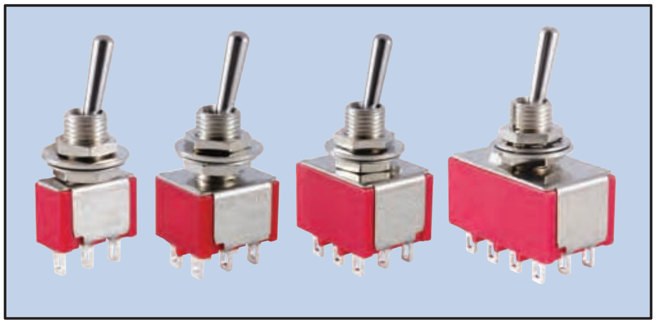
Current Rating: 6A 125VAC, 3A 250VAC or 4A 30VDC
Insulation Resistance: 1000 Megohms (min.) at 500VDC
Dielectric Strength: 1000V RMS (min.) between terminals
Temperature Rating: –40° to +185°F (–40° to +85°C)
Electrical Life: 50,000 cycles (min.)
40,000 cycles (min.) **3 Pole Only**
30,000 cycles (min.) **4 Pole Only**
Terminal Type: Refer to Diag No. in Table
Mounting Hole: .255 (6.5)

Toggle Switches

Mini Bat Handle

Features

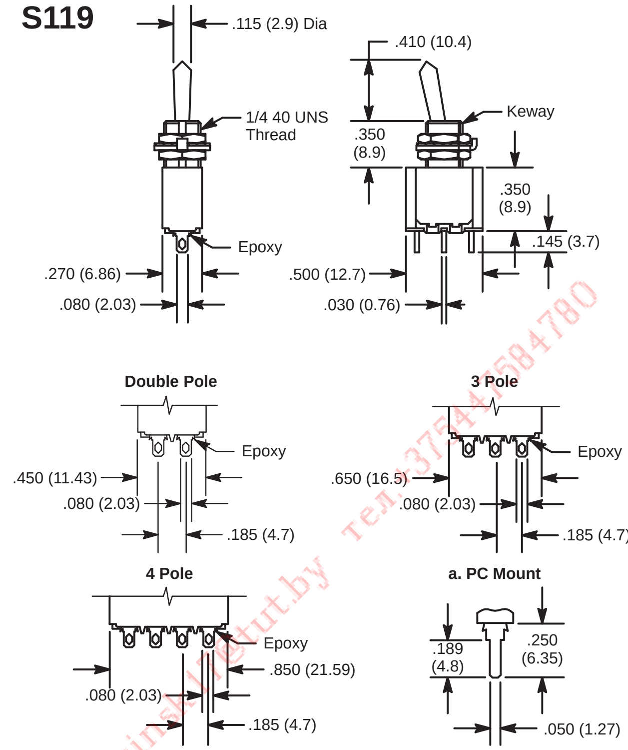
- **Economy Series**
- **SP, DP, 3P & 4P Types**
- **PC Terminal Types Available (PC suffix)**
- **Epoxy Sealed Terminals**
- **Typical Applications Include: Switching Power Supplies, DC–DC Converters, Motors, etc.**



NTE Type No.	Circuitry	Action			Actuator	Diag No.
54–301E	SPDT	ON	NONE	(ON)	Chrome Plated Brass	S119
54–301PC	SPDT	ON	NONE	(ON)	Chrome Plated Brass	S119a
54–302E	SPDT	ON	NONE	ON	Chrome Plated Brass	S119
54–302PC	SPDT	ON	NONE	ON	Chrome Plated Brass	S119a
54–303E	SPDT	ON	OFF	ON	Chrome Plated Brass	S119
54–303PC	SPDT	ON	OFF	ON	Chrome Plated Brass	S119a
54–304E	SPDT	ON	OFF	(ON)	Chrome Plated Brass	S119
54–304PC	SPDT	ON	OFF	(ON)	Chrome Plated Brass	S119a
54–305E	SPDT	(ON)	OFF	(ON)	Chrome Plated Brass	S119
54–305PC	SPDT	(ON)	OFF	(ON)	Chrome Plated Brass	S119a
54–307E	DPDT	ON	NONE	ON	Chrome Plated Brass	S119
54–307PC	DPDT	ON	NONE	ON	Chrome Plated Brass	S119a
54–308E	DPDT	ON	OFF	ON	Chrome Plated Brass	S119
54–308PC	DPDT	ON	OFF	ON	Chrome Plated Brass	S119a
54–309E	DPDT	ON	NONE	(ON)	Chrome Plated Brass	S119
54–309PC	DPDT	ON	NONE	(ON)	Chrome Plated Brass	S119a
54–310E	DPDT	ON	OFF	(ON)	Chrome Plated Brass	S119
54–310PC	DPDT	ON	OFF	(ON)	Chrome Plated Brass	S119a
54–311E	DPDT	(ON)	OFF	(ON)	Chrome Plated Brass	S119
54–311PC	DPDT	(ON)	OFF	(ON)	Chrome Plated Brass	S119a
54–323E	3PDT	ON	NONE	ON	Chrome Plated Brass	S119
54–323PC	3PDT	ON	NONE	ON	Chrome Plated Brass	S119a
54–324E	3PDT	ON	OFF	ON	Chrome Plated Brass	S119
54–324PC	3PDT	ON	OFF	ON	Chrome Plated Brass	S119a
54–327PC	3PDT	ON	NONE	(ON)	Chrome Plated Brass	S119a
54–312E	4PDT	ON	NONE	ON	Chrome Plated Brass	S119
54–312PC	4PDT	ON	NONE	ON	Chrome Plated Brass	S119a
54–313E	4PDT	ON	OFF	ON	Chrome Plated Brass	S119
54–313PC	4PDT	ON	OFF	ON	Chrome Plated Brass	S119a
54–316PC	4PDT	ON	NONE	(ON)	Chrome Plated Brass	S119a

SPECIAL NOTE: ( ) = Momentary Function

S119



Specifications

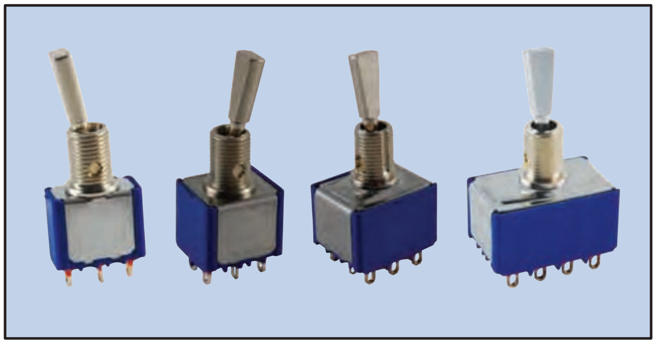
Current Rating: 5A 120VAC or 28VDC, 2A 250VAC
Insulation Resistance: 1000 Megohms (min.)
Dielectric Strength: 1000V RMS (min.)
Temperature Rating: –22° to +185°F (–30° to +85°C)
Electrical Life: 50,000 cycles (min.) at full load
Terminal Type: Refer to Diag No. in Table
Mounting Hole: .250 (6.35)

Toggle Switches

Flatted Handle Mini

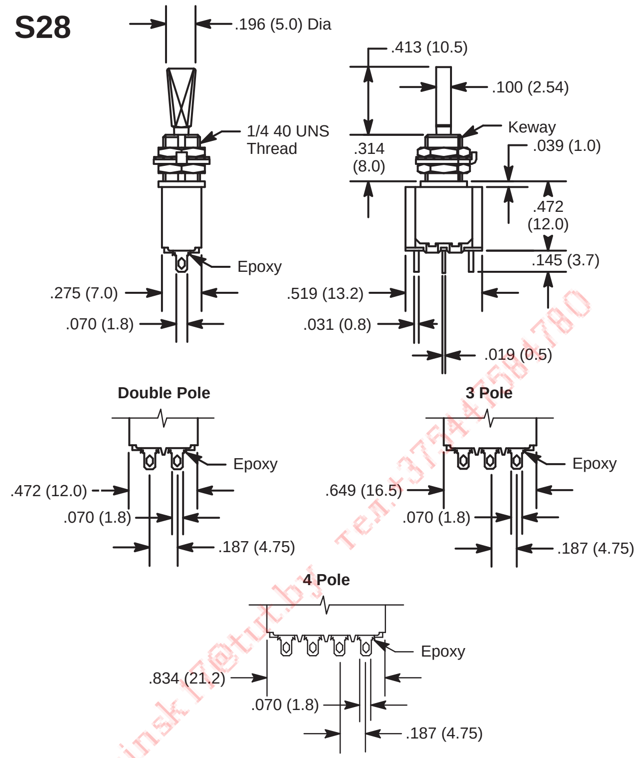
Features

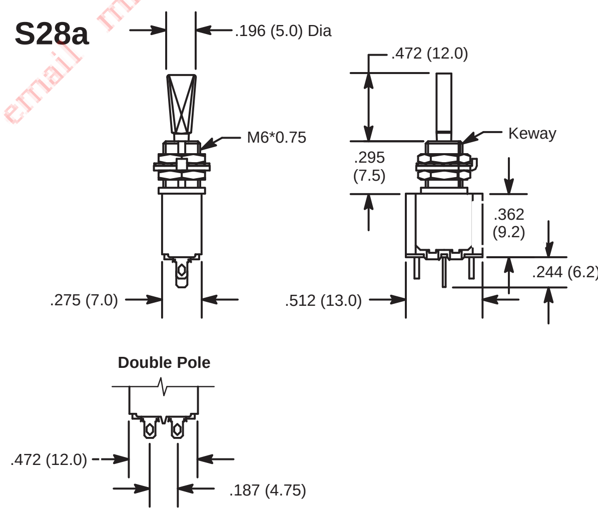
- **SP, DP, 3P & 4P Types**
- **Epoxy Sealed Terminals**
- **Typical Applications Include: Switching Power Supplies, DC–DC Converters, Motors, etc.**



NTE Type No.	Circuitry	Action			Actuator	Diag No.
54–328	SPDT	ON	NONE	ON	Chrome Plated Brass	S28a
54–329	SPDT	ON	OFF	ON	Chrome Plated Brass	S28a
54–330	SPDT	(ON)	OFF	(ON)	Chrome Plated Brass	S28a
54–331	SPDT	ON	OFF	(ON)	Chrome Plated Brass	S28a
54–332	SPDT	ON	NONE	(ON)	Chrome Plated Brass	S28a
54–333	DPDT	ON	NONE	ON	Chrome Plated Brass	S28
54–334	DPDT	ON	OFF	ON	Chrome Plated Brass	S28a
54–335	DPDT	(ON)	OFF	(ON)	Chrome Plated Brass	S28
54–336	DPDT	ON	OFF	(ON)	Chrome Plated Brass	S28a
54–337	DPDT	ON	NONE	(ON)	Chrome Plated Brass	S28a
54–339	3PDT	ON	OFF	ON	Chrome Plated Brass	S28
54–340	3PDT	(ON)	OFF	(ON)	Chrome Plated Brass	S28
54–341	3PDT	ON	OFF	(ON)	Chrome Plated Brass	S28
54–342	3PDT	ON	NONE	(ON)	Chrome Plated Brass	S28
54–344	4PDT	ON	OFF	ON	Chrome Plated Brass	S28
54–345	4PDT	(ON)	OFF	(ON)	Chrome Plated Brass	S28
54–346	4PDT	ON	OFF	(ON)	Chrome Plated Brass	S28
54–347	4PDT	ON	NONE	(ON)	Chrome Plated Brass	S28

SPECIAL NOTE: ( ) = Momentary Function





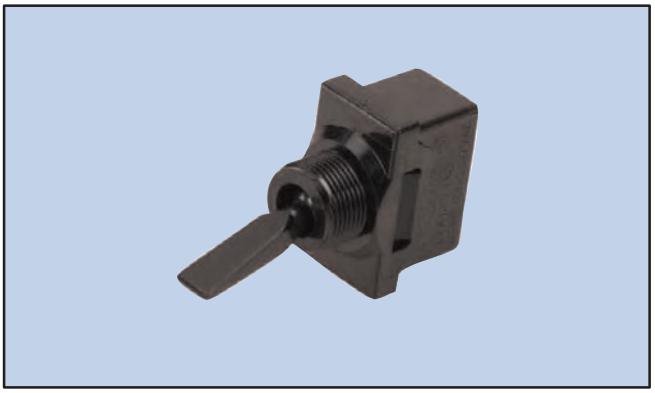
Specifications

Current Rating: 6A 125VAC, 3A 250VAC or 4A 30VDC
Insulation Resistance: 1000 Megohms (min.) at 500VDC
Dielectric Strength: 1000V RMS (min.) between terminals
Temperature Rating: –40° to +185°F (–40° to +85°C)
Electrical Life: 50,000 cycles (min.)
40,000 cycles (min.) **3 Pole Only**
30,000 cycles (min.) **4 Pole Only**
Terminal Type: Solder Lug
Mounting Hole: .255 (6.5)

Nylon Paddle

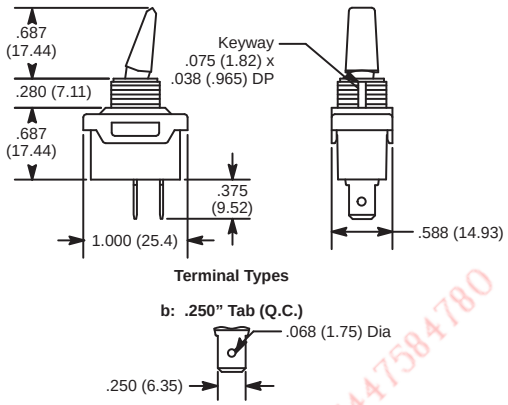
Features

- Nylon Insulated Toggle
- Self–Cleaning Wiping Contacts
- Industry Standard .500” Dia Mounting Hole
- Support Double Insulated Requirements



NTE Type No.	Circuitry	Action			Actuator	Diag No.
54–020	SPST	OFF	NONE	ON	Black Nylon	S6b
54–021	SPDT	ON	NONE	ON	Black Nylon	S6b
54–022	SPDT	ON	OFF	ON	Black Nylon	S6b

S6



Specifications

Current Rating: 20A 125VAC, 10A 250VAC, 1 1/2 HP 125–250VAC
Insulation Resistance: 100 Megohms (min.)
Dielectric Strength: 1000V RMS (min.)
Temperature Rating: +32° to +185°F (0° to +85°C)
Electrical Life: 25,000 cycles
Mechanical Life: 100,000 cycles
Terminal Type: .250” Tab Q.C.
Mounting Hole: .500 (12.7)

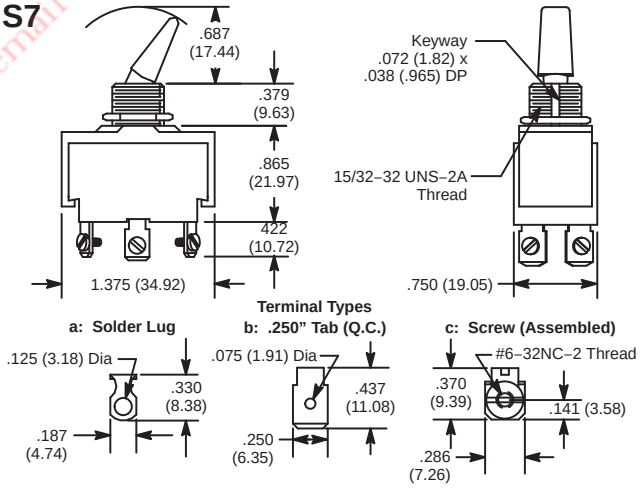
Nylon Paddle

Features

- Slow Make, Slow Break Contacts
- Heavy Duty AC Rated Also Suitable for Low Voltage DC Applications
- Industry Standard .500” Dia Mounting Hole

NTE Type No.	Circuitry	Action			Actuator	Diag No.
54–110	SPST	ON	NONE	OFF	Black Polycarbonate	S7c
54–111	SPDT	ON	NONE	ON	Black Polycarbonate	S7c
54–119	SPDT	ON	OFF	ON	Black Polycarbonate	S7b
54–107	DPST	ON	NONE	OFF	Black Polycarbonate	S7b
54–112	DPST	ON	NONE	OFF	Black Polycarbonate	S7c
54–084	DPDT	ON	NONE	ON	Black Polycarbonate	S7a
54–085	DPDT	ON	OFF	ON	Black Polycarbonate	S7a
54–108	DPDT	ON	NONE	ON	Black Polycarbonate	S7b
54–109	DPDT	ON	OFF	ON	Black Polycarbonate	S7b
54–120	DPDT	ON	OFF	ON	Black Polycarbonate	S7c

S7



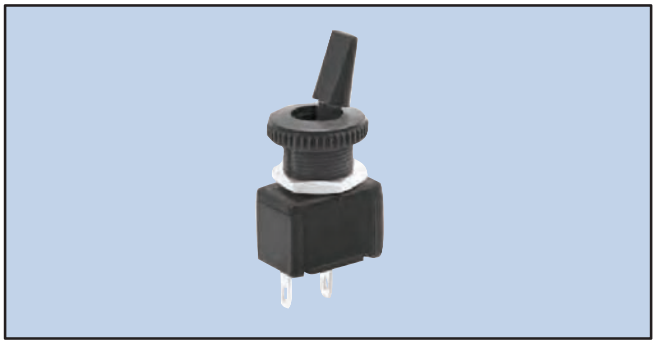
Specifications

Current Rating:
54–084 & 54–085: 6A 125VAC, 3A 250VAC, 1/4 HP 125-250VAC
All Other Devices: 20A 125-277VAC, 1 1/2 HP 125VAC, 2 HP 250VAC
Insulation Resistance: 100 Megohms (min.)
Dielectric Strength: 1000V RMS (min.)
Temperature Rating: +32° to +185°F (0° to +85°C)
Electrical Life: 50,000 cycles
Mechanical Life: 100,000 cycles
Terminal Type: Refer to Diag No. in Table
Mounting Hole: .500 (12.7)

Toggle Switches

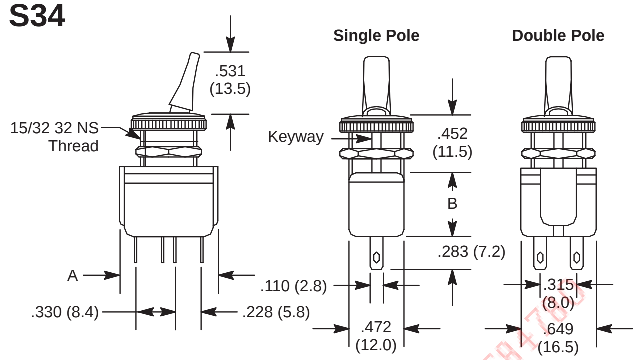
Nylon Paddle

Features
- Quick Connect Terminals
- Insulated Actuator



NTE Type No.	Circuitry	Action			Actuator	Diag No.
54–317	SPDT	ON	NONE	ON	Black Polyamide 6–6	S34
54–318	SPDT	ON	OFF	ON	Black Polyamide 6–6	S34
54–319	SPST	ON	NONE	OFF	Black Polyamide 6–6	S34
54–320	DPST	ON	NONE	OFF	Black Polyamide 6–6	S34
54–321	DPDT	ON	NONE	ON	Black Polyamide 6–6	S34
54–322	DPDT	ON	OFF	ON	Black Polyamide 6–6	S34

S34



Device Type	A	B
Single Pole	.748 (19.0)	.551 (14.0)
Double Pole	.826 (21.0)	.590 (15.0)

Specifications

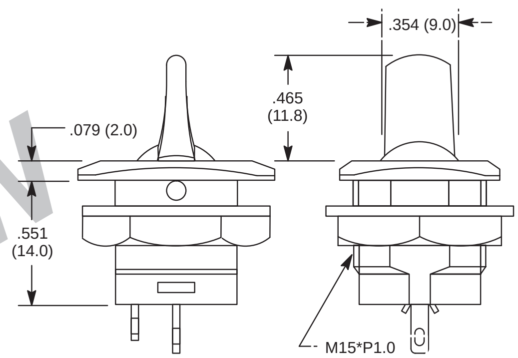
Current Rating: 6A 125VAC, 4A 250VAC
Insulation Resistance: 1000 Megohms (min.) at 500VDC
Dielectric Strength: 2000V RMS (min.) between terminals
Temperature Rating: –4° to +131°F (–20° to +55°C)
Electrical Life: 10,000 cycles (min.)
Terminal Type: Solder Lug/Quick Connect
Mounting Hole: .492 (12.5)

Nylon Paddle

Features
- Solder Lug Terminals

NTE Type No.	Circuitry	Action			Actuator	Diag No.
54–723	SPDT	ON	NONE	ON	Black Nylon	S129
54–724	SPST	OFF	NONE	ON	Black Nylon	S129
54–725	SPDT	ON	OFF	ON	Black Nylon	S129
54–726	SPDT	(ON)	NONE	ON	Black Nylon	S129

S129



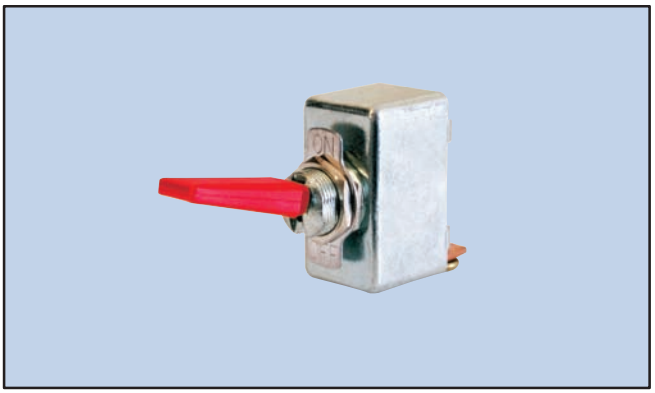
Specifications

Current Rating: 6A 125VAC, 3A 250VAC
Insulation Resistance: 100 Megohms (min.) at 500VDC
Dielectric Strength: 1000V RMS (min.)
Temperature Rating: +32° to +149°F (0° to +65°C)
Electrical Life: 6,000 cycles
Mechanical Life: 10,000 cycles
Terminal Type: Solder Lug
Mounting Hole: .590 (15.0)

Paddle Handle

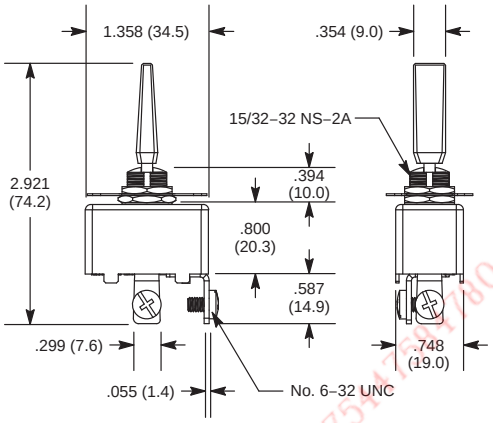
Features

- 50 Amps at 12VDC
- Suitable for Low Voltage, High Amperage Applications
- Screw Terminals



NTE Type No.	Circuitry	Action			Actuator		Diag No.
					Material	Color	
54–560	SPST	ON	NONE	OFF	ABS	Black	S26
54–561	SPST	ON	NONE	OFF		Red	S26
54–562	SPST	ON	NONE	OFF	ABS w/Chrome Plating	Chrome	S26

S26



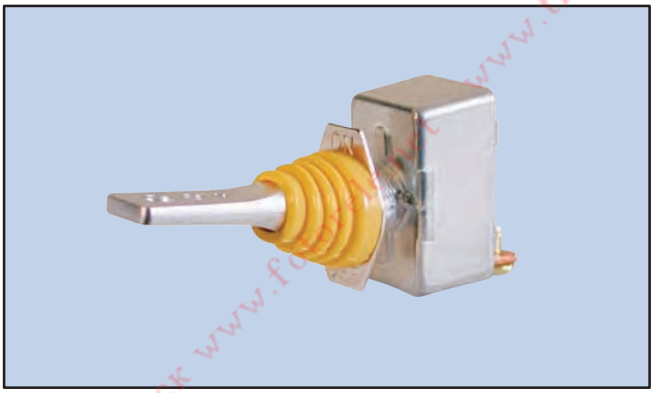
Specifications

Current Rating: 50A 12VDC
Insulation Resistance: 100 Megohms (min.) at 500VDC
Dielectric Strength: 1500V RMS (min.)
Temperature Rating: –4° to +180°F (–20° to +85°C)
Electrical Life: 25,000 cycles
Mechanical Life: 100,000 cycles
Terminal Type: Screw Type
Mounting Hole: .500 (12.7)

Paddle Handle

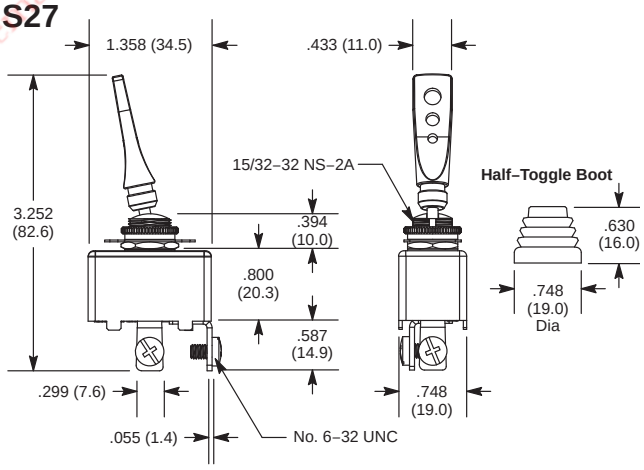
Features

- 50 Amps at 12VDC
- Interchangeable Boots (Red, Black, Yellow and Blue) Included
- Screw Terminals



NTE Type No.	Circuitry	Action			Actuator	Diag No.
54–563	SPST	ON	NONE	OFF	Chrome Plated	S27

S27



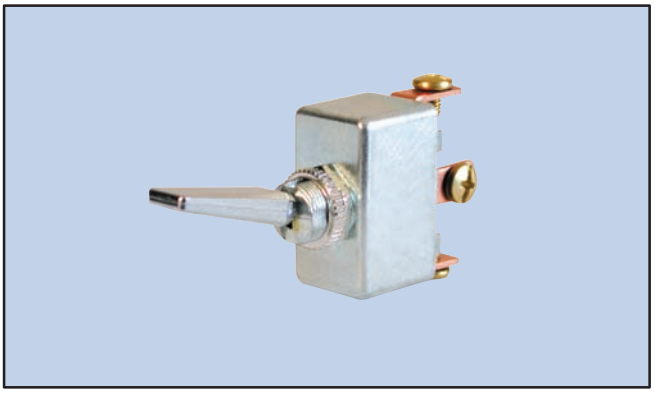
Specifications

Current Rating: 50A 12VDC
Insulation Resistance: 100 Megohms (min.) at 500VDC
Dielectric Strength: 1500V RMS (min.)
Temperature Rating: –4° to +180°F (–20° to +85°C)
Electrical Life: 25,000 cycles
Mechanical Life: 100,000 cycles
Terminal Type: Screw Type
Mounting Hole: .500 (12.7)

Paddle Handle

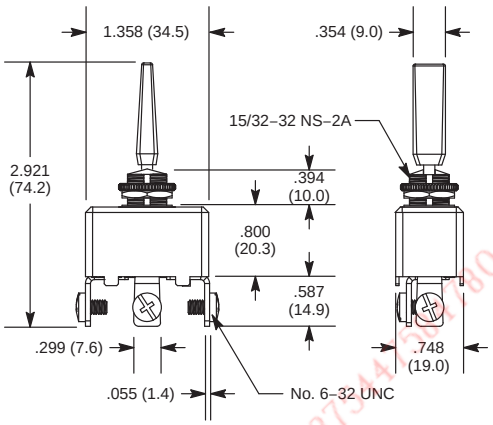
Features

- 50 Amps at 12VDC
- Screw Terminals



NTE Type No.	Circuitry	Action			Actuator	Diag No.
54–565	SPDT	ON	OFF	ON	Chrome Plated	S29

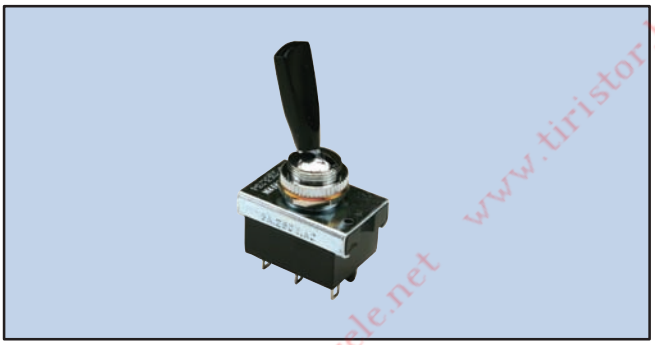
S30



Specifications

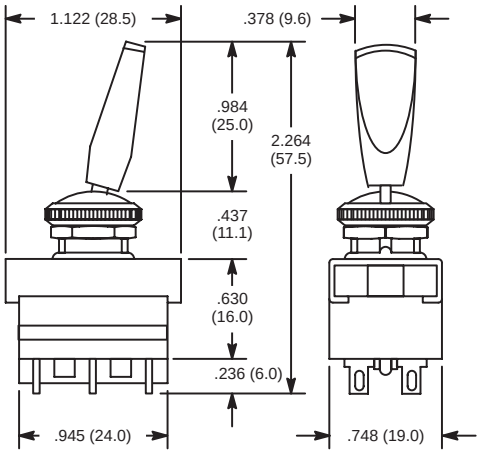
Current Rating: 50A 12VDC
Insulation Resistance: 100 Megohms (min.) at 500VDC
Dielectric Strength: 1500V RMS (min.)
Temperature Rating: –4° to +180°F (–20° to +85°C)
Electrical Life: 25,000 cycles
Mechanical Life: 100,000 cycles
Terminal Type: Screw Type
Mounting Hole: .500 (12.7)

Paddle Handle



NTE Type No.	Circuitry	Action			Actuator	Diag No.
54–381	DPDT	ON	OFF	ON	Black ABS Resin	S69

S69



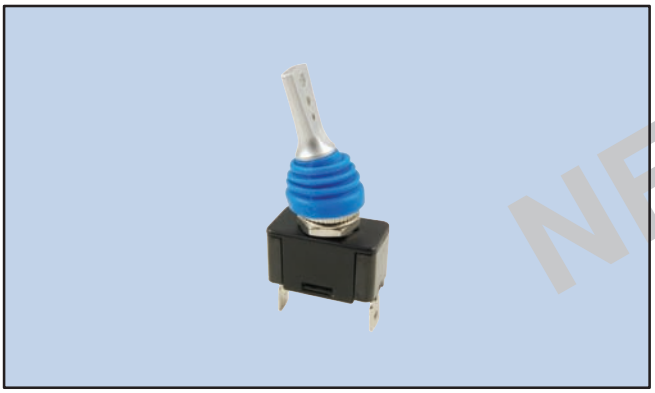
Specifications

Current Rating: 6A 250VAC
Insulation Resistance: 100 Megohms (min.) at 500VDC
Dielectric Strength: 1500V RMS (min.)
Temperature Rating: +14° to +131°F (–10° to +55°C)
Electrical Life: 6,000 cycles
Mechanical Life: 30,000 cycles
Terminal Type: Solder Lug
Mounting Hole: .472 (12.0)

Paddle Handle

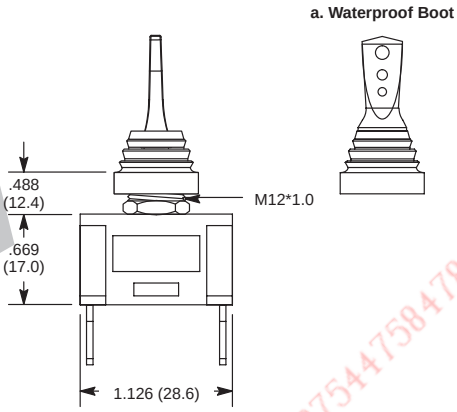
Features

- **Plastic Lever with Waterproof Boot**



NTE Type No.	Circuitry	Action			Actuator	Diag No.
54–713	SPST	OFF	NONE	ON	Nickel Plated Brass	S132a

S132



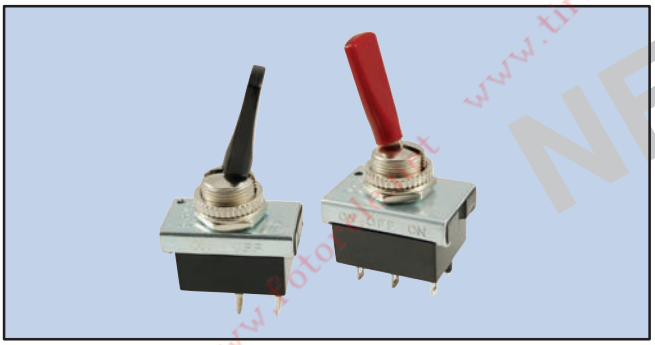
Specifications

Current Rating: 10A 125VAC; 6A 250VAC
Insulation Resistance: 100 Megohms (min.) at 500VDC
Dielectric Strength: 1500V RMS (min.)
Temperature Rating: –4° to +180°F (–20° to +85°C)
Electrical Life: 6,000 cycles
Mechanical Life: 10,000 cycles
Terminal Type: .250" Tab Q.C.
Mounting Hole: .480 (12.2)

Paddle Handle

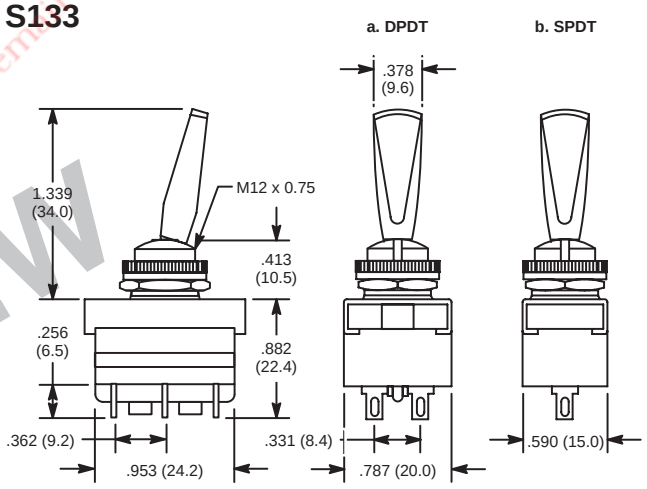
Features

- **Optional Indicator Plates Available:**
  54–925 Plate for 54–727
  54–926 Plate for 54–728
  54–927 Plate for 54–729 and 54–730



NTE Type No.	Circuitry	Action			Actuator	Diag No.
54–727	SPST	ON	NONE	OFF	Black ABS Resin	S133b
54–728	DPDT	ON	NONE	ON	Black ABS Resin	S133a
54–729	DPDT	ON	OFF	ON	Red ABS Resin	S133a
54–730	SPDT	ON	OFF	ON	Black ABS Resin	S133b

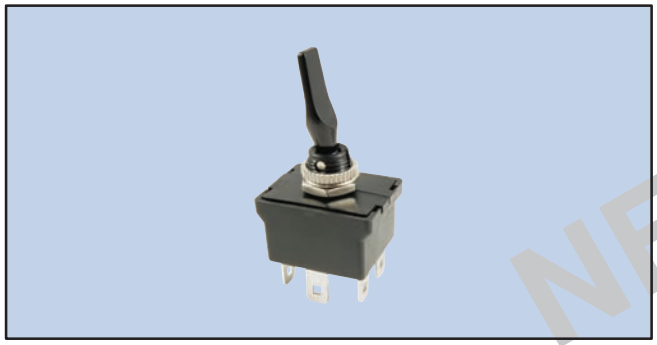
S133



Specifications

Current Rating: 10A 125VAC, 6A 250VAC
Insulation Resistance: 100 Megohms (min.) at 500VDC
Dielectric Strength: 1000V RMS (min.)
Temperature Rating: +32° to +149°F (0° to +65°C)
Electrical Life: 6,000 cycles
Mechanical Life: 10,000 cycles
Terminal Type: Solder Lug
Mounting Hole: .480 (12.2)

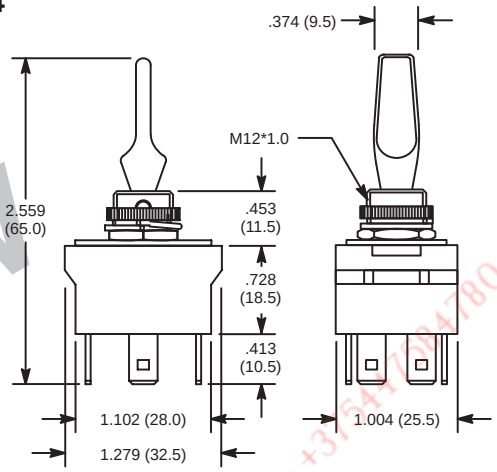
Paddle Handle



NTE Type No.	Circuitry	Action			Actuator	Diag No.
54–731	DPDT	(ON)	OFF	(ON)	Black ABS Resin	S134
54–732	DPDT	ON	OFF	ON	Black ABS Resin	S134

SPECIAL NOTE: ( ) = Momentary Function

S134



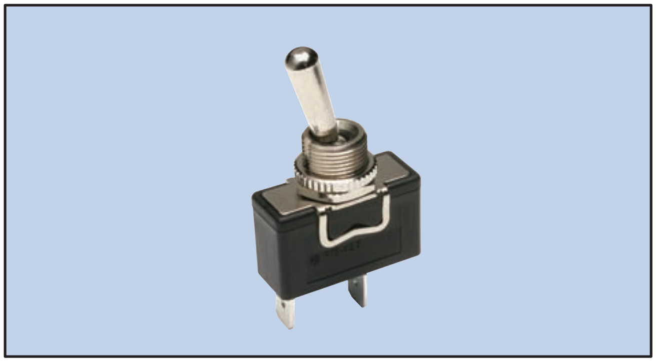
Specifications

Current Rating: 20A 12VDC
Insulation Resistance: 100 Megohms (min.) at 500VDC
Dielectric Strength: 1500V RMS (min.)
Temperature Rating: +32° to +149°F (0° to +65°C)
Electrical Life: 6,000 cycles
Mechanical Life: 10,000 cycles
Terminal Type: .250" Tab Q.C.
Mounting Hole: .480 (12.2)

Waterproof Toggle Switches

Bat Handle

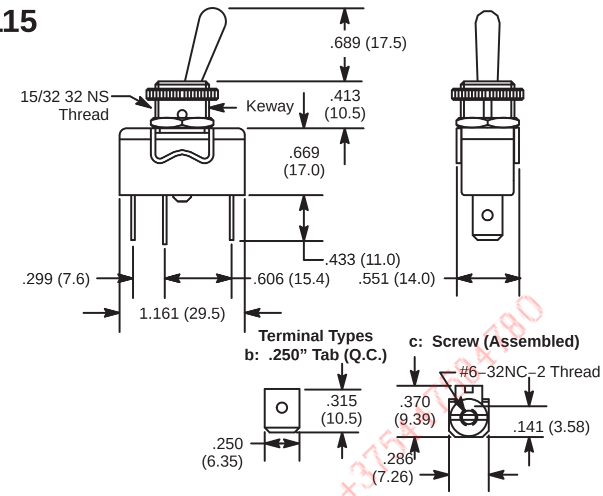
Features
- **Waterproof: IP56**
- **Single Pole Types**
- **Internal “O” Ring for Moisture and Dust Resistance**
- **.250” Quick Connect Terminals**



NTE Type No.	Circuitry	Current Rating	Action			Actuator	Diag No.
54-348W#	SPST	B	ON	NONE	OFF	Brass/Nickel Plate	S115b
54-349W	SPDT	A	ON	NONE	ON	Brass/Nickel Plate	S115b
54-350W	SPDT	A	ON	OFF	ON	Brass/Nickel Plate	S115b
54-352W##	SPDT	A	(ON)	OFF	(ON)	Brass/Nickel Plate	S115b
54-354W	SPST	B	ON	NONE	OFF	Brass/Nickel Plate	S115c
54-355W##	SPDT	A	ON	NONE	ON	Brass/Nickel Plate	S115c
54-356W	SPDT	A	ON	OFF	ON	Brass/Nickel Plate	S115c
54-358W##	SPDT	A	(ON)	OFF	(ON)	Brass/Nickel Plate	S115c

SPECIAL NOTE: ( ) = Momentary Function
UL for 16 Amp **ONLY**
UL for 12 Amp **ONLY**

S115

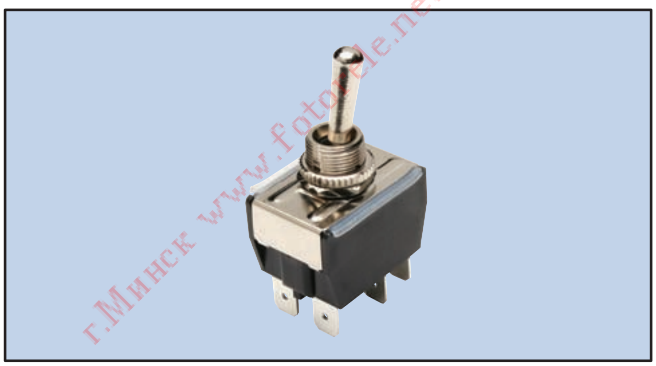


Specifications

Current Rating:
A: 16A 277VAC, 1 HP
B: 20A 277VAC, 1 HP
Insulation Resistance: 100 Megohms (min.) at 500VDC
Dielectric Strength: 1500V RMS (min.)
Temperature Rating: +32° to +149°F (0° to +65°C)
Electrical Life: 6,000 cycles
Mechanical Life: 10,000 cycles at full load
Terminal Type: Refer to Diag No. in Table
Mounting Hole: .472 (12.0)

Bat Handle

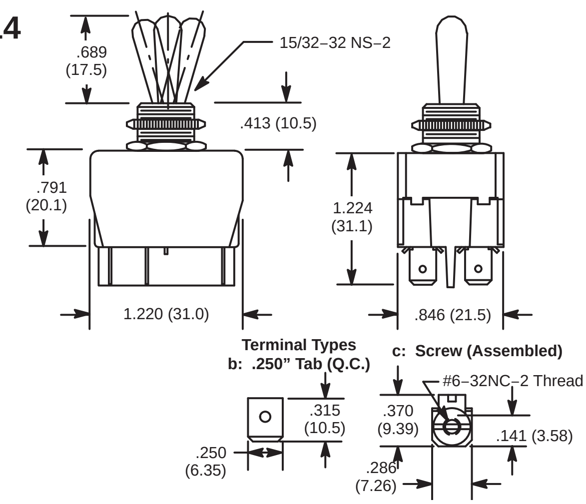
Features
- **Waterproof: IP56**
- **Double Pole Types**
- **Internal “O” Ring for Moisture and Dust Resistance**
- **.250” Quick Connect Terminals**



NTE Type No.	Circuitry	Current Rating	Action			Actuator	Diag No.
54-360W	DPDT	A	ON	NONE	ON	Brass/Nickel Plate	S114b
54-361W	DPDT	A	ON	OFF	ON	Brass/Nickel Plate	S114b
54-364W	DPDT	A	(ON)	OFF	(ON)	Brass/Nickel Plate	S114b
54-366W##	DPST	B	ON	NONE	OFF	Brass/Nickel Plate	S114b
54-367W	DPST	B	ON	NONE	OFF	Brass/Nickel Plate	S114c
54-369W	DPDT	A	ON	NONE	ON	Brass/Nickel Plate	S114c
54-370W##	DPDT	A	ON	OFF	ON	Brass/Nickel Plate	S114c
54-373W	DPDT	A	(ON)	OFF	(ON)	Brass/Nickel Plate	S114c

SPECIAL NOTE: ( ) = Momentary Function
UL for 12 Amp **ONLY**

S114



Specifications

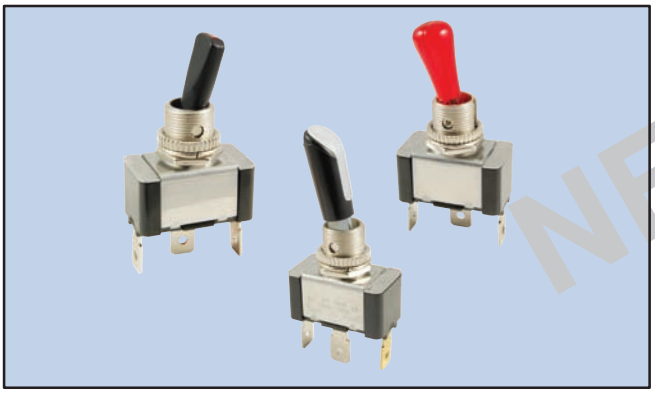
Current Rating:
A: 16A 250VAC, 1 HP
B: 20A 277VAC, 1 HP
Insulation Resistance: 100 Megohms (min.) at 500VDC
Dielectric Strength: 1500V RMS (min.)
Temperature Rating: +32° to +149°F (0° to +65°C)
Electrical Life: 6,000 cycles
Mechanical Life: 10,000 cycles at full load
Terminal Type: Refer to Diag No. in Table
Mounting Hole: .472 (12.0)

Illuminated Toggle Switches

Bat and Paddle Handle

Features

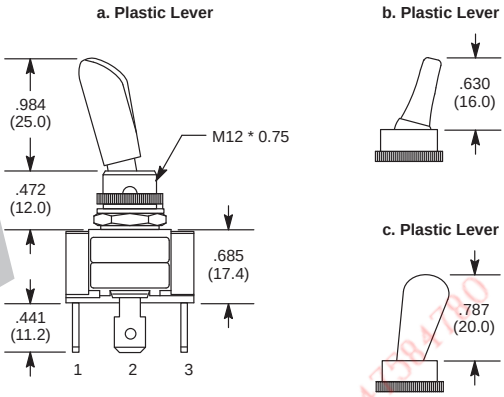
- .250” Quick–Connect Terminals



NTE Type No.	Circuitry	Action			Actuator				Diag No.
					Material	Color		Vltg	
						Neon	LED		
54–714	SPST	ON	NONE	OFF	PC	–	Red	DC	S128b
54–715	SPST	ON	NONE	OFF	PC	–	Red	DC	S128c
54–716	SPST	ON	NONE	OFF	PC	–	Note 1	DC	S128a

Note 1. ON is green lighted, OFF is red lighted.

