



Lighting Control Relays

Relay Series

A lighting system designer generally has a choice of using a multiple relay or individual lamp controls. In some cases, self-controlled luminaries are a good option. However, when the lighting system must extend beyond a confined area or the number of lamps exceeds five or six, a multiple relay should be considered. Multiple relays offer several unique advantages:

- Single-point maintenance
- Primary circuits are energized only at night
- Lightning protection available for the load, line and control circuits
- Circuitry can be de-energized for service safely day or night
- All lamps come on and go off at the same time
- Only one control is required

Trinetics offers an extensive line of multiple relay lighting controls. Commonly referred to as RCOC (Remote Control of Outdoor Circuits) relays, the company manufactures the following product lines:

- MR Series
- MTR Series
- RLY Series
- Special Series

MR Series

The MR Series is the foundation of the Trinetics product line of multiple relay lighting controls. MR relays feature a time-proven electromagnetic design that provides high compression, low audible noise and minimum eddy current heating. For customers in need of heavy duty construction and long-term performance, the MR Series is built for years of trouble-free service in the most challenging environments. This open air contact style relay is offered in the following configurations:

- One or two pole
- Normally open or normally closed
- 30, 60 or 100 amp

MTR

The MTR Series is designed for users who prefer mercury tube contactors that are hermetically sealed, have no contactor wear points, no-spark operation and only one moving part. The single moving part is a ceramic plunger that causes mercury to flow together or separate to electrically close and open the load circuit. The ruggedness and reliability of this simple design has been proven in thousands of field applications. The MTR Series is available in the following standard versions:

- One or two pole
- Normally open or normally closed
- 30, 60 or 100 amp

RLY Series

The RLY Series was developed for lighting system designers in need of an inexpensive control relay that outperforms throw-away type units that are sealed or difficult to repair. The reputation of the Trinetics line proves durability and maintainability are essential to cost-efficient lighting relays. The RLY Series offers superior service life, durability and maintainability at a competitive purchase price. The RLY Series is offered in the following standard versions:

- One or two pole
- Normally open or normally closed
- 30 amp

Special Series

This catalog details 20 of the most popular relays; however, Trinetics also manufactures a variety of specially-designed lighting controls. Available in electromagnetic or mercury tube configurations, these special order relays are variations of time proven designs. If you have a unique load, wiring or case requirement, contact Trinetics to find a relay that meets your specific lighting control need. Custom relays are available in the following configurations:

- One or two pole
- Normally open or normally closed
- 30, 60 or 100 amp

Relay Features

Cases and Covers

Much of the popularity of the Trinetics RCOC line is due to the rugged design and durability of the enclosures. Controls are housed in aluminum, bakelite or Lexan® cases and covers.

Most MR relays, as well as the 60 and 100 amp MTR relays, are furnished with rugged aluminum enclosures. These cases are built with a hinged cover and an integral padlock hasp. Certain 30 amp MR relays are the exception; these controls are housed in a heavy-duty bakelite case with an aluminum cover.

The 30 amp MTR and RLY relays come standard with UV-stable Lexan cases. These enclosures have a detachable cover retained by an integral safety chain that ensures ample working room and easy service access. Aluminum enclosures are also available as an option for these 30 amp relays.

All Trinetics relays include plated brass, stainless steel or aluminum fasteners and mounting hardware. There are no unused holes or knockout type perforations. All entrance holes are drilled at the factory, sized and located directly in line with internal connection terminals. The relays will retain their original appearance and integrity for many years.

Weather Seals

Trinetics relays have enclosures with one piece, die-cut or hand-cut rubber gaskets. The gaskets retain their elasticity and compressibility in all weather conditions for the life of the unit and will not stick or break when servicing the control. Close tolerance control of the case, cover and hinge geometry ensures uniform gasket compression. Photocell receptacles are sealed with solid neoprene gaskets. All materials are highly resistant to ozone aging.

Grommeting

Neoprene grommets with flexible inside diameter are furnished where primary and control cable sizes would normally be up to 3/8 inch diameter. Cable grips are installed for larger wire up to 9/16 inch diameter. The customer may specify the size and location of drilled holes for conduit fittings.

Security

All aluminum enclosures are furnished with provisions for padlocking the door to prevent inquisitive or destructive entry.

Grounding

All units rated for 480 volt service and most 100 amp controls are supplied with a case grounding terminal for added safety. Any aluminum case can be so equipped if specified.

Nameplate Data

On cast aluminum enclosures, identification and rating information is permanently etched and metal stamped on a heavy duty nameplate which is secured to the door with drive screws. The data remains legible for the life of the unit.

Bakelite enclosures also include an aluminum nameplate, which is secured to the cover of the relay. Lexan enclosures are marked with a laminated label.

Mechanisms

The basis for Trinetics' superiority in the lighting controls industry is the construction of the relay mechanism. Current-carrying circuit elements are always conservatively rated. Mechanical assemblies employ threaded fasteners, not rivets and clips. Molded and extruded parts are avoided in favor of machined components. Each mechanism is carefully assembled and tested by qualified personnel using time-tested methods and traditional workmanship.

Clearances

Spacing of components and terminal locations within the enclosure are governed by two basic considerations, dielectric properties and access to field connections. All components are spaced to provide high dielectric strength even in the most adverse environment, high humidity and salt air. Field connections are located directly in line with their entrance ports. There is adequate room for safe and convenient attachment of incoming wires.

Panels

Components are mounted on high quality phenolic panels chosen for their superior electrical properties and strength. The boards are 5/16" thick and have very high dielectric ratings, extremely low water absorption coefficients and heat resistance. The material lends itself to close tolerance machining and is dimensionally stable.

Magnets

The electromagnets in Trinetics relays are built by us to our own design. They are exactly matched to the requirements of our lighting control relay. Laminations are of high quality electrical steel. Assembly methods assure high compression and fit for low audible noise and minimum eddy current heating.

The magnets are zinc and die-chromate plated for corrosion resistance. A phosphor bronze breaker strip is used on the clapper type armature to reduce the effects of residual magnetism during dropout. This increases the speed of contact separation, thereby reducing arc length and contact erosion.