S128



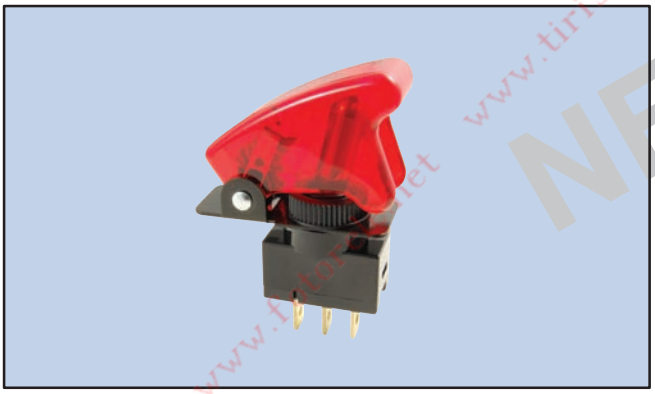
Specifications

Current Rating: 20A 12VDC, 10A 24VDC
Lens Color: See Table
Lamp Voltage: 12V LED (DC)
Insulation Resistance: 100 Megohms (min.) at 500VDC
Dielectric Strength: 1500V RMS (min.)
Temperature Rating: –4° to +180°F (–20° to +85°C)
Electrical Life: 6,000 cycles
Mechanical Life: 10,000 cycles
Terminal Type: .250” Tab Q.C.
Mounting Hole: .480 (12.2)

On/Off Metal Toggle w/Cover

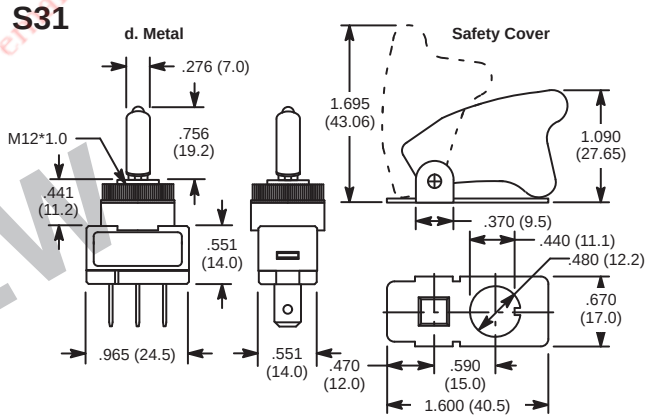
Features

- Illuminated Switch Includes Safety Cover
- .250” Quick–Connect Terminals



NTE Type No.	Circuitry	Action			Actuator				Diag No.
					Material	Color		Vltg	
						Neon	LED		
54–721	SPST	ON	NONE	OFF	PC	–	Red	DC	S31d

S31



Specifications

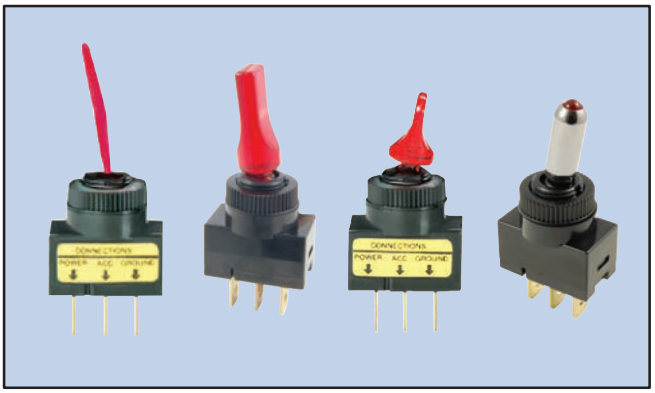
Current Rating: 20A 12VDC
Lens Color: See Table
Lamp Voltage: 12V Neon (AC) & 12V LED (DC)
Insulation Resistance: 100 Megohms (min.) at 500VDC
Dielectric Strength: 1000V RMS (min.)
Temperature Rating: –4° to +180°F (–20° to +85°C)
Electrical Life: 25,000 cycles
Mechanical Life: 100,000 cycles
Terminal Type: .250” Tab Q.C.
Mounting Hole: .500 (12.7)

Illuminated Toggle Switches

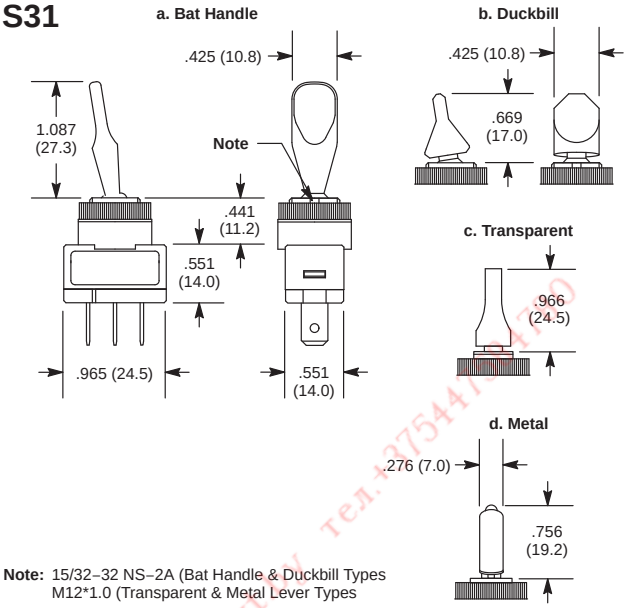
On/Off Bat Handle, Duckbill, Transparent, and Metal Toggle

Features

- Bat Handle, Duckbill, Transparent, and Metal Types
- .250” Quick–Connect Terminals



S31



Note: 15/32–32 NS–2A (Bat Handle & Duckbill Types
M12*1.0 (Transparent & Metal Lever Types

	NTE Type No.	Circuitry	Action			Actuator				Diag No.
						Material	Color		Vltg	
							Neon	LED		
	54–567	SPST	ON	NONE	OFF	PC	Red	–	AC	S31a
	54–568	SPST	ON	NONE	OFF	PC	Green	–	AC	S31a
	54–569	SPST	ON	NONE	OFF	PC	Amber	–	AC	S31a
	54–570	SPST	ON	NONE	OFF	PC	Blue	–	AC	S31a
	54–572	SPST	ON	NONE	OFF	PC	Red	–	AC	S31b
NEW	54–572–L	SPST	ON	NONE	OFF	PC	–	Red	DC	S31b
	54–573	SPST	ON	NONE	OFF	PC	Amber	–	AC	S31b
	54–574	SPST	ON	NONE	OFF	PC	Blue	–	AC	S31b
NEW	54–574–L	SPST	ON	NONE	OFF	PC	–	Blue	DC	S31b
	54–575	SPST	ON	NONE	OFF	PC	Green	–	AC	S31b
NEW	54–575–L	SPST	ON	NONE	OFF	PC	–	Green	DC	S31b
NEW	54–705–R	SPST	ON	NONE	OFF	PC	–	Red	DC	S31c
NEW	54–705–A	SPST	ON	NONE	OFF	PC	–	Amber	DC	S31c
NEW	54–705–G	SPST	ON	NONE	OFF	PC	–	Green	DC	S31c
NEW	54–706–R	SPST	ON	NONE	OFF	PC	–	Red	DC	S31d
NEW	54–706–A	SPST	ON	NONE	OFF	Metal	–	Amber	DC	S31d
NEW	54–706–G	SPST	ON	NONE	OFF	Metal	–	Green	DC	S31d

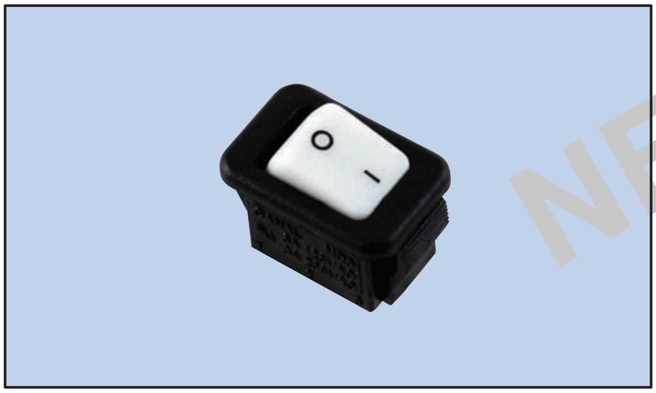
Specifications

Current Rating: 20A 12VDC
Lens Color: See Table
Lamp Voltage: 12V Neon (AC) & 12V LED (DC)
Insulation Resistance: 100 Megohms (min.) at 500VDC
Dielectric Strength: 1000V RMS (min.)
Temperature Rating: –4° to +180°F (–20° to +85°C)
Electrical Life: 25,000 cycles
Mechanical Life: 100,000 cycles
Terminal Type: .250” Tab Q.C.
Mounting Hole: .500 (12.7)

Rocker Switches

Micro Snap–In Nylon

Features
- Fits Standard Panel Cutout
- RoHS Compliant



NTE Type No.	Circuitry	Action			Actuator	Legend	Diag No.
54–870	SPST	ON	NONE	OFF	White Nylon	Yes	S108
54–872	SPST	ON	NONE	OFF	Black Nylon	Yes	S108
54–874	SPST	ON	NONE	OFF	Red Nylon	No	S108

S108

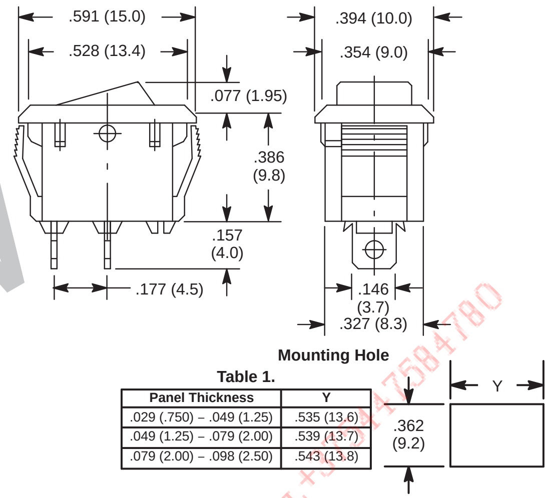


Table 1.

Panel Thickness	Y
.029 (.750) – .049 (1.25)	.535 (13.6)
.049 (1.25) – .079 (2.00)	.539 (13.7)
.079 (2.00) – .098 (2.50)	.543 (13.8)

Specifications

Current Rating: 6A 125VAC, 3A 250VAC, 3A 250VAC T100/55
Insulation Resistance: 100 Megohms (min.) at 500VDC
Dielectric Strength: 1000V RMS (min.) for 1 minute
Temperature Rating: +32° to +212°F (0° to +100°C)
Electrical Life: 10,000 cycles
Mechanical Life: 50,000 cycles
Terminal Type: Solder Lug
Mounting Hole: See Table 1.

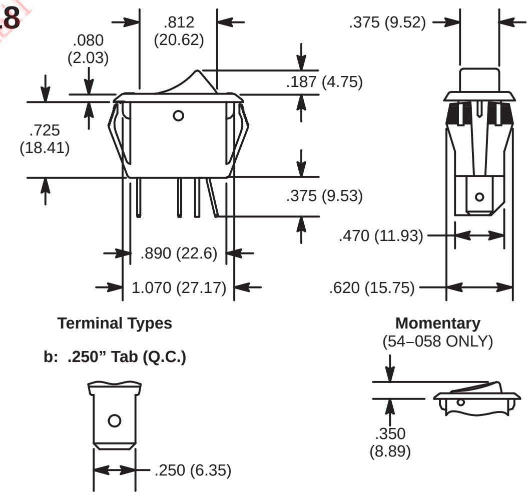
Miniature Snap–In Nylon

Features
- Fits Standard Panel Cutout

NTE Type No.	Circuitry	Action			Actuator Material	Actuator Color	Diag No.
54–058*	SPST	OFF	NONE	(ON)	Polyester or Nylon	White	S18b
54–059**	SPST	OFF	NONE	ON		Black	S18b
54–060	SPST	OFF	NONE	ON		Black	S18b
54–061	SPDT	ON	NONE	ON		Black	S18b
54–062**	SPST	OFF	NONE	ON		Black	S18b
54–063	SPDT	ON	OFF	ON		Black	S18b

SPECIAL NOTE: ( ) = Momentary Function
* Momentary Rocker Style White Actuator
** Two Color Visi–Red Visi–Rocker Style Actuator

S18



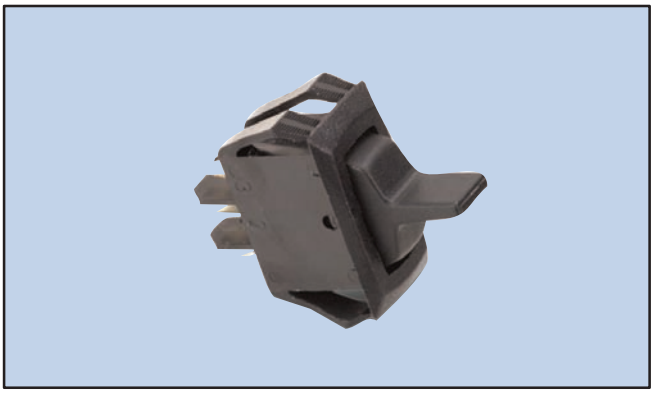
Specifications

Current Rating: 16A 125VAC, 10A 250VAC, 3/4 HP 125–250VAC
10(4)A 250VAC T85
(54–058 Only) 12A 125VAC, 8A 250VAC, 1/2 HP 125–250VAC
Insulation Resistance: 100 Megohms (min.)
Dielectric Strength: 1000V RMS (min.)
Temperature Rating: +32° to +185°F (0° to +85°C)
Electrical Life: 100,000 cycles
Mechanical Life: 100,000 cycles
Terminal Type: .250" Tab Q.C.
Mounting Hole: 1.125 (28.58) x .550 (13.97)

Miniature Snap–In Nylon

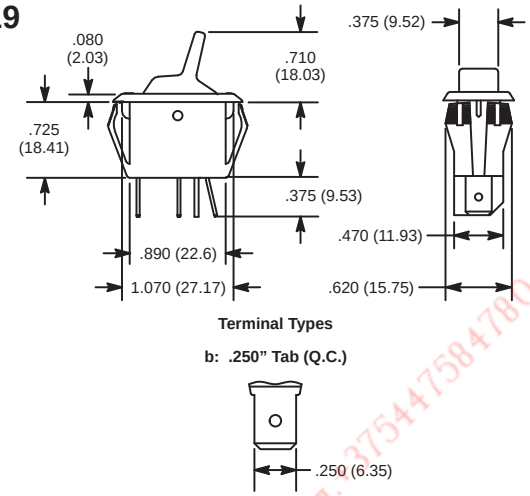
Features

- **Fits Standard Panel Cutout**



NTE Type No.	Circuitry	Action			Actuator		Diag No.
					Material	Color	
54–102	SPST	OFF	NONE	ON	Polyester or Nylon	Black	S19b

S19



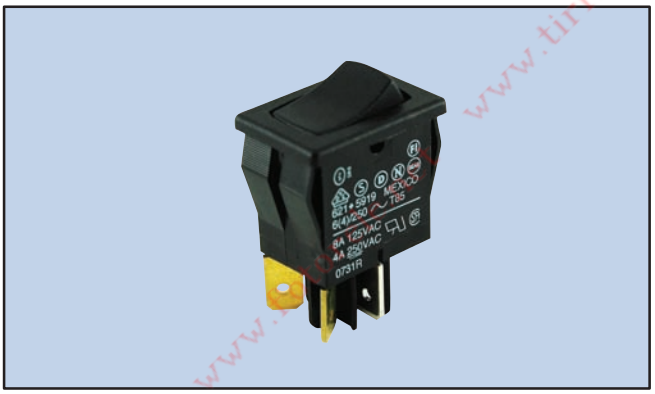
Specifications

Current Rating: 16A 125VAC, 10A 250VAC, 10(4)A 250VAC T85
Insulation Resistance: 100 Megohms (min.)
Dielectric Strength: 1000V RMS (min.)
Temperature Rating: +32° to +185°F (0° to +85°C)
Electrical Life: 100,000 cycles
Mechanical Life: 100,000 cycles
Terminal Type: .250" Tab Q.C.
Mounting Hole: 1.125 (28.58) x .550 (13.97)

Miniature Snap–In Nylon

Features

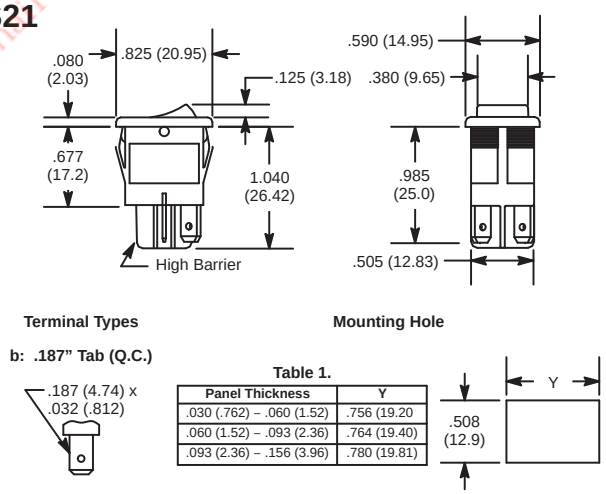
- **Single & Double Pole Types**
- **Double Insulated**
- **High Barrier Type**



NTE Type No.	Circuitry	Action			Actuator		Diag No.
					Material	Color	
54–074	SPDT	ON	NONE	ON	Nylon	Black	S21b
54–075	SPST	ON	NONE	OFF	Nylon	Black	S21b
54–075–L1	SPST	ON	NONE	OFF	Nylon	Black	S21b
54–076	DPST	ON	NONE	OFF	Nylon	Black	S21b
54–077	SPDT	ON	NONE	ON	Nylon	Black	S21b

NOTE: 54–074–L1 contains ON–OFF legend

S21



Specifications

Current Rating: 8A 125VAC, 4A 250VAC,
Current Rating: 12A 125VAC, 6A 250VAC (**54–075–L1 ONLY**),
Inductive 6(4)A 250VAC T85**
Insulation Resistance: 100 Megohms (min.)
Dielectric Strength: 1000V RMS (min.)
Temperature Rating: +32° to +185°F (0° to +85°C)
Electrical Life: 50,000 cycles
Mechanical Life: 100,000 cycles
Terminal Type: .187" Tab Q.C.
Mounting Hole: See Table 1

** 54–075, 54–076, 54–077 **ONLY**

Miniature Snap–In Nylon

Features

- .250” Quick Connect Terminals
- Fits Standard Panel Cutout
- Withstand Peak Inrush to 100 Amps

NTE Type No.	Circuitry	Action			Actuator Material	Actuator Color	Diag No.
54–081	DPST	OFF	NONE	ON	Nylon	Black	S20b

Snap–In Nylon

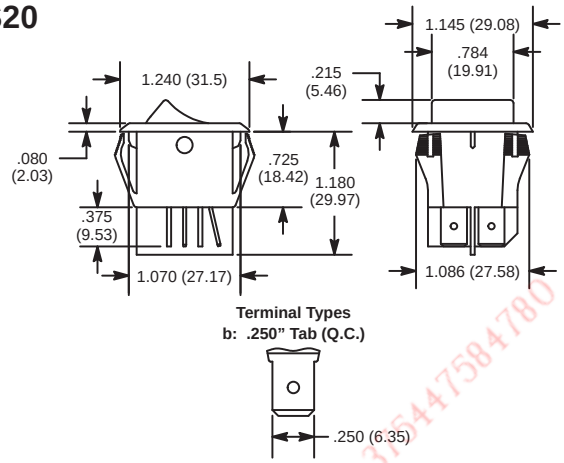
Features

- AC Rated, Also Suitable for Low Voltage DC Applications

NTE Type No.	Circuitry	Action			Actuator Material	Actuator Color	Diag No.
54–047	SPST	ON	NONE	OFF	Nylon	Black	S15b
54–048	SPDT	ON	NONE	ON	Nylon	Black	S15b
54–049	SPDT	ON	OFF	ON	Nylon	Black	S15b
54–050	DPST	ON	NONE	OFF	Nylon	Black	S15b
54–051	DPDT	ON	NONE	ON	Nylon	Black	S15b
54–052	DPDT	ON	OFF	ON	Nylon	Black	S15b
54–114	DPST	(ON)	NONE	OFF	Nylon	Black	S15b
54–115	DPST	ON	NONE	(OFF)	Nylon	Black	S15b
54–116	DPDT	ON	NONE	(ON)	Nylon	Black	S15b
54–117	DPDT	ON	OFF	(ON)	Nylon	Black	S15b
54–118	DPDT	(ON)	OFF	(ON)	Nylon	Black	S15b

SPECIAL NOTE: ( ) = Momentary Function

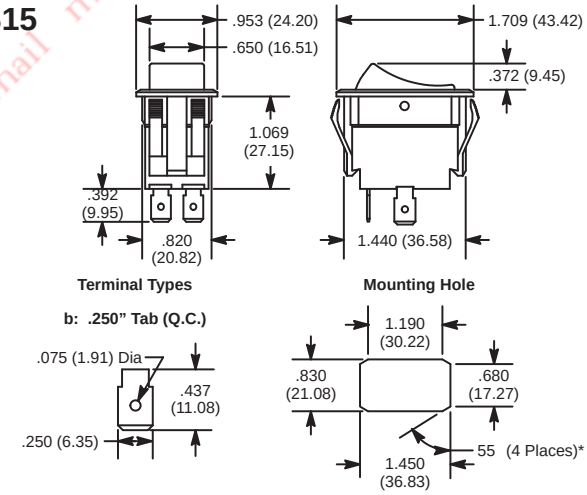
S20



Specifications

Current Rating: 20A 125VAC, 15A 250VAC, 3/4 HP 125–250VAC
Insulation Resistance: 100 Megohms (min.)
Dielectric Strength: 1000V RMS (min.)
Temperature Rating: –40° to +185°F (–40° to +85°C)
Electrical Life: 50,000 cycles
Mechanical Life: 100,000 cycles
Terminal Type: .250” Tab Q.C.
Mounting Hole: 1.125 (28.58) x 1.000 (25.4)

S15



* Angled corners are suggested for optimum fit. Standard rectangular cutout is acceptable

Specifications

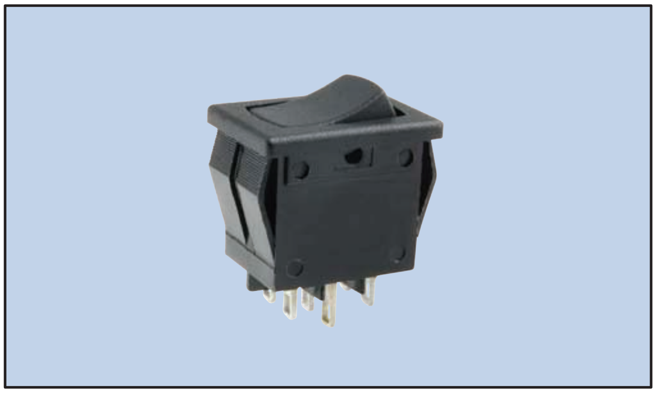
Current Rating: 15A 125VAC, 10A 250VAC, 3/4 HP 125–250VAC
Insulation Resistance: 100 Megohms (min.)
Dielectric Strength: 1000V RMS (min.)
Temperature Rating: +32° to +185°F (0° to +85°C)
Electrical Life: 50,000 cycles
Mechanical Life: 100,000 cycles (min.)
Terminal Type: .250” Tab Q.C.
Mounting Hole: 1.450 (36.83) x .830 (21.08)

Rocker Switches

Snap–In Nylon

Features

- Double Pole Types
- Double Insulated



NTE Type No.	Circuitry	Action			Actuator Material	Actuator Color	Diag No.
54–073	DPDT	ON	NONE	ON	Nylon	Black	S22a
54–078	DPDT	ON	NONE	(ON)	Nylon	Black	S22a
54–079	DPDT	ON	OFF	ON	Nylon	Black	S22a

SPECIAL NOTE: ( ) = Momentary Function

S22

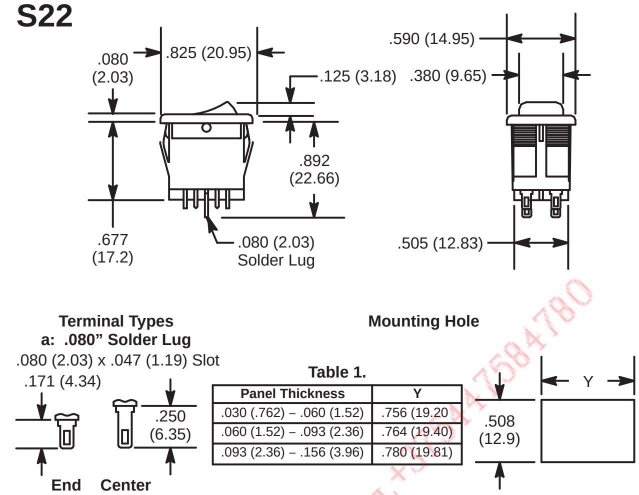


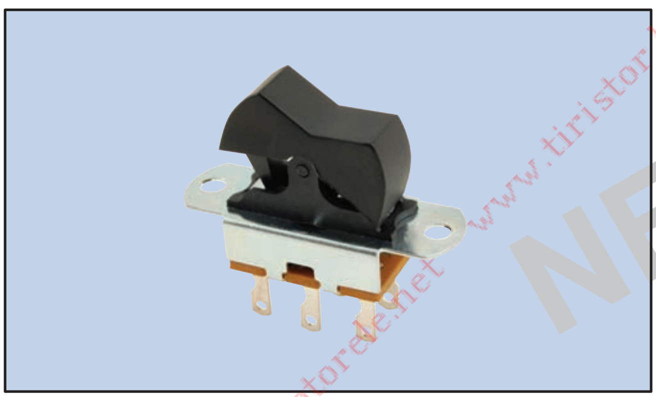
Table 1.

Panel Thickness	Y
.030 (.762) – .060 (1.52)	.756 (19.20)
.060 (1.52) – .093 (2.36)	.764 (19.40)
.093 (2.36) – .156 (3.96)	.780 (19.81)

Specifications

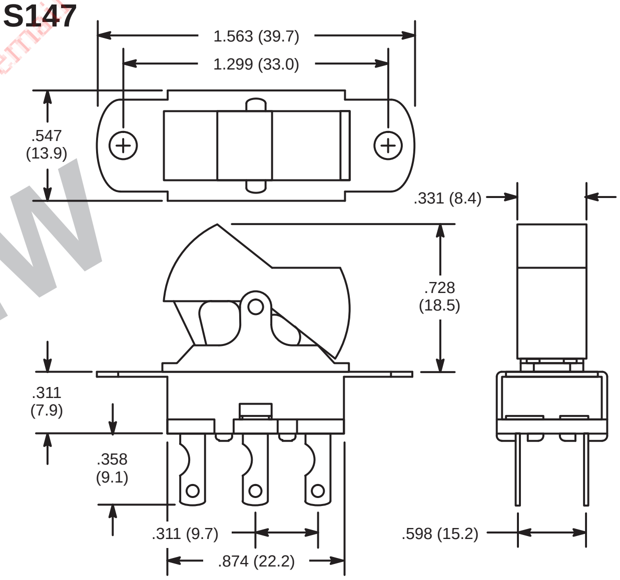
Current Rating: 8A 125VAC, 4A 250VAC
Insulation Resistance: 100 Megohms (min.)
Dielectric Strength: 1000V RMS (min.)
Temperature Rating: +32° to +185°F (0° to +85°C)
Electrical Life: 50,000 cycles
Mechanical Life: 100,000 cycles
Terminal Type: .080" Solder Lug
Mounting Hole: See Table 1

Screw Mount



NTE Type No.	Circuitry	Action			Actuator	Legend	Diag No.
54–742	DPDT	ON	NONE	ON	Nylon 66	No	S147

S147



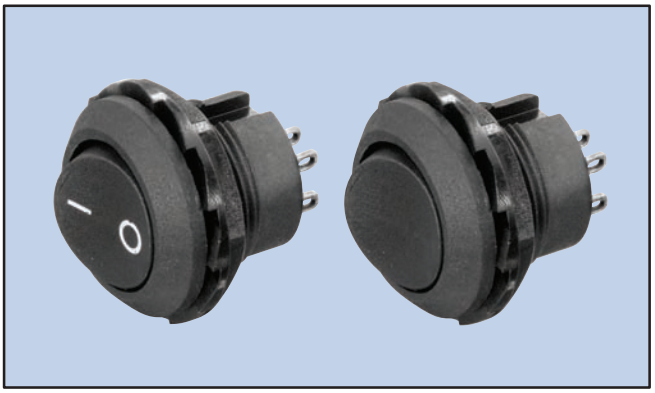
NEW

Specifications

Current Rating: 4A 125VAC, 1.5A 250VAC
Insulation Resistance: 100 Megohms (min.) at 500VDC
Dielectric Strength: 1000V RMS (min.)
Temperature Rating: –13° to +185°F (–25° to +85°C)
Electrical Life: 6,000 cycles
Mechanical Life: 10,000 cycles
Terminal Type: Solder Lug
Mounting Hole: .965 (24.5) x .362 (9.2)

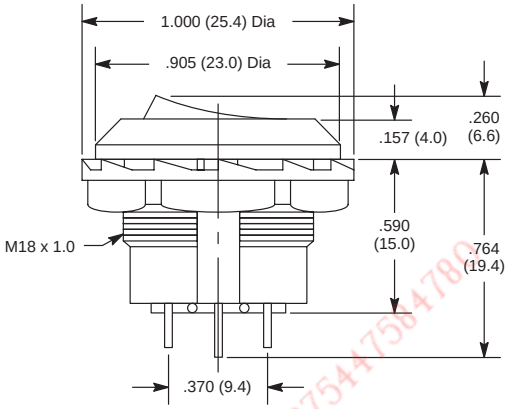
Round Hole Rocker Switches

Round Hole



NTE Type No.	Circuitry	Action			Actuator	Legend	Diag No.
54–500	SPST	ON	NONE	OFF	Nylon	Yes	S89
54–501	SPDT	ON	NONE	ON	Nylon	No	S89
54–502	DPDT	ON	NONE	ON	Nylon	No	S89

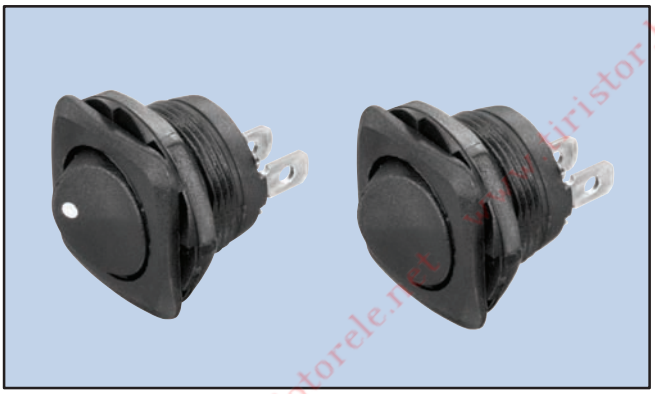
S89



Specifications

Current Rating: 10A 125VAC, 6A 250VAC
Insulation Resistance: 100 Megohms (min.) at 500VDC
Dielectric Strength: 1000V RMS (min.)
Temperature Rating: –4° to +149°F (–20° to +65°C)
Electrical Life: 6000 cycles (min.)
Mechanical Life: 100,000 cycles (min.)
Terminal Type: Solder Lug
Mounting Hole: .717 (18.2)

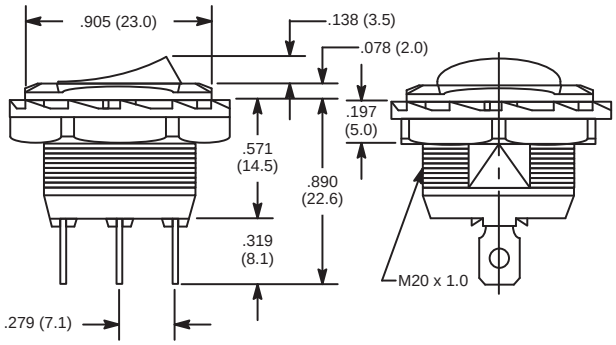
Round Hole



NTE Type No.	Circuitry	Action			Actuator	Legend	Diag No.
54–510	SPST	ON	NONE	OFF	Nylon	Yes	S93
54–511	SPDT	ON	OFF	ON	Nylon	No	S93
54–512	SPDT	ON	NONE	ON	Nylon	No	S93
54–543	SPST	(ON)	NONE	OFF	Nylon	Yes	S93
54–544	SPST	ON	NONE	(OFF)	Nylon	Yes	S93
54–545	SPDT	ON	NONE	(ON)	Nylon	Yes	S93
54–546	SPDT	ON	OFF	(ON)	Nylon	Yes	S93
54–548	SPDT	(ON)	OFF	(ON)	Nylon	No	S93

SPECIAL NOTE: ( ) = Momentary Function

S93

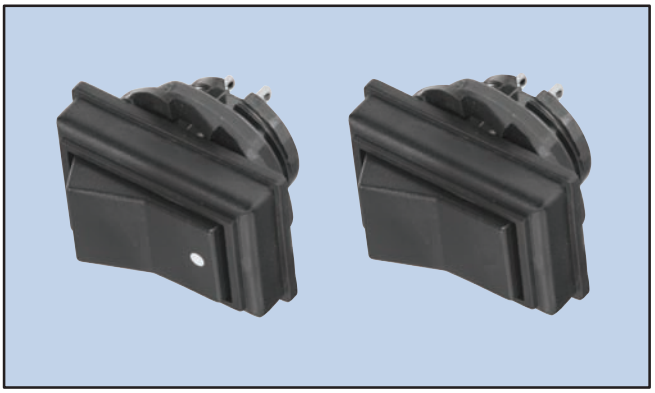


Specifications

Current Rating: 16A 125VAC, 10A 250VAC
Insulation Resistance: 100 Megohms (min.) at 500VDC
Dielectric Strength: 1500V RMS (min.)
Temperature Rating: –4° to +149°F (–20° to +65°C)
Electrical Life: 6000 cycles (min.)
Mechanical Life: 100,000 cycles (min.)
Terminal Type: .185" Tab Q.C.
Mounting Hole: .795 (20.2)

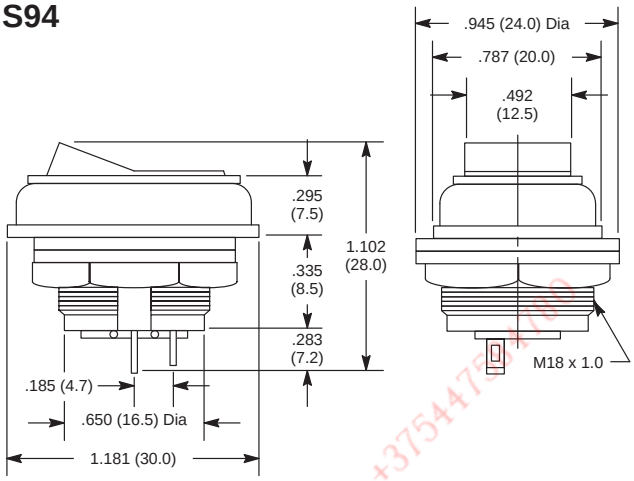
Round Hole Rocker Switches

Round Hole



NTE Type No.	Circuitry	Action			Actuator	Legend	Diag No.
54–514	SPST	ON	NONE	OFF	Nylon	Yes	S94
54–515	SPDT	ON	NONE	ON	Nylon	No	S94
54–516	DPDT	ON	NONE	ON	Nylon	No	S94

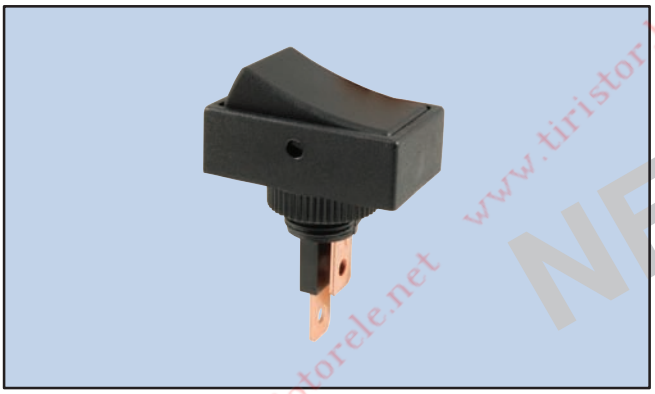
S94



Specifications

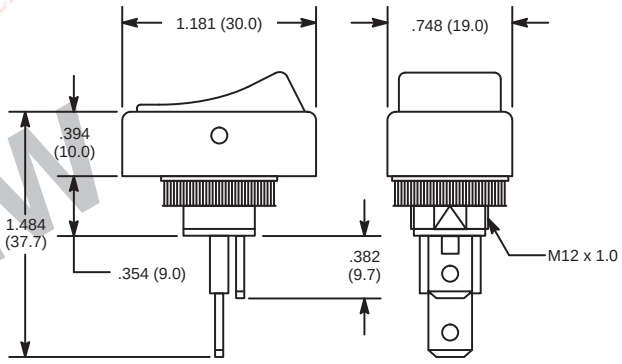
Current Rating: 6A 125VAC, 3A 250VAC
Insulation Resistance: 100 Megohms (min.) at 500VDC
Dielectric Strength: 1500V RMS (min.)
Temperature Rating: –4° to +149°F (–20° to +65°C)
Electrical Life: 6,000 cycles (min.)
Mechanical Life: 100,000 cycles (min.)
Terminal Type: Solder Lug
Mounting Hole: .717 (18.2)

Round Hole



NTE Type No.	Circuitry	Action			Actuator	Legend	Diag No.
54–709	SPST	ON	NONE	OFF	Nylon	No	S139

S139



Specifications

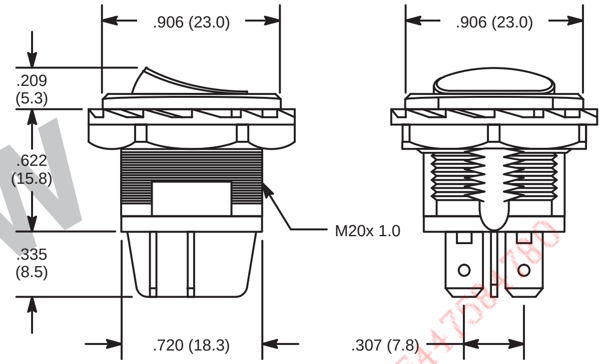
Current Rating: 30A 12VDC, 15A 24VDC, 1/4 HP 125V to 250V
Insulation Resistance: 100 Megohms (min.) at 500VDC
Dielectric Strength: 1500V RMS (min.)
Temperature Rating: –4° to +149°F (–20° to +65°C)
Electrical Life: 6,000 cycles
Mechanical Life: 10,000 cycles
Terminal Type: .250" Tab Q.C.
Mounting Hole: .480 (12.2)

Round Hole Rocker Switches

Round Hole, Square Bezel

NTE Type No.	Circuitry	Action			Actuator	Legend	Diag No.
54–710	DPST	ON	NONE	OFF	Nylon	No	S140

S140



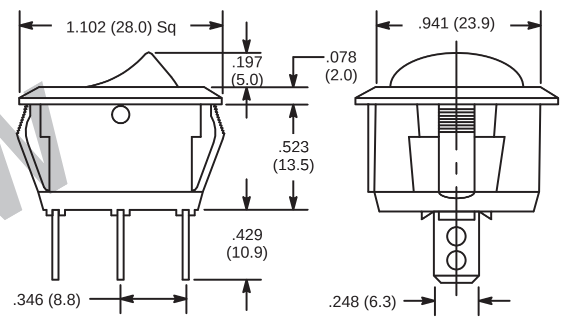
Specifications

Current Rating: 10A 250VAC, 16A 125VAC
Insulation Resistance: 100 Megohms (min.) at 500VDC
Dielectric Strength: 1500V RMS (min.)
Temperature Rating: –13° to +185°F (–25° to +85°C)
Electrical Life: 6,000 cycles
Mechanical Life: 10,000 cycles
Terminal Type: .187" Tab Q.C.
Mounting Hole: .795 (20.2)

Round Hole, Square Bezel

NTE Type No.	Circuitry	Action			Actuator	Legend	Diag No.
54–733	SPST	ON	NONE	OFF	PC	Yes	S144

S144



Specifications

Current Rating: 25A 12VDC
Insulation Resistance: 100 Megohms (min.) at 500VDC
Dielectric Strength: 1500V RMS (min.)
Temperature Rating: –4° to +149°F (–20° to +65°C)
Electrical Life: 6,000 cycles
Mechanical Life: 10,000 cycles
Terminal Type: .250" Tab Q.C.
Mounting Hole: .945 (24.0)

Round Hole Rocker Switches

Snap–In Round Hole

Features

- Waterproof Types Available on Page 172

NTE Type No.	Circuitry	Action			Actuator	Legend	Diag No.
54–503	SPST	ON	NONE	OFF	Nylon	Yes	S90
54–504	SPDT	ON	OFF	ON	Nylon	No	S90
54–505	SPDT	ON	NONE	ON	Nylon	No	S90
54–520	SPST	(ON)	NONE	OFF	Nylon	Yes	S90
54–521	SPST	ON	NONE	(OFF)	Nylon	Yes	S90
54–522	SPDT	ON	NONE	(ON)	Nylon	Yes	S90

SPECIAL NOTE: ( ) = Momentary Function

S90

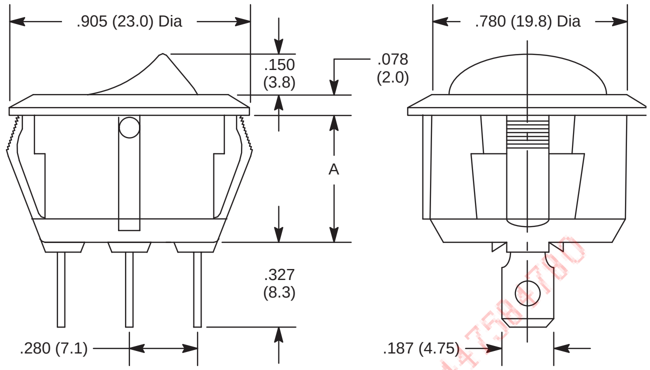


Table 1.

Device Type	A
All Devices	.472 (12.0)
54–504	.570 (14.5)

Specifications

Current Rating: 16A 125VAC, 10A 250VAC
Insulation Resistance: 100 Megohms (min.) at 500VDC
Dielectric Strength: 1500V RMS (min.)
Temperature Rating: –4° to +149°F (–20° to +65°C)
Electrical Life: 6000 cycles (min.)
Mechanical Life: 100,000 cycles (min.)
Terminal Type: .187” Tab Q.C.
Mounting Hole: .795 (20.2)

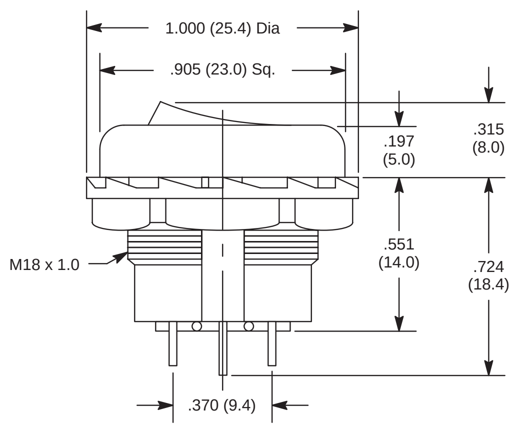
Round Hole, Square Bezel

Features

- Single & Double Pole Types

NTE Type No.	Circuitry	Action			Actuator	Legend	Diag No.
54–507	SPST	ON	NONE	OFF	Red Nylon	Yes	S92
54–508	SPDT	ON	NONE	ON	Red Nylon	No	S92
54–509	DPDT	ON	NONE	ON	Red Nylon	No	S92

S92



Specifications

Current Rating: 10A 125VAC, 6A 250VAC
Insulation Resistance: 100 Megohms (min.) at 500VDC
Dielectric Strength: 1500V RMS (min.)
Temperature Rating: –4° to +149°F (–20° to +65°C)
Electrical Life: 6000 cycles (min.)
Mechanical Life: 100,000 cycles (min.)
Terminal Type: Solder Lug
Mounting Hole: .717 (18.2)

Automotive/Marine Rocker Switches

Sealed Nylon Snap–In

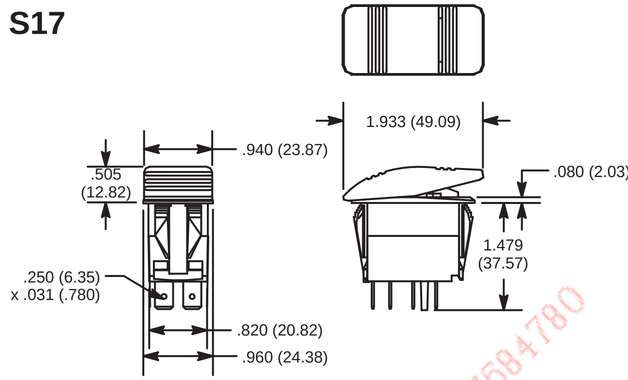
Features

- IP66/IP68 Certified
- Illuminated and Non–Illuminated Types
- UL1500 Recognized – Ignition Protection for Marine Use
- Sealed for Auto/Marine applications
- Salt Spray Resistant
- Able to Withstand –40° to +85°C Temperature

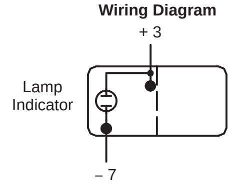
NTE Type No.	Circuitry	Action			Actuator	Lens Color	Diag No.
54–034	SPST	ON	NONE	OFF	Thermoplastic polycarbonate with a hard Nylon 66 thermoplastic surface overlay	Amber	S17
54–035	SPST	ON	NONE	OFF		Red	S17
54–036	DPDT	ON	OFF	ON		Green	S17
54–037	DPDT	ON	OFF	ON		Red	S17
54–038	SPST	(ON)	NONE	OFF		Amber	S17
54–039	SPST	(ON)	NONE	OFF		Red	S17
54–040	DPDT	(ON)	OFF	(ON)		Amber	S17
54–041	DPDT	(ON)	OFF	(ON)		Green	S17
54–042	DPDT	(ON)	OFF	(ON)		Red	S17
54–043	DPDT	(ON)	OFF	(ON)		Blue	S17
54–044	SPST	ON	NONE	OFF		N/A	S17
54–045	DPDT	ON	NONE	ON		N/A	S17
54–046	DPDT	ON	OFF	ON		N/A	S17
54–087	SPST	ON	NONE	OFF		Green	S17
54–088	SPST	ON	NONE	OFF		Blue	S17
54–089	DPDT	ON	OFF	ON		Amber	S17
54–090	DPDT	ON	OFF	ON		Blue	S17
54–091	SPST	(ON)	NONE	OFF		Green	S17
54–092	SPST	(ON)	NONE	OFF		Blue	S17
54–639	DPDT	(ON)	OFF	(ON)		N/A	S17

SPECIAL NOTE: ( ) = Momentary Function

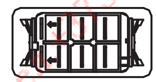
S17



Wiring Diagram



Terminal Arrangement (Bottom View)



Specifications

Current Rating: 20A 12VDC
Lamp Voltage: 12V Incandescent
Insulation Resistance: 50 Megohms (min.)
Dielectric Strength: 1500V RMS (min.)
Temperature Rating: –40° to +185°F (–40° to +85°)
Electrical Life: 50,000 to 100,000 cycles circuit dependent
Mechanical Life: 150,000 cycles
Terminal Type: .250” Tab Q.C.
Mounting Hole: 1.450 (36.83) x .830 (21.08)

Waterproof Rocker Switches

Miniature Illuminated

Features

- **Waterproof: IP65**
- **Single Pole**
- **.187” Quick Connect Terminals**

NTE Type No.	Circuitry	Action			Actuator Material	Actuator Color Neon	Actuator Color LED	Vltg	Diag No.
54–200W	SPST	ON	NONE	OFF	PC	Red	–	AC	S110
54–201W	SPST	ON	NONE	OFF	PC	–	Red	DC	S110
54–202W*	SPDT	ON	NONE	ON	PC	Black		N/A	S110
54–203W	SPST	ON	NONE	OFF	PC	Green	–	AC	S110
54–204W	SPST	ON	NONE	OFF	PC	–	Green	DC	S110

* Designates Non–Illuminated Type

S110

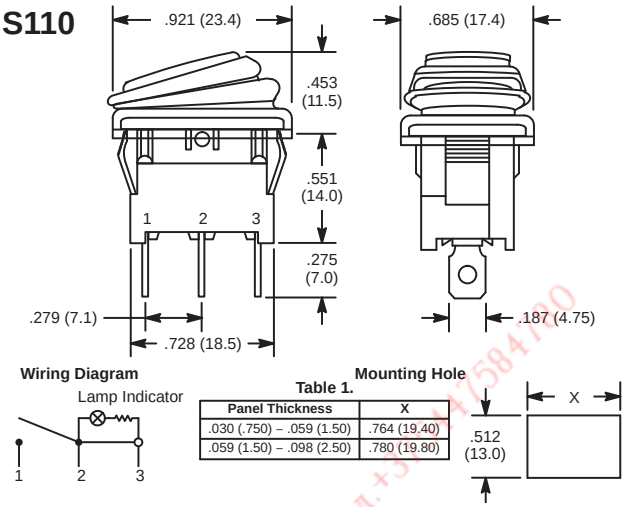


Table 1.

Panel Thickness	X
.030 (.750) – .059 (1.50)	.764 (19.40)
.059 (1.50) – .098 (2.50)	.780 (19.80)

Specifications

Current Rating: 16A 125VAC 1/3 HP, 10A 250VAC 1/2 HP
Lamp Voltage: 110V Neon (AC) & 12V LED (DC)
Insulation Resistance: 100 Megohms (min.) at 500VDC
Dielectric Strength: 1000V RMS (min.)
Temperature Rating: +32° to +185°F (0° to +85°C)
Electrical Life: 10,000 cycles
Mechanical Life: 50,000 cycles at full load
Terminal Type: .187” Tab Q.C.
Mounting Hole: See Table 1

Miniature Illuminated

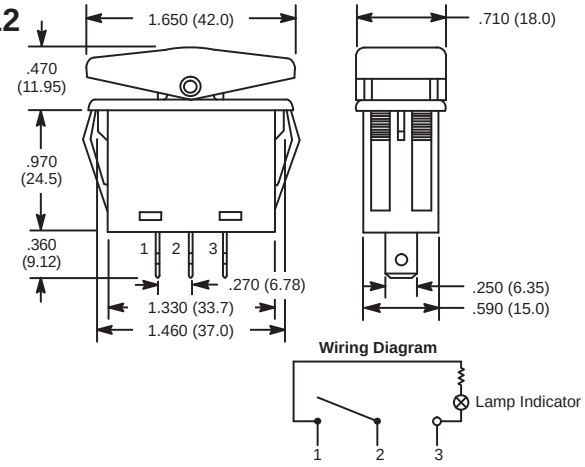
Features

- **Waterproof: IP66**
- **Single Pole**
- **.250” Quick Connect Terminals**

NTE Type No.	Circuitry	Action			Actuator Material	Actuator Color Neon	Actuator Color LED	Vltg	Diag No.
54–215W	SPST	ON	NONE	OFF	PC	Red	–	AC	S112
54–216W	SPST	ON	NONE	OFF	PC	–	Red	DC	S112
54–219W	SPST	ON	NONE	OFF	PC	Green	–	AC	S112
54–220W	SPST	ON	NONE	OFF	PC	–	Green	DC	S112
54–221W*	SPST	ON	NONE	OFF	PC	Black		N/A	S112

* Designates Non–Illuminated Type

S112



Specifications

Current Rating: 20A 125VAC 1/3 HP, 10A 250VAC 3/4 HP, 20A 14VAC, 10A 24VAC
Lamp Voltage: 110V Neon (AC) & 12V LED (DC)
Insulation Resistance: 100 Megohms (min.) at 500VDC
Dielectric Strength: 1500V RMS (min.)
Temperature Rating: +32° to +185°F (0° to +85°C)
Electrical Life: 10,000 cycles
Mechanical Life: 50,000 cycles at full load
Terminal Type: .250” Tab Q.C.
Mounting Hole: 1.450 (36.8) x .600 (15.2)

Waterproof Rocker Switches

Round Illuminated

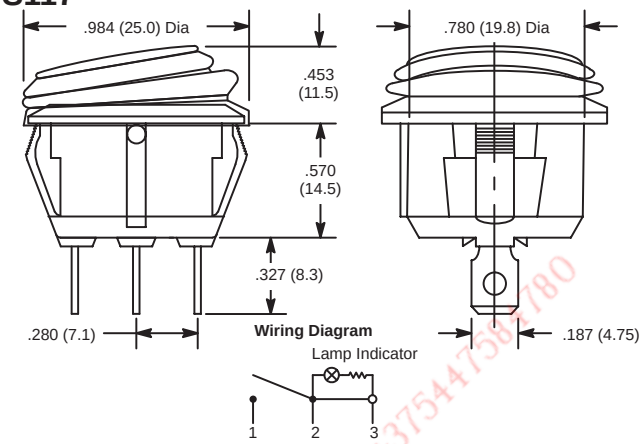
Features

- **Waterproof: IP65**
- **Single Pole**
- **.187” Quick Connect Terminals**

NTE Type No.	Circuitry	Action			Actuator				Diag No.
					Material	Color		Vltg	
						Neon	LED		
54–503W*	SPST	ON	NONE	OFF	Nylon	Black		N/A	S117
54–526W	SPST	ON	NONE	OFF	Nylon	Green	–	AC	S117
54–527W	SPST	ON	NONE	OFF	Nylon	–	Red	DC	S117
54–529W	SPST	ON	NONE	OFF	Nylon	–	Green	DC	S117
54–531W	SPST	ON	NONE	OFF	Nylon	Red	–	AC	S117

* Designates Non–Illuminated Type

S117



Specifications

Current Rating: 16A 125VAC, 10A 250VAC
Lamp Voltage: 110V Neon (AC) & 12V LED (DC)
Insulation Resistance: 100 Megohms (min.) at 500VDC
Dielectric Strength: 1500V RMS (min.)
Temperature Rating: +32° to +185°F (0° to +85°C)
Electrical Life: 10,000 cycles
Mechanical Life: 50,000 cycles at full load
Terminal Type: .187” Tab Q.C.
Mounting Hole: .795 (20.2)

Round Illuminated

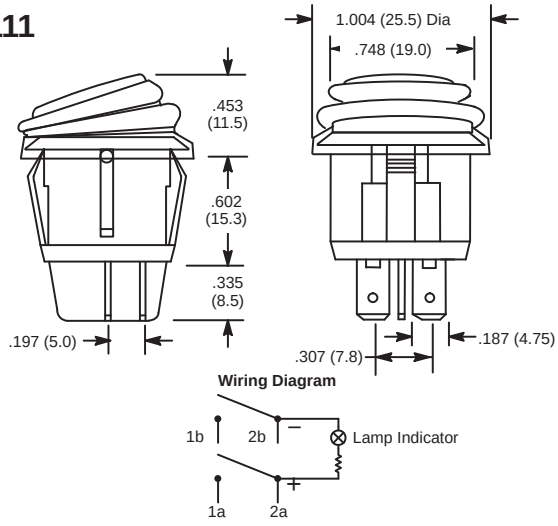
Features

- **Waterproof: IP65**
- **Double Pole**
- **.187” Quick Connect Terminals**

NTE Type No.	Circuitry	Action			Actuator				Diag No.
					Material	Color		Vltg	
						Neon	LED		
54–205W	DPST	ON	NONE	OFF	PC	Red	–	AC	S111
54–206W	DPST	ON	NONE	OFF	PC	–	Red	DC	S111
54–209W	DPST	ON	NONE	OFF	PC	Green	–	AC	S111
54–210W	DPST	ON	NONE	OFF	PC	–	Green	DC	S111
54–211W*	DPST	ON	NONE	OFF	PC	Black		N/A	S111

* Designates Non–Illuminated Type

S111



Specifications

Current Rating: 16A 125VAC, 10A 250VAC
Lamp Voltage: 110V Neon (AC) & 12V LED (DC)
Insulation Resistance: 100 Megohms (min.) at 500VDC
Dielectric Strength: 1500V RMS (min.)
Temperature Rating: +32° to +185°F (0° to +85°C)
Electrical Life: 10,000 cycles
Mechanical Life: 50,000 cycles at full load
Terminal Type: .187” Tab Q.C.
Mounting Hole: .795 (20.2)

Waterproof Rocker Switches

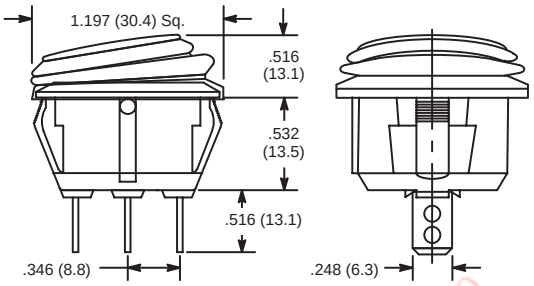
Round Illuminated

Features

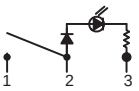
- **Waterproof: IP65**
- **.250” Quick Connect Terminals**

NTE Type No.	Circuitry	Action			Actuator				Diag No.
					Material	Color		Vltg	
						Neon	LED		
54–739W	SPST	ON	NONE	OFF	PC	–	Red	AC	S146

S146



Wiring Diagram



Specifications

Current Rating: 16A 125VAC
Lamp Voltage: 110V
Insulation Resistance: 100 Megohms (min.) at 500VDC
Dielectric Strength: 1500V RMS (min.)
Temperature Rating: –13° to +185°F (–25° to +85°C)
Electrical Life: 6,000 cycles
Mechanical Life: 10,000 cycles
Terminal Type: .250” Tab Q.C.
Mounting Hole: .945 (24.0)

Dual Color Illuminated

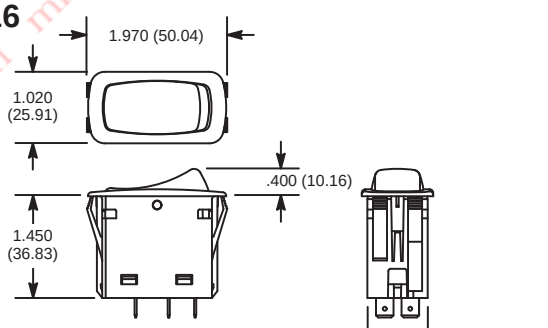
Features

- **IP67 Certified**
- **Single and Double Pole**
- **Dual Color Types**
- **.250” Quick Connect Terminals**

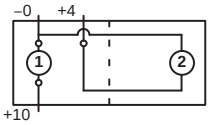
NTE Type No.	Circuitry	Action			Actuator				Diag No.
					Material	Color		Vltg	
						Neon	LED		
54–150	SPST	ON	NONE	OFF	Nylon	–	Amber/ Green	DC	S116
54–151	SPST	(ON)	NONE	OFF	Nylon	–	Amber/ Green	DC	S116
54–153	SPDT	ON	OFF	ON	Nylon	–	Amber/ Green	DC	S116
54–154	SPDT	ON	OFF	(ON)	Nylon	–	Amber/ Green	DC	S116
54–157	DPDT	ON	NONE	ON	Nylon	–	Amber/ Green	DC	S116
54–158	DPDT	(ON)	OFF	(ON)	Nylon		Amber/ Green	DC	S116

SPECIAL NOTE: ( ) = Momentary Function

S116



Lamp Circuit Diagram



Specifications

Current Rating: 20A 12VDC,
Lamp Voltage: 12V LED (DC)
Insulation Resistance: 50 Megohms
Dielectric Strength:
Between Pole to Pole: 1250 VRMS
Between Live Parts & Accessible Surfaces: 3750 VRMS
Temperature Rating: –40° to +185°F (–40° to +85°C)
Electrical Life: 100,000 cycles maintained
50,000 cycles momentary at rated voltage & current
Mechanical Life: 250,000 cycles min.
Terminal Type: .250” Tab Q.C.
Mounting Hole: 1.734 (44.04) x .867 (22.02)

Waterproof Rocker Switches

Illuminated & Non-Illuminated

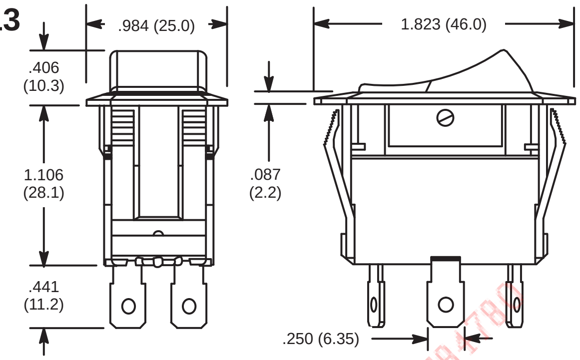
Features

- Waterproof: IP66
- Single and Double Pole
- Available in Single and Dual Color Types
- .250” Quick Connect Terminals

NTE Type No.	Circuitry	Action			Actuator				Diag No.
					Material	Color		Vltg	
						Neon	LED		
54–225W*	SPST	ON	NONE	OFF	PC	Black		N/A	S113
54–226W*	DPDT	ON	NONE	ON	PC	Black		N/A	S113
54–227W*	SPDT	ON	NONE	ON	PC	Black		N/A	S113
54–228W*	SPDT	ON	OFF	ON	PC	Black		N/A	S113
54–229W*	DPDT	ON	OFF	ON	PC	Black		N/A	S113
54–230W	SPST	ON	NONE	OFF	PC	Red	–	AC	S113
54–231W	SPST	ON	NONE	OFF	PC	–	Red	DC	S113
54–232W	SPST	ON	NONE	OFF	PC	Green	–	AC	S113
54–233W	SPST	ON	NONE	OFF	PC	–	Green	DC	S113
54–234W	SPST	ON	NONE	OFF	PC	Blue	–	AC	S113
54–235W	SPST	ON	NONE	OFF	PC	–	Blue	DC	S113
54-238W#	SPDT	ON	NONE	ON	PC	Rd/Gn	–	AC	S113
54–239W	SPDT	ON	NONE	ON	PC	–	Rd/Gn	DC	S113
54–240W	SPDT	ON	OFF	ON	PC	Rd/Gn	–	AC	S113
54–241W	SPDT	ON	OFF	ON	PC	–	Rd/Gn	DC	S113
54–246W	SPDT	ON	NONE	ON	PC	Rd/Rd	–	AC	S113
54–247W	SPDT	ON	NONE	ON	PC	–	Rd/Rd	DC	S113
54–248W	SPDT	ON	OFF	ON	PC	Rd/Rd	–	AC	S113
54–249W	SPDT	ON	OFF	ON	PC	–	Rd/Rd	DC	S113
54–250W*	DPDT	(ON)	OFF	(ON)	PV	Black		N/A	S113

* Designates Non–Illuminated Type
SPECIAL NOTE: ( ) = Momentary Function

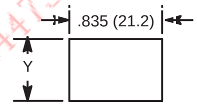
S113



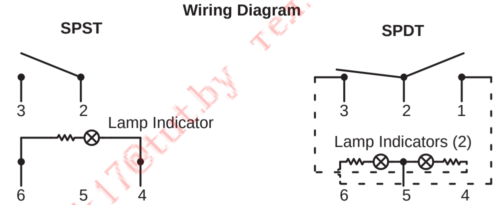
Mounting Hole

Table 1.

Panel Thickness	Y
.030 (.750) – .049 (1.25)	1.441(36.6)
.049 (1.25) – .079 (2.00)	1.449 (36.8)
.079 (2.00) – .118 (3.00)	1.457 (37.0)



Wiring Diagram



Specifications

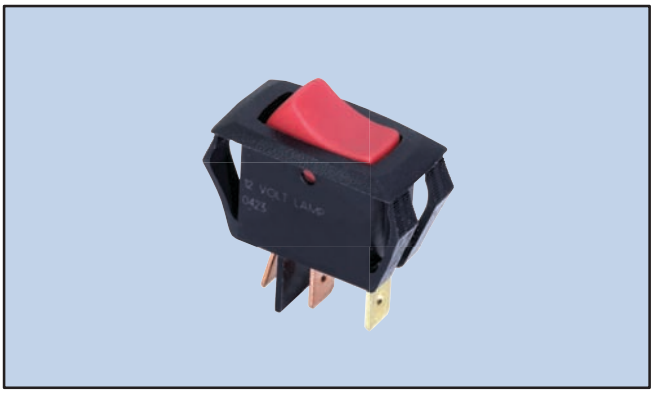
Current Rating: 21A 14VDC
20A, 125VAC (**54–238W Only**)
Lamp Voltage: 110V Neon (AC) & 12V LED (DC)
Insulation Resistance: 100 Megohms (min.) at 500VDC
Dielectric Strength: 1500V RMS (min.)
Temperature Rating: +32° to +149°F (0° to +65°C)
Electrical Life: 10,000 cycles
Mechanical Life: 50,000 cycles at full load
Terminal Type: .250” Tab Q.C.
Mounting Hole: See Table 1

Illuminated Rocker Switches

Miniature Snap–In for Low Voltage Applications

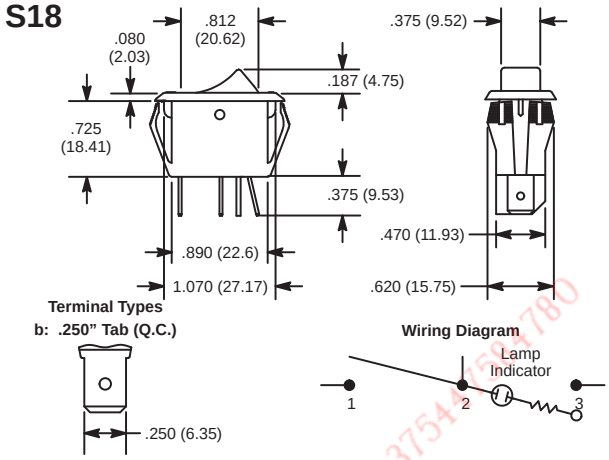
Features

- For Low Voltage Applications
- .250” Quick Connect Terminals



NTE Type No.	Circuitry	Action			Actuator	Lens Color	Diag No.
54–083	SPST	OFF	NONE	ON	Translucent Nylon	Red	S18b
54–086	SPST	OFF	NONE	ON	Clear Nylon	Blue	S18b

S18



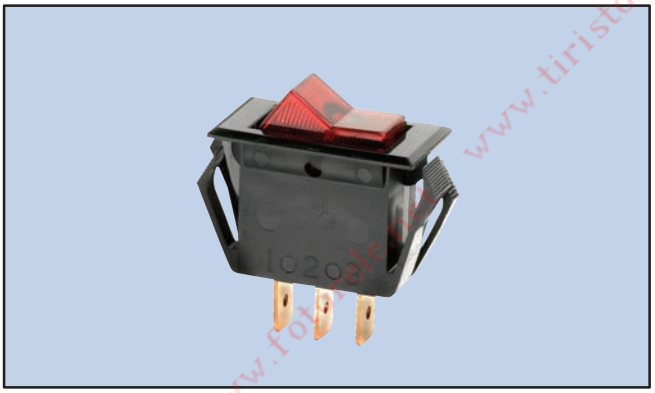
Specifications

Current Rating: 10A 12VDC
Lamp Voltage: 12V Incandescent
Insulation Resistance: 100 Megohms (min.)
Dielectric Strength: 1000V RMS (min.)
Temperature Rating: +32° to +185°F (0° to +85°)
Electrical Life: 100,000 cycles
Mechanical Life: 100,000 cycles
Terminal Type: .250” Tab Q.C.
Mounting Hole: 1.125 (28.58) x .550 (13.97)

Miniature Snap–In Nylon

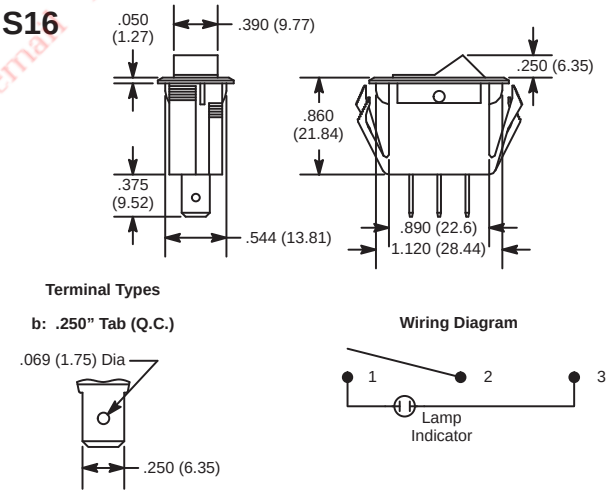
Features

- Single Pole
- Double Insulated



NTE Type No.	Circuitry	Action			Actuator	Lens Color	Diag No.
54–054	SPST	OFF	NONE	ON	Nylon	Red	S16b

S16



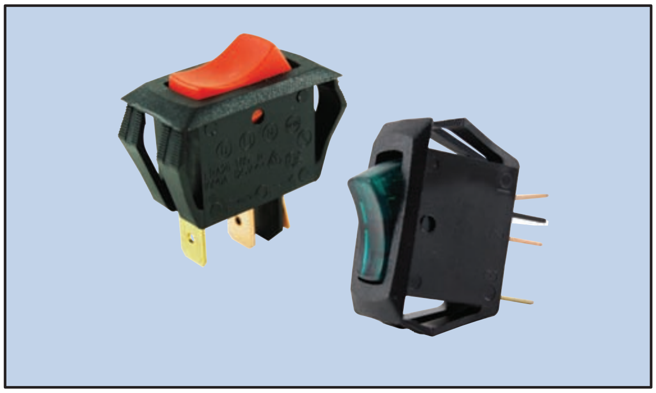
Specifications

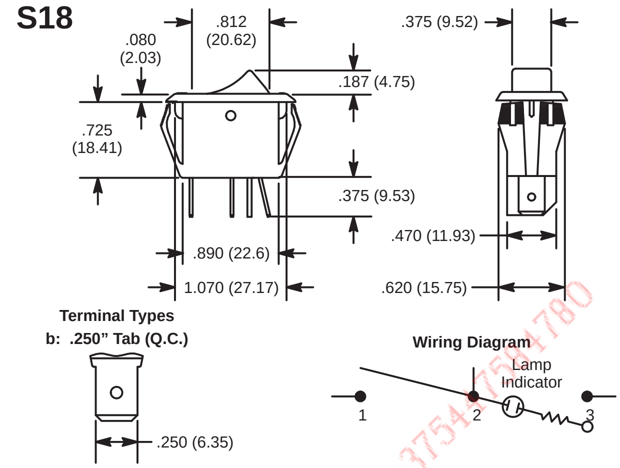
Current Rating: 15A 125VAC, 10A 250VAC, 3/4 HP 125–250VAC
Lamp Voltage: 125V Neon
Insulation Resistance: 100 Megohms (min.)
Dielectric Strength: 1000V RMS (min.)
Temperature Rating: +32°to +185°F (0° to +85°C)
Electrical Life: 100,000 cycles
Mechanical Life: 100,000 cycles
Terminal Type: .250” Tab Q.C.
Mounting Hole: 1.125 (28.57) x .550 (13.97)

Miniature Snap–In Nylon

Features

- Single Pole
- .250” Quick Connect Terminals





NTE Type No.	Circuitry	Action			Actuator	Lens Color	Diag No.
54–064	SPST	OFF	NONE	ON	Translucent Nylon	Amber	S18b
54–065	SPST	OFF	NONE	ON		Red	S18b
54–517	SPST	OFF	NONE	ON	Clear Nylon	Red	S18b
54–518	SPST	OFF	NONE	ON		Green	S18b
54–519	SPST	OFF	NONE	ON		Amber	S18b

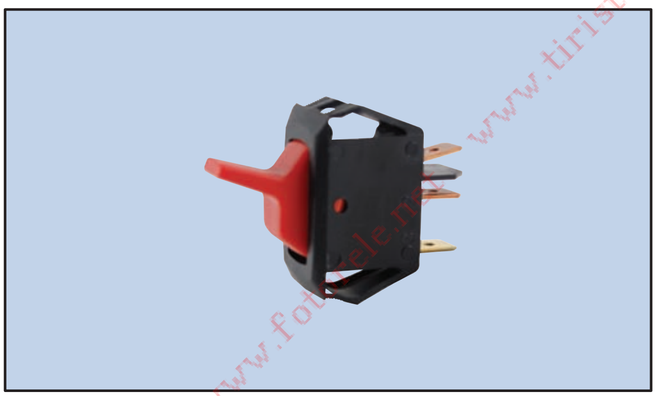
Specifications

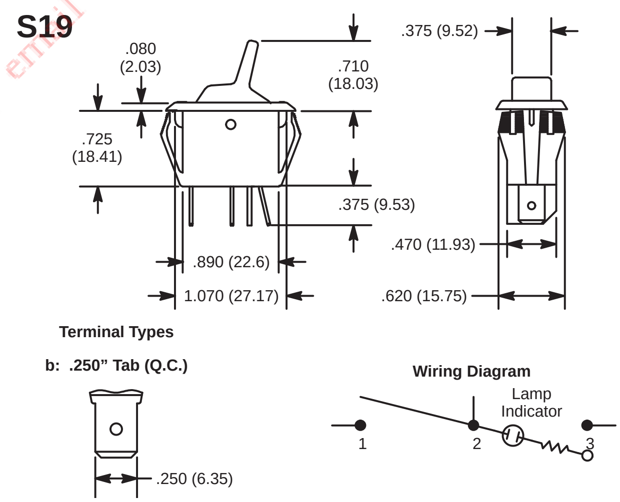
Current Rating: 16A 125VAC, 10A 250VAC, 10(4)A 250VAC T85
Lamp Voltage: 125V Neon
Insulation Resistance: 100 Megohms (min.)
Dielectric Strength: 1000V RMS (min.)
Temperature Rating: +32° to +185°F (0° to +85°C)
Electrical Life: 100,000 cycles
Mechanical Life: 100,000 cycles
Terminal Type: .250” Tab Q.C.
Mounting Hole: 1.125 (28.58) x .550 (13.97)

Miniature Snap–In Nylon

Features

- Single Pole
- .250” Quick Connect Terminals





NTE Type No.	Circuitry	Action			Actuator	Lens Color	Diag No.
54–105	SPST	OFF	NONE	ON	Translucent Nylon	Amber	S19b
54–106	SPST	OFF	NONE	ON		Red	S19b

Specifications

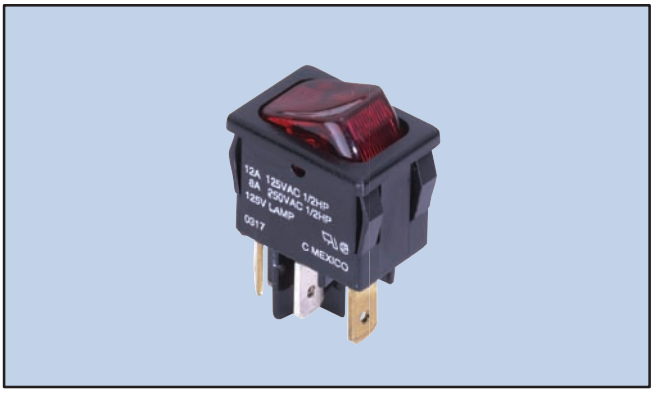
Current Rating: 16A 125VAC, 10A 250VAC, 10(4)A 250VAC
Lamp Voltage: 125V Neon
Insulation Resistance: 100 Megohms (min.)
Dielectric Strength: 1000V RMS (min.)
Temperature Rating: +32° to +185°F (0° to +85°C)
Electrical Life: 100,000 cycles
Mechanical Life: 100,000 cycles
Terminal Type: .250” Tab Q.C.
Mounting Hole: 1.125 (28.58) x .550 (13.97)

Illuminated Rocker Switches

Miniature Snap–In Nylon

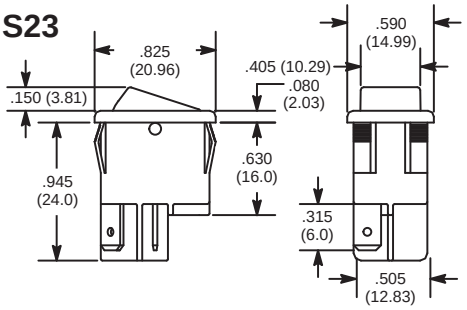
Features

- Single Pole
- .187” Quick Connect Terminals
- Fits Standard Panel Cutout
- High Inrush Capability
- Shallow Base Design

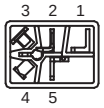


NTE Type No.	Circuitry	Action			Actuator	Lens Color	Diag No.
54–080	SPST	ON	NONE	OFF	Polycarbonate	Red	S23b

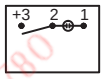
S23



Terminal Arrangement (Bottom View)

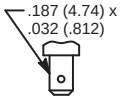


Schematic



Terminal Types

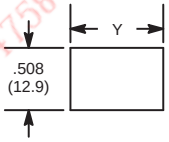
b: .187” Tab (Q.C.)



Mounting Hole

Table 1.

Panel Thickness	Y
.030 (.762) – .060 (1.52)	.756 (19.20
.060 (1.52) – .093 (2.36)	.764 (19.40)
.093 (2.36) – .156 (3.96)	.780 (19.81)



Specifications

Current Rating: 12A 125VAC, 8A 250VAC, 1/2 HP 125–250VAC
Lamp Voltage: 125V Neon
Insulation Resistance: 50 Megohms (min.)
Dielectric Strength: 1500V RMS (min.)
Temperature Rating: +32° to +185°F (0° to +85°C)
Electrical Life: 50,000 cycles
Mechanical Life: 100,000 cycles
Terminal Type: .187” Tab Q.C.
Mounting Hole: See Table 1

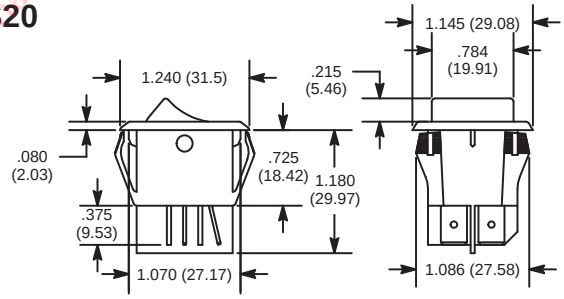
Miniature Snap–In Nylon

Features

- Double Pole
- .250” Quick Connect Terminals
- High Inrush Capability

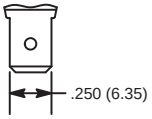
NTE Type No.	Circuitry	Action			Actuator	Lens Color	Diag No.
54–082	DPST	OFF	NONE	ON	Translucent Nylon	Red	S20b

S20

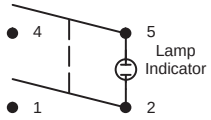


Terminal Types

b: .250” Tab (Q.C.)



Wiring Diagram



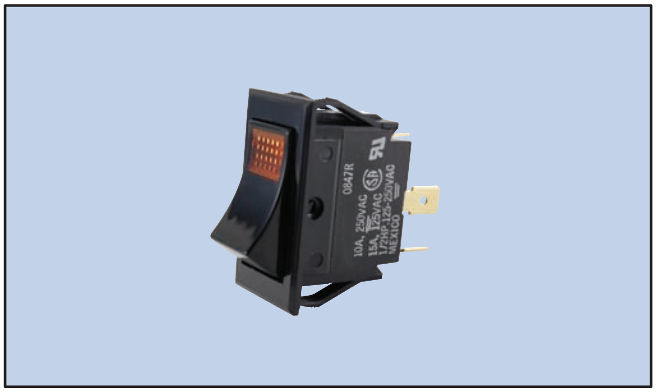
Specifications

Current Rating: 20A 125VAC, 15A 250VAC
Lamp Voltage: 125V Neon
Insulation Resistance: 100 Megohms (min.)
Dielectric Strength: 1000V RMS (min.)
Temperature Rating: +32° to +185°F (0° to +85°C)
Electrical Life: 50,000 cycles
Mechanical Life: 100,000 cycles
Terminal Type: .250” Tab Q.C.
Mounting Hole: 1.125 (28.58) x 1.000 (25.4)

Snap–In Nylon

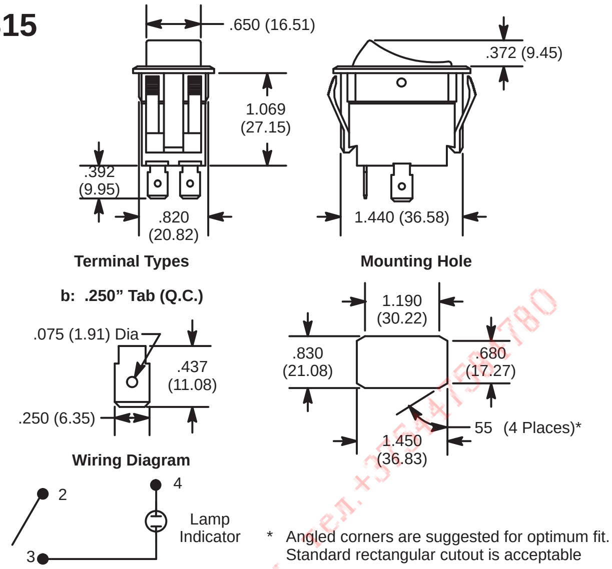
Features

- AC Rated, Also Suitable for Low Voltage DC Applications



NTE Type No.	Circuitry	Action			Actuator Material	Actuator Color	Lens Color	Diag No.
54–029	SPST	ON	NONE	OFF	Nylon	White	Green	S15b
54–053	SPST	ON	NONE	OFF		Black	Amber	S15b

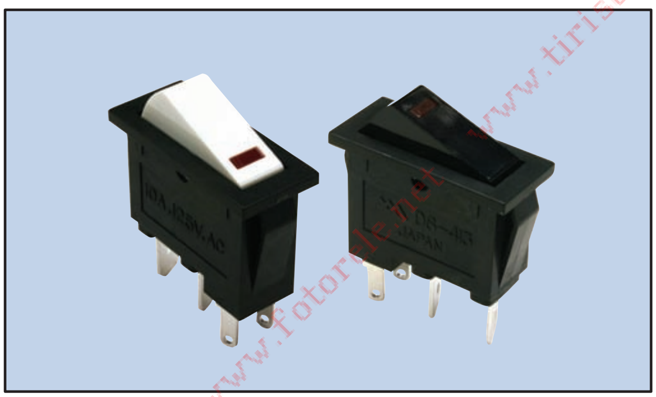
S15



Specifications

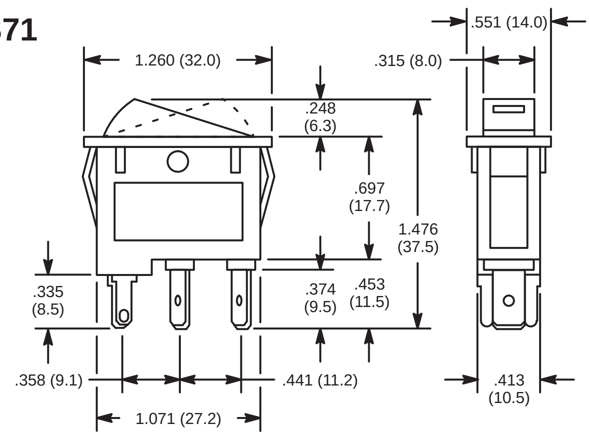
Current Rating: 15A 125VAC, 10A 250VAC, 1/2 HP 125–250VAC
Lamp Voltage: 125V Neon (54–053), 18V Incandescent (54–029)
Insulation Resistance: 100 Megohms (min.)
Dielectric Strength: 1000V RMS (min.)
Temperature Rating: +32° to +185°F (0° to +85°C)
Electrical Life: 50,000 cycles
Mechanical Life: 100,000 cycles
Terminal Type: .250" Tab Q.C.
Mounting Hole: 1.450 (36.83) x .830 (21.08)

Snap–In Slimline



NTE Type No.	Circuitry	Action			Actuator Material	Actuator Color	Lens Color	Diag No.
54–386	SPST	ON	NONE	OFF	Polycarbonate	White	Red	S71
54–387	SPST	ON	NONE	OFF		Black	Red	S71

S71



Specifications

Current Rating: 10A 125VAC
Lamp Voltage: 2.1V LED
Insulation Resistance: 100 Megohms (min.) at 500VDC
Dielectric Strength: 1000V RMS (min.)
Temperature Rating: +14° to +131°F (–10° to +55°C)
Electrical Life: 20,000 cycles
Mechanical Life: 30,000 cycles
Terminal Type: .250" Tab Q.C.
Mounting Hole: 1.189 (30.2) x .433 (11.0)

Illuminated Rocker Switches

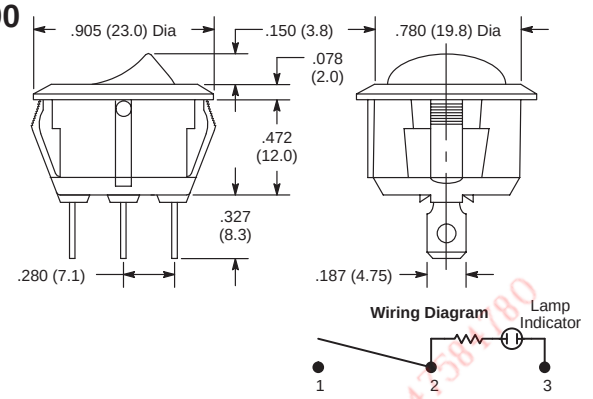
Snap–In Round Hole

Features

- **AC and DC Types**

NTE Type No.	Circuitry	Action			Actuator				Diag No.
					Material	Color		Vltg	
						Neon	LED		
54–506	SPST	ON	NONE	OFF	Nylon	Red	–	AC	S90
54–532	SPST	ON	NONE	OFF	Nylon	Amber	–	AC	S90
54–533	SPST	ON	NONE	OFF	Nylon	Green	–	AC	S90
54–534	SPST	ON	NONE	OFF	Nylon	–	Red	DC	S90
54–535	SPST	ON	NONE	OFF	Nylon	–	Amber	DC	S90
54–536	SPST	ON	NONE	OFF	Nylon	–	Green	DC	S90
54–537	SPST	ON	NONE	OFF	Nylon	–	Blue	DC	S90

S90



Specifications

Current Rating: 16A 125VAC, 10A 250VAC
Lamp Voltage: 110V Neon (AC) & 2V @ 20mA* LED (DC)
Insulation Resistance: 100 Megohms (min.) at 500VDC
Dielectric Strength: 1500V RMS (min.)
Temperature Rating: –4° to +149°F (–20° to +65°C)
Electrical Life: 6000 cycles (min.)
Mechanical Life: 100,000 cycles (min.)
Terminal Type: .187" Tab Q.C.
Mounting Hole: .795 (20.2)

* Resistor needed for other voltages.