Coils

All Trinetics multiple relay coils are wound on a nylon bobbin and sealed in a pressure molded, high crystalline nylon resin outer casing. They have a Class B (130°C) insulation rating, but in normal service will not exceed 55°C. Each coil has an operating voltage range of $\pm 20\%$ of nominal and is tested by the factory at both extremes. The moisture barrier has been proven by underwater functional testing. Power rating are given in the chart on page 5.

Contacts

Contact material is silver cadmium oxide, a sintered alloy chosen for its ability to withstand high inrush currents, anti-welding properties, low contact resistance and durability. The contacts are induction brazed onto electrolytic copper studs. The surfaces are slightly crowned for perfect mating at their centers. In every relay, contact gaps and pressures are adjusted at final test to insure proper operation and long life. Relays can be supplied with normally open or normally closed contacts.

Action

The clapper type magnet imparts a sweeping motion to the moving contacts which generates our unique "wiping" action. The contacts meet at their outer edges, wipe themselves clean and seat firmly at their centers. This action locates the make/break arc erosion at the perimeter or nonconducting surface of the contacts. In designs having linear or axial motion, arc erosion is aggravated by contact "bounce." This phenomenon is all but eliminated by our design. Periodic maintenance is not required.

Mercury Tube Contactors

The mercury tube contactors are of hermetically sealed steel tube construction and offer the inherent advantages and benefits of silent switching, long life, high inrush capabilities, contact arc quenching and the structural advantages that are provided in the steel tube construction. These contactors operate in a wide range of temperatures, under low or high pressures, in dust or vapor filled environments.

Fusing

Fuses should be included in any circuit to which the public is exposed. They afford protection against shorts in the line and in the ballast. Trinetics relays can be ordered without over-current load circuit protection. All others are shipped with fuses or breakers installed.

Fuses supplied with Trinetics relays are the dual element type for low heat rise and 200,000 amp interrupting capacity. The spring-loaded fuse clips are silver plated for long term corrosion resistance.

The recommended loads shown in the chart on page 5 reflect the NEMA standard limitation of loading fuses to 80% of their rated current. Control circuit fusing can be supplied if specified separately.

When circuit breaker protection is specified, Trinetics uses the E-frame, magnetic trip type with 5000 amp interrupter capacity. Relays equipped with breakers can be loaded to 100% of the breaker rating.

Control Circuit

All Trinetics relays are magnetically actuated and held. The control circuit can be energized by a photocell, time clock or manual switch located either within the relay or in a remote location.

Most relays are equipped with control circuit lightning protection as standard equipment. Fuse protection is also available if specified. Terminals for connection of remote control wiring will be provided when external control is specified.

Photocell Receptacles

Receptacles furnished with our relays are the twist-lock type and conform to EEL SPEC TDJ 146 (NEMA SM-16). They are attached with corrosion resistant hardware and weather-sealed with solid neoprene gaskets. Simple provisions for northward orientation are standard.

Relay Features (cont.)

Lightning Protection

Lightning arresters should be included in areas where frequent electrical storms occur. Most Trinetics relays are equipped with control circuit arresters and can be ordered with optional line and/or load circuit protection.

The control circuit arresters are the dual expulsion gap type. Each assembly includes two gaps in series from the terminal post to a common ring which provide an alternate path for lightning surges to bypass the coil. The fibre rings are designed to extinguish the surge arc without damage to the assembly or loss of protection. The arresters are designed to arc at one half the impulse level of the control coil.

The load circuit arresters are the valve type designed for use on secondary distribution circuits up to 650 volts. Any surge above that level will be instantly shunted to neutral protecting the equipment on the load circuit from damaging voltage. When the surge passes, and the arrester has interrupted the follow current, it then returns to a non-conducting mode.

Hand-Off-Auto Switch

This is an optional three position, rocker switch installed in the control circuit. In normal service, the switch is in the Auto position. For daytime lamp servicing, moving the switch to the Hand position energizes the control coil turning on the load circuit. If lamp placement is required, moving the switch to the Off position disconnects the control circuit, keeping the load secured for maintenance. Repair work can be quickly checked and the system returned to automatic control.

Transformers

If line voltage is 480 volts, a 480 to 120 volt transformer should be incorporated to allow the use of 120 volt control. Separate control circuit wiring is not required. The transformer is an integral part of the Trinetics relay.

Our transformers are specially designed for a maximum heat rise of 35°C to maintain low internal case temperatures. The units are deliberately oversized to accommodate our minimum coil pull-in voltage requirements. All transformers are custom wound to avoid over voltage at normal power levels. Standard reduction is 480 to 120 volts.

Terminals

The control terminals are tin-plated copper and will accept wire sizes from No. 14 to No. 6 AWG. The line/load terminal is a three piece unit. The collar is aluminum. The tang is electrolytic copper and the screw is brass, both tin plated. This construction will accept either copper or aluminum cable is sizes No. 6 through 1/0 AWG.

Power Distribution

In addition to multiple relay lighting controls, Trinetics offers an extensive line of oil and vacuum switchgear. These single-phase, medium voltage products are designed to switch capacitor banks, control lighting circuits and sectionalize power.

The VS Series vacuum switch is an exact form, fit and function replacement for existing switches in the field. The product combines the extended operating life and maintenance-free benefits of a vacuum interrupter with the lubrication and insulation advantages of oil. The VS features a manual lever for emergency hook stick operation and is available in 13, 15 and 20 kV models.

A proven performer and cost-effective alternative to the VS is the CSD Series oil switch. The CSD is equipped with an electromechanical contact assembly insulated in a transformer oil dielectric. This industry-tested product features automatic and manual operation and is available in 15 and 20 kV versions. The CSD and VS are both designed in conformance with ANSI Standard C37.66.

The SPR oil switches are available for remote control of primary circuits. They have an insulation rating of 15 kV and are designed for use on circuits having a maximum line-to-line voltage of 7.5 kV. These primary oil switches are offered in single-pole configuration.