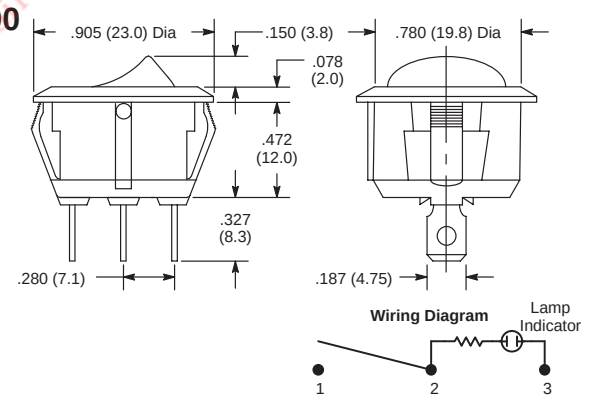
Snap–In Round Hole

Features

- **Waterproof Types Available on Page 166**

NTE Type No.	Circuitry	Action			Actuator			Diag No.
					Material	Color	Vltg	
54–525	SPST	ON	NONE	OFF	Nylon	Amber	AC	S90
54–526	SPST	ON	NONE	OFF	Nylon	Green	AC	S90
54–527	SPST	ON	NONE	OFF	Nylon	Red	DC	S90
54–528	SPST	ON	NONE	OFF	Nylon	Amber	DC	S90
54–529	SPST	ON	NONE	OFF	Nylon	Green	DC	S90
54–530	SPST	ON	NONE	OFF	Nylon	Blue	DC	S90
54–531	SPST	ON	NONE	OFF	Nylon	Red	AC	S90

S90



Specifications

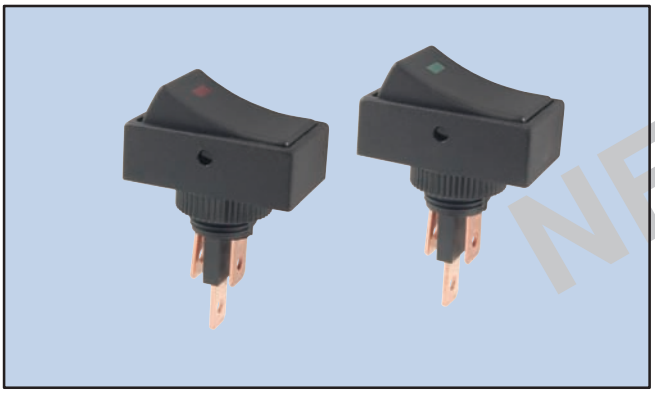
Current Rating: 16A 125VAC, 10A 250VAC
Lamp Voltage: 110V (AC) Neon, 12V (DC) Incandescent
Insulation Resistance: 100 Megohms (min.) at 500VDC
Dielectric Strength: 1500V RMS (min.)
Temperature Rating: –4° to +149°F (–20° to +65°C)
Electrical Life: 6000 cycles (min.)
Mechanical Life: 100,000 cycles (min.)
Terminal Type: .187" Tab Q.C.
Mounting Hole: .795 (20.2)

Illuminated Rocker Switches

Round Hole

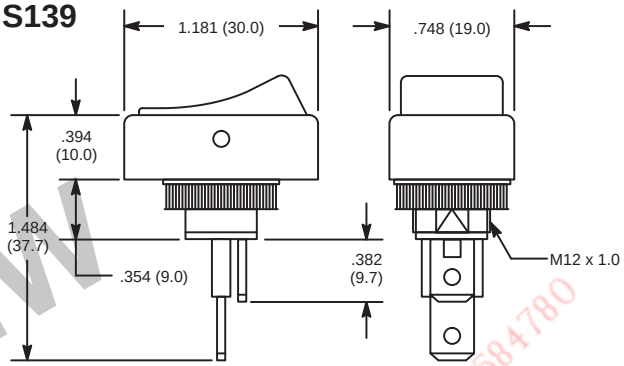
Features

- **Illuminated LED Indicator**

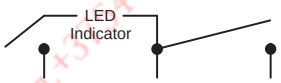


NTE Type No.	Circuitry	Action			Actuator				Diag No.
					Material	Color		Vltg	
						Neon	LED		
54-709-R	SPST	ON	NONE	OFF	Nylon	–	Red	DC	S139
54-709-G	SPST	ON	NONE	OFF	Nylon	–	Green	DC	S139

S139



Wiring Diagram



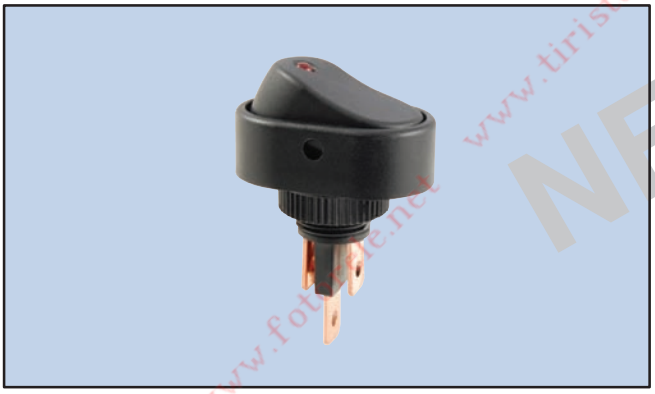
Specifications

Current Rating: 25A 12VDC
Lamp Voltage: 12V LED (DC)
Insulation Resistance: 100 Megohms (min.) at 500VDC
Dielectric Strength: 1500V RMS (min.)
Temperature Rating: –4° to +185°F (–20° to +85°C)
Electrical Life: 6000 cycles
Mechanical Life: 10000 cycles
Terminal Type: .250" Tab Q.C.
Mounting Hole: .480 (12.2)

Round Hole

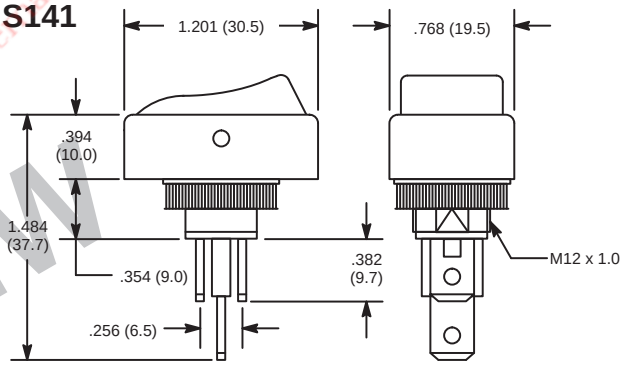
Features

- **Illuminated LED Indicator**

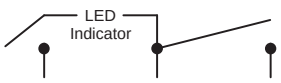


NTE Type No.	Circuitry	Action			Actuator				Diag No.
					Material	Color		Vltg	
						Neon	LED		
54-711	SPST	ON	NONE	OFF	Nylon	–	Red	DC	S141

S141



Wiring Diagram

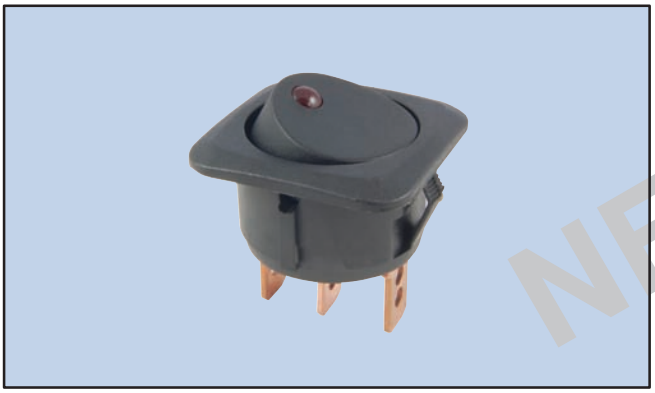


Specifications

Current Rating: 30A 12VDC
Lamp Voltage: 12V LED (DC)
Insulation Resistance: 100 Megohms (min.) at 500VDC
Dielectric Strength: 1500V RMS (min.)
Temperature Rating: –13° to +185°F (–25° to +85°C)
Electrical Life: 6000 cycles
Mechanical Life: 10000 cycles
Terminal Type: .250" Tab Q.C.
Mounting Hole: .480 (12.2)

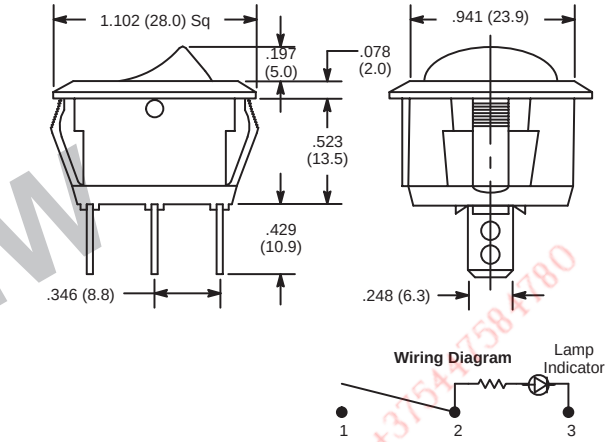
Illuminated Rocker Switches

Snap–In Round Hole



NTE Type No.	Circuitry	Action			Actuator				Diag No.
					Material	Color		Vltg	
						Neon	LED		
54-734	SPST	ON	NONE	OFF	Nylon	–	Red	DC	S144

S144



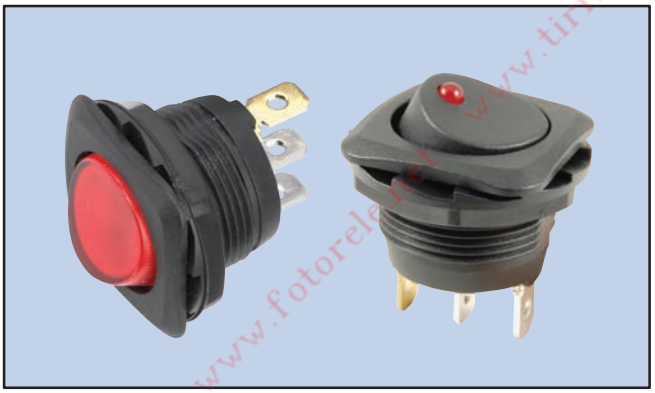
Specifications

Current Rating: 25A 12VDC
Lamp Voltage: 12V LED (DC)
Insulation Resistance: 100 Megohms (min.) at 500VDC
Dielectric Strength: 1500V RMS (min.)
Temperature Rating: –4° to +149°F (–20° to +65°C)
Electrical Life: 6000 cycles
Mechanical Life: 10000 cycles
Terminal Type: .250" Tab Q.C.
Mounting Hole: .945 (24.0)

Round Hole, Square Bezel

Features

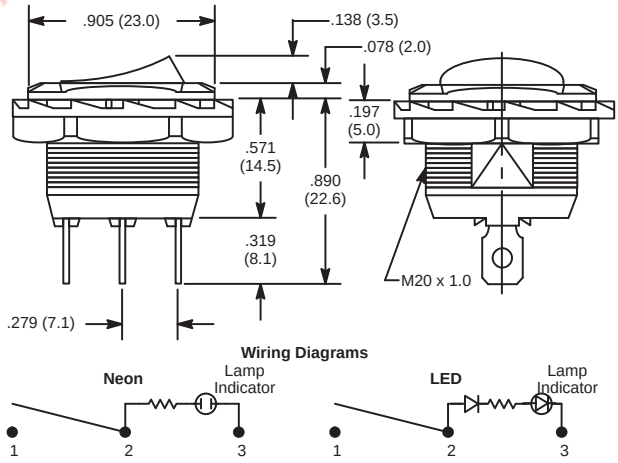
- **Circuit Contains Illuminated Indicator**
- **Single Pole**



NTE Type No.	Circuitry	Action			Actuator				Diag No.
					Material	Color		Vltg	
						Neon	LED		
54–513	SPST	ON	NONE	OFF	Nylon	Red	–	AC	S93
54–549	SPST	ON	NONE	OFF	Nylon	Amber	–	AC	S93
54–550	SPST	ON	NONE	OFF	Nylon	Green	–	AC	S93
NEW 54–712	SPST	ON	NONE	OFF	Nylon	–	Red	DC	S93

NOTE: 54–712 **is not** UL

S93



Specifications

Current Rating: 16A 125VAC, 10A 250VAC
Lamp Voltage: 110V
Insulation Resistance: 100 Megohms (min.) at 500VDC
Dielectric Strength: 1500V RMS (min.)
Temperature Rating: –4° to +149°F (–20° to +65°C)
Electrical Life: 6000 cycles (min.)
Mechanical Life: 100,000 cycles (min.)
Terminal Type: .187" Tab Q.C.
Mounting Hole: .795 (20.2)

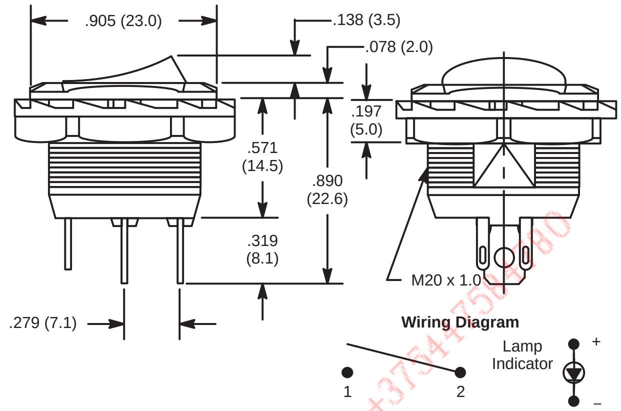
Round Hole, Square Bezel

Features

- Independent, Illuminated LED Indicator
- Single Pole

NTE Type No.	Circuitry	Action			Actuator Material	Actuator LED Color	Diag No.
54–551	SPST	ON	NONE	OFF	Nylon	Red	S118
54–552	SPST	ON	NONE	OFF	Nylon	Amber	S118
54–553	SPST	ON	NONE	OFF	Nylon	Green	S118
54–554	SPST	ON	NONE	OFF	Nylon	Blue	S118

S118



Specifications

Current Rating: 16A 125VAC, 10A 250VAC
Lamp Voltage: 3V LED
Insulation Resistance: 100 Megohms (min.) at 500VDC
Dielectric Strength: 1500V RMS (min.)
Temperature Rating: –4° to +149°F (–20° to +65°C)
Electrical Life: 6000 cycles (min.)
Mechanical Life: 100,000 cycles (min.)
Terminal Type: .187” Tab Q.C.
Mounting Hole: .795 (20.2)

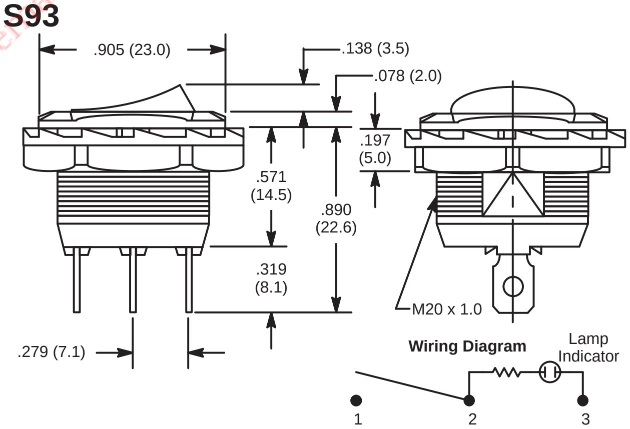
Round Hole, Square Bezel

Features

- Illuminated LED Indicator

NTE Type No.	Circuitry	Action			Actuator Material	Color Neon	Color LED	Vltg	Diag No.
54–645	SPST	ON	NONE	OFF	Nylon	–	Red	DC	S93
54-645-A	SPST	ON	NONE	OFF	Nylon	–	Amber	DC	S93
54-645-G	SPST	ON	NONE	OFF	Nylon	–	Green	DC	S93
54-645-B	SPST	ON	NONE	OFF	Nylon	–	Blue	DC	S93

S93



Specifications

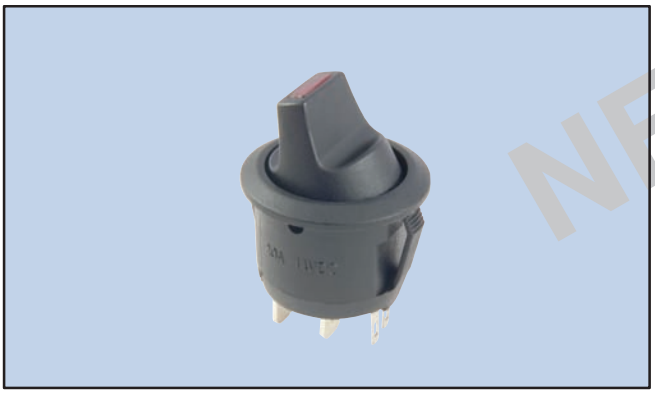
Current Rating: 20A 12VDC
Lamp Voltage: 2V @ 20mA LED (DC)
Insulation Resistance: 100 Megohms (min.) at 500VDC
Dielectric Strength: 1500V RMS (min.)
Temperature Rating: –13° to +185°F (–25° to +85°C)
Electrical Life: 6000 cycles (min.)
Mechanical Life: 100,000 cycles (min.)
Terminal Type: .187” Tab Q.C.
Mounting Hole: .795 (20.2)

Illuminated Rocker Switches

Snap–In Paddle Handle

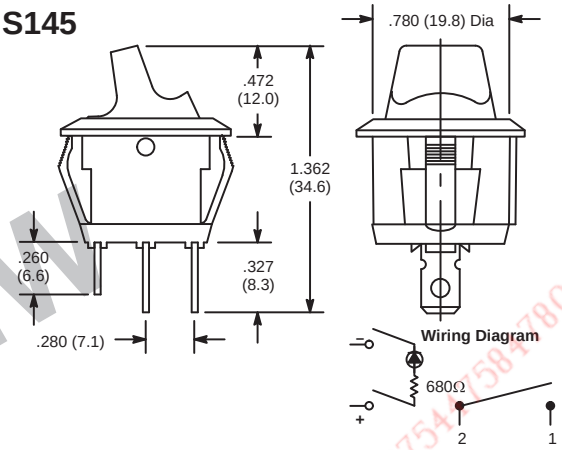
Features

- Snap–In Mounting, Easy to Install Switch into Panel
- Actuator: Black, Nylon #66
- .187” Quick Connect Terminals



NTE Type No.	Circuitry	Action			Actuator Material	Actuator Color Neon	Actuator Color LED	Actuator Color Vltg	Diag No.
54-740	SPST	ON	NONE	OFF	Nylon	–	Red	DC	S145

S145



Specifications

Current Rating: 20A 14VDC
Lamp Voltage: 12V LED (DC)
Insulation Resistance: 100 Megohms (min.) at 500VDC
Dielectric Strength: 1500V RMS (min.)
Temperature Rating: –13° to +185°F (–25° to +85°C)
Electrical Life: 6000 cycles
Mechanical Life: 10000 cycles
Terminal Type: .187” Tab Q.C.
Mounting Hole: .795 (20.2)

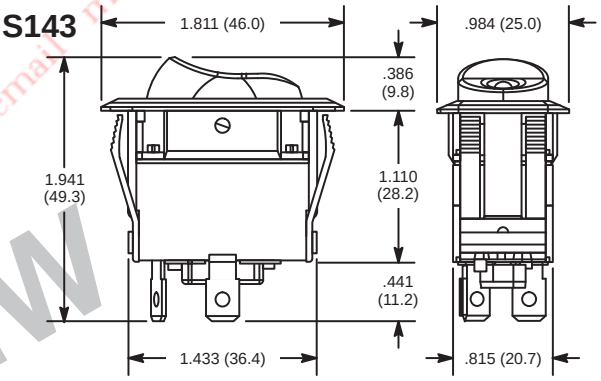
Single & Dual Color

Features

- Single and Dual Color Types
- Actuator: Black, Nylon #66
- .250” Quick Connect Terminals

NTE Type No.	Circuitry	Current Rating	Action			Actuator Color Neon	Actuator Color LED	Diag No.
54–736–1	SPST	A	ON	NONE	OFF	–	Green	S143
54–736–2	SPST	B	ON	NONE	OFF	–	Green	S143
54–737–1	SPST	C	ON	OFF	ON	–	Green/ Red	S143
54–737–2	SPDT	D	ON	OFF	ON	–	Green/ Red	S143

S143



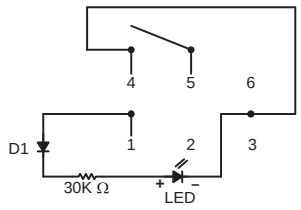
Specifications

Current Rating:
- **A:** 16A 125VAC 3/4 HP, 16(4)A 125VAC
- **B:** 21A 14VDC
- **C:** 20A 12VDC, 10A 24VDC
- **D:** 18A 125VAC, 10A 277VAC 3/4 HP or 21A 14VDC

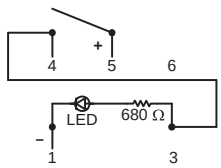
Lamp Voltage: 12V LED; 110V LED (**54–737–2 ONLY**)
Insulation Resistance: 100 Megohms (min.) at 500VDC
Dielectric Strength: 1500V RMS (min.)
Temperature Rating: –4° to +185°F (–20° to +85°C)
Electrical Life: 6000 cycles
Mechanical Life: 10000 cycles
Terminal Type: .250” Tab Q.C.
Mounting Hole: 1.457 (37.0) x .835 (21.2)

Lamp Circuit Diagrams

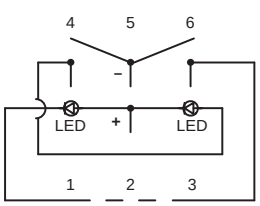
54–736–1



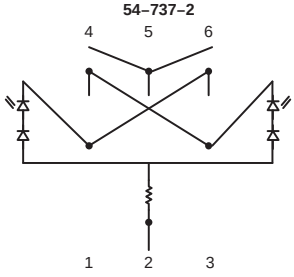
54–736–2



54–737–1



54–737–2

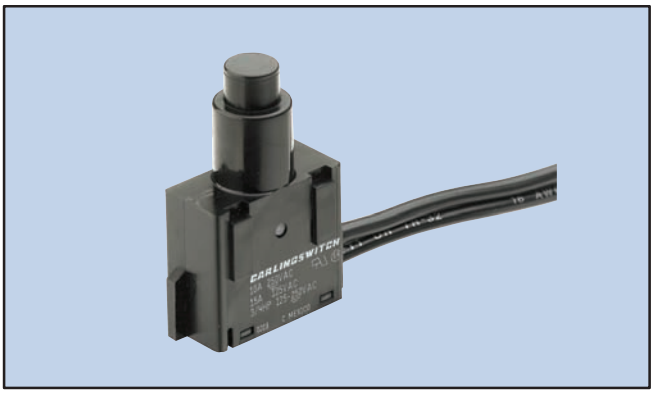


Pushbutton Switches

Nylon

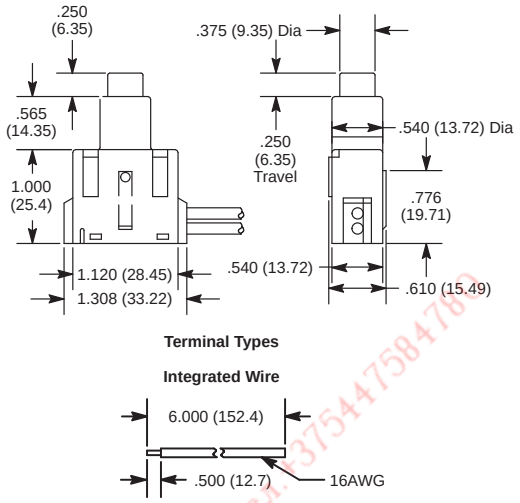
Features

- Heavy Duty
- 6” Wire Leads
- Both Bushing & Bracket are Made of Nylon



NTE Type No.	Circuitry	Action		Actuator	Diag No.
54–072	SPST	ON	OFF	Nylon	S13

S13



Specifications

Current Rating: 15A 125VAC, 10A 250VAC, 3/4 HP 125–250VAC
Insulation Resistance: 100 Megohms (min.)
Dielectric Strength: 1000V RMS (min.)
Temperature Rating: +32° to +185°F (0° to +85°C)
Electrical Life: 100,000 cycles
Mechanical Life: 25,000 cycles
Terminal Type: Integrated Wire Type
Mounting Hole: .550 (13.97)

Heavy Duty, Metal Plunger

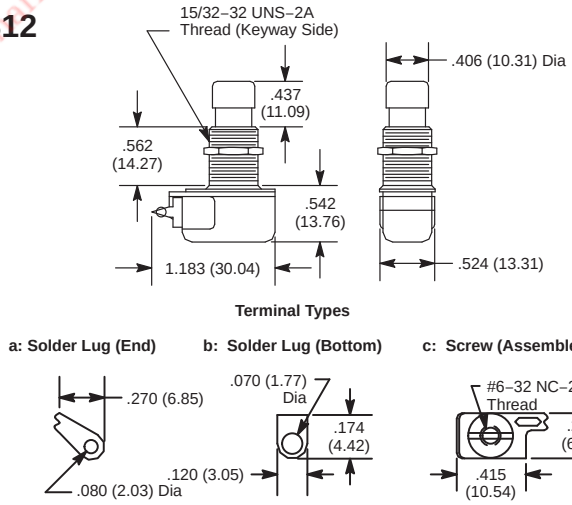
Features

- AC/DC Rated
- Quick Make, Quick Break Contacts
- Self–Cleaning Contacts
- Suitable for Foot Switches
- Typical Actuation Force: 6–8lbs.

NTE Type No.	Circuitry	Action		Actuator	Diag No.
54–066	SPST	OFF	(ON)	Brass/Nickel Plate	S12a
54–067	SPST	ON	(OFF)	Brass/Nickel Plate	S12a
54–068	SPST	ON	OFF	Brass/Nickel Plate	S12b
54–069	SPST	ON	OFF	Brass/Nickel Plate	S12c

SPECIAL NOTE: ( ) = Momentary Function

S12

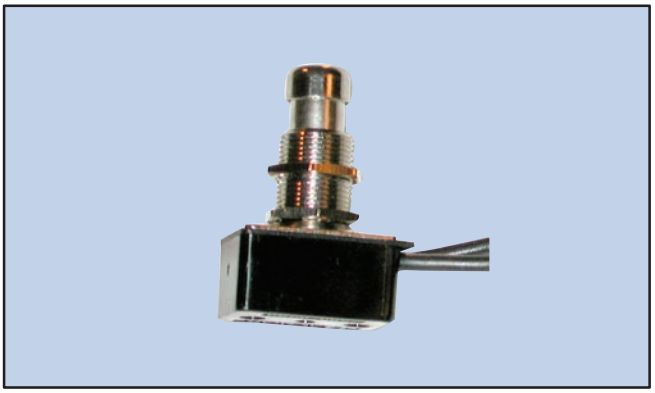


Specifications

Current Rating: 6A 125VAC, 3A 250VAC, AC/DC
Insulation Resistance: 100 Megohms (min.)
Dielectric Strength: 1000V RMS (min.)
Temperature Rating: +32° to +185°F (0° to +85°C)
Electrical Life: 100,000 cycles
Mechanical Life: 25,000 cycles
Terminal Type: Refer to Diag No. in Table
Mounting Hole: .500 (12.7)

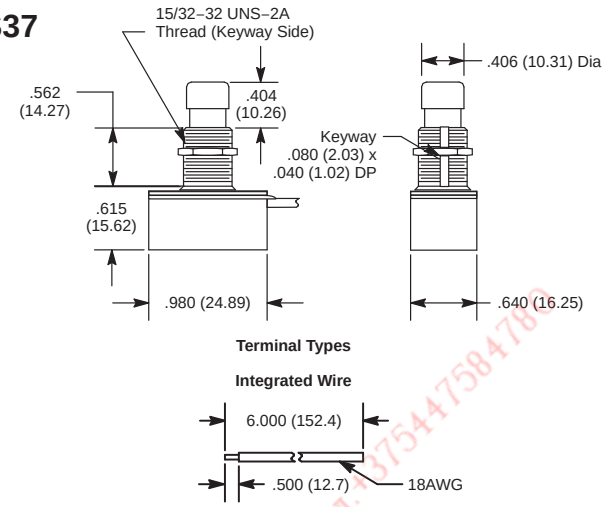
Pushbutton Switches

Metal Plunger, Wire Leads



NTE Type No.	Circuitry	Action		Actuator	Diag No.
54–132	SPST	ON	OFF	Metal	S37

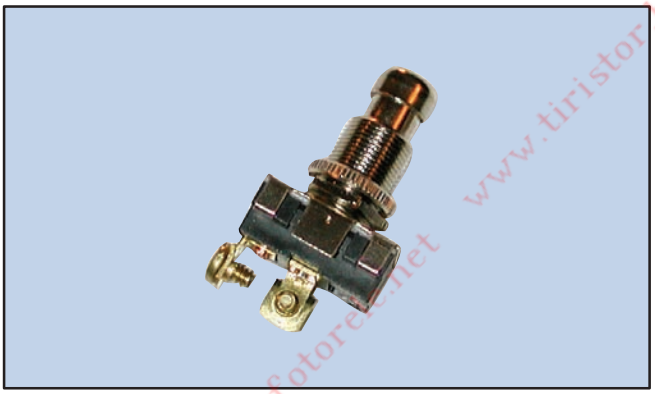
S37



Specifications

Current Rating: 10A 250VAC, 8A 125VDC, 4A 250VDC, 1/3 HP 125VAC
Dielectric Strength: 1000V RMS (min.)
Temperature Rating: +149°F (+65°C) Max
Electrical Life: 25,000 cycles Min
Mechanical Life: 100,000 cycles
Terminal Type: Integrated Wire
Mounting Hole: .500 (12.7)

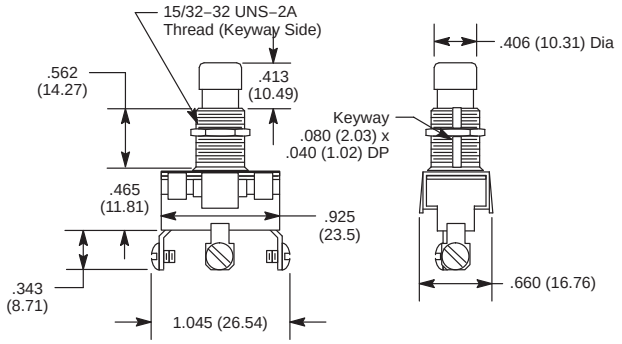
Metal Plunger, Screw Terminals



NTE Type No.	Circuitry	Action		Actuator	Diag No.
54–133	SPST	ON	OFF	Metal	S38
54–134	SPST	OFF	(ON)	Metal	S38
54–135	SPST	ON	(OFF)	Metal	S38
54–136	SPDT	ON	ON	Metal	S38

SPECIAL NOTE: ( ) = Momentary Function

S38

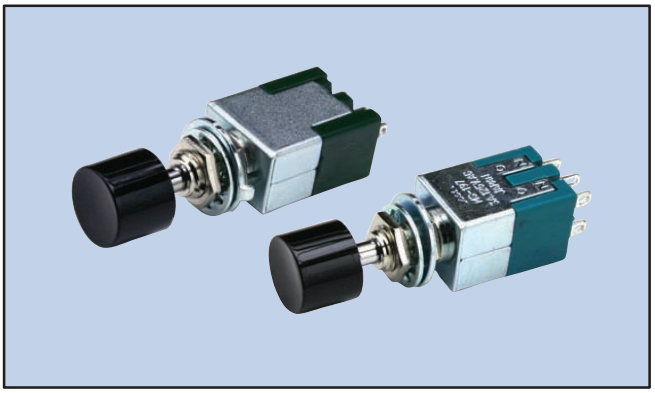


Specifications

Current Rating: 10A 250VAC, 15A 125VDC
Dielectric Strength: 1000V RMS (min.)
Temperature Rating: +149°F (+65°C) Max
Electrical Life: 15,000 cycles Min
Mechanical Life: 40,000 cycles
Terminal Type: Screw Terminals
Mounting Hole: .500 (12.7)

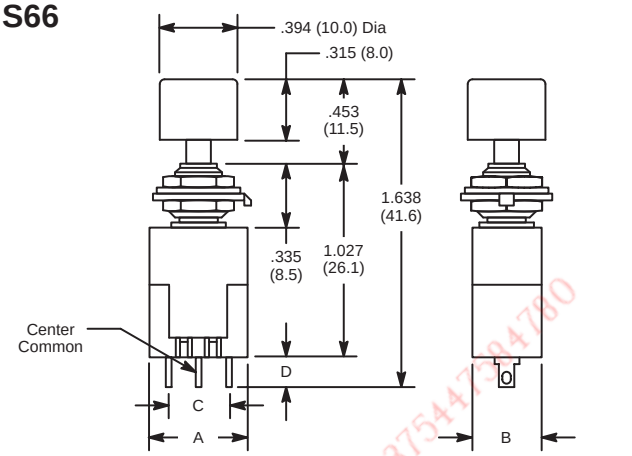
Pushbutton Switches

Panel Mount



NTE Type No.	Circuitry	Action		Actuator		Diag No.
				Material	Color	
54–380	SPDT	ON	ON	Polyamide	Black	S66
54–393	DPDT	ON	ON	Polyamide	Black	S66

S66



NTE Type	A	B	C	D
54–380	.512 (13.0)	.362 (9.2)	.331 (8.4)	.157 (4.0)
54–393	.453 (11.5)	.433 (11.0)	.307 (7.8)	.177 (4.5)

Specifications

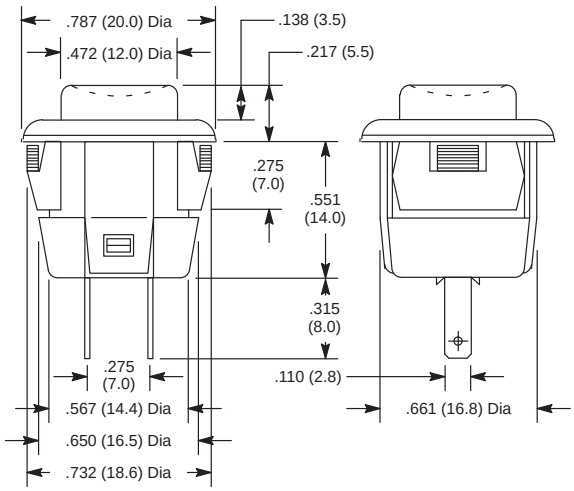
Current Rating: 3A 125VAC
Insulation Resistance: 100 Megohms (min.)
Dielectric Strength: 1000V RMS (min.)
Temperature Rating: +14° to +131°F (–10° to +55°C)
Electrical Life: 10,000 cycles
Mechanical Life: 30,000 cycles
Terminal Type: Solder Lug
Mounting Hole: .244 (6.2)

Snap–In, Round

NTE Type No.	Circuitry	Action		Actuator		Diag No.
				Material	Color	
54–385	SPST	OFF	(ON)	Molded ABS Resin	Red	S67
54–385A	SPST	OFF	ON	Molded ABS Resin	Red	S67

SPECIAL NOTE: ( ) = Momentary Function

S67



Specifications

Current Rating: 3A 125VAC
Insulation Resistance: 100 Megohms (min.) at 500VDC
Dielectric Strength: 1000V RMS (min.)
Temperature Rating: +14° to +131°F (–10° to +55°C)
Electrical Life: 5,000 cycles
Mechanical Life: 30,000 cycles
Terminal Type: Solder Lug
Mounting Hole: .700 (17.8)

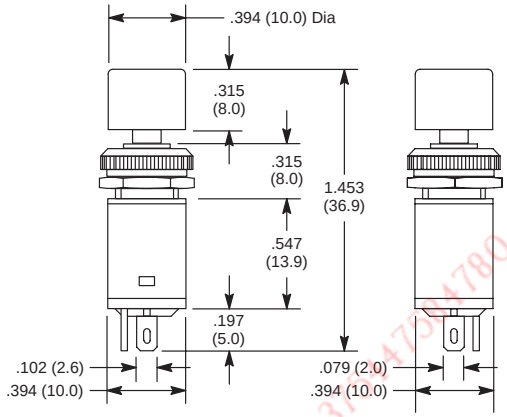
Pushbutton Switches

Panel Mount

NTE Type No.	Circuitry	Action		Actuator		Diag No.
				Material	Color	
54–382	SPST	OFF	ON	Molded Polyacetal Resin	Black	S70
54–383	SPDT	ON	ON	Molded Polyacetal Resin	Black	S70
54–384	SPST	OFF	(ON)	Molded Polyacetal Resin	Black	S70

SPECIAL NOTE: ( ) = Momentary Function

S70



Specifications

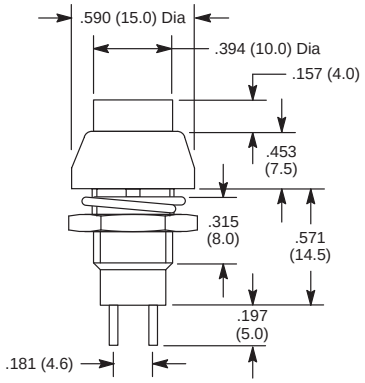
Current Rating: 3A 125VAC
Insulation Resistance: 100 Megohms (min.) at 500VDC
Dielectric Strength: 1000V RMS (min.)
Temperature Rating: +14° to +131°F (–10° to +55°C)
Electrical Life: 10,000 cycles; 5,000 cycles **(54–384 Only)**
Mechanical Life: 30,000 cycles
Terminal Type: Solder Lug
Mounting Hole: .323 (8.2)

Panel Mount, Round

NTE Type No.	Circuitry	Action		Actuator		Diag No.
				Material	Color	
54–388	SPST	OFF	(ON)	ABS Resin	Black	S72

SPECIAL NOTE: ( ) = Momentary Function

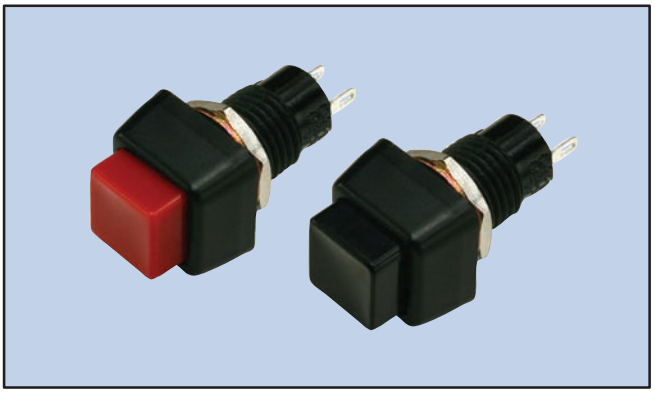
S72



Specifications

Current Rating: 3A 125VAC, 1A 250VAC
Insulation Resistance: 100 Megohms (min.) at 500VDC
Dielectric Strength: 1500V RMS (min.)
Temperature Rating: +14° to +131°F (–10° to +55°C)
Electrical Life: 50,000 cycles
Mechanical Life: 100,000 cycles
Terminal Type: Solder Lug
Mounting Hole: .402 (10.2)

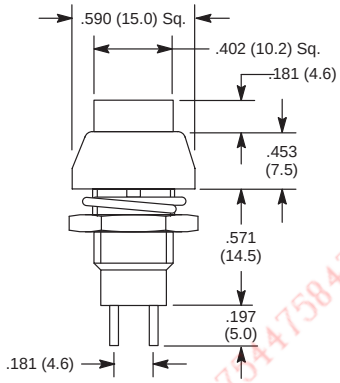
Panel Mount, Square



NTE Type No.	Circuitry	Action		Actuator		Diag No.
				Material	Color	
54–389	SPST	OFF	(ON)	ABS Resin	Black	S73
54–390–2	SPST	OFF	ON	ABS Resin	Black	S73
54–391–2	SPST	OFF	ON	ABS Resin	Red	S73

SPECIAL NOTE: ( ) = Momentary Function

S73



Specifications

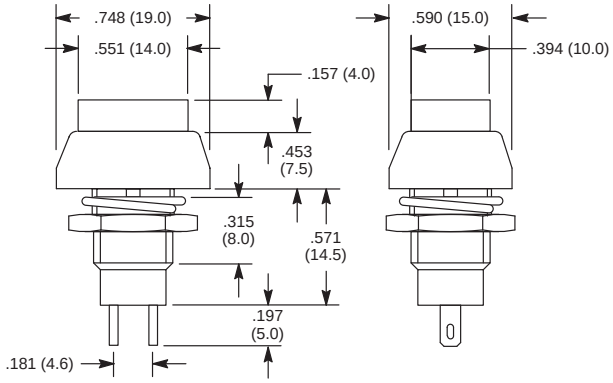
Current Rating: 3A 125VAC, 1A 250VAC
Insulation Resistance: 100 Megohms (min.) at 500VDC
Dielectric Strength: 1500V RMS (min.)
Temperature Rating: +14° to +131°F (–10° to +55°C)
Electrical Life: 50,000 cycles
Mechanical Life: 100,000 cycles
Terminal Type: Solder Lug
Mounting Hole: .402 (10.2)

Panel Mount, Rectangular

NTE Type No.	Circuitry	Action		Actuator		Diag No.
				Material	Color	
54–390	SPST	OFF	(ON)	ABS Resin	Black	S74
54–391	SPST	OFF	(ON)	ABS Resin	Red	S74

SPECIAL NOTE: ( ) = Momentary Function

S74



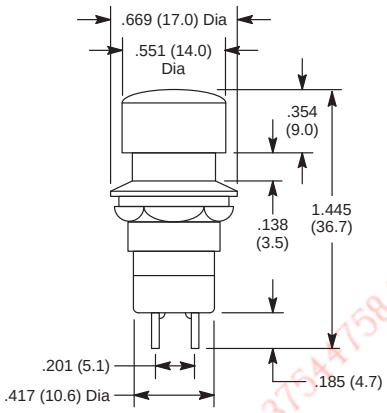
Specifications

Current Rating: 3A 125VAC, 1A 250VAC
Insulation Resistance: 100 Megohms (min.) at 500VDC
Dielectric Strength: 1500V RMS (min.)
Temperature Rating: +14° to +131°F (–10° to +55°C)
Electrical Life: 50,000 cycles
Mechanical Life: 100,000 cycles
Terminal Type: Solder Lug
Mounting Hole: .402 (10.2)

Panel Mount, Round

NTE Type No.	Circuitry	Action		Actuator		Diag No.
				Material	Color	
54–392	SPST	OFF	ON	ABS Resin	White	S75

S75



Specifications

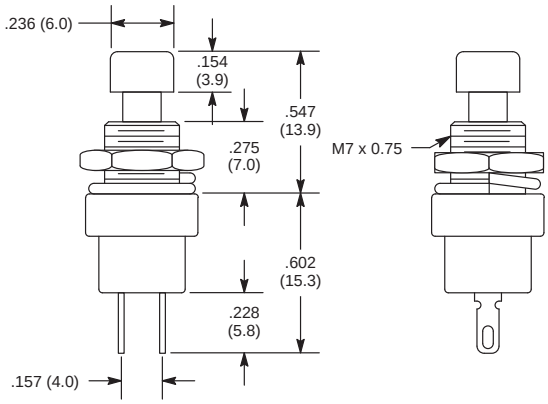
Current Rating: 3A 250VAC
Insulation Resistance: 100 Megohms (min.)
Dielectric Strength: 1500V RMS (min.)
Temperature Rating: +14° to +131°F (–10° to +55°C)
Electrical Life: 10,000 cycles
Mechanical Life: 30,000 cycles
Terminal Type: Solder Lug
Mounting Hole: .480 (12.2)

Panel Mount, Screw Type

NTE Type No.	Circuitry	Action		Actuator		Diag No.
				Material	Color	
54–394	SPST	OFF	(ON)	Nylon	Red	S88

SPECIAL NOTE: ( ) = Momentary Function

S88

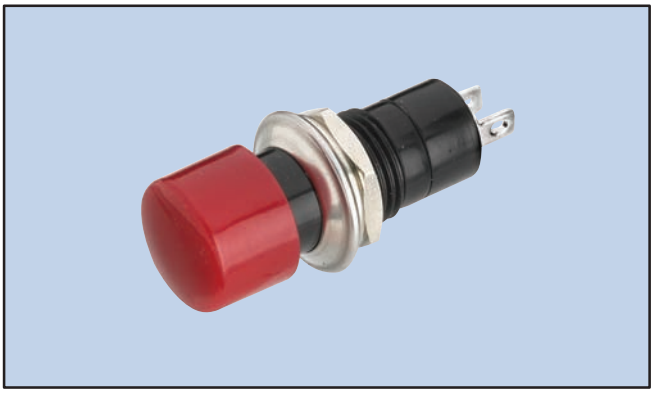


Specifications

Current Rating: 3A 250VAC, 1.5A 250VAC
Insulation Resistance: 100 Megohms (min.) at 500VDC
Dielectric Strength: 1000V RMS (min.)
Temperature Rating: –4° to +149°F (–20° to +65°C)
Electrical Life: 6000 cycles (min.)
Mechanical Life: 100,000 ycles (min.)
Terminal Type: Solder Lug
Mounting Hole: .275 (7.0)

Pushbutton Switches

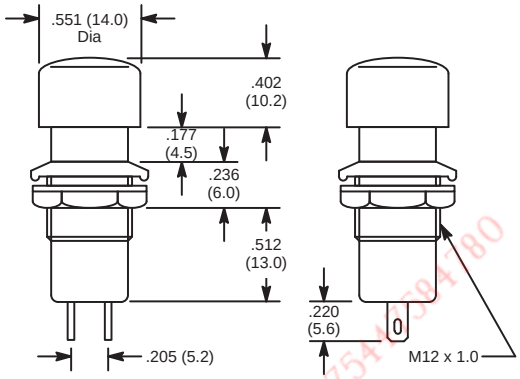
Metal Bezel, Screw Type



NTE Type No.	Circuitry	Action		Actuator		Diag No.
				Material	Color	
54–556	SPST	OFF	(ON)	ABS Resin	Red	S25
54–556–2	SPST	OFF	ON	ABS Resin	Red	S25
54–557	SPST	OFF	(ON)	ABS Resin	Yellow	S25
54–558	SPST	OFF	(ON)	ABS Resin	Black	S25

SPECIAL NOTE: ( ) = Momentary Function

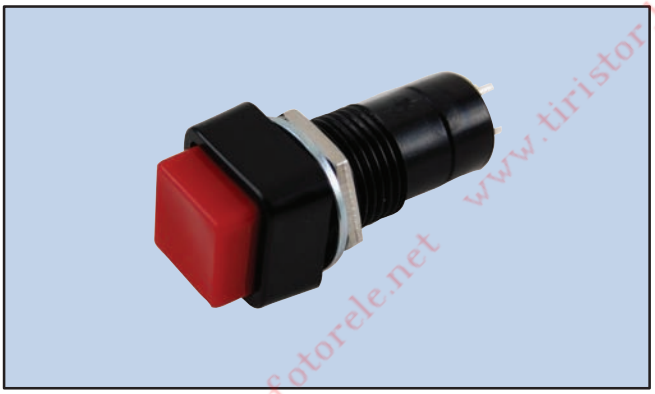
S25



Specifications

Current Rating: 3A 125VAC, 1.5A 250VAC
Insulation Resistance: 100 Megohms (min.) at 500VDC
Dielectric Strength: 1000V RMS (min.)
Temperature Rating: –4° to +149°F (–20° to +65°C)
Electrical Life: 6000 cycles (min.)
Mechanical Life: 100,000 cycles (min.)
Terminal Type: Solder Lug
Mounting Hole: .480 (12.2)

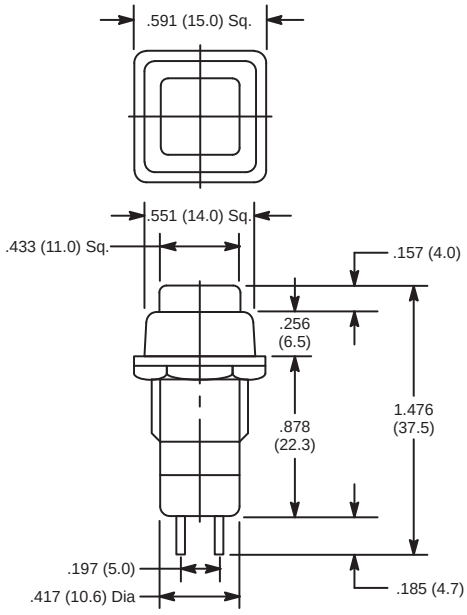
Panel Mount, Square Bezel



NTE Type No.	Circuitry	Action		Actuator		Diag No.
				Material	Color	
54–125	SPST	OFF	(ON)	Poly Oxy Methylene	Red	S109
NEW 54–125–2	SPST	OFF	ON	Poly Oxy Methylene	Red	S109

SPECIAL NOTE: ( ) = Momentary Function

S109



Specifications

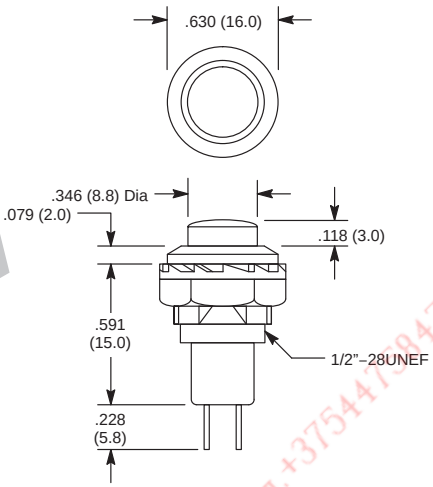
Current Rating: 3A 250VAC
Insulation Resistance: 100 Megohms (min.) at 500VDC
Dielectric Strength: 1500V RMS (min.)
1000V RMS (min.) **54–125–2**
Temperature Rating: +14° to +131°F (–10° to +55°C)
+32° to +149°F (0° to +65°C) **54–125–2**
Electrical Life: 5,000 cycles; 6,000 cycles **(54–125–2)**
Mechanical Life: 30,000 cycles; 10,000 cycles **(54–125–2)**
Terminal Type: Solder lug
Mounting Hole: .484 (12.3)

Panel Mount, Round

NTE Type No.	Circuitry	Action		Actuator		Diag No.
				Material	Color	
54–700–R	SPST	OFF	(ON)	Plastic	Red	S124
54–700–B	SPST	OFF	(ON)	Plastic	Black	S124

SPECIAL NOTE: ( ) = Momentary Function

S124



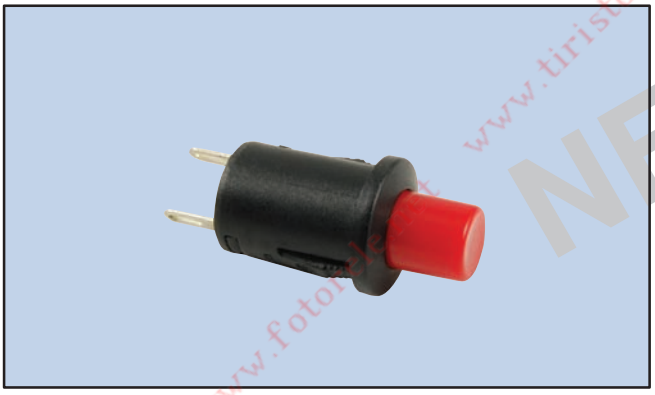
Specifications

Current Rating: 3A 125VAC; 1.5A 250VAC
Insulation Resistance: 100 Megohms (min.) at 500VDC
Dielectric Strength: 1000V RMS (min.), 1 minute
Temperature Rating: –13° to +185°F (–25° to +85°C)
Electrical Life: 6000 cycles
Mechanical Life: 100,000 cycles
Terminal Type: Solder Lug
Mounting Hole: .500 (12.7)

Snap–In, Round

Features

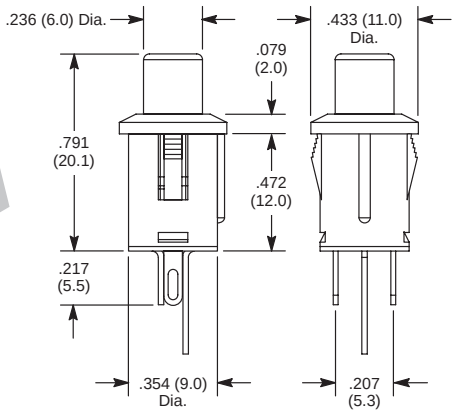
- **Snap–In Mounting, Easy to Install into Panel**



NTE Type No.	Circuitry	Action		Actuator		Diag No.
				Material	Color	
54–747–1	SPST	OFF	(ON)	PC	Red	S127

SPECIAL NOTE: ( ) = Momentary Function

S127

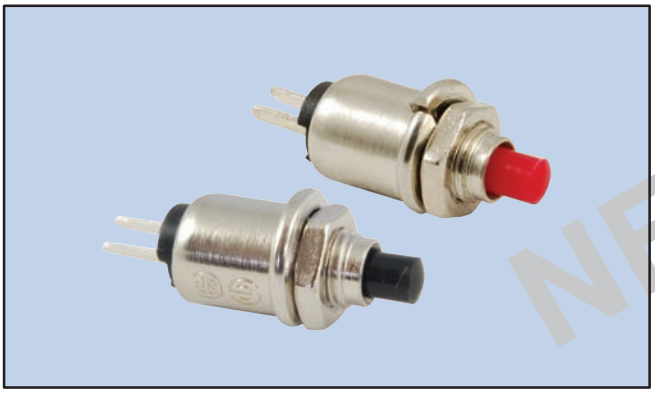


Specifications

Current Rating: 1A 125VAC; 0.5A 250VAC
Insulation Resistance: 100 Megohms (min.) at 500VDC
Dielectric Strength: 1000VAC, 1 minute
Temperature Rating: –4° to +185°F (–20° to +85°C)
Electrical Life: 6000 cycles
Mechanical Life: 100,000 cycles
Terminal Type: Solder Lug
Mounting Hole: .366 (9.3)

Pushbutton Switches

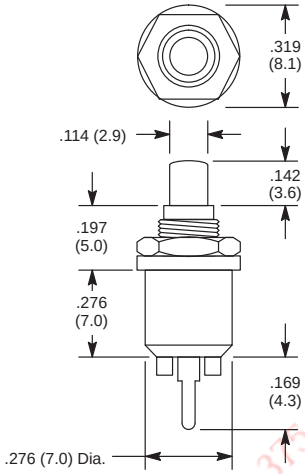
Round Hole, Metal Frame



NTE Type No.	Circuitry	Action		Actuator		Diag No.
				Material	Color	
54–735–R	SPST	OFF	(ON)	Polyoxymethylene	Red	S130
54–735–B	SPST	OFF	(ON)	Polyoxymethylene	Black	S130

SPECIAL NOTE: ( ) = Momentary Function

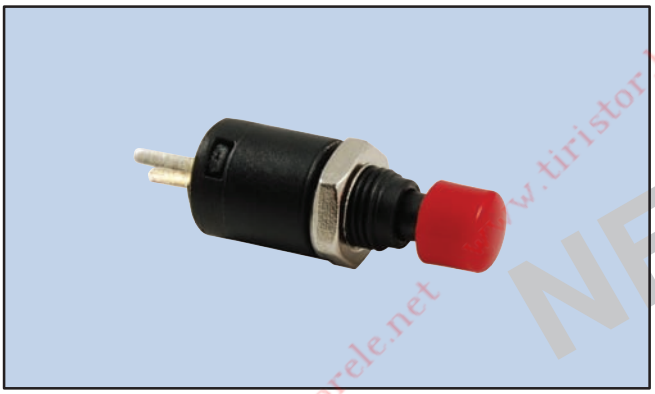
S130



Specifications

Current Rating: 0.5A 125VAC
Insulation Resistance: 100 Megohms (min.) at 500VDC
Dielectric Strength: 1500VAC, 1 minute
Temperature Rating: –4° to +149°F (–20° to +65°C)
Electrical Life: 6000 cycles
Mechanical Life: 10000 cycles
Terminal Type: PC Mount
Mounting Hole: .205 (5.2)

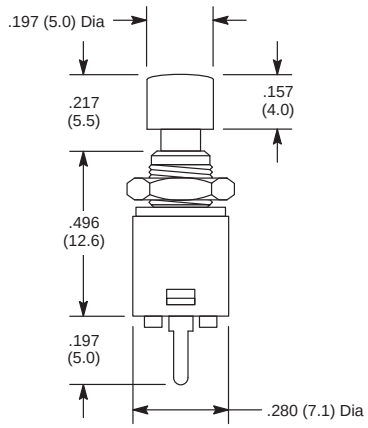
Panel Mount, Screw Type



NTE Type No.	Circuitry	Action		Actuator		Diag No.
				Material	Color	
54–744	SPST	OFF	(ON)	ABS	Red	S131

SPECIAL NOTE: ( ) = Momentary Function

S131



Specifications

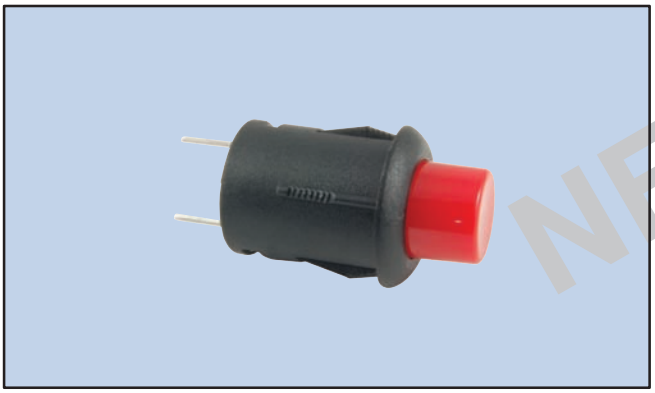
Current Rating: 1A 125VAC; 1A 250VAC
Insulation Resistance: 100 Megohms (min.) at 500VDC
Dielectric Strength: 1000VAC, 1 minute
Temperature Rating: –4° to +149°F (–20° to +65°C)
Electrical Life: 6000 cycles
Mechanical Life: 10000 cycles
Terminal Type: PC Mount
Mounting Hole: .205 (5.2)

Pushbutton Switches

Nylon Snap–In

Features

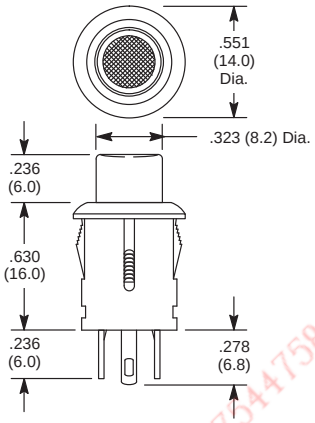
- **Snap–In Mounting, Easy to Install into Panel**



NTE Type No.	Circuitry	Action		Actuator		Diag No.
				Material	Color	
54–746	SPST	OFF	(ON)	PC	Red	S125

SPECIAL NOTE: ( ) = Momentary Function

S125



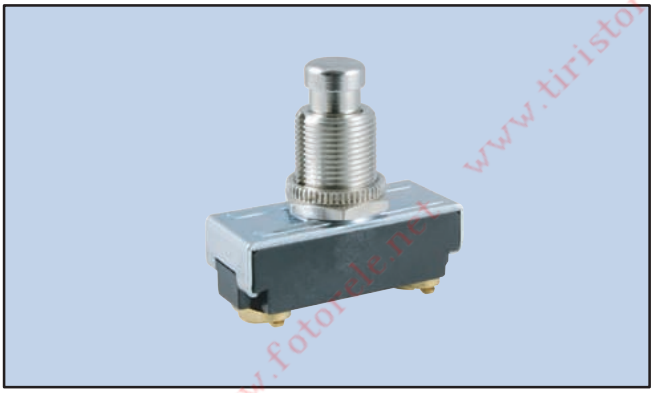
Specifications

Current Rating: 3A 125VAC; 1.5A 250VAC
Insulation Resistance: 100 Megohms (min.) at 500VDC
Dielectric Strength: 1500VAC RMS (min.), 1 minute
Temperature Rating: +32° to +149°F (+0° to +65°C)
Electrical Life: 6000 cycles
Mechanical Life: 10000 cycles
Terminal Type: Solder Lug
Mounting Hole: .476 (12.1)

Heavy Duty, Screw Terminals

Features

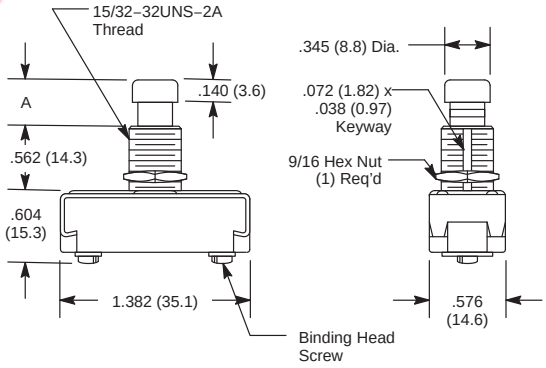
- **Momentary Action**
- **Slow Make, Slow Break Contacts**



NTE Type No.	Circuitry	Action		Actuator	Diag No.
54–650	SPST	ON	(OFF)	Brass/Nickel Plate	S120
54–651	SPST	OFF	(ON)	Brass/Nickel Plate	S120

SPECIAL NOTE: ( ) = Momentary Function

S120



Device Type	A
ON (OFF)	.240 (6.1)
OFF (ON)	.320 (8.1)

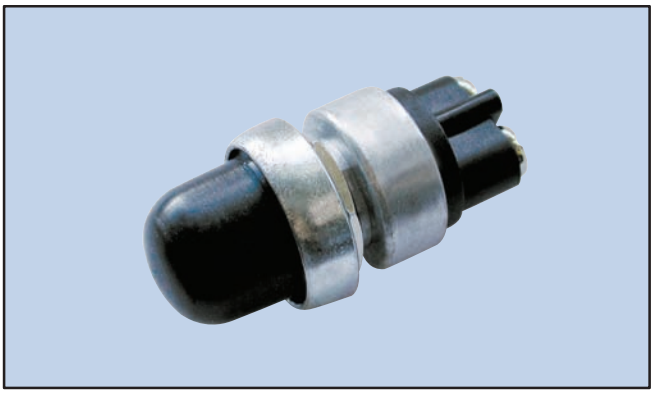
Specifications

Current Rating: 10A 250VAC, 15A 125VAC
Insulation Resistance: 100 Megohms (min.)
Dielectric Strength: 1000V RMS (min.)
Temperature Rating: +32° to +185°F (+0° to +85°C)
Electrical Life: 25,000 cycles
Mechanical Life: 100,000 cycles
Terminal Type: Screw Terminals
Mounting Hole: .500 (12.7)

Starter Button, Heavy Duty

Features

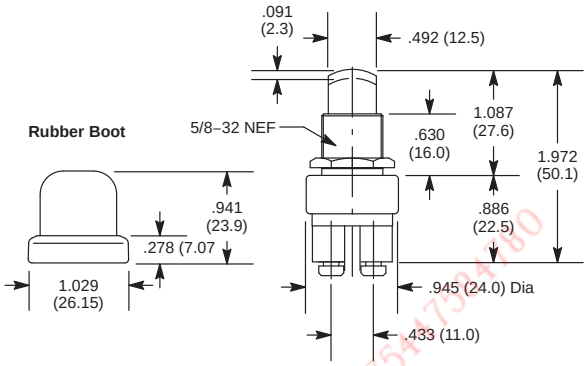
- Heavy Duty Die Cast Construction
- Rubber Dust and Moisture Resistant Boot Nut Included
- Starter Button Applications



NTE Type No.	Circuitry	Action		Actuator		Diag No.
				Material	Color	
54–576	SPST	OFF	(ON)	Nylon 66	Black	S87

SPECIAL NOTE: ( ) = Momentary Function

S87



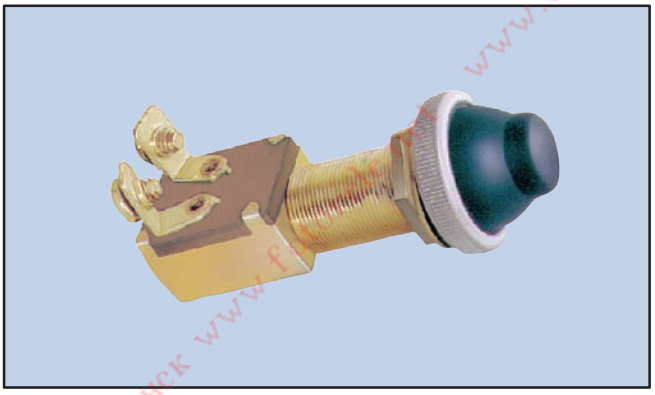
Specifications

Current Rating: 25A 6VDC, 50A 12VDC
Insulation Resistance: 100 Megohms (min.) at 500VDC
Dielectric Strength: 1500V RMS (min.)
Temperature Rating: +0° to +150°F (–18° to +65°C)
Electrical Life: 25,000 cycles
Mechanical Life: 100,000 cycles
Terminal Type: Screw Terminals
Mounting Hole: .630 (16.0)

Starter & Horn Button, Single Pole

Features

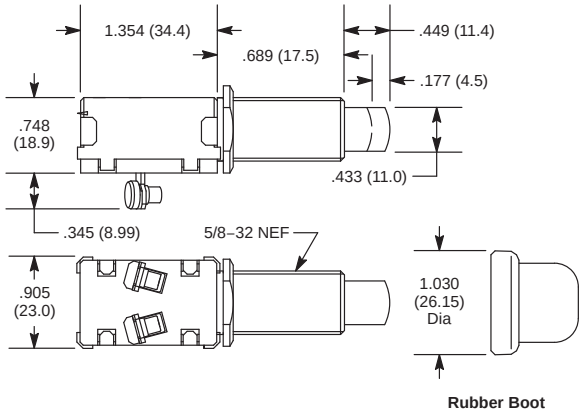
- Moisture Proof and Dust Proof Rubber Cap
- Starter and Horn Switch Applications



NTE Type No.	Circuitry	Action		Actuator		Diag No.
				Material	Color	
54–577	SPST	OFF	(ON)	Nickel Plated Copper	Black	S91

SPECIAL NOTE: ( ) = Momentary Function

S91



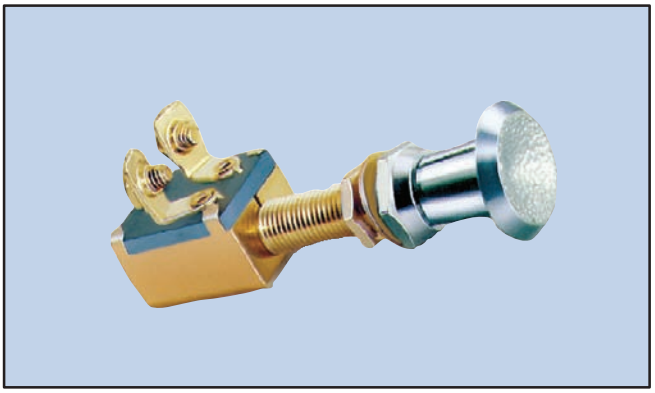
Specifications

Current Rating: 25A 6VDC, 15A 12VDC
Insulation Resistance: 100 Megohms (min.) at 500VDC
Dielectric Strength: 1500V RMS (min.)
Temperature Rating: +0° to +150°F (–18° to +65°C)
Electrical Life: 25,000 cycles
Mechanical Life: 1000,000 cycles
Terminal Type: Screw Terminals
Mounting Hole: .630 (16.0)

Push–Pull, Single Pole

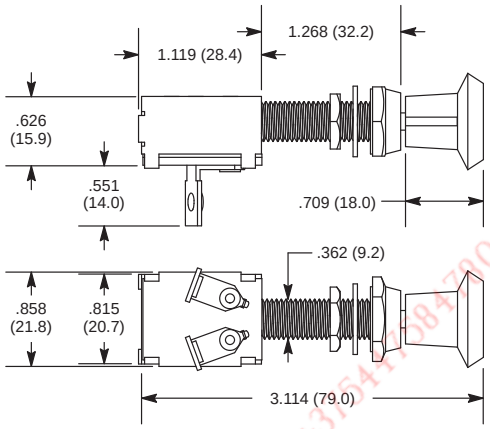
Features

- **Heavy Duty, 2–Position Push–Pull Switch**
- **Mounting Stem: 1 1/4" Long, 3/" Diameter**



NTE Type No.	Circuitry	Action		Actuator		Diag No.
				Material	Color	
54–578	SPST	OFF	ON	Brass	Chrome	S96

S96



Specifications

Current Rating: 25A 6VDC, 15A 12VDC
Insulation Resistance: 100 Megohms (min.) at 500VDC
Dielectric Strength: 1500V RMS (min.)
Temperature Rating: +0° to +150°F (–18° to +65°C)
Electrical Life: 30,000 cycles
Mechanical Life: 30,000 cycles
Terminal Type: Screw Terminals
Mounting Hole: .375 (9.52)

Pushbutton Switches

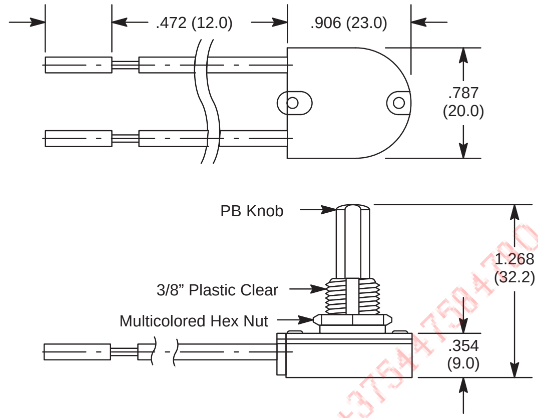
Canopy Switch

Features

- Single Circuit Canopy Switch
- Sequence – Load 1 On, Load 1 Off
- One–Piece Construction Eliminates the Need for a Hex Lock Nut

NTE Type No.	Circuitry	Action		Actuator	Diag No.
54–660	SPST	ON	OFF	3/8" Brass Plate	S121

S121



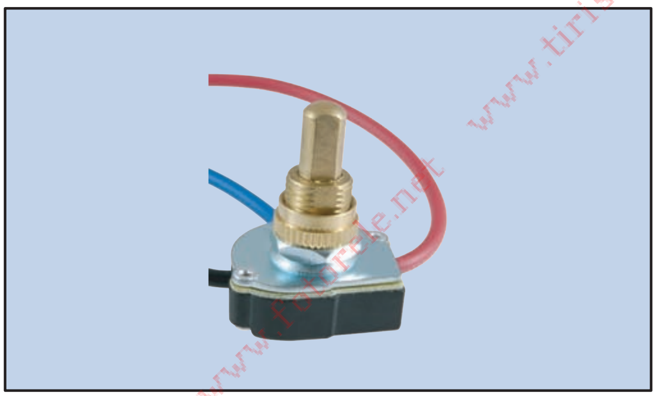
Specifications

Current Rating: 3A 250VAC, 6A 125VAC, 6A 125VL
Insulation Resistance: 100 Megohms (min.)
Dielectric Strength: 1500V RMS (min.)
Temperature Rating: +32° to +185°F (+0° to +85°C)
Electrical Life: 6,000 cycles (min.)
Mechanical Life: 6,000 cycles (min.)
Terminal Type: 18 AWG, 6" length
Mounting Hole: .393 (10.0)

Canopy Switch

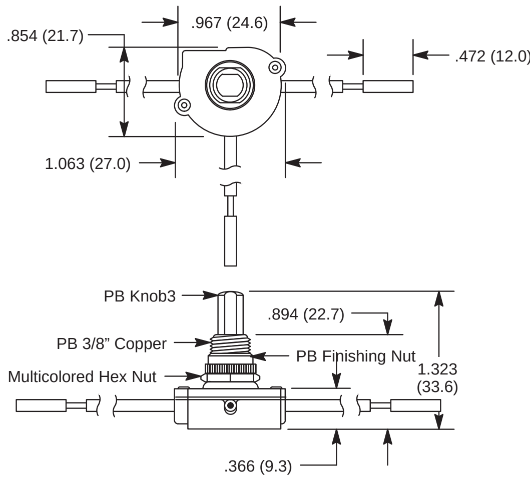
Features

- 2 Circuit, 4 Position Canopy Switch
- Sequence – Load 1 On, Load 2 On, Load 1 & 2 On, All Off



NTE Type No.	Sequence				Actuator	Diag No.
	Load 1	Load 2	Load 1& 2	All		
54–662	ON	ON	ON	OFF	3/8" Brass Plate	S122

S122



Specifications

Current Rating: 1A 125VT, 3A 250VAC, 6A 125VAC, 6A 125VL
Insulation Resistance: 100 Megohms (min.)
Dielectric Strength: 1500V RMS (min.)
Temperature Rating: +32° to +185°F (+0° to +85°C)
Electrical Life: 6,000 cycles (min.)
Mechanical Life: 6,000 cycles (min.)
Terminal Type: 18 AWG, 6" length
Mounting Hole: .393 (10.0)

Illuminated Pushbutton Switches

Single Pole, Snap–In

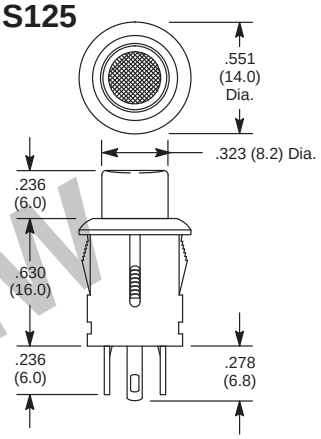
Features

- **Snap–In Mounting, Easy to Install into Panel**

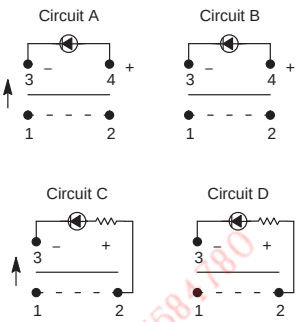
NTE Type No.	Circuitry	Action		Actuator Material	Actuator Color	Lamp Voltage	Circuit	Diag No.
54–701–A	SPST	OFF	ON	PC	Amber	3V	B	S125
54–701–R	SPST	OFF	ON	PC	Red	3V	B	S125
54–702–A	SPST	OFF	(ON)	PC	Amber	3V	A	S125
54–702–R	SPST	OFF	(ON)	PC	Red	3V	A	S125
54–703–A	SPST	OFF	(ON)	PC	Amber	12V	C	S125
54–703–R	SPST	OFF	(ON)	PC	Red	12V	C	S125
54–704–A	SPST	OFF	ON	PC	Amber	12V	D	S125
54–704–R	SPST	OFF	ON	PC	Red	12V	D	S125

SPECIAL NOTE: ( ) = Momentary Function

S125



Wiring Diagrams



Specifications

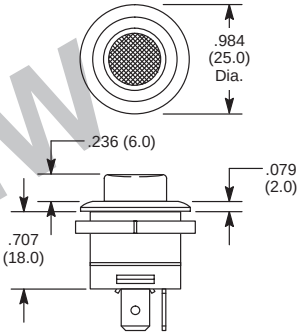
Current Rating: 3A 125VAC; 1.5A 250VAC
6A 14VDC; 3A 28VDC
LED Rating: V_F = 2.0V, I_F = 20mA (Amber)
V_F = 1.7V, I_F = 20mA (Red)
Insulation Resistance: 100 Megohms (min.) at 500VDC
Dielectric Strength: 1000VAC RMS (min.), 1 minute
Temperature Rating: +32° to +149°F (0° to +65°C)
Electrical Life: 6000 cycles
Mechanical Life: 100,000 cycles
Terminal Type: Solder Lug
Mounting Hole: .476 (12.1)

Single Pole

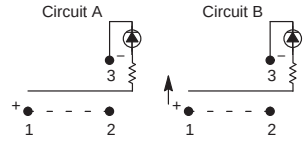
NTE Type No.	Circuitry	Action		Actuator Material	Actuator Color	Lamp Voltage	Circuit	Diag No.
54–707	SPST	OFF	ON	PC	Red	12V	A	S126
54–708	SPST	OFF	(ON)	PC	Red	12V	B	S126

SPECIAL NOTE: ( ) = Momentary Function

S126



Wiring Diagrams



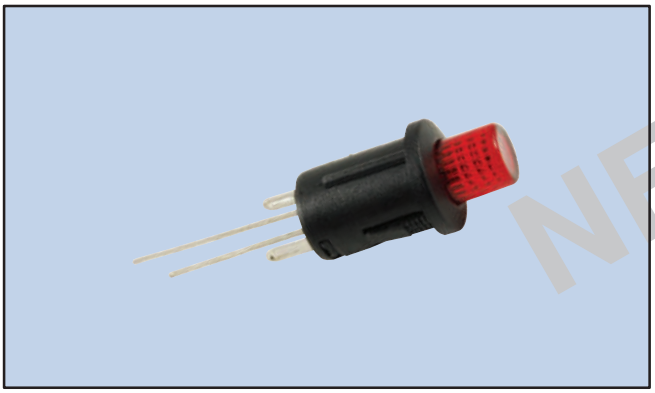
Specifications

Current Rating: 10A 14VDC; 5A 24VDC
LED Rating: 12V LED (DC)
Insulation Resistance: 100 Megohms (min.) at 500VDC
Dielectric Strength: 1500VAC RMS (min.), 1 minute
Temperature Rating: –13° to +185°F (–25° to +85°C)
Electrical Life: 25,000 cycles
Mechanical Life: 100,000 cycles
Terminal Type: .250" Quick Connect
Mounting Hole: .866 (22.0)

Single Pole, Snap–In

Features

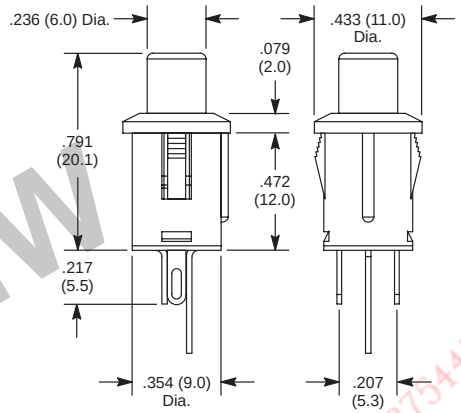
- **Snap–In Mounting, Easy to Install into Panel**



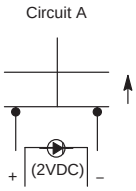
NTE Type No.	Circuitry	Action		Actuator Material	Actuator Color	Lamp Voltage	Circuit	Diag No.
54–747–2	SPST	OFF	(ON)	PC	Red	2VDC	A	S127

SPECIAL NOTE: ( ) = Momentary Function

S127



Wiring Diagrams



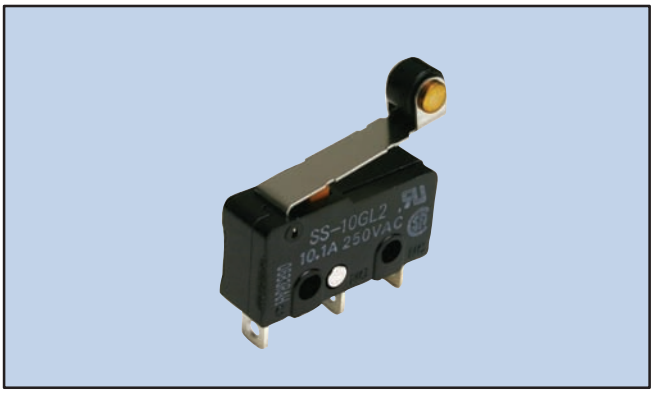
Specifications

Current Rating: 1A 125VAC; 0.5A 250VAC
LED Rating: 2V LED (DC)
Insulation Resistance: 100 Megohms (min.) at 500VDC
Dielectric Strength: 1000VAC, 1 minute
Temperature Rating: –4° to +185°F (–20° to +85°C)
Electrical Life: 6000 cycles
Mechanical Life: 100,000 cycles
Terminal Type: Solder Lug
Mounting Hole: .366 (9.3)

Subminiature

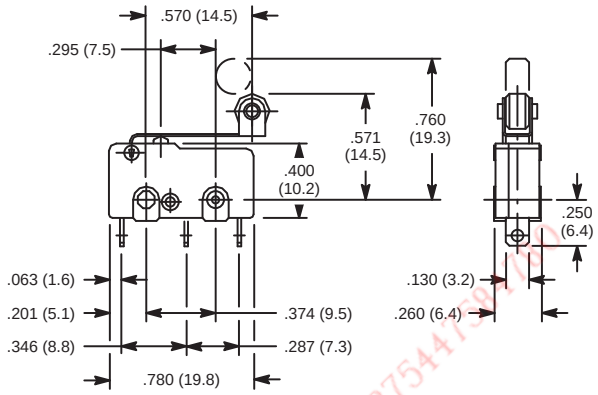
Features

- **Actuator: Hinge Roller Lever**



NTE Type No.	Circuitry	Max. Free Position	Min. Over Travel	Max. Operating Force	Max. Differential	Diag No.
54–416	SPDT	0.693"	0.032"	55g	0.032"	S45

S45



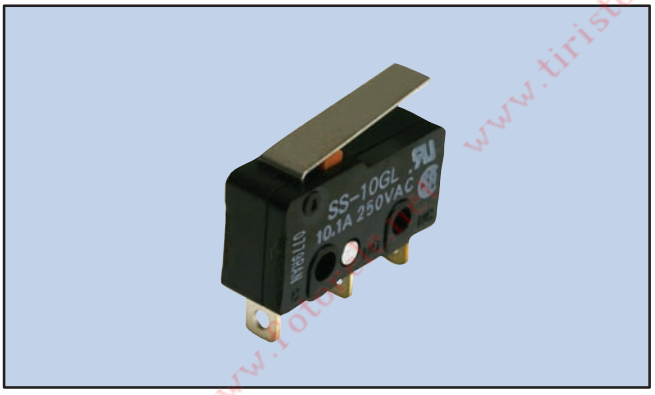
Specifications

Current Rating: 10A 125VAC
Contact Resistance: 30 Milliohms (max.) initial
Insulation Resistance: 100 Megohms at 500VDC
Dielectric Strength: 1000VAC (50/60Hz for 1 minute)
Temperature Rating: –13° to +185°F (–25° to +85°C)
Electrical Life: 50,000 cycles min.
Mechanical Life: 1,000,000 cycles min.
Terminal Type: Solder Terminals

Submimiature

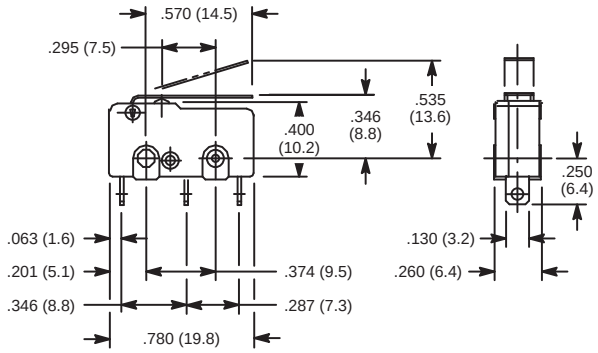
Features

- **Actuator: Hinge Lever**



NTE Type No.	Circuitry	Max. Free Position	Min. Over Travel	Max. Operating Force	Max. Differential	Diag No.
54–417	SPDT	0.469"	0.039"	55g	0.032"	S46

S46



Specifications

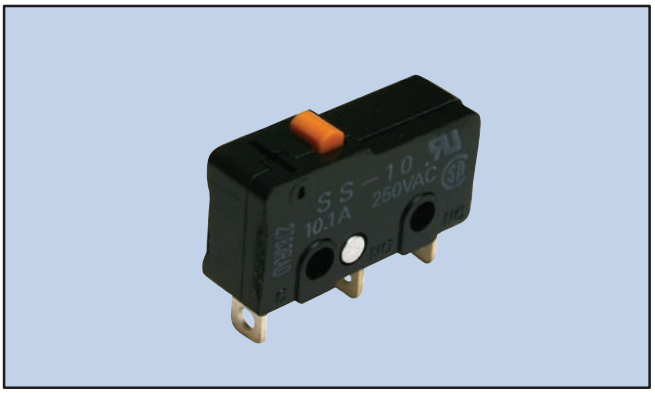
Current Rating: 10A 125VAC
Contact Resistance: 30 Milliohms (max.) initial
Insulation Resistance: 100 Megohms at 500VDC
Dielectric Strength: 1000VAC (50/60Hz for 1 minute)
Temperature Rating: –13° to +185°F (–25° to +85°C)
Electrical Life: 50,000 cycles min.
Mechanical Life: 1,000,000 cycles min.
Terminal Type: Solder Terminals

Snap Action Switches

Subminiature

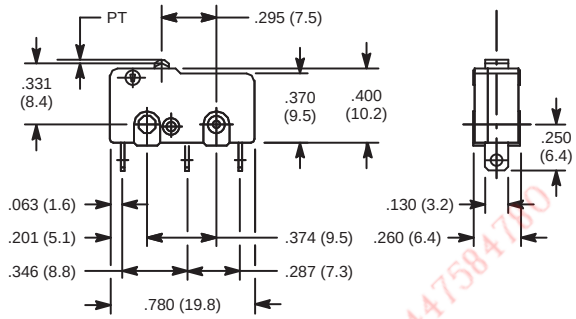
Features

- **Actuator: Pin Plunger**



NTE Type No.	Circuitry	Max. Pre–Travel	Min. Over Travel	Max. Operating Force	Max. Differential	Diag No.
54–418	SPDT	0.024"	0.016"	150g	0.005"	S47

S47



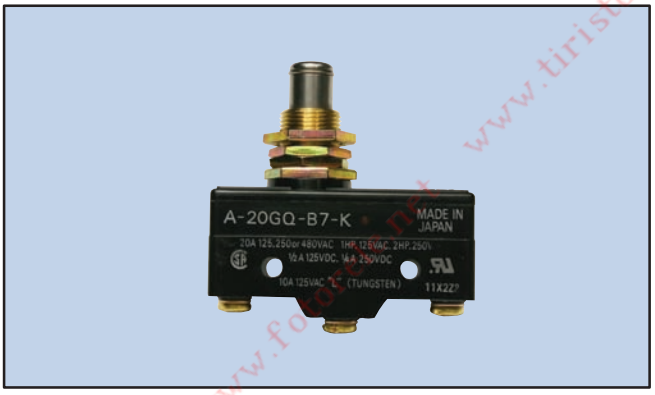
Specifications

Current Rating: 10.1A 125/250VAC, 0.4A 125VDC, 0.2A 250VDC
Contact Resistance: 30 Milliohms (max.) initial
Insulation Resistance: 100 Megohms at 500VDC
Dielectric Strength: 1000VAC (50/60Hz for 1 minute)
Temperature Rating: –13° to +185°F (–25° to +85°C) with no icing
Electrical Life: 50,000 cycles min. (under rated load)
Mechanical Life: 10,000,000 cycles min.
Terminal Type: Solder Terminals

General Purpose

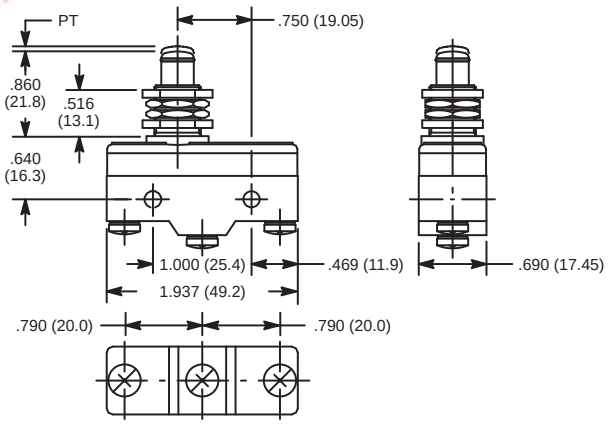
Features

- **Actuator: Panel Mount Plunger**



NTE Type No.	Circuitry	Max. Pre–Travel	Min. Over Travel	Max. Operating Force	Max. Differential	Diag No.
54–450	SPDT	0.05"	0.22"	625g	0.01"	S39

S39



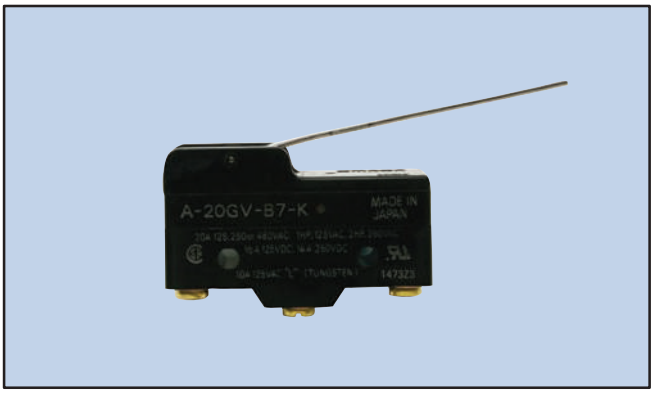
Specifications

Current Rating: 20A 125/250/480VAC, 10A 125VAC "L" (Tungsten)
0.5A 125VDC, 0.25A 250VDC, 1 HP 125VAC, 2 HP 250VA
Contact Resistance: 15 Milliohms (max.) initial
Insulation Resistance: 100 Megohms (min.) at 500VDC
Dielectric Strength: 1000VAC (50/60Hz for 1 minute)
Temperature Rating: –13° to +176°F (–25° to +80°C)
Electrical Life: 500,000 cycles min. (under rated load)
Mechanical Life: 1,000,000 cycles min.
Terminal Type: Screw Terminals

General Purpose

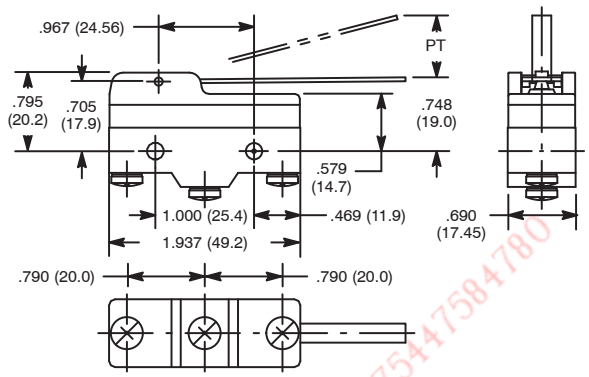
Features

- **Actuator: Long Hinge Lever**



NTE Type No.	Circuitry	Max. Pre–Travel	Min. Over Travel	Max. Operating Force	Max. Differential	Diag No.
54–451	SPDT	0.63”	0.16”	70g	0.09”	S40

S40



Specifications

Current Rating: 15A 125/250/480VAC, 10A 125VAC “L” (Tungsten)
0.5A 125VDC, 0.25A 250VDC, 1 HP 125VAC, 2 HP 250VA
Contact Resistance: 15 Milliohms (max.) initial
Insulation Resistance: 100 Megohms (min.) at 500VDC
Dielectric Strength: 1000VAC (50/60Hz for 1 minute)
Temperature Rating: –13° to +176°F (–25° to +80°C)
Electrical Life: 500,000 cycles min. (under rated load)
Mechanical Life: 1,000,000 cycles min.
Terminal Type: Screw Terminals

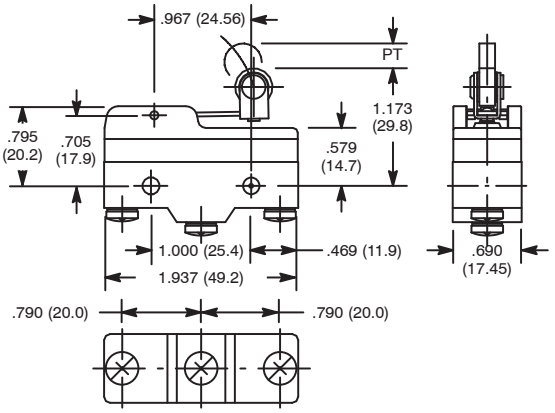
General Purpose

Features

- **Actuator: Short Hinge Roller Lever**

NTE Type No.	Circuitry	Max. Pre–Travel	Min. Over Travel	Max. Operating Force	Max. Differential	Diag No.
54–452	SPDT	0.25”	0.05”	160g	0.05”	S41

S41



Specifications

Current Rating: 20A 125/250/480VAC, 10A 125VAC “L” (Tungsten)
0.5A 125VDC, 0.25A 250VDC, 1 HP 125VAC, 2 HP 250VA
Contact Resistance: 15 Milliohms (max.) initial
Insulation Resistance: 100 Megohms (min.) at 500VDC
Dielectric Strength: 1000VAC (50/60Hz for 1 minute)
Temperature Rating: –13° to +176°F (–25° to +80°C)
Electrical Life: 500,000 cycles min. (under rated load)
Mechanical Life: 1,000,000 cycles min.
Terminal Type: Screw Terminals

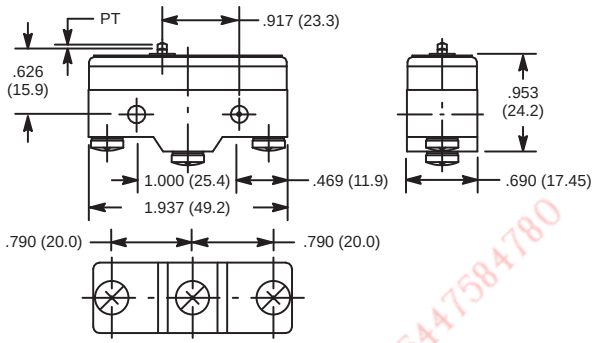
General Purpose

Features

- **Actuator: Pin Plunger**

NTE Type No.	Circuitry	Max. Pre–Travel	Min. Over Travel	Max. Operating Force	Max. Differential	Diag No.
54–453	SPDT	0.016"	0.005"	350g	0.002"	S42

S42



Specifications

Current Rating: 20A 125/250 VAC, 0.5A 125/250 VDC
Contact Resistance: 15 Milliohms (max.) initial
Insulation Resistance: 100 Megohms (min.) at 500VDC
Dielectric Strength: 1000VAC (50/60Hz for 1 minute)
Temperature Rating: –13° to +176°F (–25° to +80°C)
Electrical Life: 100,000 cycles min. (under rated load)
Mechanical Life: 1,000,000 cycles min.
Terminal Type: Screw Terminals

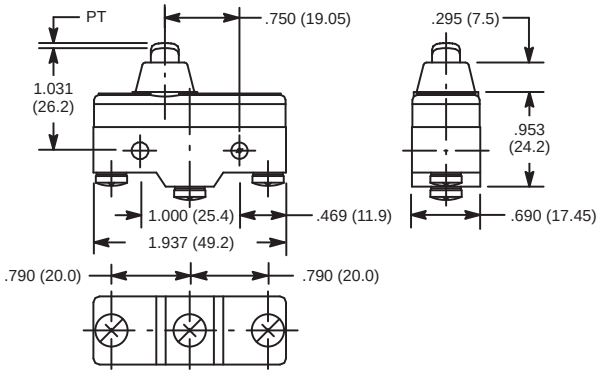
General Purpose

Features

- **Actuator: Short Spring Plunger**

NTE Type No.	Circuitry	Max. Pre–Travel	Min. Over Travel	Max. Operating Force	Max. Differential	Diag No.
54–454	SPDT	0.05"	0.12"	625g	0.01"	S43