Product literature highlighting the specifications of each of these oil and vacuum switch products is available upon request. For more information on the complete line of Trinetics switches and related accessories, contact your local sales representative or the factory.

Warranty: The seller warrants that its products shall be free from defects in workmanship and material for a period of one year from date of shipment and that its responsibility is limited to repair or replacement, at its sole discretion, of the defective part(s). The seller shall not be liable for consequential damages or related costs. The foregoing warranty is exclusive and in lieu of all other warranties of quality whether written, oral or implied, including any warranty of merchantability or fitness for purpose.

* Lexan is a registered trademark of the General Electric Company.

Load Ratings

Loading Chart

Ballast Voltage	Relay Load Rating	Number of Luminaries per Relay Pole					
		100W	175W	250W	400W	700W	1000W
120	30	21	12	9	6	3	2
120	60	43	25	18	12	6	5
120	100	72	42	30	20	10	8
208	30	38	21	16	10	6	4
208	60	76	43	32	20	10	8
208	100	127	72	53	33	16	14
240	30	43	25	18	12	7	5
240	60	86	50	36	24	14	10
240	100	144	84	60	40	23	16
277	30	51	28	21	13	8	5
277	60	102	57	43	26	16	11
277	100	170	96	72	44	27	19
480	30	88	50	35	22	13	9
480	60	172	100	72	48	26	20
480	100	288	160	115	72	44	32

This chart provides the suggested maximum number of luminaries per relay pole based on the use of regulated ballasts and the NEMA standard limitation of loading fuses to 80% of their rated current. Capacities will be slightly less when nonregulated ballasts are used.

Coil Ratings

Relay Type	Relay Rating Amps	Coil Current 120V 50/60 Hz		Coil Current 240V 50/60 Hz	
		Inrush	Continuous	Inrush	Continuous
MR	30	.330	.060	.150	.035
MR	60	.600	.132	.550	.275
MR	100	.600	.132	.550	.275
MTR	30	.080	.053	.042	.028
MTR	60	.104	.069	.051	.034
MTR	100	.293	.195	.155	.103

Nonstandard coils are available for other control voltages and frequencies. For specific information, contact your Trinetics sales representative or the factory.

Reference Information

Product Data

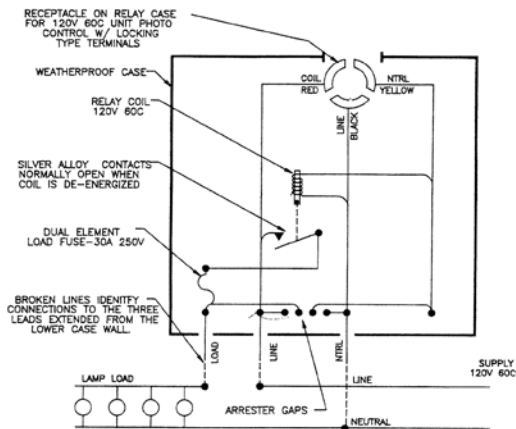
Poles	Amps	Volts	Photocell Case	Receptacle	Type	Spec	Page
1	30	120	Bakelite	Yes	MR-XG	6356	7
1	30	120/240	Bakelite	No	MR-TD	6245	7
1	30	120/240	Bakelite	No	MR-XD	6283	8
1	30	120/240	Lexan	Yes	RLY-XG	6785	8
2	30	120/240	Bakelite	No	MR-WC	6407	9
2	30	120/240	Bakelite	Yes	MR-WI	6400	9
2	30	120/240	Die-cast Aluminum	Yes	MR-WO	6585	10
2	30	120/240	Lexan	Yes	MTR-WG	6793	10
1	60	120/240	Die-cast Aluminum	No	MR-KD	6559	11
1	60	120/240	Die-cast Aluminum	Yes	MR-KG	6551	11
1	60	480	Sand-cast Aluminum	Yes	MR-HG	6398	12
1	60	480	Sand-cast Aluminum	Yes	MR-HHF	6651	12
2	60	120/240	Die-cast Aluminum	No	MR-UD	6342	13
2	60	120/240	Die-cast Aluminum	Yes	MR-UG	6338	13
2	60	240/480	Die-cast Aluminum	Yes	MR-ZH	6406	14
2	60	480	Die-cast Aluminum	No	MR-ZD	6308	14
1	100	120	Sand-cast Aluminum	Yes	MR-FG	6379	15
1	100	480	Sand-cast Aluminum	Yes	MR-ESA	6682	15
2	100	120/240	Sand-cast Aluminum	Yes	MR-YG	6314	16
2	100	120/240	Sand-cast Aluminum	Yes	MR-YO	6442	16

The 20 relays listed in the product data chart above satisfy most applications. When ordering, reference our type and spec numbers. Should special or unusual conditions arise, specifications can be defined based on the following parameters.

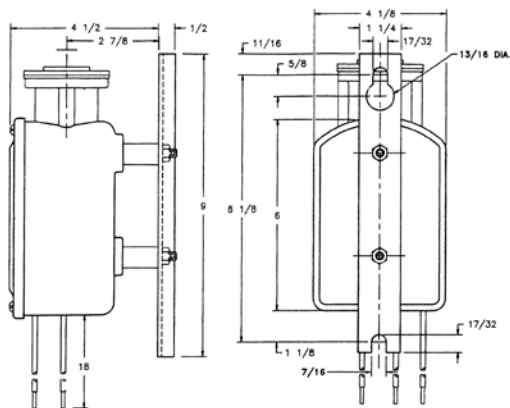
- Specify primary voltage and current
Trinetics relays handle 30 to 100 amp and 120 to 480 volt requirements.
- Specify control voltage and frequency
Trinetics relays offer 120 or 240 volt control coils for 50 or 60 Hz systems and transform from 480 to 120 volts, when required.
- Specify provisions for photocell
Trinetics relays can be equipped with a photocell receptacle or wired for remote control.
- Specify protective equipment desired
Trinetics control coils can be protected by lightning arresters and primary circuits by breakers or dual element load fuses.
- Specify case and mounting data
Trinetics relays are available in a variety of case and hanger configurations. Describe the style, size, quantity and location of connection parts required.