S43



Specifications

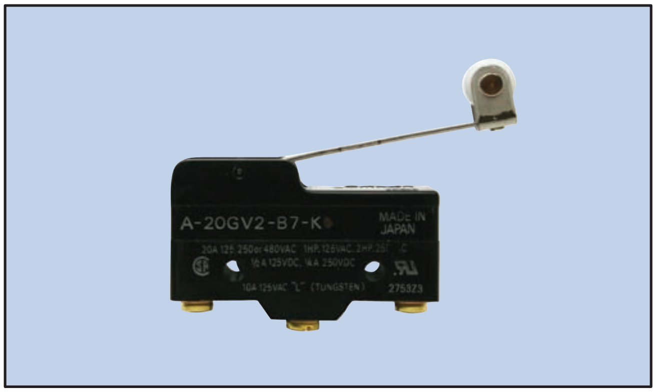
Current Rating: 20A 125/250/480VAC, 10A 125VAC "L" (Tungsten)
0.5A 125VDC, 0.25A 250VDC, 1 HP 125VAC, 2 HP 250VA
Contact Resistance: 15 Milliohms (max.) initial
Insulation Resistance: 100 Megohms (min.) at 500VDC
Dielectric Strength: 1000VAC (50/60Hz for 1 minute)
Temperature Rating: –13° to +176°F (–25° to +80°C)
Electrical Life: 500,000 cycles min. (under rated load)
Mechanical Life: 1,000,000 cycles min.
Terminal Type: Screw Terminals

Snap Action Switches

General Purpose

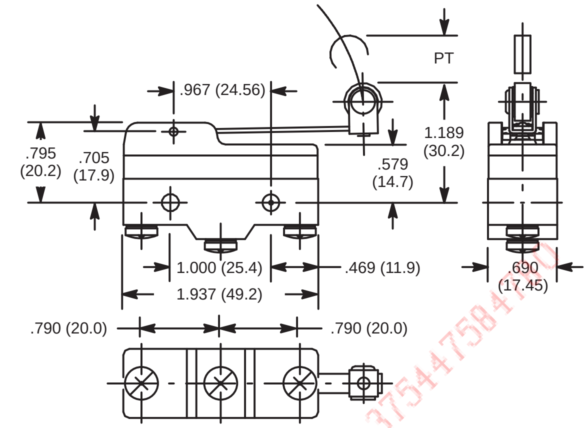
Features

- **Actuator: Hinge Roller Lever**



NTE Type No.	Circuitry	Max. Pre–Travel	Min. Over Travel	Max. Operating Force	Max. Differential	Diag No.
54–455	SPDT	0.28”	0.16”	100g	0.04”	S44

S44



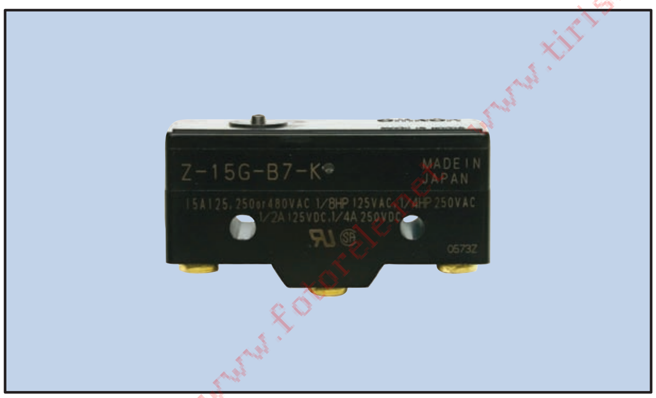
Specifications

Current Rating: 15A 125/250/480VAC, 10A 125VAC “L” (Tungsten)
0.5A 125VDC, 0.25A 250VDC, 1 HP 125VAC, 2 HP 250VA
Contact Resistance: 15 Milliohms (max.) initial
Insulation Resistance: 100 Megohms (min.) at 500VDC
Dielectric Strength: 1000VAC (50/60Hz for 1 minute)
Temperature Rating: –13° to +176°F (–25° to +80°C)
Electrical Life: 500,000 cycles min. (under rated load)
Mechanical Life: 1,000,000 cycles min.
Terminal Type: Screw Terminals

Standard

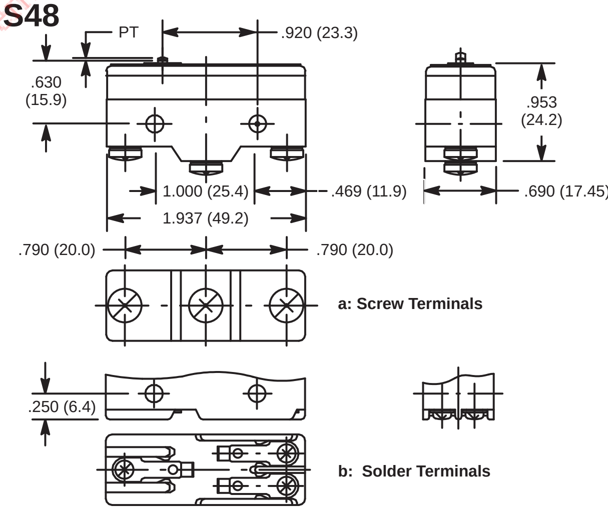
Features

- **Actuator: Pin Plunger**



NTE Type No.	Circuitry	Max. Pre–Travel	Min. Over Travel	Max. Operating Force	Max. Differential	Diag No.
54–423	SPDT	0.02”	0.01”	350g	0.002”	S48a
54–435	SPDT	0.02”	0.01”	350g	0.002”	S48b

S48



Specifications

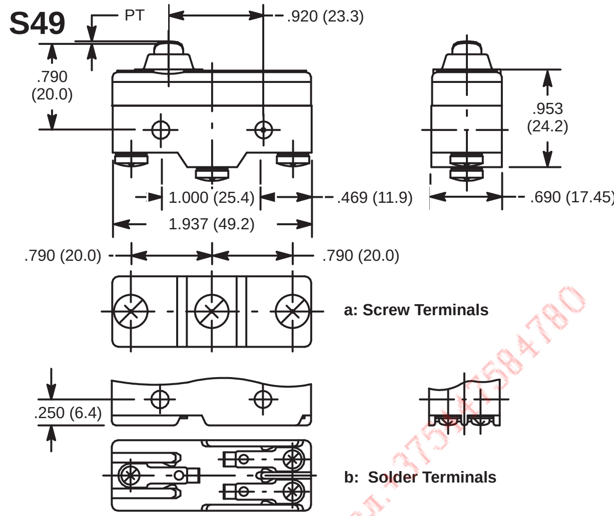
Current Rating: 15A 125/250/480VAC, 0.5A 125VDC, 0.25A 250VDC
1/8 HP 125VAC, 1/4 HP 250VA
Contact Resistance: 50 Milliohms (max.) initial
Insulation Resistance: 100 Megohms at 500VDC
Dielectric Strength: 1000VAC (50/60Hz for 1 minute)
Temperature Rating: –13° to +176°F (–25° to +80°C) with no icing
Electrical Life: 500,000 cycles min. (under rated load)
Mechanical Life: 20,000,000 cycles min.
Terminal Type: Refer to Diag No. in Table

Standard

Features

- **Actuator: Short Spring Plunger**

NTE Type No.	Circuitry	Max. Pre–Travel	Min. Over Travel	Max. Operating Force	Max. Differential	Diag No.
54–424	SPDT	0.02"	0.06"	350g	0.002"	S49a
54–437	SPDT	0.02"	0.06"	350g	0.002"	S49b



Specifications

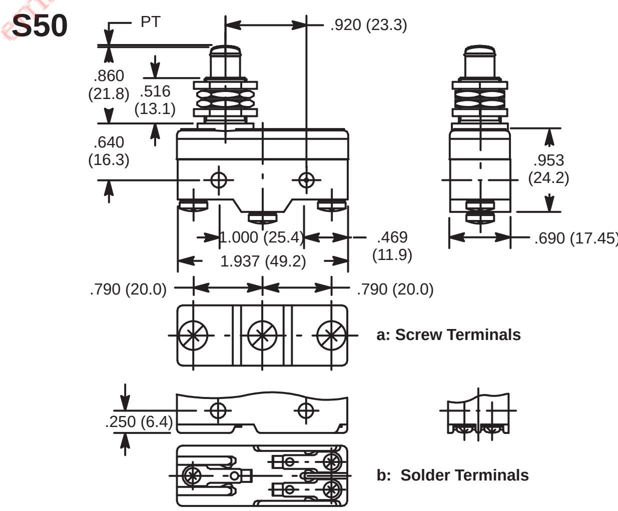
Current Rating: 15A 125/250/480VAC, 0.5A 125VDC, 0.25A 250VDC
1/8 HP 125VAC, 1/4 HP 250VA
Contact Resistance: 50 Milliohms (max.) initial
Insulation Resistance: 100 Megohms at 500VDC
Dielectric Strength: 1000VAC (50/60Hz for 1 minute)
Temperature Rating: –13° to +176°F (–25° to +80°C) with no icing
Electrical Life: 500,000 cycles min. (under rated load)
Mechanical Life: 20,000,000 cycles min.
Terminal Type: Refer to Diag No. in Table

Standard

Features

- **Actuator: Panel Mount Plunger**

NTE Type No.	Circuitry	Max. Pre–Travel	Min. Over Travel	Max. Operating Force	Max. Differential	Diag No.
54–425	SPDT	0.02"	0.22"	350g	0.002"	S50a
54–433	SPDT	0.02"	0.22"	350g	0.002"	S50b



Specifications

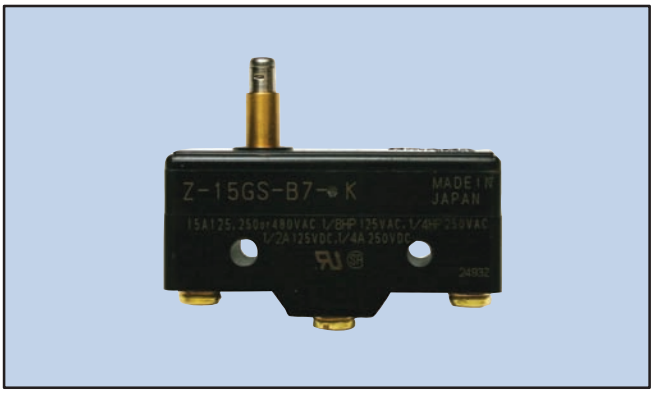
Current Rating: 15A 125/250/480VAC, 0.5A 125VDC, 0.25A 250VDC
1/8 HP 125VAC, 1/4 HP 250VA
Contact Resistance: 50 Milliohms (max.) initial
Insulation Resistance: 100 Megohms at 500VDC
Dielectric Strength: 1000VAC (50/60Hz for 1 minute)
Temperature Rating: –13° to +176°F (–25° to +80°C) with no icing
Electrical Life: 500,000 cycles min. (under rated load)
Mechanical Life: 20,000,000 cycles min.
Terminal Type: Refer to Diag No. in Table

Snap Action Switches

Standard

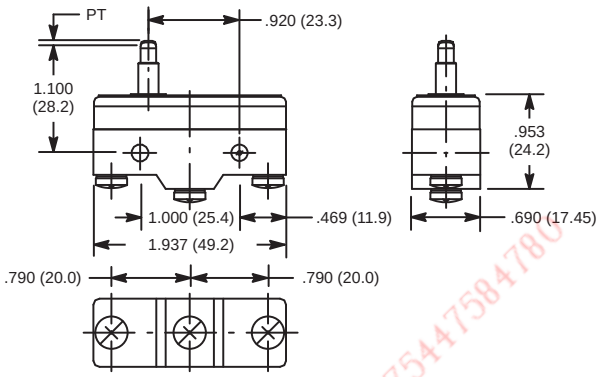
Features

- **Actuator: Slim Spring Plunger**



NTE Type No.	Circuitry	Max. Pre–Travel	Min. Over Travel	Max. Operating Force	Max. Differential	Diag No.
54–426	SPDT	0.02"	0.06"	350g	0.002"	S51

S51



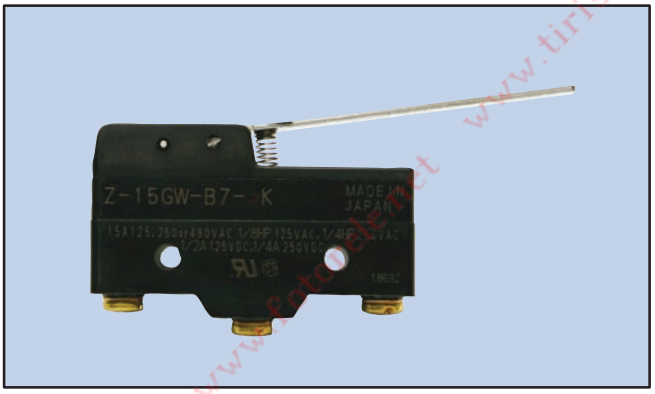
Specifications

Current Rating: 15A 125/250/480VAC, 0.5A 125VDC, 0.25A 250VDC
1/8 HP 125VAC, 1/4 HP 250VA
Contact Resistance: 50 Milliohms (max.) initial
Insulation Resistance: 100 Megohms at 500VDC
Dielectric Strength: 1000VAC (50/60Hz for 1 minute)
Temperature Rating: –13° to +176°F (–25° to +80°C) with no icing
Electrical Life: 500,000 cycles min. (under rated load)
Mechanical Life: 20,000,000 cycles min.
Terminal Type: Screw Terminal

Standard

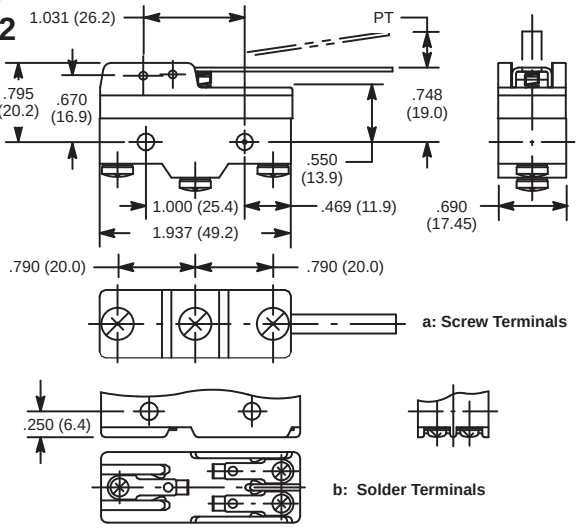
Features

- **Actuator: Long Hinge Lever**



NTE Type No.	Circuitry	Max. Pre–Travel	Min. Over Travel	Max. Operating Force	Max. Differential	Diag No.
54–427	SPDT	0.022"	0.05"	70g	0.05"	S52a
54–432	SPDT	0.022"	0.05"	70g	0.05"	S52b

S52



Specifications

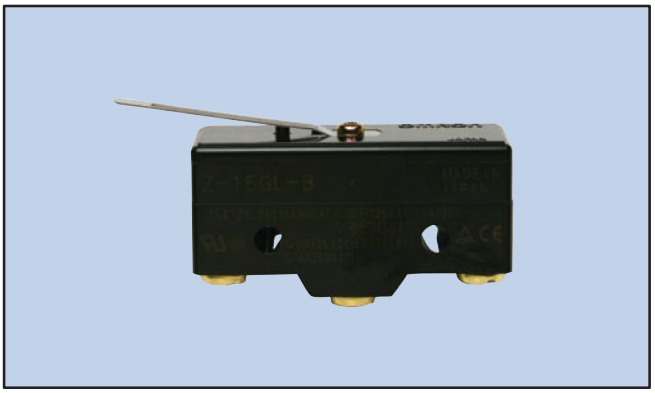
Current Rating: 15A 125/250/480VAC, 0.5A 125VDC, 0.25A 250VDC
1/8 HP 125VAC, 1/4 HP 250VA
Contact Resistance: 50 Milliohms (max.) initial
Insulation Resistance: 100 Megohms at 500VDC
Dielectric Strength: 1000VAC (50/60Hz for 1 minute)
Temperature Rating: –13° to +176°F (–25° to +80°C) with no icing
Electrical Life: 500,000 cycles min. (under rated load)
Mechanical Life: 20,000,000 cycles min.
Terminal Type: Refer to Diag No. in Table

Snap Action Switches

Standard

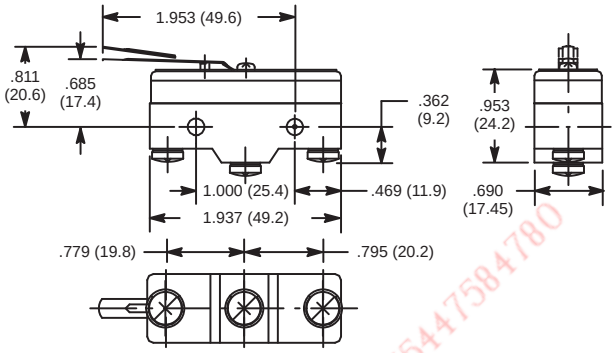
Features

- **Actuator: Hinge Lever**



NTE Type No.	Circuitry	Max. Pre–Travel	Min. Over Travel	Max. Operating Force	Max. Differential	Diag No.
54–428	SPDT	0.157”	0.063”	141g	0.051”	S53

S53



Specifications

Current Rating: 15A 125/250VAC, 0.5A 125VDC, 0.25A 250VDC
1/8 HP 125VAC, 1/4 HP 250VAC
Contact Resistance: 15 Milliohms (max.) initial
Insulation Resistance: 100 Megohms at 500VDC
Dielectric Strength: 1500VAC (50/60Hz for 1 minute)
Temperature Rating: –13° to +176°F (–25° to +80°C)
Electrical Life: 100,000 cycles min. (under rated load)
Mechanical Life: 1,000,000 cycles min.
Terminal Type: Screw Terminal

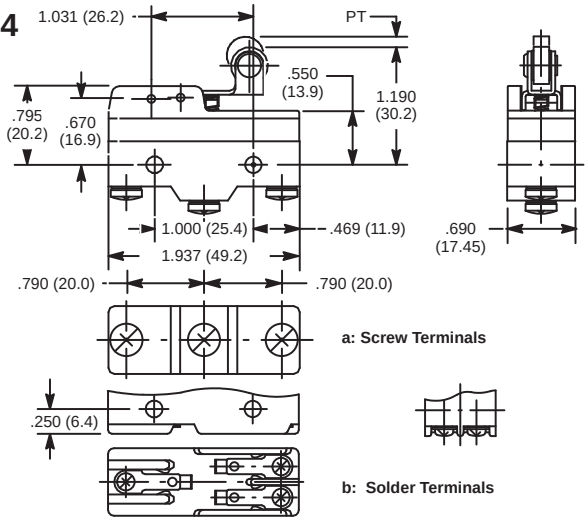
Standard

Features

- **Actuator: Short Hinge Roller Lever**

NTE Type No.	Circuitry	Max. Pre–Travel	Min. Over Travel	Max. Operating Force	Max. Differential	Diag No.
54–429	SPDT	0.22”	0.05”	160g	0.02”	S54b
54–440	SPDT	0.09”	0.095”	160g	0.02”	S54a

S54



Specifications

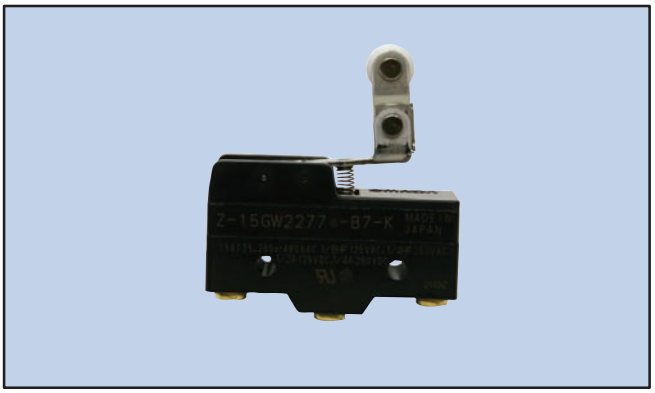
Current Rating: 15A 125/250/480VAC, 0.5A 125VDC, 0.25A 250VDC
1/8 HP 125VAC, 1/4 HP 250VA
Contact Resistance: 50 Milliohms (max.) initial
Insulation Resistance: 100 Megohms at 500VDC
Dielectric Strength: 1000VAC (50/60Hz for 1 minute)
Temperature Rating: –13° to +176°F (–25° to +80°C) with no icing
Electrical Life: 500,000 cycles min. (under rated load)
Mechanical Life: 20,000,000 cycles min.
Terminal Type: Refer to Diag No. in Table

Snap Action Switches

Standard

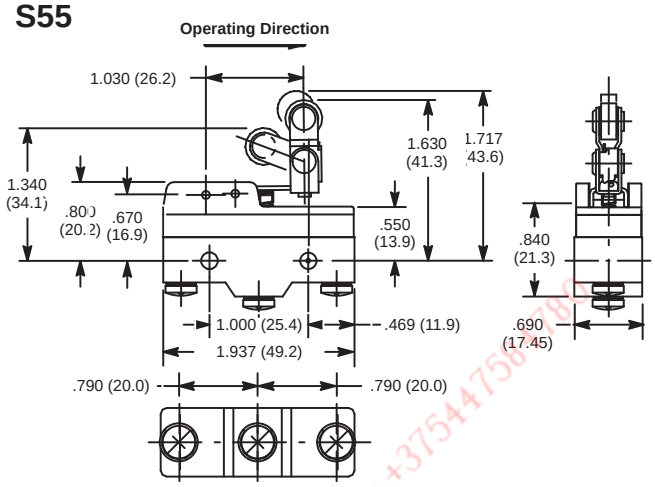
Features

- **Actuator: Unidirectional Short Hinge Roller Lever**



NTE Type No.	Circuitry	Max. Pre–Travel	Min. Over Travel	Max. Operating Force	Max. Differential	Diag No.
54–430	SPDT	0.09"	0.02"	170g	0.02"	S55

S55



Specifications

Current Rating: 15A 125/250/480VAC, 0.5A 125VDC, 0.25A 250VDC
1/8 HP 125VAC, 1/4 HP 250VA
Contact Resistance: 50 Milliohms (max.) initial
Insulation Resistance: 100 Megohms at 500VDC
Dielectric Strength: 1000VAC (50/60Hz for 1 minute)
Temperature Rating: –13° to +176°F (–25° to +80°C) with no icing
Electrical Life: 500,000 cycles min. (under rated load)
Mechanical Life: 20,000,000 cycles min.
Terminal Type: Screw Terminal

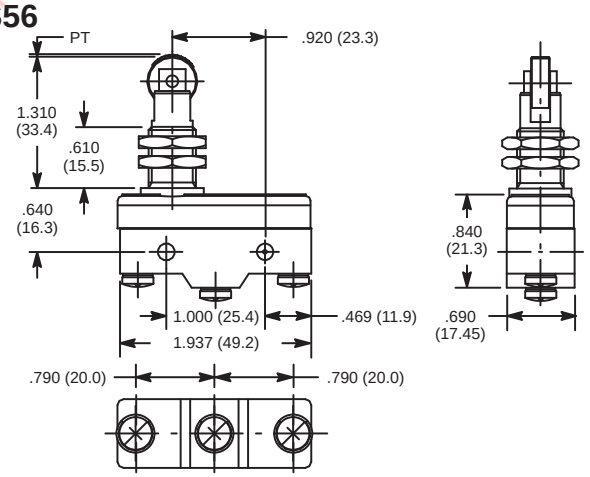
Standard

Features

- **Actuator: Panel Mount Roller Plunger**

NTE Type No.	Circuitry	Max. Pre–Travel	Min. Over Travel	Max. Operating Force	Max. Differential	Diag No.
54–438	SPDT	0.02"	0.22"	350g	0.002"	S56

S56



Specifications

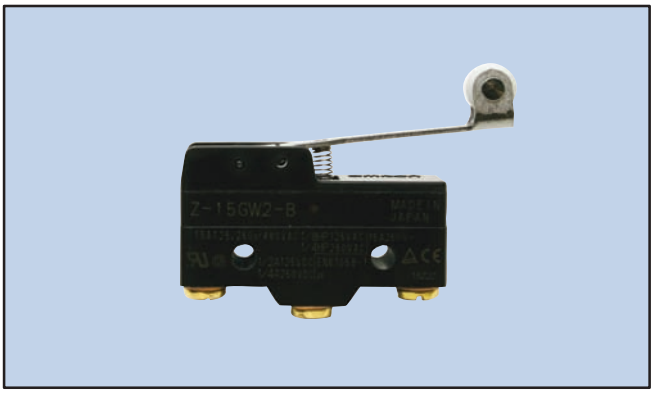
Current Rating: 15A 125/250/480VAC, 0.5A 125VDC, 0.25A 250VDC
1/8 HP 125VAC, 1/4 HP 250VA
Contact Resistance: 50 Milliohms (max.) initial
Insulation Resistance: 100 Megohms at 500VDC
Dielectric Strength: 1000VAC (50/60Hz for 1 minute)
Temperature Rating: –13° to +176°F (–25° to +80°C) with no icing
Electrical Life: 500,000 cycles min. (under rated load)
Mechanical Life: 20,000,000 cycles min.
Terminal Type: Screw Terminal

Snap Action Switches

Standard

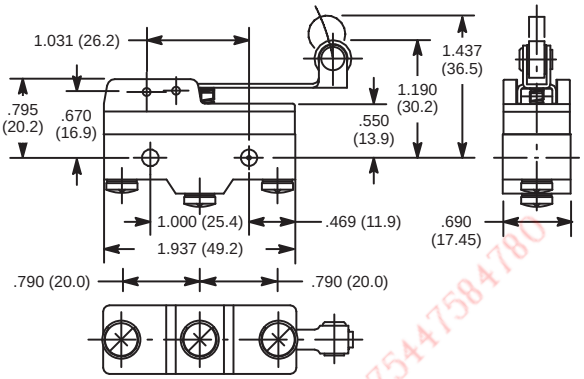
Features

- **Actuator: Hinge Roller Lever**



NTE Type No.	Circuitry	Max. Pre–Travel	Min. Over Travel	Max. Operating Force	Max. Differential	Diag No.
54–441	SPDT	0.16"	0.04"	100g	0.04"	S57

S57



Specifications

Current Rating: 15A 125/250/480VAC, 0.5A 125VDC, 0.25A 250VDC
1/8 HP 125VAC, 1/4 HP 250VA
Contact Resistance: 50 Milliohms (max.) initial
Insulation Resistance: 100 Megohms at 500VDC
Dielectric Strength: 1000VAC (50/60Hz for 1 minute)
Temperature Rating: –13° to +176°F (–25° to +80°C) with no icing
Electrical Life: 500,000 cycles min. (under rated load)
Mechanical Life: 20,000,000 cycles min.
Terminal Type: Screw Terminal

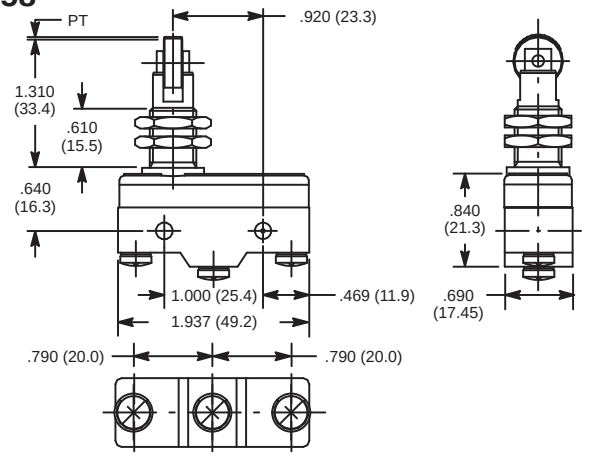
Standard

Features

- **Actuator: Panel Mount Cross Roller Plunger**

NTE Type No.	Circuitry	Max. Pre–Travel	Min. Over Travel	Max. Operating Force	Max. Differential	Diag No.
54–442	SPDT	0.02"	0.14"	350g	0.002"	S58

S58



Specifications

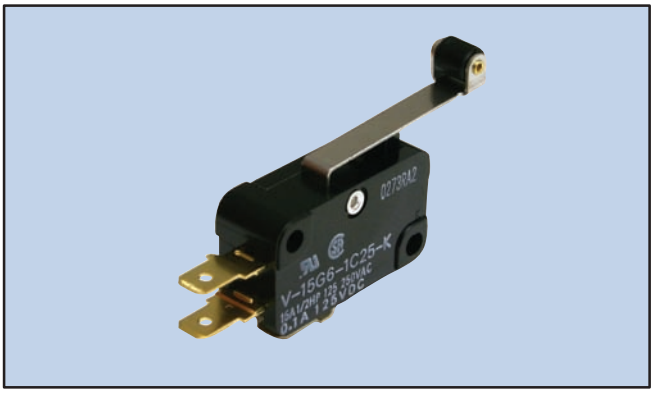
Current Rating: 15A 125/250/480VAC, 0.5A 125VDC, 0.25A 250VDC
1/8 HP 125VAC, 1/4 HP 250VA
Contact Resistance: 50 Milliohms (max.) initial
Insulation Resistance: 100 Megohms at 500VDC
Dielectric Strength: 1000VAC (50/60Hz for 1 minute)
Temperature Rating: –13° to +176°F (–25° to +80°C) with no icing
Electrical Life: 500,000 cycles min. (under rated load)
Mechanical Life: 20,000,000 cycles min.
Terminal Type: Screw Terminal

Snap Action Switches

Standard

Features

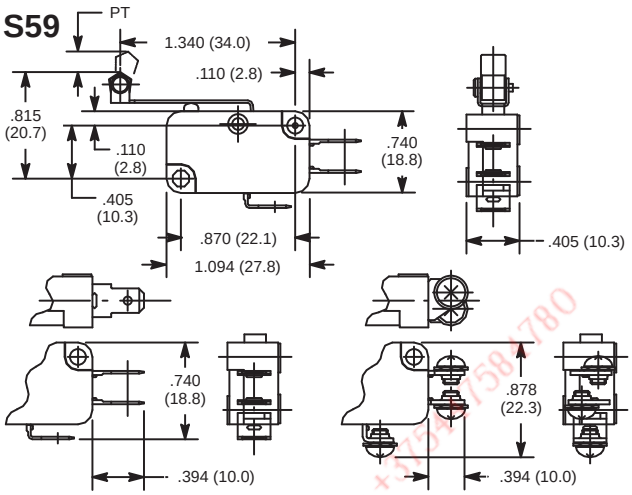
- **Actuator: Hinge Roller Lever**
- **Screw or Quick Connect Terminals**



NTE Type No.	Circuitry	Max. Pre–Travel	Min. Over Travel	Max. Operating Force	Max. Differential	Diag No.
54–400 *	SPDT	0.13”	0.09”	125g	0.03”	S59a
54–405 *	SPDT	0.13”	0.09”	115g	0.03”	S59b
54–406	SPDT	0.13”	0.09”	60g	0.03”	S59a

* Not UL approved or CSA compliant.

S59



a: Quick Connect Terminals **b: Screw Terminals**

Specifications

Current Rating: 15A 250VAC, 0.1A 125VDC **(54–400, 54–405)**
10A 250VAC, 0.1A 125VDC **(54–406)**
Contact Resistance: 15 Milliohms (15A); 30 Milliohms (10A)(max.) initial
Insulation Resistance: 100 Megohms at 500VDC
Dielectric Strength: 1000VAC between non–continuous terminals
Temperature Rating: –13° to +176°F (–25° to +80°C)
Electrical Life: 100,000 (15A); 300,000 (10A) cycles min. (under rated load)
Mechanical Life: 50,000,000 cycles min.
Terminal Type: Refer to Diag No. in Table

Standard

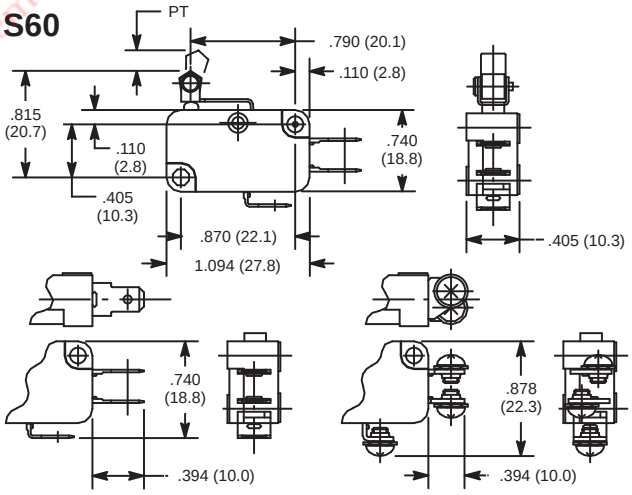
Features

- **Actuator: Short Hinge Roller Lever**
- **Screw or Quick Connect Terminals**

NTE Type No.	Circuitry	Max. Pre–Travel	Min. Over Travel	Max. Operating Force	Max. Differential	Diag No.
54–401	SPDT	0.06”	0.04”	240g	0.02”	S60b
54–407 *	SPDT	0.06”	0.04”	240g	0.02”	S60a
54–408	SPDT	0.06”	0.04”	120g	0.02”	S60a

* Not UL approved or CSA compliant.

S60



a: Quick Connect Terminals **b: Screw Terminals**

Specifications

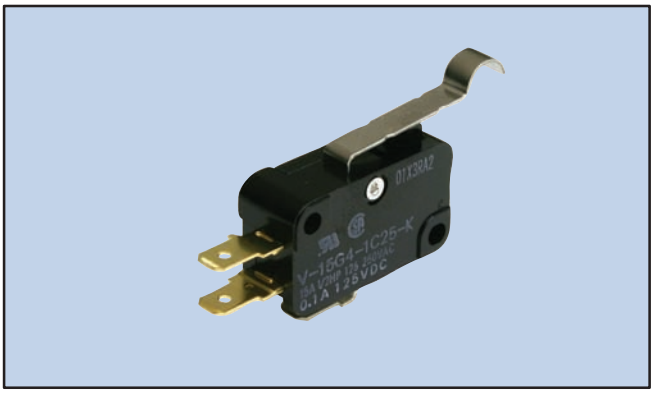
Current Rating: 15A 250VAC, 0.1A 125VDC **(54–401)**
10A 250VAC, 0.1A 125VDC **(54–407, 54–408)**
Contact Resistance: 15 Milliohms (15A); 30 Milliohms (10A)(max.) initial
Insulation Resistance: 100 Megohms at 500VDC
Dielectric Strength: 1000VAC between non–continuous terminals
Temperature Rating: –13° to +176°F (–25° to +80°C)
Electrical Life: 100,000 (15A); 300,000 (10A) cycles min. (under rated load)
Mechanical Life: 50,000,000 cycles min.
Terminal Type: Refer to Diag No. in Table

Snap Action Switches

Standard

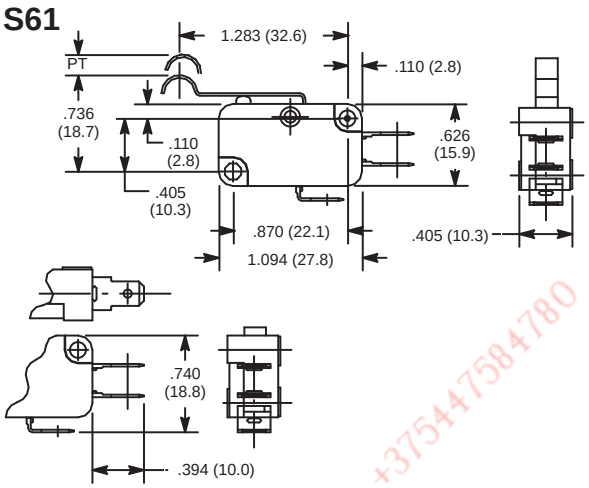
Features

- **Actuator: Simulated Roller Lever**



NTE Type No.	Circuitry	Max. Pre–Travel	Min. Over Travel	Max. Operating Force	Max. Differential	Diag No.
54–402	SPDT	0.13"	0.09"	125g	0.03"	S61
54–422	SPDT	0.13"	0.09"	60g	0.03"	S61

S61



Quick Connect Terminals

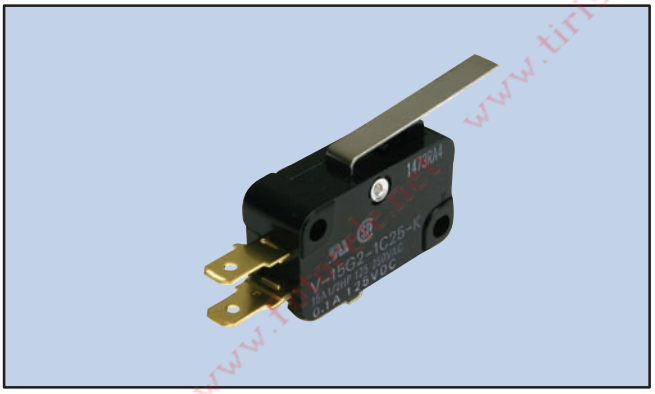
Specifications

Current Rating: 15A 250VAC, 0.1A 125VDC **(54–402)**
10A 250VAC, 0.1A 125VDC **(54–422)**
Contact Resistance: 15 Milliohms (15A); 30 Milliohms (10A)(max.) initial
Insulation Resistance: 100 Megohms at 500VDC
Dielectric Strength: 1000VAC between non–continuous terminals
Temperature Rating: –13° to +176°F (–25° to +80°C)
Electrical Life: 100,000 (15A); 300,000 (10A) cycles min. (under rated load)
Mechanical Life: 50,000,000 cycles min.
Terminal Type: .187" Quick Connect Terminals

Standard

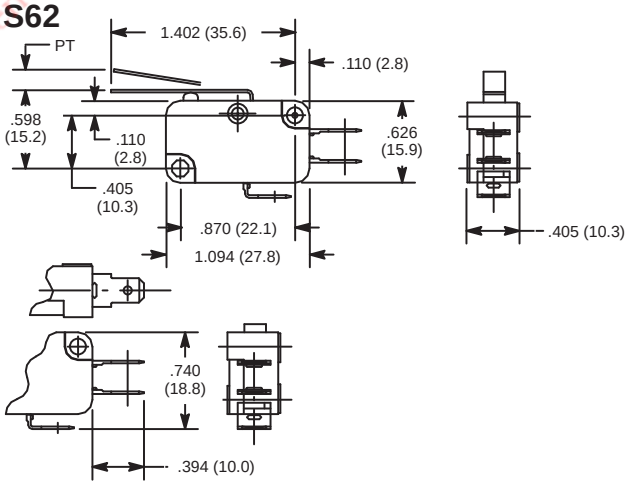
Features

- **Actuator: Hinge Lever**



NTE Type No.	Circuitry	Max. Pre–Travel	Min. Over Travel	Max. Operating Force	Max. Differential	Diag No.
54–403	SPDT	0.13"	0.09"	125g	0.03"	S62
54–414	SPDT	0.13"	0.09"	60g	0.03"	S62

S62



Quick Connect Terminals

Specifications

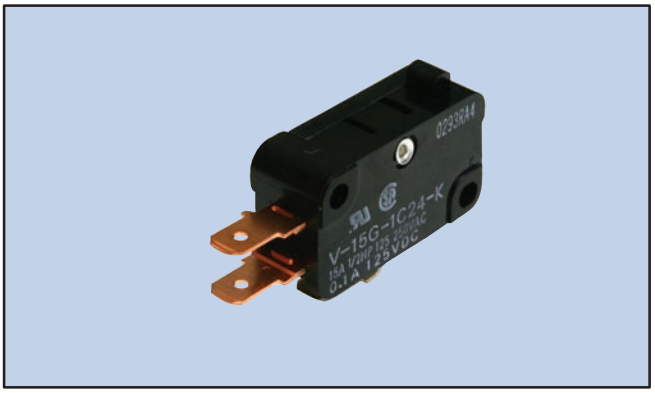
Current Rating: 15A 250VAC, 0.1A 125VDC **(54–403)**
10A 250VAC, 0.1A 125VDC **(54–414)**
Contact Resistance: 15 Milliohms (max.) initial
Insulation Resistance: 100 Megohms at 500VDC
Dielectric Strength: 1000VAC between non–continuous terminals
Temperature Rating: –13° to +176°F (–25° to +80°C)
Electrical Life: 100,000 cycles min. (under rated load)
Mechanical Life: 50,000,000 cycles min.
Terminal Type: .187" Quick Connect Terminals

Snap Action Switches

Standard

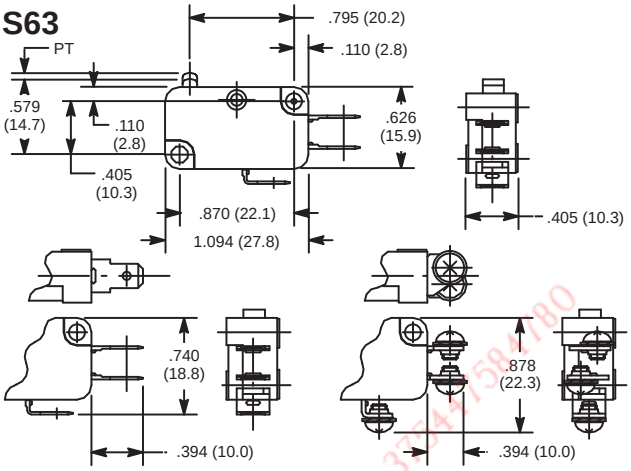
Features

- **Actuator: Pin Plunger**
- **Screw or Quick Connect Terminals**



NTE Type No.	Circuitry	Current Rating	Max. Pre–Travel	Min. Over Travel	Max. Operating Force	Max. Differential	Diag No.
54–404	SPDT	A	0.06”	0.04”	100g	0.02”	S63a
54–411	SPDT	A	0.05”	0.05”	100g	0.01”	S63a
54–412	SPST-NC	C	0.72”	0.69”	110g	0.01”	S63a
54–413	SPST-NO	C	0.72”	0.69”	110g	0.01”	S63a
54–415	SPDT	B	0.05”	0.05”	200g	0.01”	S63b
54–419	SPDT	A	0.05”	0.03”	250g	0.02”	S63a
54–420	SPDT	A	0.05”	0.05”	200g	0.01”	S63a

S63



a: Quick Connect Terminals **b: Screw Terminals**

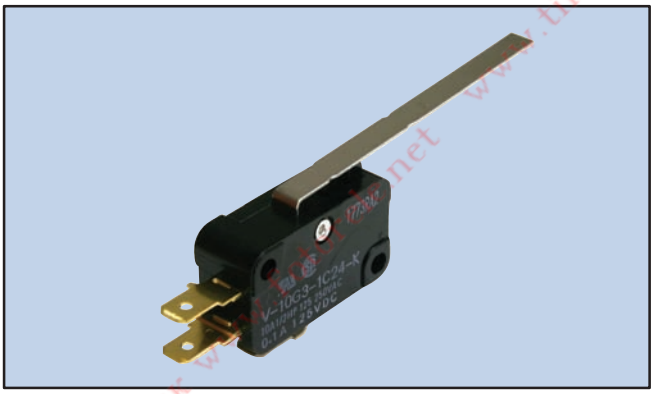
Specifications

Current Rating:
A: 10A 250VAC, 0.1A 125VDC,
B: 15A 250VAC, 0.1A 125VDC,
C: 15A 250VAC, 15A 125VAC
Contact Resistance: 15 Milliohms (15A); 30 Milliohms (10A)(max.) initial
Insulation Resistance: 100 Megohms at 500VDC
Dielectric Strength: 1000VAC between non–continuous terminals
Temperature Rating: –13° to +176°F (–25° to +80°C)
Electrical Life: 100,000 (15A); 300,000 (10A) cycles min. (under rated load)
Mechanical Life: 50,000,000 cycles min.
Terminal Type: Refer to Diag No. in Table

Standard

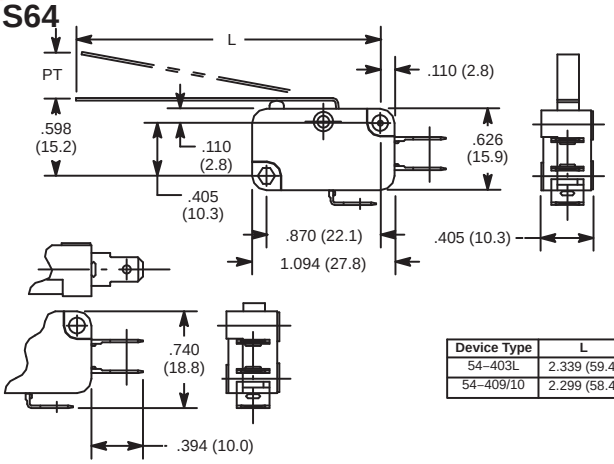
Features

- **Actuator: Long Hinge Lever**



NTE Type No.	Circuitry	Max. Pre–Travel	Min. Over Travel	Max. Operating Force	Max. Differential	Diag No.
54–403L	SPDT	0.35”	0.12”	70g	0.08”	S64
54–409	SPDT	0.30”	0.13”	35g	0.08”	S64
54–410	SPDT	0.35”	0.12”	70g	0.08”	S64

S64



Device Type	L
54–403L	2.339 (59.4)
54–409/10	2.299 (58.4)

Quick Connect Terminals

Specifications

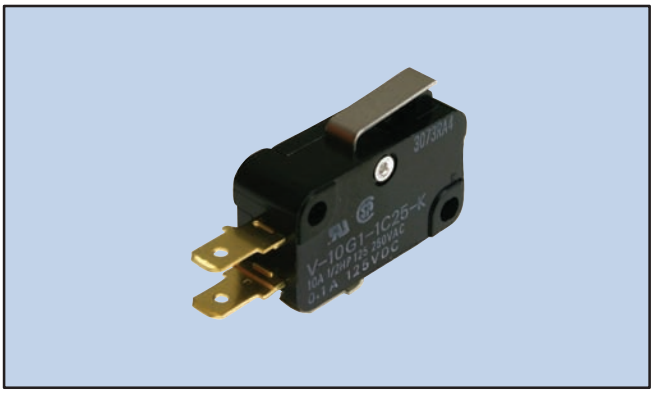
Current Rating: 10A 250VAC, 0.1A 125VDC **(54–409, 54–410)**
15A 250VAC, 0.1A 125VDC **(54–403L)**
Contact Resistance: 30 Milliohms (max.) initial
Insulation Resistance: 100 Megohms at 500VDC
Dielectric Strength: 1000VAC between non–continuous terminals
Temperature Rating: –13° to +176°F (–25° to +80°C)
Electrical Life: 300,000 cycles min. (under rated load)
Mechanical Life: 50,000,000 cycles min.
Terminal Type: .187” Quick Connect Terminals