1-Pole, 30 Amp Relays

MR-XG Specification 6356

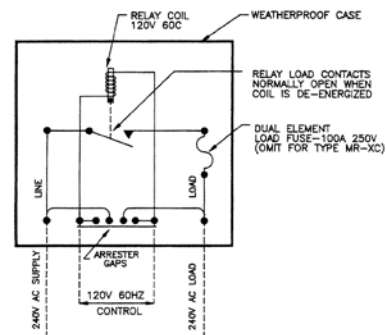


CONNECTIONS FOR TYPES MR-XI, MR-XG, OR MR-TG SINGLE POLE 30 AMPERE RELAY.

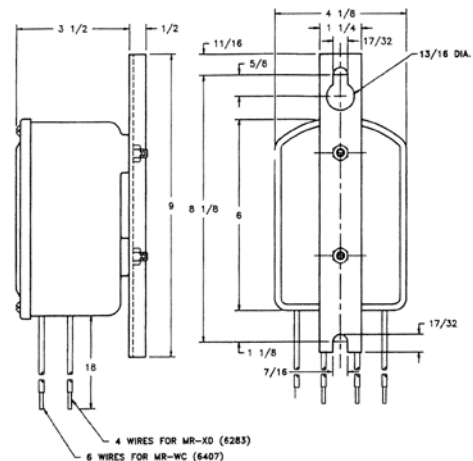


WEATHERPROOF CASE WITH MOLDED PHENOLIC BASE, PRESSED ALUMINUM COVER, EXTRUDED ALUMINUM HANGER, AND CAST ALUMINUM RECEPTACLE HOUSING.

MR-TD Specification 6245



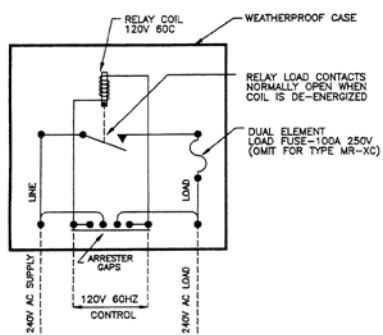
CONNECTIONS FOR SINGLE POLE 30A RELAY TYPES MR-XC, MR-XD, AND MR-TD.



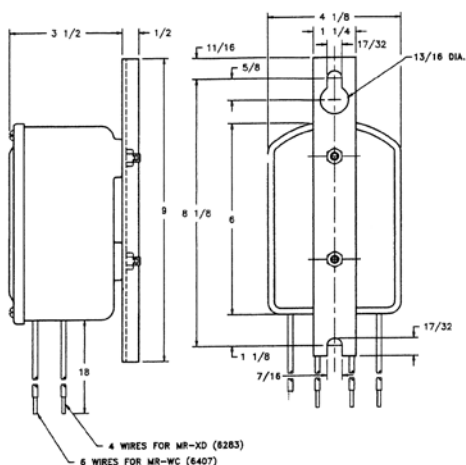
WEATHERPROOF CASE WITH MOLDED PHENOLIC BASE, PRESSED ALUMINUM COVER, EXTRUDED ALUMINUM HANGER, THE COVER SCREWS ARE RETAINED BY THE COVER GASKET.

1-Pole, 30 Amp Relays

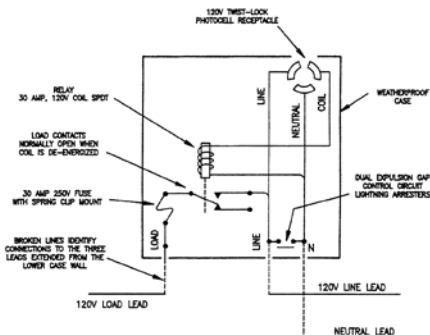
MR-XD Specification 6283



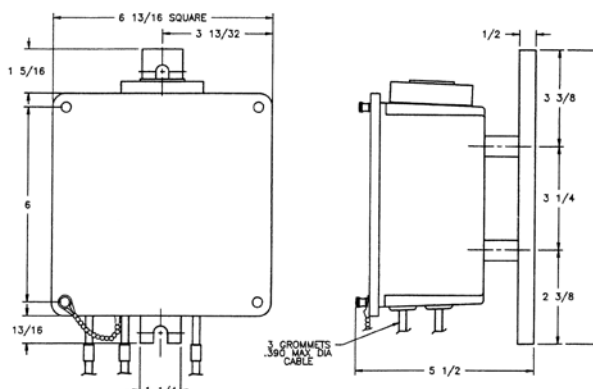
CONNECTIONS FOR SINGLE POLE 30A
RELAY TYPES MR-XC, MR-XD, AND MR-TD.



RLY-XG Specification 6785



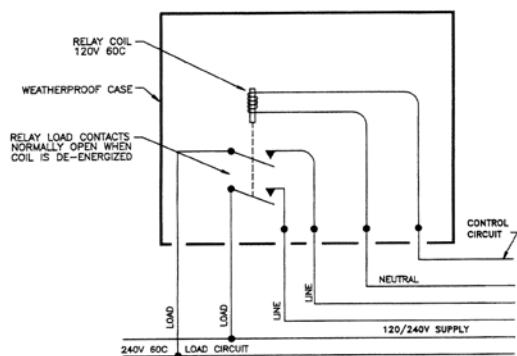
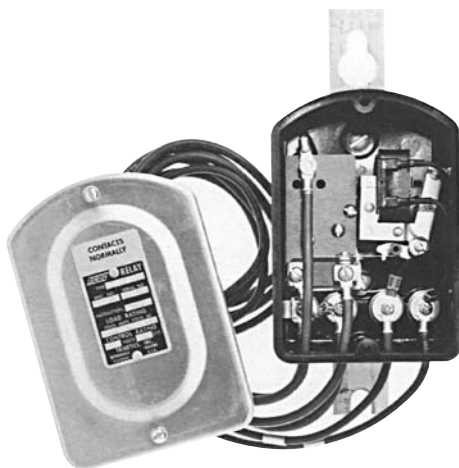
CONNECTIONS FOR TYPE RLY-XG 1 POLE 30 AMPERE RELAY WITH PHOTOCELL



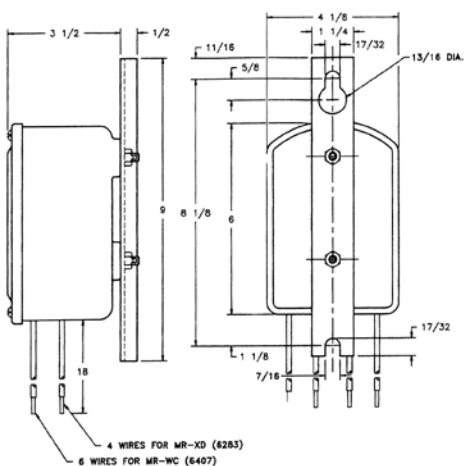
LEXAN WEATHER RESISTANT ENCLOSURE WITH DETACHABLE
COVER AND HANGER FOR RLY-XG, 1 POLE 30 AMP RELAY

2-Pole, 30 Amp Relays

MR-WC Specification 6407

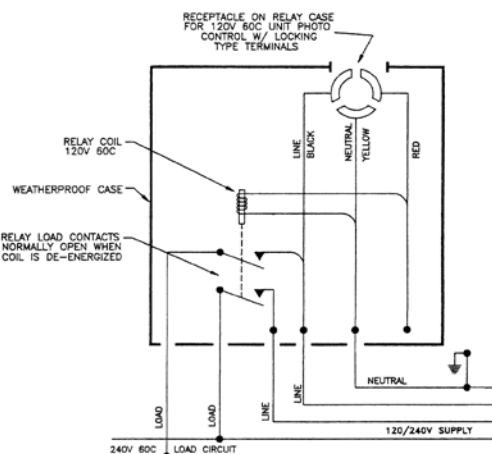


CONNECTIONS FOR TYPE MR-WC 2 POLE 30 AMPERE RELAY.

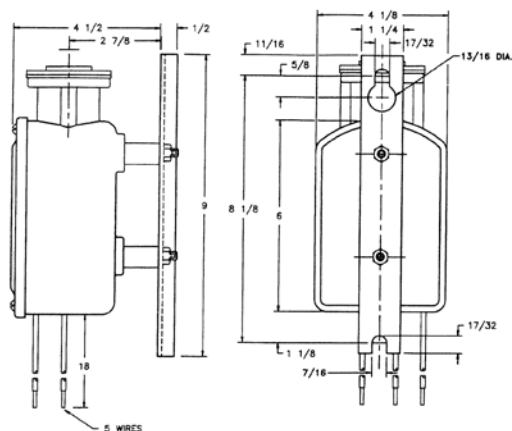


WEATHERPROOF CASE WITH MOLDED PHENOLIC BASE, PRESSED ALUMINUM COVER AND EXTRUDED ALUMINUM HANGER. THE COVER SCREWS ARE RETAINED BY THE COVER GASKET.

MR-WI Specification 6400



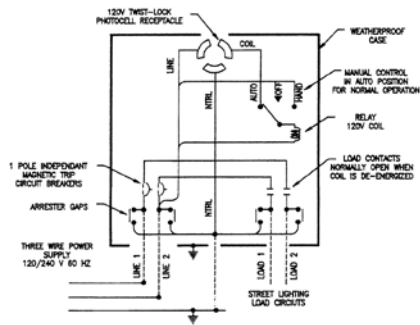
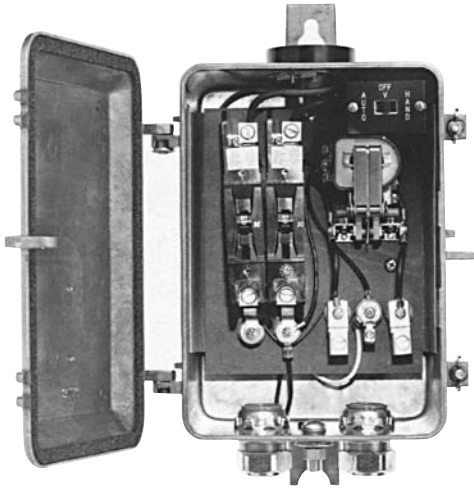
CONNECTIONS FOR TYPE MR-WI 2 POLE 30 AMPERE RELAY.



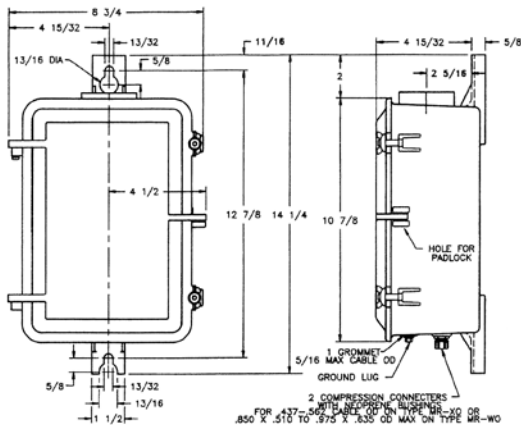
WEATHERPROOF CASE WITH MOLDED PHENOLIC BASE, PRESSED ALUMINUM COVER, EXTRUDED ALUMINUM HANGER, AND CAST ALUMINUM RECEPTACLE HOUSING FOR TYPE MR-WI RELAY.