Snap Action Switches

Standard

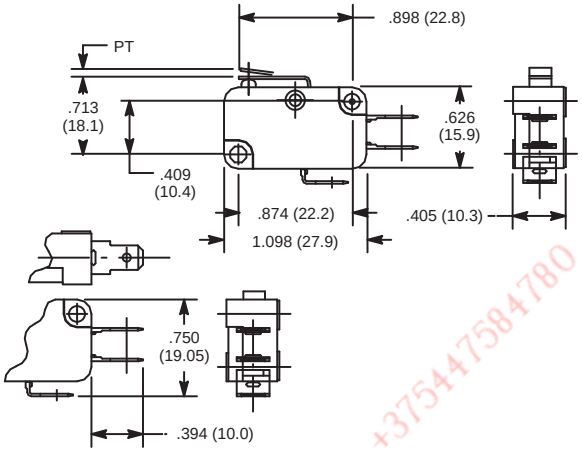
Features

- **Actuator: Short Hinge Lever**



NTE Type No.	Circuitry	Max. Pre–Travel	Min. Over Travel	Max. Operating Force	Max. Differential	Diag No.
54–421	SPDT	0.04"	–	200g	–	S65

S65



Quick Connect Terminals

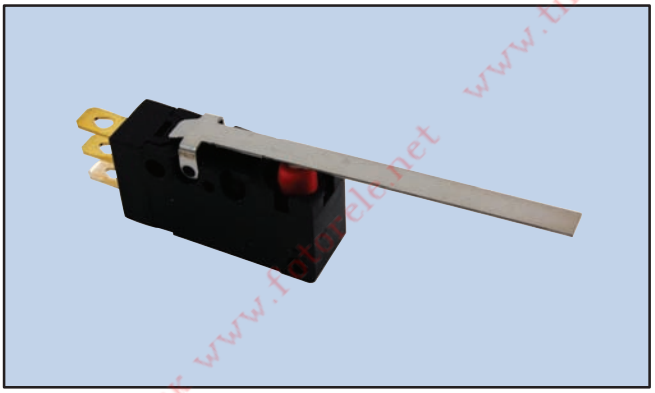
Specifications

Current Rating: 10A 125/250VAC
Contact Resistance: ≤100 Milliohms, initial value
Insulation Resistance: ≥100 Megohms at 500VDC
Dielectric Strength: 1500VAC, 1 minute
Temperature Rating: –13° to +185°F (–25° to +85°C)
Electrical Life: 10,000 cycles min. (under rated load)
Mechanical Life: 1,000,000 cycles min.
Terminal Type: .187" Quick Connect Terminals

Sealed, Miniature

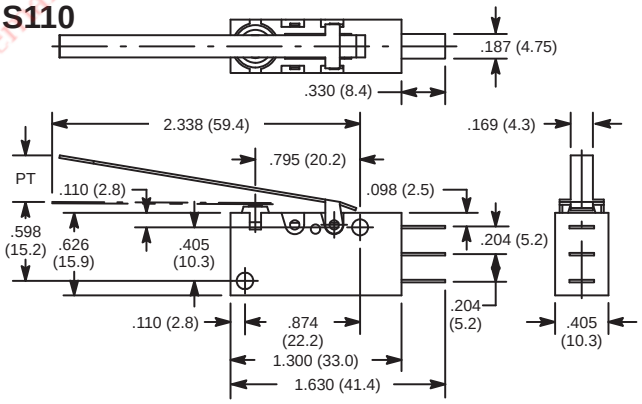
Features

- **Actuator: Long Hinge Lever**
- **Sealed Construction (Meets IP50 Requirements)**
- **RoHS Compliant**



NTE Type No.	Circuitry	Max. Pre–Travel	Min. Over Travel	Max. Operating Force	Max. Differential	Diag No.
54–480WT	SPDT	0.35"	0.13"	60g	0.03"	S110
54–481WT	SPDT	0.35"	0.13"	60g	0.03"	S110

S110



Specifications

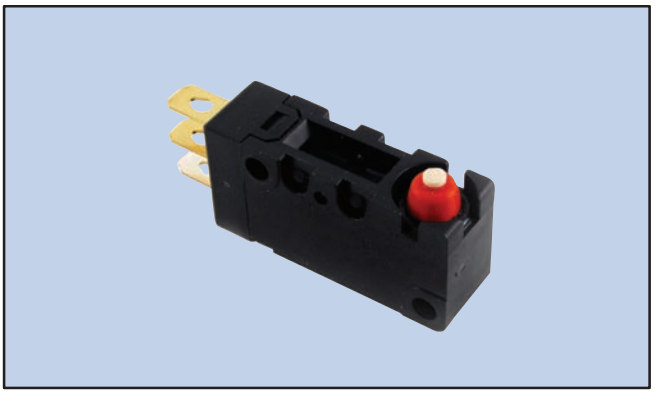
Current Rating:
54–480WT: 5A 125/250VAC (Note: UL/CSA for 3 Amp **Only**), 5A 30VDC, 0.4A 125VDC, 0.2A 250VDC
54–481WT: 0.1A 125VAC, 0.1A 30VDC
Contact Resistance: 100 Milliohms (max.) initial
Insulation Resistance: 100 Megohms (min.) at 500VDC
Dielectric Strength (50/60Hz for 1 min.):
Between Contacts of Same Polarity: 1000VAC
Between Each Terminal & GND: 1500VAC
Temperature Rating: –40° to +194°F (–40° to +90°C)
Electrical Life: 100,000 (5A Type); 1,000,000 (0.1A Type) cycles min.
Mechanical Life: 10,000,000 cycles min.
Terminal Type: Solder Lug and #187 Tab Terminals

Snap Action Switches

Sealed, Miniature

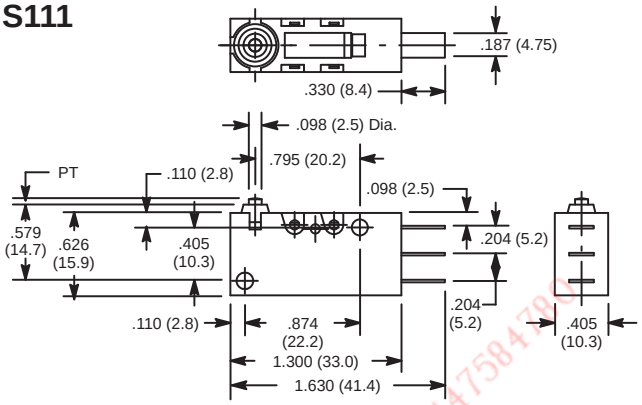
Features

- **Actuator: Pin Plunger**
- **Sealed Construction (Meets IP50 Requirements)**
- **RoHS Compliant**



NTE Type No.	Circuitry	Max. Pre–Travel	Min. Over Travel	Max. Operating Force	Max. Differential	Diag No.
54–482WT	SPDT	0.05”	0.04”	200g	0.016”	S111
54–483WT	SPDT	0.05”	0.04”	200g	0.016”	S111

S111



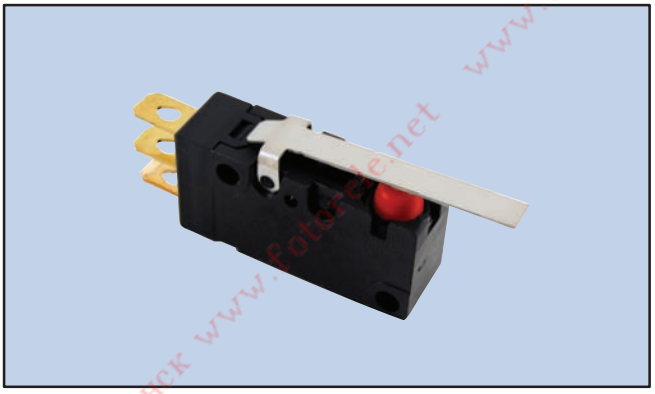
Specifications

Current Rating:
54–482WT: 5A 125/250VAC (Note: UL/CSA for 3 Amp **Only**), 5A 30VDC, 0.4A 125VDC, 0.2A 250VDC
54–483WT: 0.1A 125VAC, 0.1A 30VDC
Contact Resistance: 100 Milliohms (max.) initial
Insulation Resistance: 100 Megohms (min.) at 500VDC
Dielectric Strength (50/60Hz for 1 min.):
Between Contacts of Same Polarity: 1000VAC
Between Each Terminal & GND: 1500VAC
Temperature Rating: –40° to +194°F (–40° to +90°C)
Electrical Life: 100,000 (5A Type); 1,000,000 (0.1A Type) cycles min.
Mechanical Life: 10,000,000 cycles min.
Terminal Type: Solder Lug and #187 Tab Terminals

Sealed, Miniature

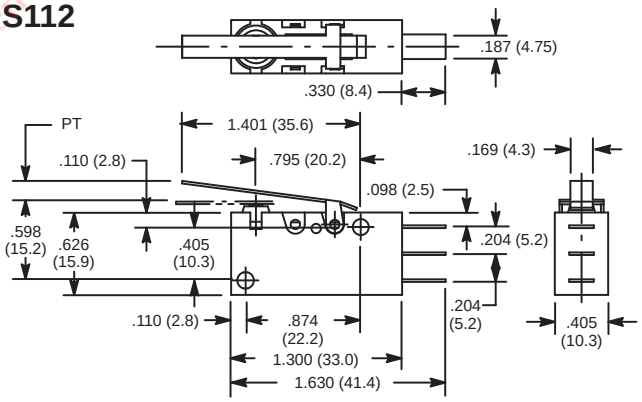
Features

- **Actuator: Hinge Lever**
- **Sealed Construction (Meets IP50 Requirements)**
- **RoHS Compliant**



NTE Type No.	Circuitry	Max. Pre–Travel	Min. Over Travel	Max. Operating Force	Max. Differential	Diag No.
54–484WT	SPDT	0.13”	0.051”	130g	0.047”	S112
54–485WT	SPDT	0.13”	0.05”	130g	0.047”	S112

S112



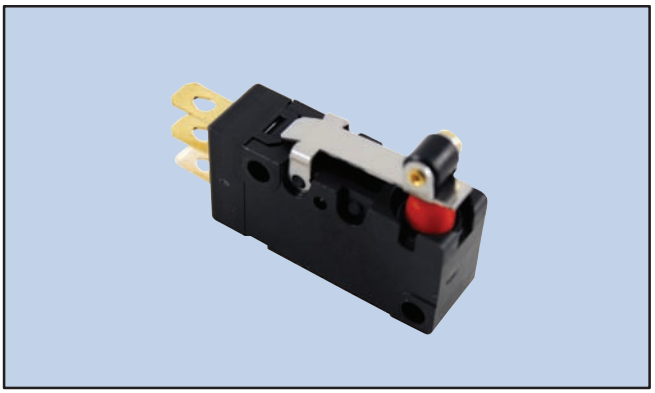
Specifications

Current Rating:
54–484WT: 5A 125/250VAC, 5A 30VDC
54–485WT: 0.1A 125/250VAC, 0.1A 48VDC
Contact Resistance: 100 Milliohms (max.) initial
Insulation Resistance: 100 Megohms (min.) at 500VDC
Dielectric Strength (50/60Hz for 1 min.):
Between Contacts of Same Polarity: 1000VAC
Between Each Terminal & GND: 1500VAC
Temperature Rating: –40° to +194°F (–40°to +90°C)
Electrical Life: 100,000 (5A Type); 1,000,000 (0.1A Type) cycles min.
Mechanical Life: 10,000,000 cycles min.
Terminal Type: Solder Lug and #187 Tab Terminals

Sealed, Miniature

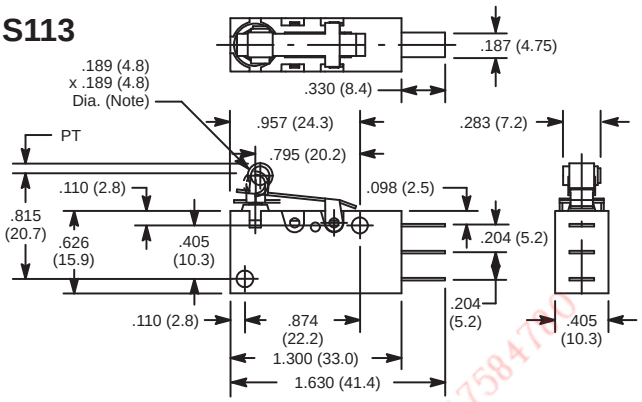
Features

- **Actuator: Short Hinge Roller Lever**
- **Sealed Construction (Meets IP50 Requirements)**
- **RoHS Compliant**



NTE Type No.	Circuitry	Max. Pre–Travel	Min. Over Travel	Max. Operating Force	Max. Differential	Diag No.
54–486WT	SPDT	0.06”	0.03”	230g	0.02”	S113
54–487WT	SPDT	0.06”	0.03”	230g	0.02”	S113

S113



Note: Oilless polyacetar resin roller

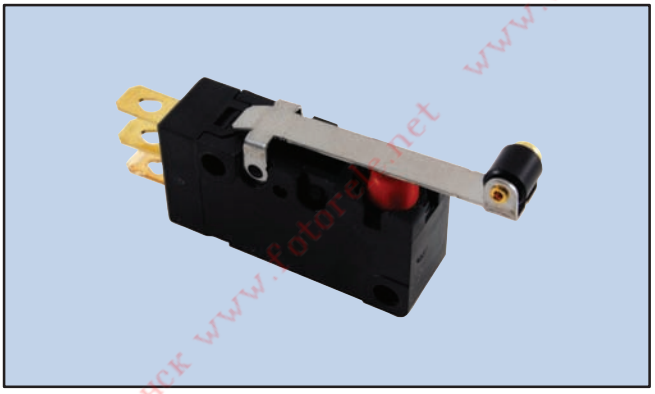
Specifications

Current Rating:
54–486WT: 5A 125/250VAC (Note: UL/CSA for 3 Amp **Only**), 5A 30VDC, 0.4A 125VDC, 0.2A 250VDC
54–487WT: 0.1A 125VAC, 0.1A 30VDC
Contact Resistance: 100 Milliohms (max.) initial
Insulation Resistance: 100 Megohms (min.) at 500VDC
Dielectric Strength (50/60Hz for 1 min.):
Between Contacts of Same Polarity: 1000VAC
Between Each Terminal & GND: 1500VAC
Temperature Rating: –40° to +194°F (–40° to +90°C)
Electrical Life: 100,000 (5A Type); 1,000,000 (0.1A Type) cycles min.
Mechanical Life: 10,000,000 cycles min.
Terminal Type: Solder Lug and #187 Tab Terminals

Sealed, Miniature

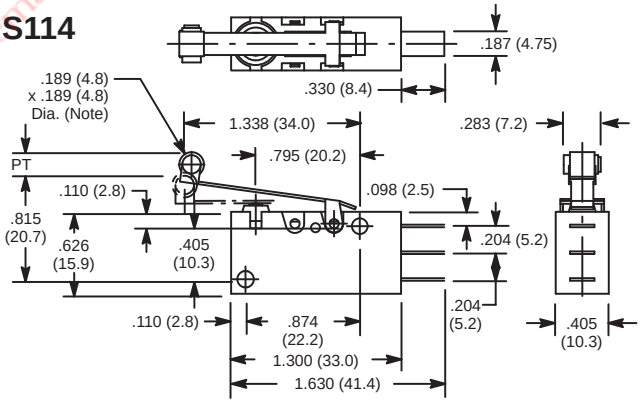
Features

- **Actuator: Hinge Roller Lever**
- **Sealed Construction (Meets IP50 Requirements)**
- **RoHS Compliant**



NTE Type No.	Circuitry	Max. Pre–Travel	Min. Over Travel	Max. Operating Force	Max. Differential	Diag No.
54–488WT	SPDT	0.16”	0.06”	120g	0.03”	S114
54–489WT	SPDT	0.16”	0.06”	120g	0.03”	S114

S114



Note: Oilless polyacetar resin roller

Specifications

Current Rating:
54–488WT: 5A 125/250VAC (Note: UL/CSA for 3 Amp **Only**), 5A 30VDC, 0.4A 125VDC, 0.2A 250VDC
54–489WT: 0.1A 125VAC, 0.1A 30VDC
Contact Resistance: 100 Milliohms (max.) initial
Insulation Resistance: 100 Megohms (min.) at 500VDC
Dielectric Strength (50/60Hz for 1 min.):
Between Contacts of Same Polarity: 1000VAC
Between Each Terminal & GND: 1500VAC
Temperature Rating: –40° to +194°F (–40° to +90°C)
Electrical Life: 100,000 (5A Type); 1,000,000 (0.1A Type) cycles min.
Mechanical Life: 10,000,000 cycles min.
Terminal Type: Solder Lug and #187 Tab Terminals

Anti–Vandal, Pushbutton

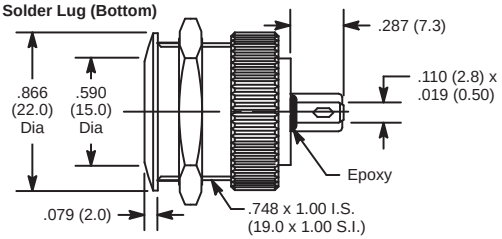
Features

- **.748” (19mm) bushing diameter**

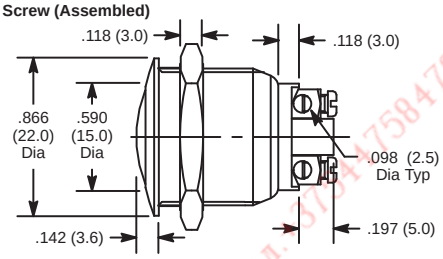
NTE Type No.	Circuitry	Action		Actuator	Diag No.
54–377	SPST–NO	OFF	(ON)	Stainless Steel, Flat	S76b
54–378	SPST–NO	OFF	(ON)	Stainless Steel, Curved	S76c
54–378E	SPST–NO	OFF	(ON)	Stainless Steel, Curved	S76c

SPECIAL NOTE: ( ) = Momentary Function

S76 **b: Solder Lug (Bottom)**



c: Screw (Assembled)



Specifications

Contact Rating: 2A 48VDC max. (resistive load)
Initial Contact Resistance: 10 Milliohms (max.) at 1A, 2V
Insulation Resistance: 100 Megohms (min.) at 500VDC
Dielectric Strength: 2000V RMS (min.)
Temperature Rating: –4° to +131°F (–20° to +55°C)
Electrical Life: 10,000 cycles min. at full load
Mechanical Life: 1,000,000 cycles min.
Terminal Type: Refer to Diag No. in Table
Mounting Hole: .756 (19.2)

Anti–Vandal, Pushbutton

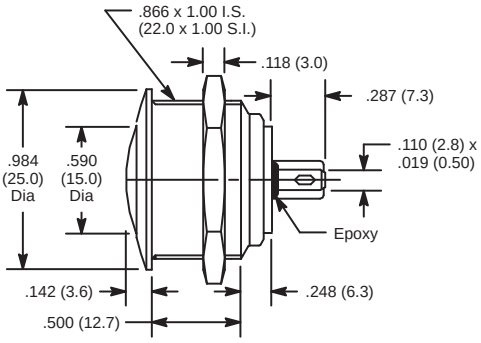
Features

- **.866” (22mm) bushing diameter**

NTE Type No.	Circuitry	Action		Actuator	Diag No.
54–379	SPST–NO	OFF	(ON)	Stainless Steel, Curved	S77b

SPECIAL NOTE: ( ) = Momentary Function

S77 **b: Solder Lug (Bottom)**



Specifications

Contact Rating: 2A 48VDC max. (resistive load)
Initial Contact Resistance: 10 Milliohms (max.) at 1A, 2V
Insulation Resistance: 100 Megohms (min.) at 500VDC
Dielectric Strength: 2000V RMS (min.)
Temperature Rating: –4° to +131°F (–20° to +55°C)
Electrical Life: 10,000 cycles min. at full load
Mechanical Life: 1,000,000 cycles min.
Terminal Type: Solder Lug/Quick–Connect
Mounting Hole: .756 (19.2)

Economy Anti-Vandal, Pushbutton

Features

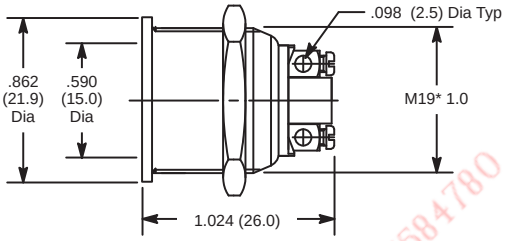
- **.748” (19mm) bushing diameter**

NTE Type No.	Circuitry	Action		Actuator	Diag No.
54–375E	SPST–NO	OFF	(ON)	Stainless Steel, Flat	S124

SPECIAL NOTE: ( ) = Momentary Function

S124

Flat Actuator



Specifications

Contact Rating: 5A 48VDC max.
Initial Contact Resistance: 50 Milliohms (max.) initial
Insulation Resistance: 100 Megohms (min.)
Dielectric Strength: 2000VAC for 1 minute
Temperature Rating: –4° to +158°F (–20° to +70°C)
Operating Life: 200,000 cycles
Terminal Type: Screw Type
Mounting Hole: .756 (19.2)

Security, Pushbutton

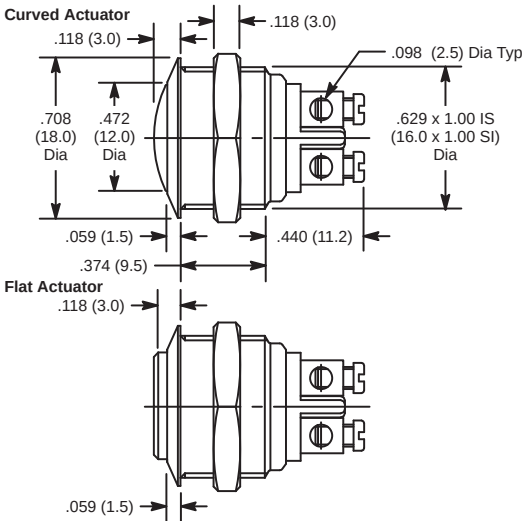
Features

- **.629” (16mm) bushing diameter**

NTE Type No.	Circuitry	Action		Actuator	Diag No.
54–460	SPST–NO	OFF	(ON)	Stainless Steel, Curved	S78
54–474	SPST–NO	OFF	(ON)	Nickel Plated Brass, Flat	S78

SPECIAL NOTE: ( ) = Momentary Function

S78



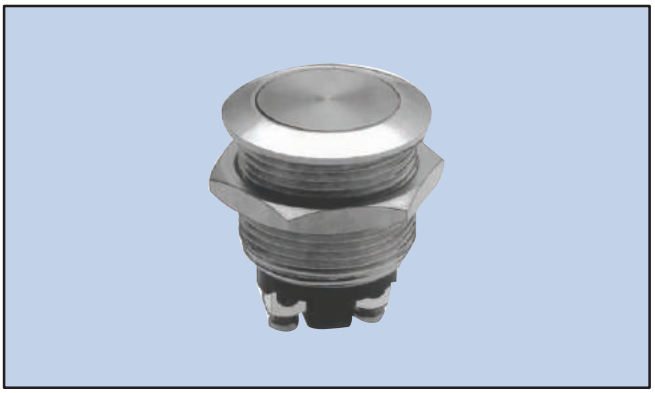
Specifications

Contact Rating: 100–400mA 48VDC max. (resistive load)
Initial Contact Resistance: 50 Milliohms (max.)
Insulation Resistance: 1000 Megohms (min.) at 500VDC
Dielectric Strength: 2000V RMS (min.)
Temperature Rating: –4° to +131°F (–20° to +55°C)
Electrical Life: 50,000 cycles min. at 200mA 48VDC
Mechanical Life: 1,000,000 cycles min.
Terminal Type: Screw Type
Mounting Hole: .638 (16.2)

Security, Pushbutton

Features

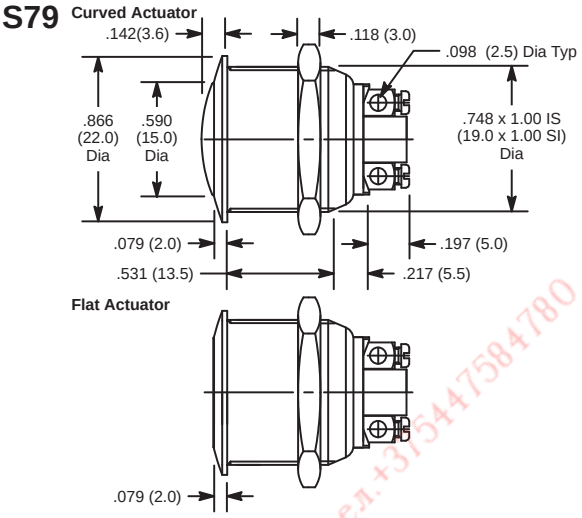
- **.748” (19mm) bushing diameter**



NTE Type No.	Circuitry	Action		Actuator	Diag No.
54–375	SPST–NO	OFF	(ON)	Nickel Plated Brass, Flat	S79
54–376	SPST–NO	OFF	(ON)	Nickel Plated Brass, Curved	S79

SPECIAL NOTE: ( ) = Momentary Function

S79



Specifications

Contact Rating: 2A 48VDC max. (resistive load)
Initial Contact Resistance: 10 Milliohms (max.) at 1A, 2V
Insulation Resistance: 1000 Megohms (min.) at 500VDC
Dielectric Strength: 2000V RMS (min.)
Temperature Rating: –4° to +131°F (–20° to +55°C)
Electrical Life: 10,000 cycles min. full load
Mechanical Life: 1,000,000 cycles min.
Terminal Type: Screw Type
Mounting Hole: .756 (19.2)

Security, Pushbutton

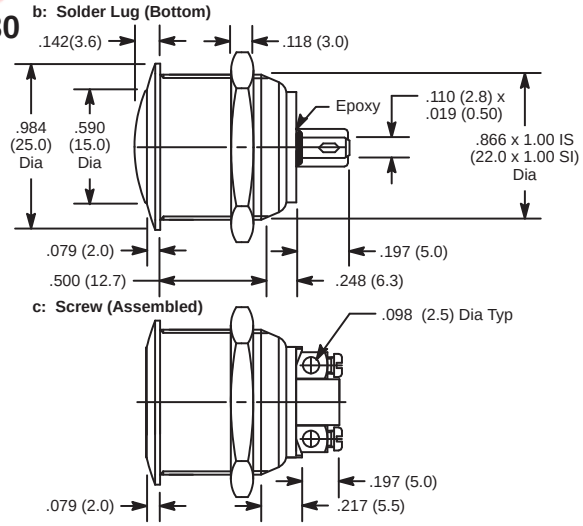
Features

- **.866” (22mm) bushing diameter**

NTE Type No.	Circuitry	Action		Actuator	Diag No.
54–461	SPST–NO	OFF	(ON)	Nickel Plated Brass, Curved	S80c
54–462	SPST–NO	OFF	(ON)	Nickel Plated Brass, Curved	S80b
54–463	SPST–NO	OFF	(ON)	Nickel Plated Brass, Flat	S80c

SPECIAL NOTE: ( ) = Momentary Function

S80



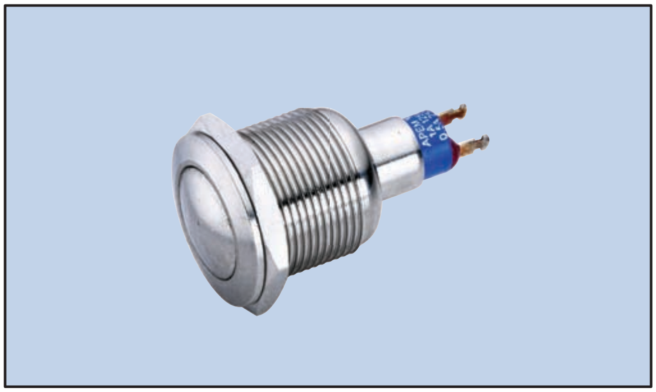
Specifications

Contact Rating: 2A 48VDC max. (resistive load)
Initial Contact Resistance: 10 Milliohms (max.) at 1A, 2V
Insulation Resistance: 1000 Megohms (min.) at 500VDC
Dielectric Strength: 2000V RMS (min.)
Temperature Rating: –4° to +131°F (–20° to +55°C)
Electrical Life: 10,000 cycles min. full load
Mechanical Life: 1,000,000 cycles min.
Terminal Type: Refer to Diag No. in Table
Mounting Hole: .874 (22.2)

Security, Pushbutton

Features

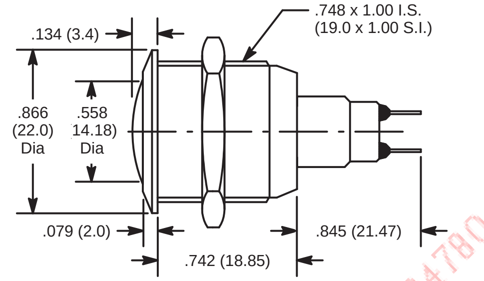
- **.748” (19mm) bushing diameter**



NTE Type No.	Circuitry	Action		Actuator	Diag No.
54–465	SPST–NO	ON*	OFF*	Nickel Plated Brass, Curved	S81

SPECIAL NOTE: ( ) = Momentary Function
* = Alternate Action (Push ON/Push OFF)

S81



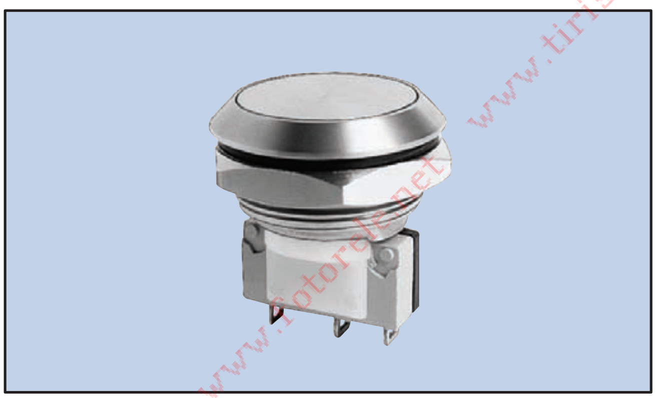
Specifications

Contact Rating: 3A 120VAC or 28VDC, 1.5A 250VAC (1)
1A 120VAC or 28VDC, 0.5A 250VAC (2)
(max. resistive load)
Initial Contact Resistance: 10 Milliohms (max.) at 3V, 0.1A
Insulation Resistance: 10,000 Megohms (min.)
Dielectric Strength: 1000V RMS (min.)
Temperature Rating: –22° to +185°F (–30° to +85°C)
Electrical Life: 10,000(1)/250,000(2) cycles min. full load
Mechanical Life: 1,00,000 cycles (min.)
Terminal Type: Solder Lug
Mounting Hole: .756 (19.2)

Security, Pushbutton

Features

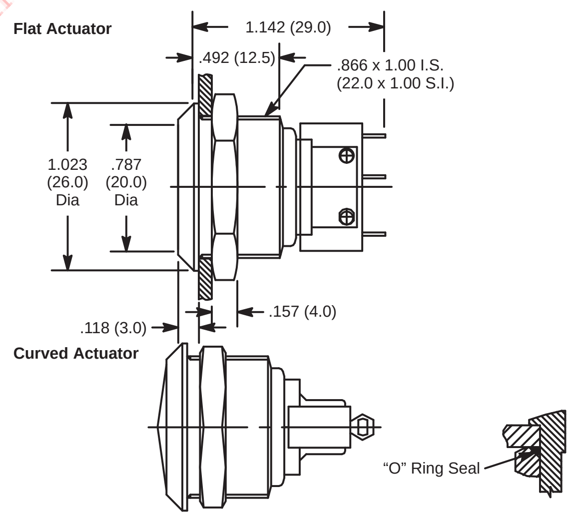
- **.866” (22mm) bushing diameter**
- **Large Actuator**



NTE Type No.	Circuitry	Action		Actuator	Diag No.
54–466	SPST–NO/NC	ON	(OFF)	Stainless Steel, Flat	S82
54–468	SPST–NO/NC	ON	(OFF)	Stainless Steel, Curved	S82

SPECIAL NOTE: ( ) = Momentary Function

S82



Specifications

Contact Rating: 5A 250VAC max.
Initial Contact Resistance: 100 Milliohms (max.)
Insulation Resistance: 1000 Megohms (min.) at 500VDC
Dielectric Strength: 2000V RMS (min.)
Temperature Rating: –4° to +131°F (–20° to +55°C)
Electrical Life: 1,000,000 cycles (min.) at 1A 250VAC or
100,00 cycles at full load
Mechanical Life: 3,000,000 cycles min.
Terminal Type: Solder Lug
Mounting Hole: .874 (22.2)

Security, Pushbutton

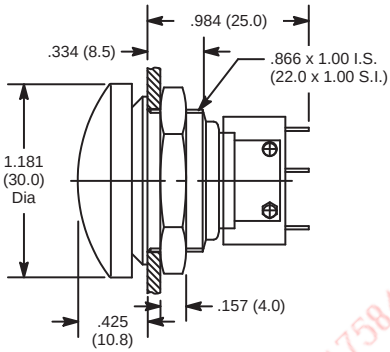
Features

- .866” (22mm) bushing diameter
- Mushroom Head Actuator

NTE Type No.	Circuitry	Action		Actuator	Diag No.
54–470	SPST–NO/NC	ON	(OFF)	Nickel Plated Brass, Black	S83

SPECIAL NOTE: ( ) = Momentary Function

S83



Specifications

Contact Rating: 5A 250VAC max.
Initial Contact Resistance: 100 Milliohms (max.)
Insulation Resistance: 1000 Megohms (min.) at 500VDC
Dielectric Strength: 2000V RMS (min.)
Temperature Rating: –4° to +131°F (–20° to +55°C)
Electrical Life: 1,000,000 cycles (min.) at 1A 250VAC or 100,00 cycles at full load
Mechanical Life: 1,000,000 cycles min.
Terminal Type: Solder lug
Mounting Hole: .874 (22.2)

Snap–Action Security, Pushbutton

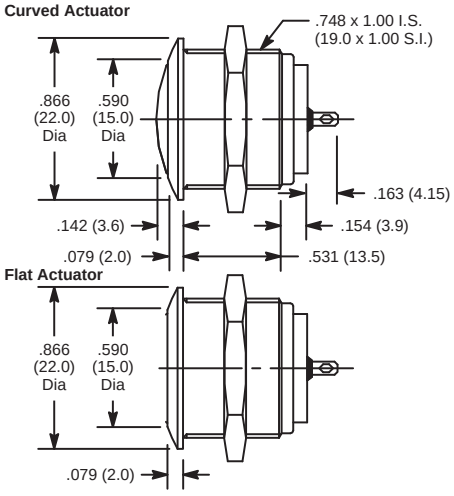
Features

- .748” (19mm) bushing diameter

NTE Type No.	Circuitry	Action		Actuator	Diag No.
54–472	SPST–NO	OFF	(ON)	Nickel Plated Brass, Curved	S85
54–473	SPST–NO	OFF	(ON)	Nickel Plated Brass, Flat	S85

SPECIAL NOTE: ( ) = Momentary Function

S85 Curved Actuator



Specifications

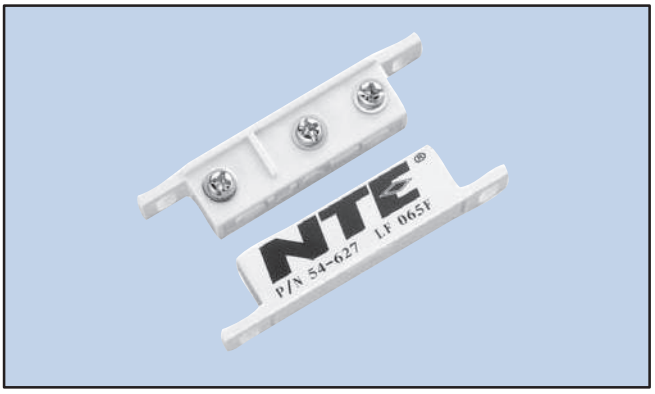
Contact Rating: 50mA 24VDC max. (Resistive Load)
Initial Contact Resistance: 100 Milliohms (max.)
Insulation Resistance: 1000 Megohms (min.) at 500VDC
Dielectric Strength: 500V RMS (min.)
Temperature Rating: –22° to +158°F (–30° to +70°C)
Electrical Life: 1,000,000 cycles at full load
Mechanical Life: 100,000 cycles at 300mA 24V
Operating Force: 7 N 2 N
Terminal Type: Solder lug
Mounting Hole: .756 (19.2)

Magnetic Alarm Switches

Reed Switch

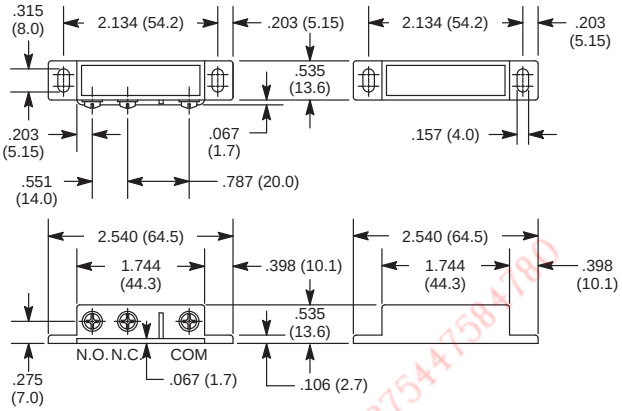
Features

- Can be installed/wired to be Normally Closed & Normally Open
- Commonly Seen on Door and Window Alarms



NTE Type No.	Circuitry	Action	Actuator	Diag No.
54–627	SPDT	NO or NC	Magnet	S99

S99



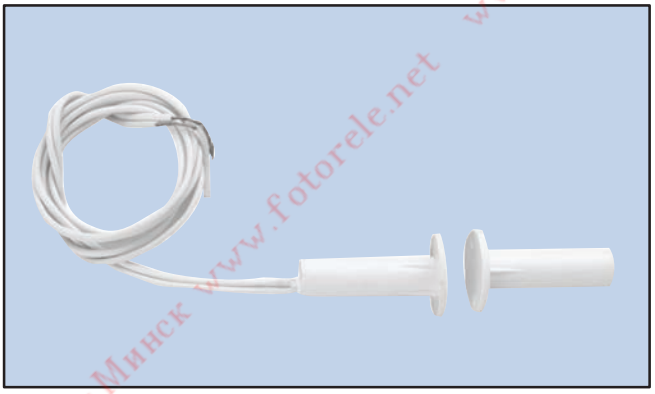
Specifications

Contact Rating: 3 W/VA
Contact Resistance: 200 megohms
Contact Material: Ruthenium Oxide over Rhodium
Voltage Rating: 125 VAC, 100 VDC
Switching Current: 250mA
Insulation Resistance: 10 gigohms
Shock Resistance: nil
Vibration Resistance: nil
Life Expectancy: 10,000,000 cycles
Operating Gap: 1.180” (3cm) max.
Terminal Type: Screw
Mounting Hole: .157” (4mm)

Reed Switch

Features

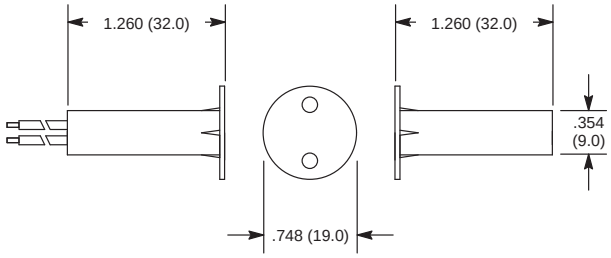
- 3/8” (9mm) Diameter Press Fit
- Operating Gap*: 5/8” (16mm) min.
- 18” Wire Leads
- 3/4” (19mm) Collar Flange for Better Retention



NTE Type No.	Circuitry	Action	Actuator	Diag No.
54–628	SPST–NO	NO for Closed Loop System	Magnet	S100

NOTE: The circuit is open when the magnet is not present.
*** The operating gap is the maximum distance that the magnet can be from the switch before operation is released.**

S100



Specifications

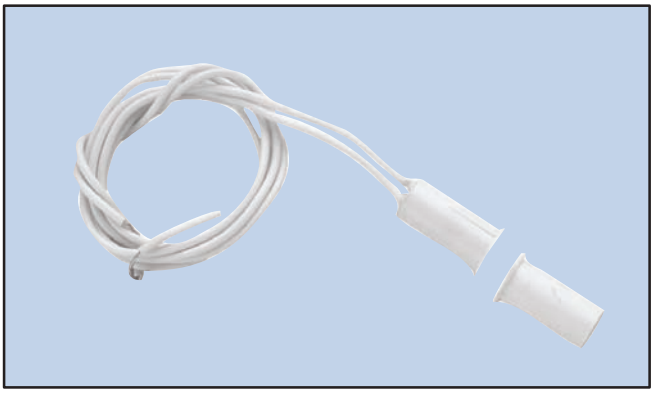
Contact Rating: 10W/VA
Contact Resistance: 150 milliohms.
Contact Material: Ruthenium Oxide over Palladium
Switching Voltage: 200 VDC max.
Switching Current: 500mA max.
Insulation Resistance: 10 gigohms
Shock Resistance: 30G for 11mS
Vibration Resistance: 20G (10 to 1000Hz)
Life Expectancy: 20,000,000 cycles (resistive load, 12VDC, 250mA)
Operating Gap: .629” (16mm) min.
Terminal Type: Wire Leads
Mounting Hole: .375” (9mm)

Magnetic Alarm Switches

Reed Switch

Features

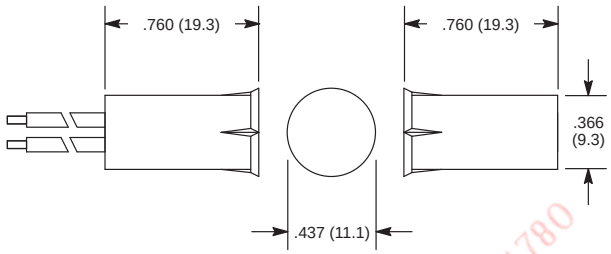
- 3/8” (9mm) Dia with 18” Long Wire Leads
- Easy & Quick Installation
- Longer Length
- Operating Gap*: 3/4” (19mm) min.



NTE Type No.	Circuitry	Action	Actuator	Diag No.
54–629	SPST–NO	NO for Closed Loop System	Magnet	S101

NOTE: The circuit is open when the magnet is not present.
*** The operating gap is the maximum distance that the magnet can be from the switch before operation is released.**

S101



Specifications

Contact Rating: 10W/VA
Contact Resistance: 150 milliohms.
Contact Material: Ruthenium Oxide over Palladium
Switching Voltage: 200 VDC max.
Switching Current: 500mA max.
Insulation Resistance: 10 gigohms
Shock Resistance: 30G for 11mS
Vibration Resistance: 20G (10 to 1000Hz)
Life Expectancy: 20,000,000 cycles (resistive load, 12VDC, 250mA)
Operating Gap: .748” (19mm) min.
Terminal Type: Wire Leads
Mounting Hole: .375” (9mm)

Reed Switch

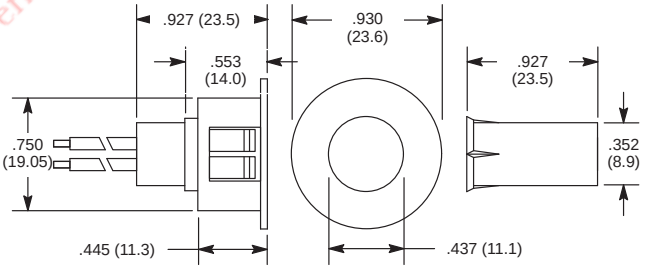
Features

- 3/8” (9mm) Dia with Adaptor Holder
- Operating Gap*: 3/4” (19mm) min.
- Easy & Quick Installation
- 3/4” Adaptor/Holder

NTE Type No.	Circuitry	Action	Actuator	Diag No.
54–631	SPST–NO	NO for Closed Loop System	Magnet	S102

NOTE: The circuit is open when the magnet is not present.
*** The operating gap is the maximum distance that the magnet can be from the switch before operation is released.**

S102



Specifications

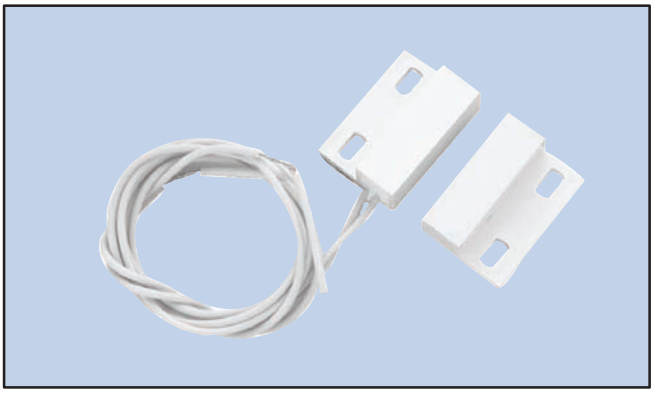
Contact Rating: 10W/VA
Contact Resistance: 150 milliohms.
Contact Material: Ruthenium Oxide over Palladium
Switching Voltage: 200 VDC max.
Switching Current: 500mA max.
Insulation Resistance: 10 gigohms
Shock Resistance: 30G for 11mS
Vibration Resistance: 20G (10 to 1000Hz)
Life Expectancy: 20,000,000 cycles (resistive load, 12VDC, 250mA)
Operating Gap: .748” (19mm) min.
Terminal Type: Wire Leads
Mounting Hole: .375” (9mm)

Magnetic Alarm Switches

Reed Switch

Features

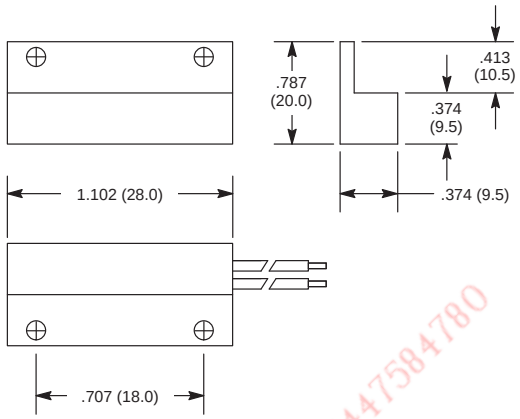
- Mini Stick–On Surface Mount Contact with Side Leads
- 18” Long Side Wire Leads
- Adhesive & Screw Mounting
- Operating Gap*: 3/4” (19mm) min.