2-Pole, 30 Amp Relays

MR-WO Specification 6585

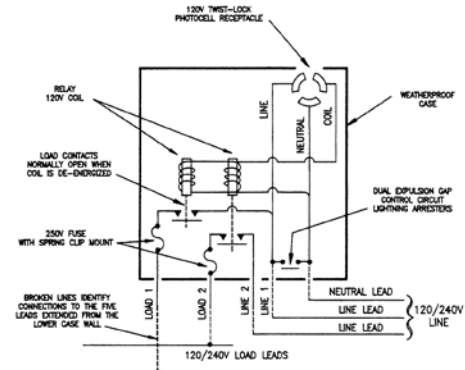
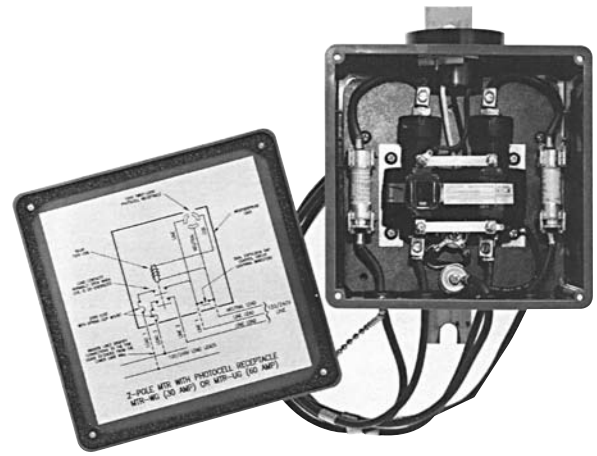


CONNECTIONS FOR TYPE MR-WO, MR-UG, AND MR-YO

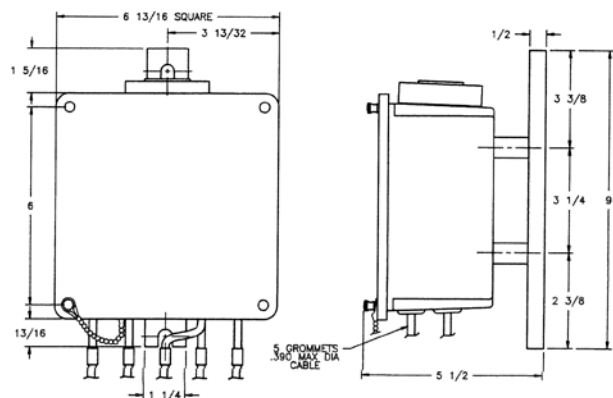


CAST ALUMINUM WEATHERPROOF CASE WITH HINGED COVER AND HANGER WITH RECEPTACLE FOR PHOTO CONTROL AND WITH GROUND LUG.

MTR-WG Specification 6793



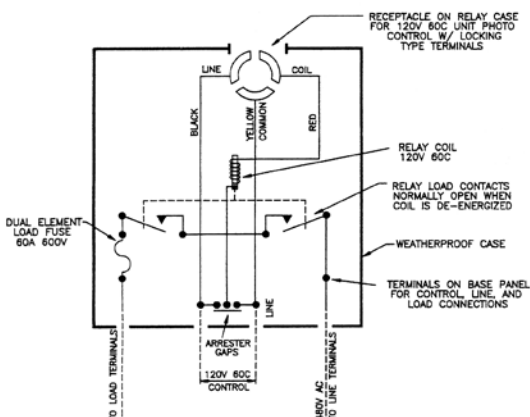
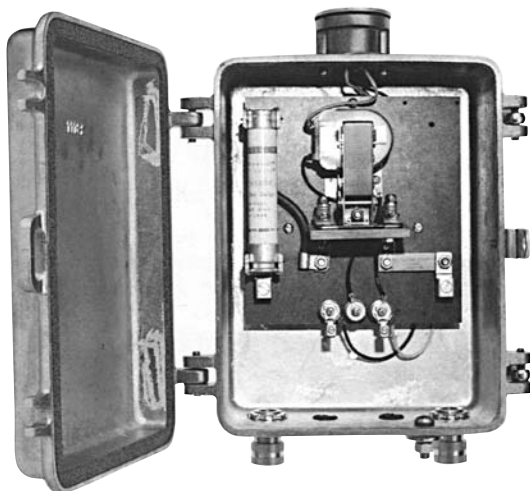
CONNECTIONS FOR TYPE MTR-WG AND MTR-UG 2 POLE 30 AND 60 AMPERE RELAYS.



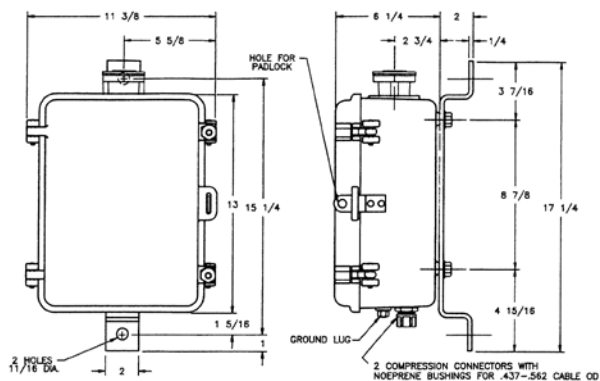
LOOSELY WEATHER RESISTANT ENCLOSURE WITH DETACHABLE COVER AND HANGER FOR MTR-WG, 2 POLE 30 AMP RELAY

1-Pole, 60 Amp Relays

MR-HG Specification 6398

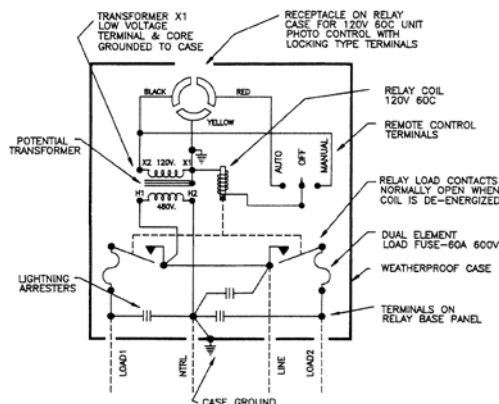
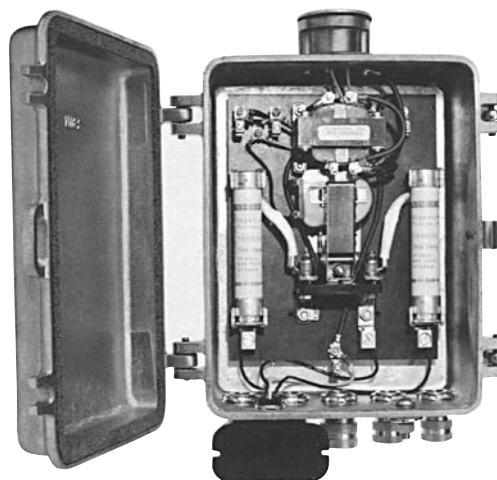


CONNECTIONS FOR TYPE MR-HG 1 POLE 60 AMPERE 480V AC RELAY WITH PHOTO CONTROL RECEPTACLE.

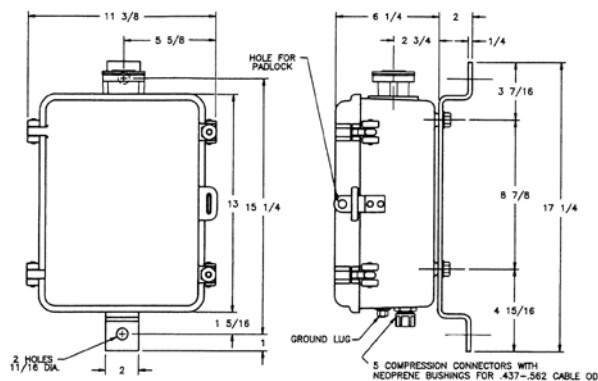


CAST ALUMINUM WEATHERPROOF CASE WITH BRACKET, CAST ALUMINUM RECEPTACLE HOUSING AND HINGED COVER FOR TYPE MR-HG RELAY.

MR-HHF Specification 6651



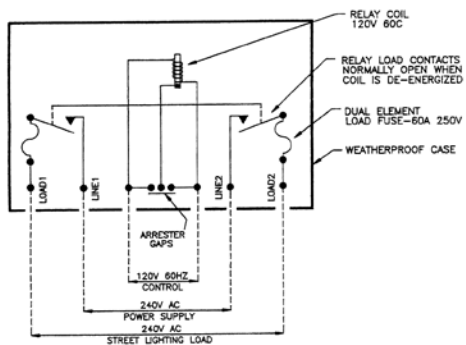
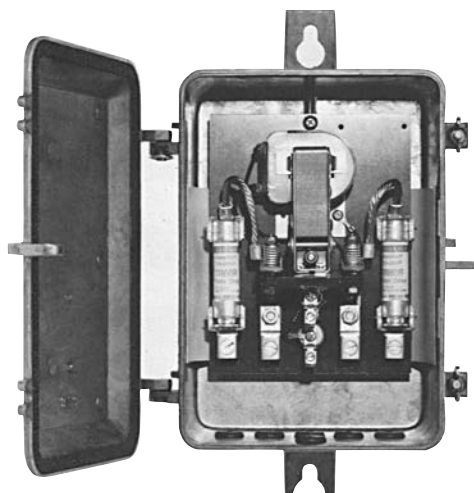
TYPICAL CONNECTIONS FOR 1 POLE 60 AMPERE RELAY TYPE MR-HHF.



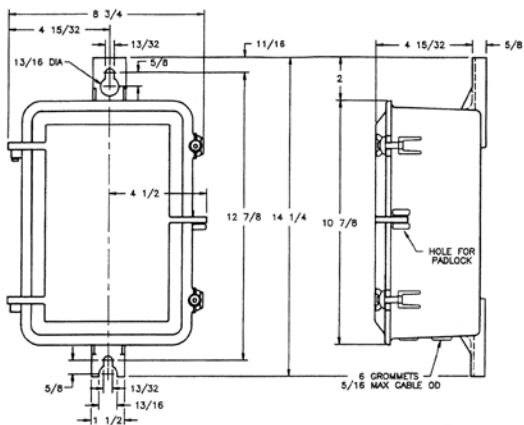
CAST ALUMINUM WEATHERPROOF CASE WITH BRACKET, CAST ALUMINUM RECEPTACLE HOUSING FOR SINGLE POLE 60A RELAYS

2-Pole, 60 Amp Relays

MR-UD Specification 6342

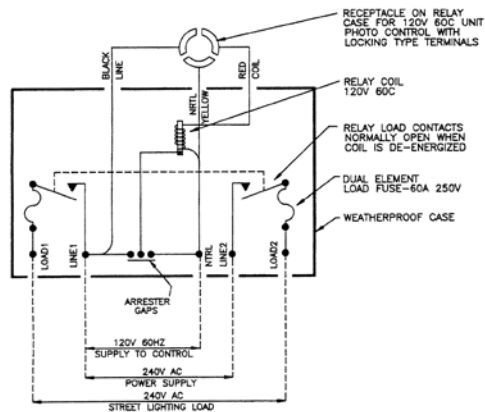
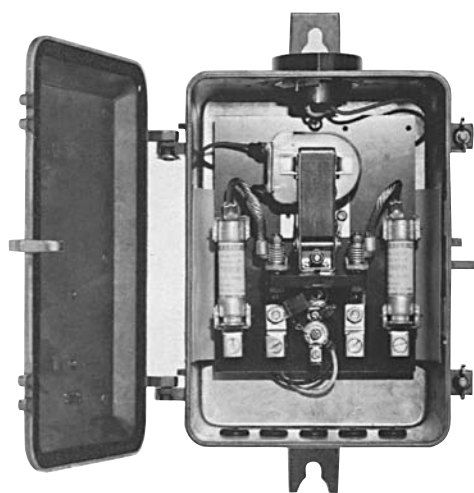


TYPICAL CONNECTIONS FOR 2 POLE 60 AMPERE RELAY TYPE MR-UD.

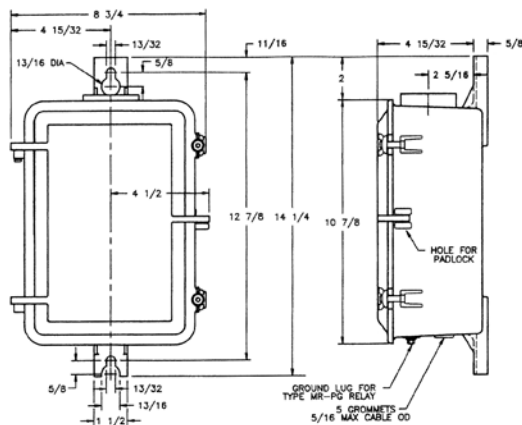


CAST ALUMINUM WEATHERPROOF CASE WITH HINGED COVER AND HANGER FOR DIRECT POLE OR WALL MOUNTING FOR 2 POLE 40 AND 60 AMP RELAYS.