NTE Type No.	Circuitry	Action	Actuator	Diag No.
54–632	SPST–NO	NO for Closed Loop System	Magnet	S103

NOTE: The circuit is open when the magnet is not present.
*** The operating gap is the maximum distance that the magnet can be from the switch before operation is released.**

S103



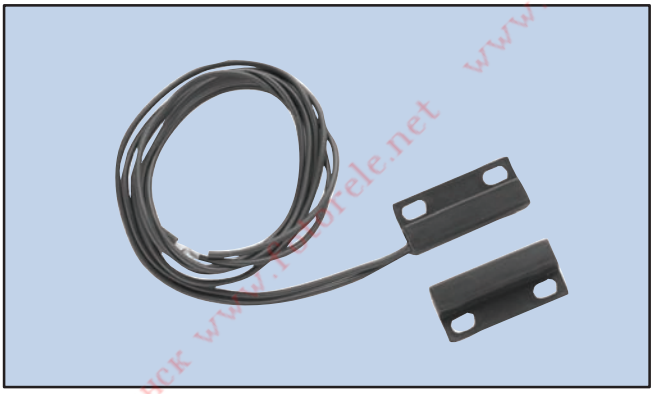
Specifications

Contact Rating: 10W/VA
Contact Resistance: 150 milliohms.
Contact Material: Ruthenium Oxide over Palladium
Switching Voltage: 200 VDC max.
Switching Current: 500mA max.
Insulation Resistance: 10 gigohms
Shock Resistance: 30G for 11mS
Vibration Resistance: 20G (10 to 1000Hz)
Life Expectancy: 20,000,000 cycles (resistive load, 12VDC, 250mA)
Operating Gap: .748” (19mm) min.
Terminal Type: Wire Leads
Mounting Hole: .250” (6.35mm)

Reed Switch

Features

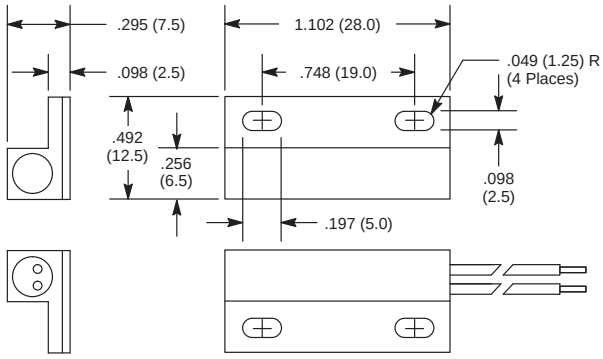
- Mini Stick–On Contact with Flange Center Leads
- 18” Leads
- Adhesive and Screw Mount
- Operating Gap*: 1” (25mm)



NTE Type No.	Color	Circuitry	Action	Actuator	Diag No.
54–630	White	SPST–NO	NO for Closed Loop System	Magnet	S107
54–636	Brown	SPST–NO	NO for Closed Loop System	Magnet	S107
54–637	Black	SPST–NO	NO for Closed Loop System	Magnet	S107

NOTE: The circuit is open when the magnet is not present.
*** The operating gap is the maximum distance that the magnet can be from the switch before operation is released.**

S107



Specifications

Contact Rating: 10W/VA
Contact Resistance: 150 milliohms.
Contact Material: Ruthenium Oxide over Palladium
Switching Voltage: 200 VDC max.
Switching Current: 500mA max.
Insulation Resistance: 10 gigohms
Shock Resistance: 30G for 11mS
Vibration Resistance: 20G (10 to 1000Hz)
Life Expectancy: 20,000,000 cycles (resistive load, 12VDC, 250mA)
Terminal Type: Wire Leads
Mounting Hole: .200” (5mm)

Magnetic Alarm Switches

Roller Ball Switch

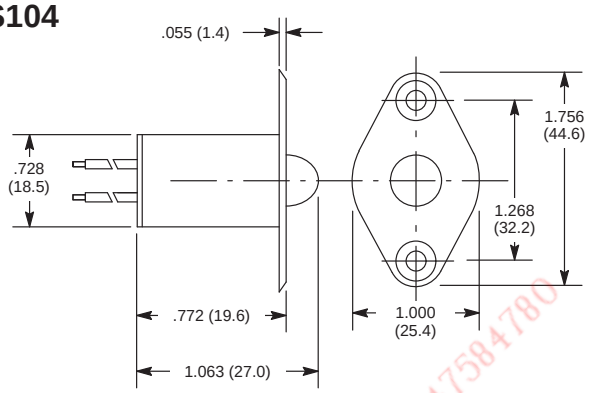
Features

- 3/8” Dia with 18” Long Wire Leads
- Flange for Reliable Retention
- Suitable For Sliding as well as Swing Doors

NTE Type No.	Circuitry	Action	Actuator	Diag No.
54–633	SPST–NO	NO for Closed Loop System	Magnet	S104

NOTE: The circuit is open when the ball is not depressed.

S104



Specifications

Contact Rating: 10W/VA
Contact Resistance: 150 milliohms.
Contact Material: Ruthenium Oxide over Palladium
Switching Voltage: 200 VDC max.
Switching Current: 500mA max.
Insulation Resistance: 10 gigohms
Shock Resistance: 30G for 11mS
Vibration Resistance: 20G (10 to 1000Hz)
Life Expectancy: 20,000,000 cycles (resistive load, 12VDC, 250mA)
Terminal Type: Wire Leads
Mounting Hole: .375” (9mm)

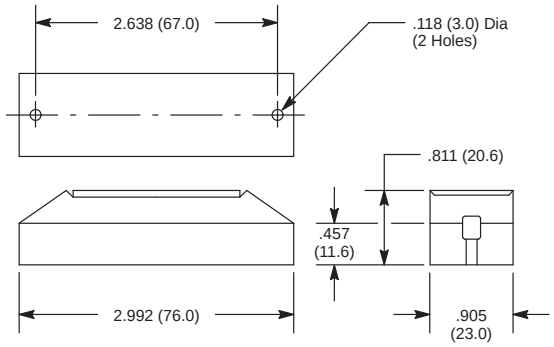
Panic Switch

Features

- Surface Mount Type
- Push Button Function
- Emergency Marking on the Button

NTE Type No.	Circuitry	Action	Actuator	Diag No.
54–634	SPST–NO	NO for Closed Loop System	Microswitch	S105

S105



Specifications

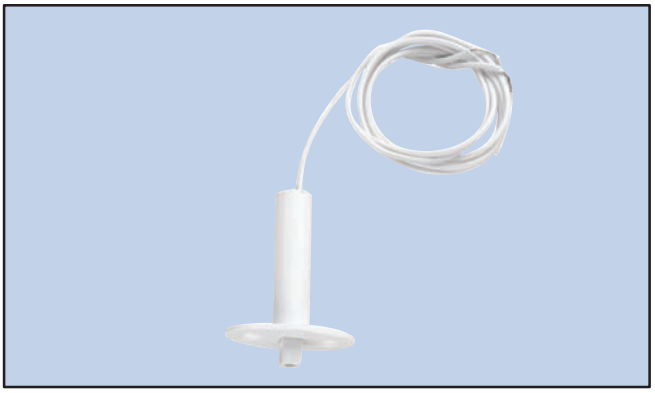
Contact Rating: 10W/VA
Contact Resistance: 150 milliohms.
Contact Material: Silver over Palladium
Switching Voltage: 200 VDC max.
Switching Current: 500mA max.
Insulation Resistance: 10 gigohms
Shock Resistance: 30G for 11mS
Vibration Resistance: 20G (10 to 1000Hz)
Life Expectancy: 20,000,000 cycles (resistive load, 12VDC, 250mA)
Terminal Type: Y Type Tin Plated Brass

Magnetic Alarm Switches

Plunger Switch

Features

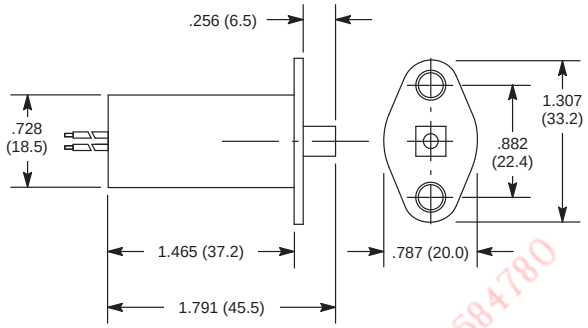
- 3/8” Dia Mounting Hole
- Flange for Reliable Retention
- 3mm Pre–Travel Stroke and 7mm Overall Operating Stroke
- 18” Long Wire Leads
- Screw Provided



NTE Type No.	Circuitry	Action	Actuator	Diag No.
54–635	SPST–NO	NO for Closed Loop System	Magnet	S106

NOTE: The circuit is open when the plunger is not depressed.

S106



Specifications

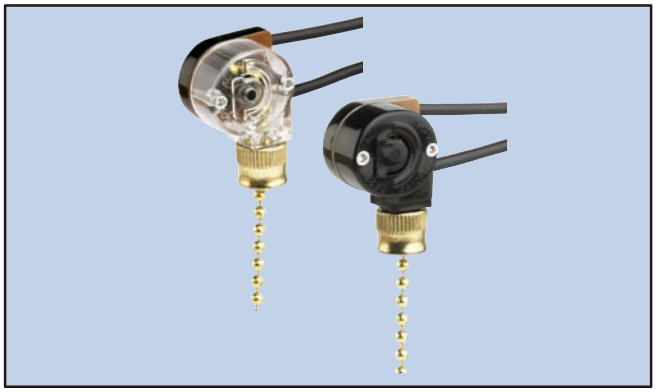
Contact Rating: 10W/VA
Contact Resistance: 150 milliohms.
Contact Material: Ruthenium Oxide over Palladium
Switching Voltage: 200 VDC max.
Switching Current: 500mA max.
Insulation Resistance: 10 gigohms
Shock Resistance: 30G for 11mS
Vibration Resistance: 20G (10 to 1000Hz)
Life Expectancy: 20,000,000 cycles (resistive load, 12VDC, 250mA)
Terminal Type: Wire Leads
Mounting Hole: .375” (9mm)

Pull Chain Switches

Single Pole

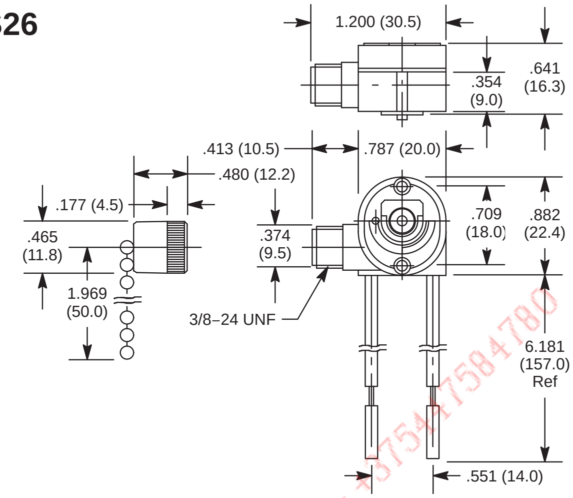
Features

- Steel Chain W/Rope Cord



NTE Type No.	Circuitry	Action		Base	Cover		Diag No.
					Material	Color	
54–538	SPST	ON	OFF	Nylon 66	Nylon 66	Transparent	S26
54–539	SPST	ON	OFF	Nylon 66	Nylon 66	Black	S26

S26



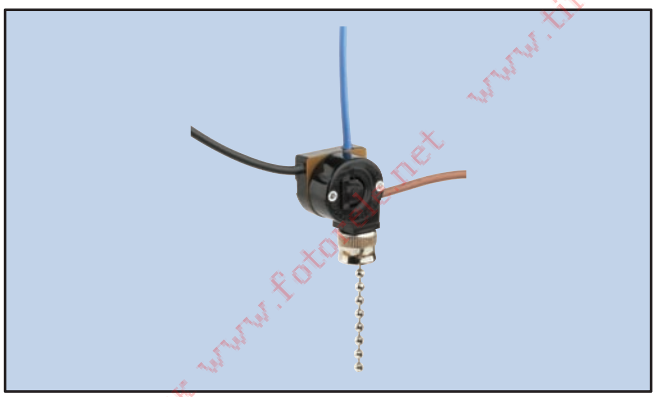
Specifications

Current Rating: 6A 125VAC, 3A 250VAC
Contact Resistance: 50 Milliohms initial (max.)
Insulation Resistance: 100 Megohms (min.) at 500VDC
Dielectric Strength: 1000V RMS (min.) for 1 minute
Operation Force: 400 plus/minus 200 gram
Temperature Rating: +32° to +149°F (0° to +65°C)
Electrical Life: 6000 cycles
Mechanical Life: 50,000 cycles
Terminal Type: 18 AWG, 6" length
Mounting Hole: .393 (10.0)

Single Pole

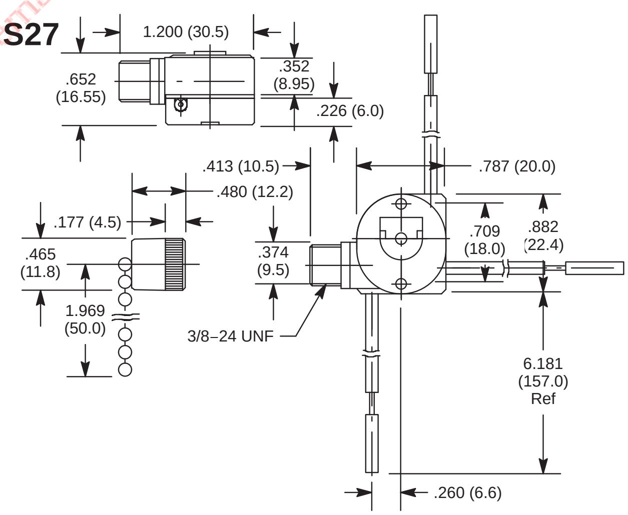
Features

- Sequence – Load 1 On, Load 2 On, Load 1 & 2 On, All Off
- For Use in Ceiling Fan Applications



NTE Type No.	Sequence				Base	Cover		Diag No.
	Load 1	Load 2	Load 1& 2	All		Material	Color	
54–540	ON	ON	ON	OFF	Nylon 66	Nylon 66	Black	S27

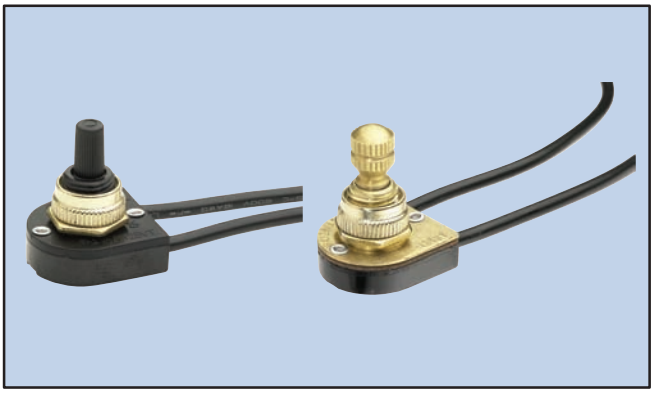
S27



Specifications

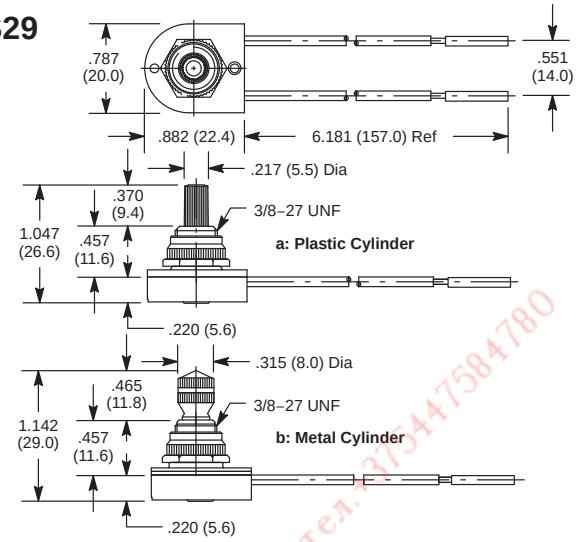
Current Rating: 6A 125VAC, 3A 250VAC
Contact Resistance: 50 Milliohms initial (max.)
Insulation Resistance: 100 Megohms (min.) at 500VDC
Dielectric Strength: 1000V RMS (min.) for 1 minute
Operation Force: 400 plus/minus 200 gram
Temperature Rating: +32° to +149°F (0° to +65°C)
Electrical Life: 6000 cycles
Mechanical Life: 50,000 cycles
Terminal Type: 18 AWG, 6" length
Mounting Hole: .393 (10.0)

Two Position, Single Pole



NTE Type No.	Circuitry	Action		Cylinder	Actuator	Diag No.
54–541	SPST	ON	OFF	Nylon 66	Nylon 66	S29a
54–542	SPST	ON	OFF	Steel	Brass Plated Steel	S29b

S29



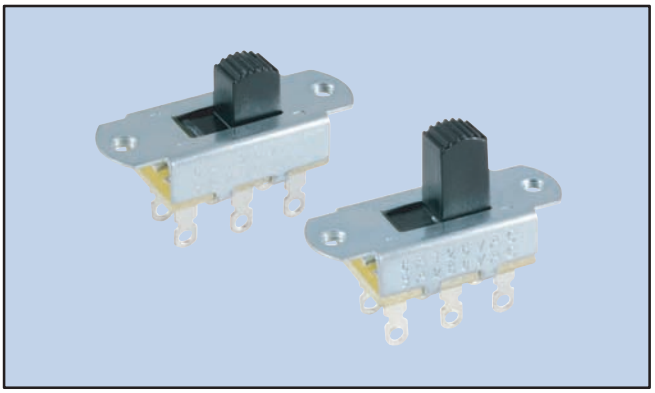
Specifications

Current Rating: 6A 125VAC, 3A 250VAC, 1A 125VL
Contact Resistance: 20 Milliohms initial (max.)
Insulation Resistance: 100 Megohms (min.) at 500VDC
Dielectric Strength: 1000V RMS (min.) for 1 minute
Operation Force: 400 plus/minus 200 gram
Temperature Rating: +32° to +149°F (0° to +65°C)
Electrical Life: 6000 cycles
Mechanical Life: 50,000 cycles
Terminal Type: 18 AWG, 6” length
Mounting Hole: .393 (10.0)

Slide Switch, Two Circuit

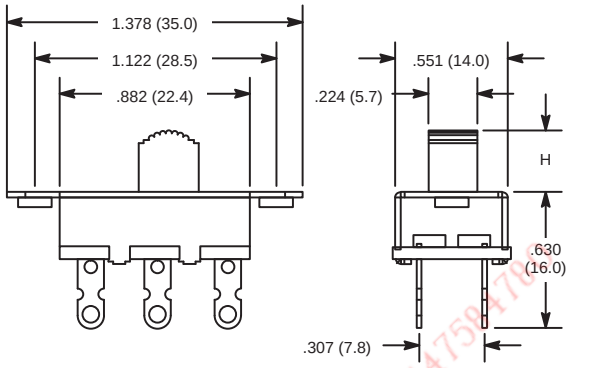
Features

- **Sequence – Load 1 ON, Load 2 OFF; Load 2 OFF, Load 1 ON**



NTE Type No.	Circuitry	Poles	Action		Actuator Height	Diag No.
54–667	DPDT	6 Pole	ON	OFF	.276 (7.0)	S123
54–668	DPDT	6 Pole	ON	OFF	.433 (11.0)	S123

S123

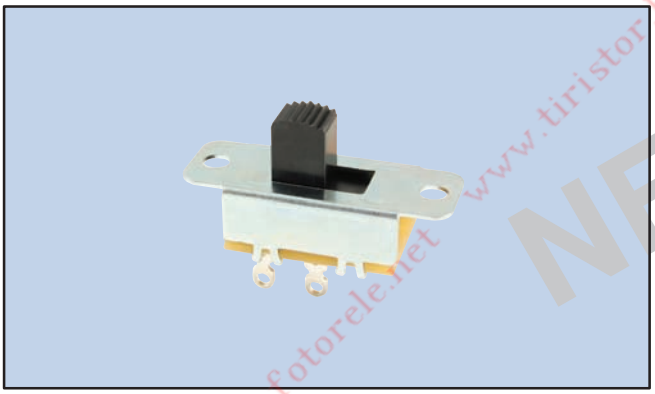


NTE Type No.	H
54–667	.276 (7.0)
54–668	.433 (11.0)

Specifications

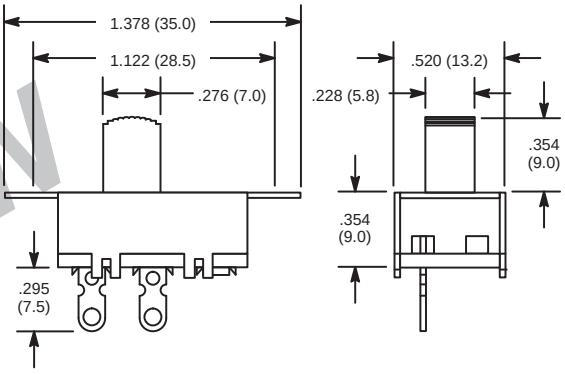
Current Rating: 0.5A 125V, 3A 250VAC, 6A 125 VAC
Insulation Resistance: 150 Megohms (min.)
Dielectric Strength: 1500V RMS (min.)
Temperature Resistance: +221°F (+105°C)
Temperature Rating: +32° to +185°F (+0° to +85°C)
Electrical Life: 6000 cycles (min.)
Mechanical Life: 6000 cycles (min.)
Terminal Type: Solder Lug
Mounting Hole: .551 (14.0) x .276 (7.0)

Slide Switch



NTE Type No.	Circuitry	Poles	Action		Actuator Height	Diag No.
54–719	SPST	2 Pole	ON	OFF	.354 (9.0)	S137

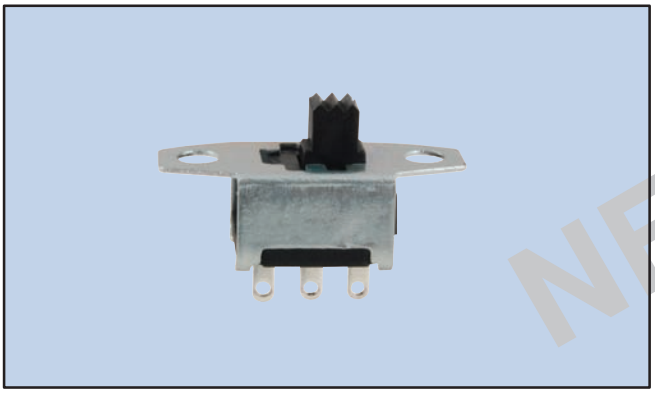
S137



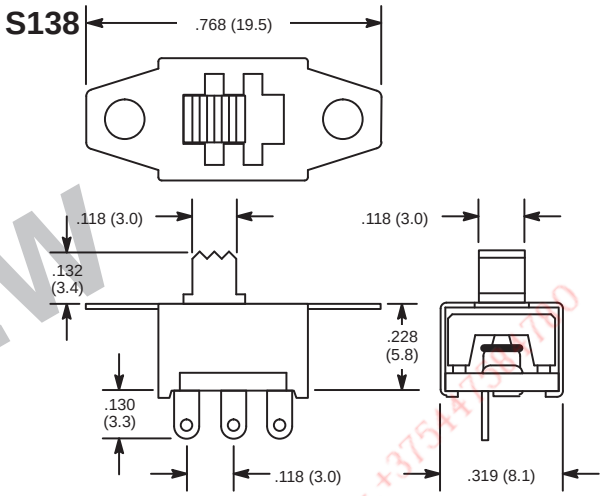
Specifications

Current Rating: 6A 125VAC, 3A 250VAC
Insulation Resistance: 100 Megohms (min.) at 500VDC
Dielectric Strength: 1000V RMS (min.)
Temperature Rating: +32° to +149°F (+0° to +65°C)
Electrical Life: 6000 cycles
Mechanical Life: 10000 cycles
Terminal Type: Solder Lug
Mounting Hole: .512 (13.0) x .256 (6.5)

Slide Switch



NTE Type No.	Circuitry	Poles	Action		Actuator Height	Diag No.
54–720	SPDT	3 Pole	ON	ON	.132 (3.4)	S138



Specifications

Current Rating: 3A 125VAC, 1.5A 250VAC
Insulation Resistance: 100 Megohms (min.) at 500VDC
Dielectric Strength: 1000V RMS (min.)
Temperature Rating: +32° to +149°F (+0° to +65°C)
Electrical Life: 6000 cycles
Mechanical Life: 10000 cycles
Terminal Type: Solder Lug
Mounting Hole: .236 (6.0) x .138 (3.5)

Miscellaneous Switches

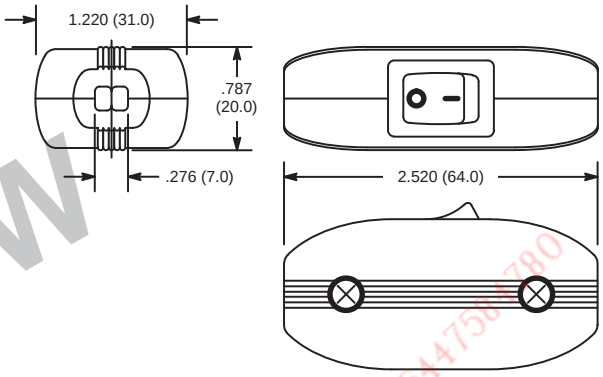
In–Line Switch

Features

- For 16 AWG and 18 AWG Wire

NTE Type No.	Circuitry	Action			Actuator	Legend	Diag No.
54–743	SPST	ON	NONE	OFF	Nylon 66	Yes	S148

S148



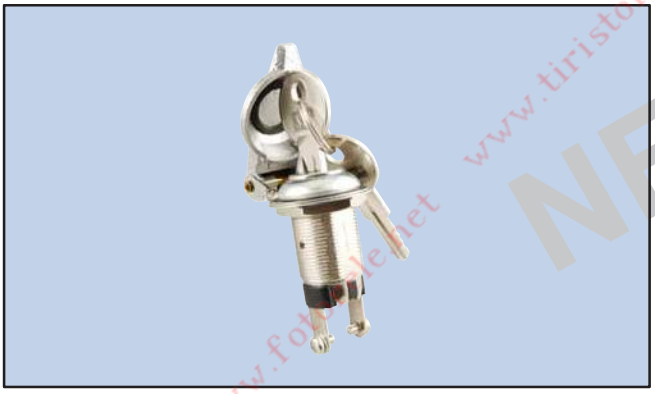
Specifications

Current Rating: 10A 125VAC, 6A 250VAC
Insulation Resistance: 100 Megohms (min.) at 500VDC
Dielectric Strength: 1500V RMS (min.)
Temperature Rating: –4° to +185°F (–20° to +85°C)
Electrical Life: 6000 cycles
Mechanical Life: 10000 cycles
Operation Force: 450g
Terminal Type: N/A
Mounting Hole: N/A

Key Switch

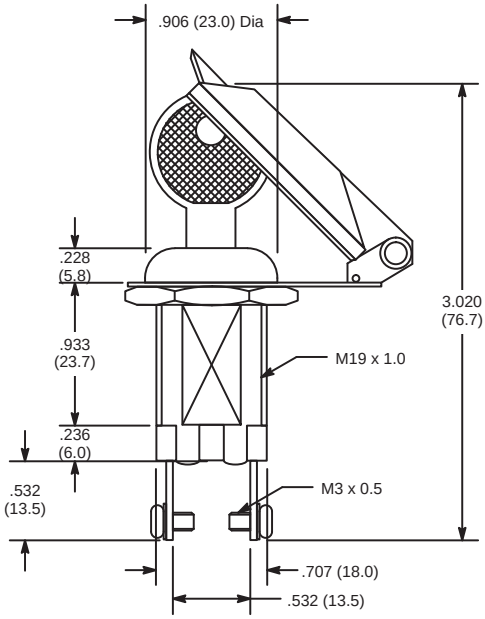
Features

- Includes Cover



NTE Type No.	Circuitry	Action			Housing	Cover	Diag No.
54–741	SPST	ON	NONE	OFF	ZDC1	Yes	S149

S149



Specifications

Current Rating: 3A 125VAC, 1.5A 250VAC
Insulation Resistance: 100 Megohms (min.) at 500VDC
Dielectric Strength: 1000V RMS (min.)
Temperature Rating: –13° to +185°F (–25° to +85°C)
Electrical Life: 6000 cycles
Mechanical Life: 10000 cycles
Terminal Type: Screw Type
Mounting Hole: .756 (19.2)

54–900

Hardware, Indicator Plate

Features:
- Nickel–Plated Steel
- Fits 15/32” [.466 (11.91mm)] Bushing

54–901

Hardware, Indicator Plate

Features:
- Nickel–Plated Steel
- Fits 15/32” [.469 (11.91mm)] Bushing

54–902

Hardware, Indicator Plate

Features:
- Nickel–Plated Steel
- Fits 15/32” [.469 (11.81)] Bushing

54–903

Hardware, Indicator Plate

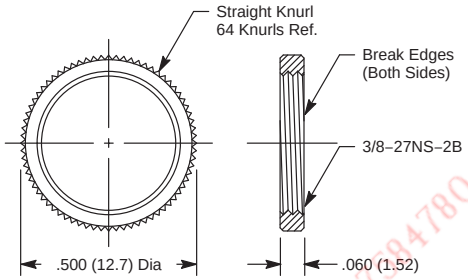
Hardware, Indicator Plate

Features:
- Grade 430 Stainless Steel
- Fits 15/32” [.469 (11.91)] Bushing

54–904

Hardware, Brass Facenut

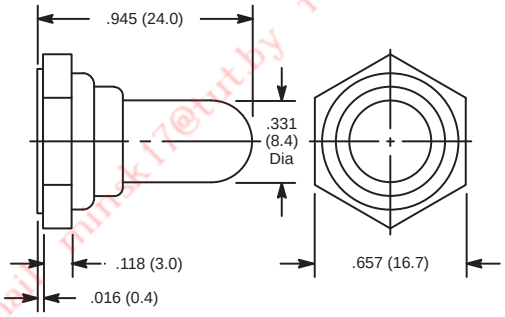
Features:
- Bright Nickel Plating
- 3/8–27NS–2B Thread



54–905

Hardware, Rubber Boot

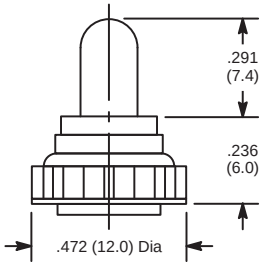
Features:
- For Bat Handle Toggle Switch
- 15/32–32 UNS–2A Thread



54–906

Hardware, Rubber Boot/Knob

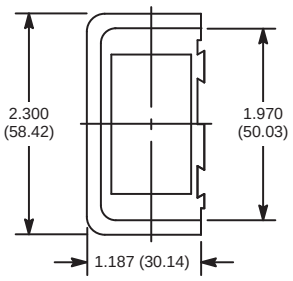
Features:
- For Mini Toggle Switch
- 1/4–40 Thread
- Contains “O”–Ring Seal



54–910

Hardware, Mounting Panel

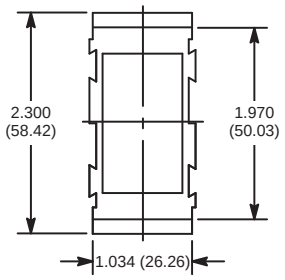
Features:
- End Section
- For Automotive/Marine Types
- Black Color



54–911

Hardware, Mounting Panel

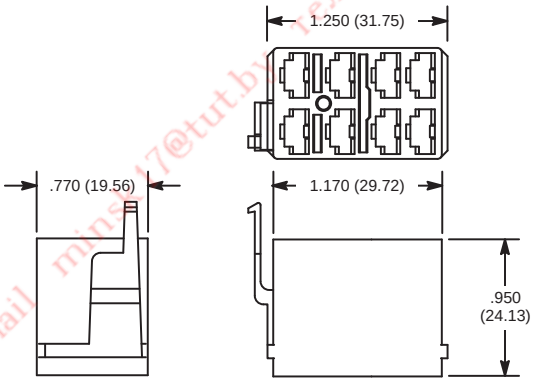
Features:
- Middle Section
- For Automotive/Marine Types
- Black Color



54–912

Hardware, Connector Housing

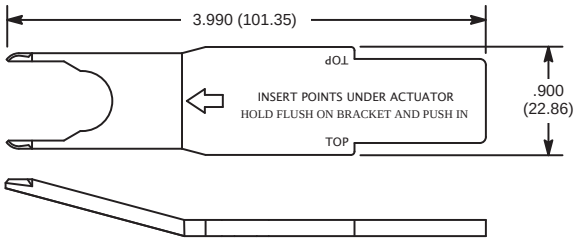
Features:
- For Automotive/Marine Types



54–913

Hardware, Actuator Removal Tool

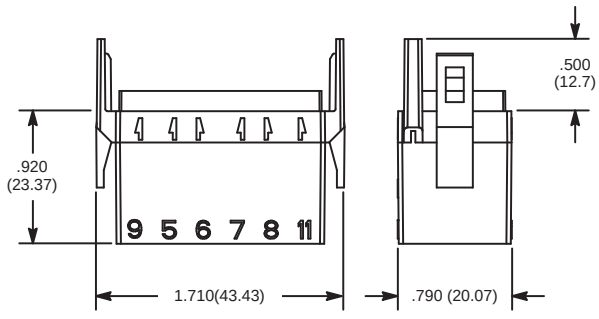
Features:
- For Automotive/Marine Types
- For Flush Bracket



54–914

Hardware, Connector

Features:
- .250” Tab
- Black Color

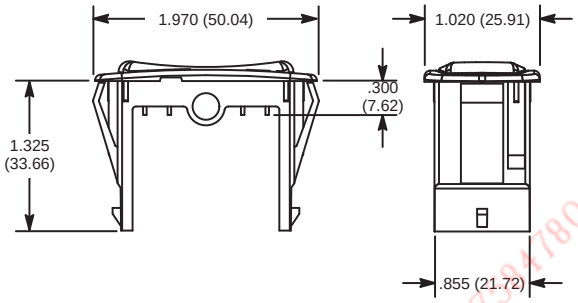


54–915

Hardware, Removable Hole Plug

Features:

- For Automotive/Marine Types
- With Non–Serrated Wings

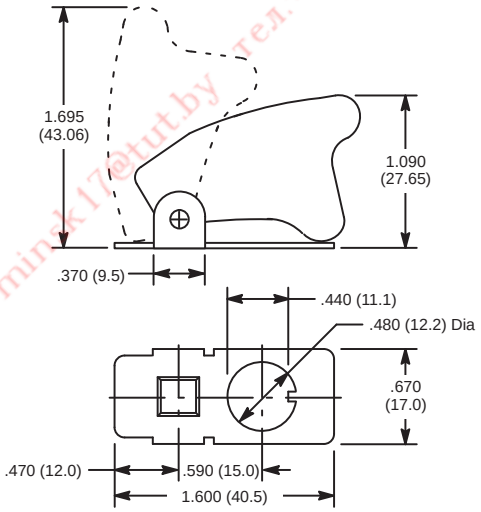


54–920, 54–921, 54–922, 54–923

Hardware, Safety Cover

Features:

- For Toggle Switch w/12mm (15/32”) Mounting Hole
- Accepts Standard 17.5mm (11/16”) Switch Handles
- Available in 4 Colors:
  - 54–920 (Red)
  - 54–921 (Red Metallic)
  - 54–922 (Blue Metallic)
  - 54–923 (Silver Metallic)



54–925

Hardware, Indicator Plate

Features:

- Nickel–Plated Steel
- Fits 15/32” [.466 (11.91mm)] Bushing
- For use with 54–727 Switch

54–926

Hardware, Indicator Plate

Features:

- Nickel–Plated Steel
- Fits 15/32” [.466 (11.91mm)] Bushing
- For use with 54–728 Switch

54–927

Hardware, Indicator Plate

Features:

- Nickel–Plated Steel
- Fits 15/32” [.466 (11.91mm)] Bushing
- For use with 54–729 & 54–730 Switches

54–928

Hardware, Indicator Plate

Features:

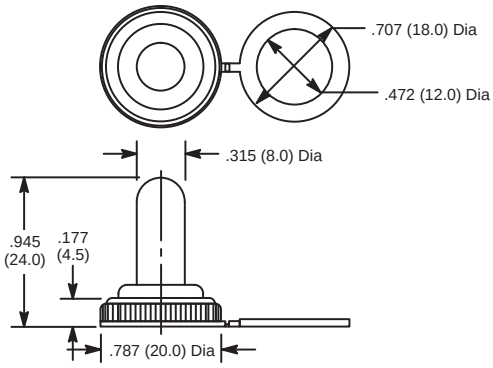
- Nickel–Plated Steel
- Fits 15/32” [.466 (11.91mm)] Bushing
- For use with 54–722 Switch

54–929

Hardware, Watertight Boot

Features:

- M12*0.75 Thread
- Contains “O”–Ring Seal
- For use with 54–722 Switch



Definitions and Glossary

Relays

AC Operated Relays
These type of relays incorporate a shading ring on the pole face preventing total collapse of the magnetic field during zero voltage crossover.

Armature
The moving magnetic member of an electromagnetic relay structure.

Break
The opening of closed contacts to interrupt an electric circuit.

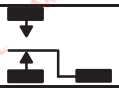
Bounce Time
Duration from the first to last making or breaking of a relay contact during one operation.

Coil
An assembly consisting of one or more windings with terminals and any other required parts such as a sleeve or slug. The windings may be self supporting but usually are wound around an insulated iron core or on a bobbin.

Contact
1. A conductive connection of two elements.
2. A contact piece designed to ensure reliable current passage either in the form of a rivit or welded assembly.

Contact Forms
Denotes the contact mechanism and number of contacts in the contact circuit.

Contact Symbols

Form "A" Contacts (Normally Open Contacts)	
Form "B" Contacts (Normally Closed Contacts)	
Form "C" Contacts (Changeover Contacts)	

Form "A" contacts are also called N.O. contacts or make contacts.
Form "B" contacts are also called N.C. contacts or break contacts.
Form "C" contacts are also called changeover contacts or transfer contacts.

Contact Life
The number of operations for a given contact load under specified conditions (e.g. duty cycle, maximum operating rate) without leading to permanent contact failure (e.g. contact welding, excessive contact wear/resistance or contact locking when switching DC loads).

Contact Resistance
The electrical resistance of closed contacts.

Continuous Current
The maximum current a relay may carry continuously without exceeding temperature limits.

DC Relays
A relay with coils designed for operation from a DC supply.

Dielectric Strength
The voltage which may be applied to two adjacent metal parts insulated from each other without causing electrical breakdown.

Drop Out (Release) Time
The time from removal of voltage from the coil circuit to the first breaking or making of the relay contact.

Drop Out (Release) Voltage
The voltage at which the relay returns safely to its unoperated position.

Duty Cycle
The ratio of operated time to the total cycle time expressed as a percentage.

Electrical Life
Refer to "Contact Life".

Holding Current
Minimum coil current required to hold the armature in the operated position.

Insulation Resistance
The resistance value between mutually isolated conducting sections of the relay (e.g. between coil and contacts, across open contacts, and between coil or contacts to any core or frame at ground potential). This value is usually expressed as "initial insulation resistance" and may decrease with time, due to material degradation and the accumulation of contaminants.

Mechanical Life
The guaranteed number of operating cycles without load.

Make
The closure of an open contact to complete an electric circuit.

MBB Contacts
Abbreviation for make–before–break contacts. Contact mechanism where Form "A" contacts (normally open contacts) close before Form "B" contacts open (normally closed contacts).

Normal Position
1. The de–energized, unoperated position of contacts (open or closed) due to spring tension, gravity, or magnetic polarity.
2. The home position for a stepping switch.

Nominal Coil Resistance
The DC coil resistance measured at its terminals at a winding temperature of +23 C.

Peak Make Current (Inrush Current)
The maximum current flowing through a relay contact immediately after closure.

Power Consumption (Total)
Sum of nominal coil power consumption plus power consumed in any series resistor in Watts or VA.

Pull In (Operate) Time
The time from application of voltage to the coil to first making or breaking of the relay contact.

Pull In (Operate) Power
The power consumed by the relay coil in order to operate the relay.

Pull In (Operate) Voltage
The minimum voltage required to operate the relay.

Rated Current
1. For a relay coil – the nominal voltage divided by the coil resistance.
2. For a contact – refer to "Continuous Current".

Rated Voltage

The reference voltage for the definition of other relay data.

Definitions and Glossary

Relay Life
Refer to “Electrical Life” and “Mechanical Life”.

Relay Pole
A contact set comprising either a changeover or normally open, or normally closed contact. Relays with more than one pole can control more than one circuit.

Switching Cycle
One cycle of energization and release of a relay.

Switching Rate
Operating cycles per hour or per second.

Switching Voltage
The voltage which appears on the contacts before their closing or after their opening after transients have disappeared.

Temperature Compensation
With increasing temperature but constant coil voltage the magnetic field generated will be reduced due to a change in coil resistance (e.g. for enamelled copper wire approximately 4%/10 C). By incorporating a permanent magnet with an opposite temperature coefficient into the magnetic circuit, the pull in voltage of the relay may be kept stable over a wide temperature range.

Thermal Resistance
Coil heating as a function of coil power consumption.

Time Constant (Electrical)
The time until the current reaches 63% of its final value after energization (ratio L to R). DC load handling capacity and life figures are dependent on the L/R value of the DC load circuit.

Total Contact Resistance
The sum of relay contact resistance plus resistance of connecting elements as measured on the relay terminals.

Switches

Actuation Force
See Operating Force.

Actuator
An actuator is the mechanical component used to manually turn a switch or circuit breaker on and off.

Alternate Action (Double Action)
A “Push–On/Push–Off” switch action, typically referring to maintained circuit pushbutton switches.

Arcing
Sparking that occurs each time a switch is turned on or off, except in very low voltage and low current applications. This sparking can burn up the switch contacts and reduce the life of a switch. In general, the arc produced by a DC voltage will be greater and last longer than an AC voltage because DC current has a constant value in relation to ground and zero. AC current has a value that is always rising or falling in relation to zero. Whenever it reaches zero (120 times a second) it cannot produce an arc.

Break–Before–Make
Switches that will only complete one circuit at a time, leaving an interval of time between the time one circuit opens and the next circuit closes.

Center–Off
A switch with three actuator positions. Contact is made (with one or several circuits) in the two extreme positions; in the center position of the actuator, all circuits are off.

Contact Resistance
The resitance of a pair of contacts, measured at the terminals, which effectively appears in series with the load (milliohm range).

Current Rating
The maximum current in amperes, at rated current and frequency, that a device will carry continuously under defined conditions without exceeding specified performance limits.

Dielectric Strength
The highest voltage an insulator can withstand without allowing current to flow. Also referred to as breakdown voltage. For switches, also represents the strength between live parts and operator at accessible surfaces.

Double Break/Double Make
Contacts that open at two separate places on a circuit.

Double Pole (DP) Switches
A switch device that opens, closes, or changes connection of two conductors in an electrical circuit.

Double Throw (DT) Switches
A switch that opens, closes, or completes a circuit at both extreme positions of its actuator.

Insulation Resistance
The resistance between two normally insulated parts measured at a specified high DC potential (megohm range). Also referred to as Leakage Resistance.

Life Expectancy (Useful Life)
Depends upon the end life criteria for a specific application. In order to determine your failure criteria, the following parameters should be known; dielectric strength, duty cycle, mechanical breakdown, contact resistance, insulation resistance, operating force. Life expectancy is normally experienced in minimum switch cycles before failure.

Make–Before–Break
Switches that complete a new circuit before breaking an old one.

Momentary Switch
A switch that automatically returns to its original, or at rest position.

Normally Closed
Often abbreviated N.C., indicates that the circuit is closed when the switch is not operated. Activation of the switch causes the circuit to open.

Normally Open
Often abbreviated N.O., indicates that the circuit is open when the switch is not operated. Activation of the switch causes the circuit to close.

Operating Force
Also known as Actuation Force, the force required to transfer a switch from one position to another.

Pole
The number of completely separate circuits that can be active through a switch or simultaneously protected by a circuit breaker at any on time.

Push–On/Push–Off
An alternate action switch, often used on lamps, vacuum cleaners, etc. When pushed, the circuit closes. When pushed again, it opens. Often called “Push–Push”.

Quick Break/Quick Make
Switches designed to make or break circuits in less than 5 milliseconds to make or break. Recommended for use on DC circuits.

Single Break/Single Make
Contact that open and close a circuit at only one place.

Single Pole (SP) Switches
A switch device that opens, closes, or changes the connection of a single conductor in an electrical circuit.

Definitions and Glossary

Single Throw (ST) Switches

A switch that opens, closes, or completes a circuit at only one of the extreme positions of its actuator.

Slow Break/Slow Make

Switches designed to make or break circuits within 8–12 milliseconds. Typically used for AC applications.

Snap–Action

Non–teasable switch action having unstable equilibrium so that it must be either “ON” or “OFF”. Can also be referred to as “Push–Push”.

Wiping Action Contacts

Self–cleaning contacts that wipe or slide against each other when opening or closing a circuit.

Notes

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