MR-UG Specification 6338



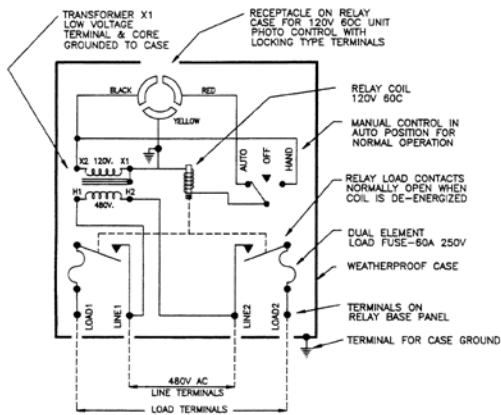
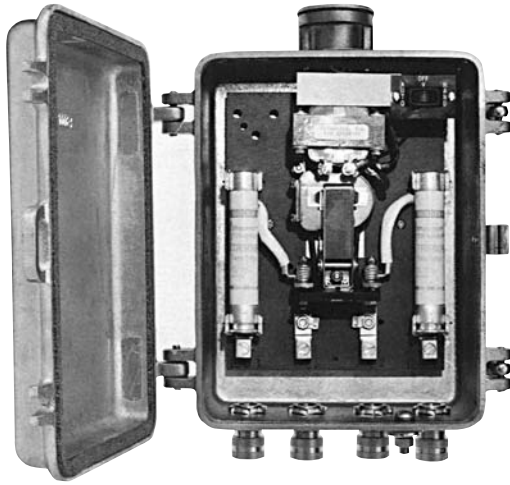
TYPICAL CONNECTIONS FOR 2 POLE 60 AMPERE RELAY TYPE MR-UG.



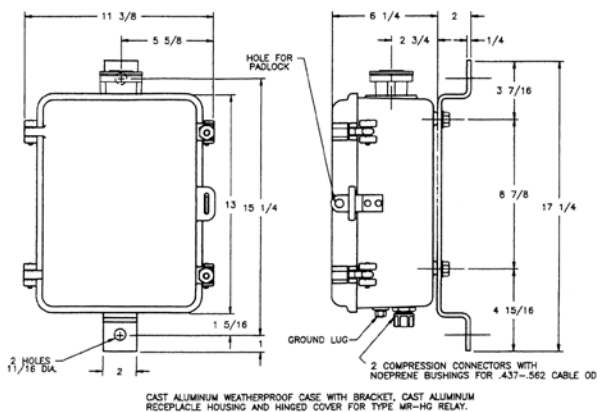
CAST ALUMINUM WEATHERPROOF CASE WITH HINGED COVER, HANGER WITH RECEPTACLE FOR PHOTO CONTROL, FOR 2 POLE 30, 40, AND 60 AMP RELAYS.

2-Pole, 60 Amp Relays

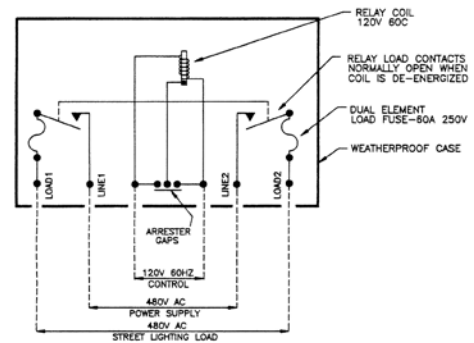
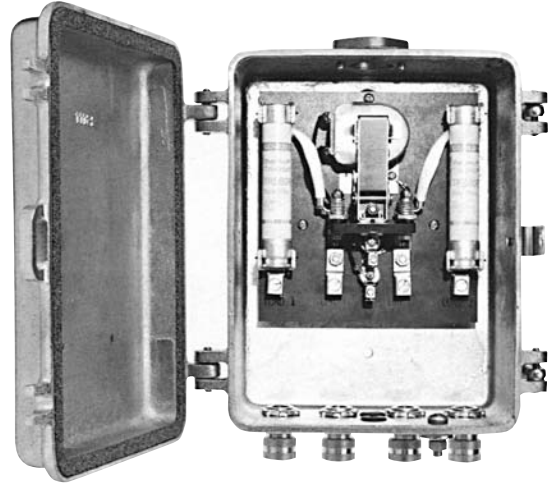
MR-ZH Specification 6406



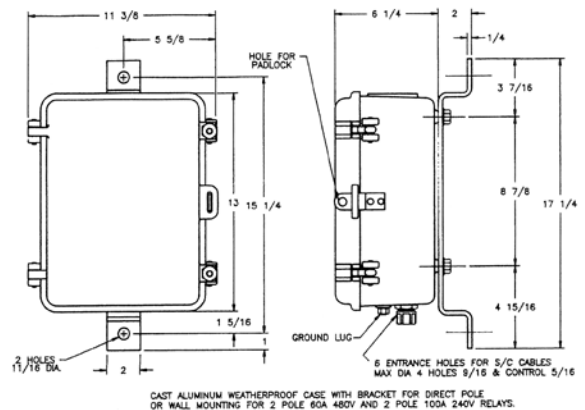
TYPICAL CONNECTIONS FOR 2 POLE 60 AMPERE RELAY TYPE MR-ZH.



MR-ZD Specification 6308

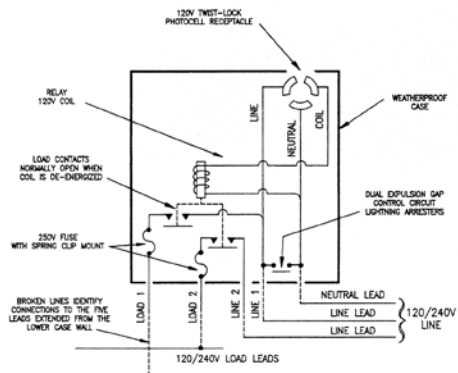
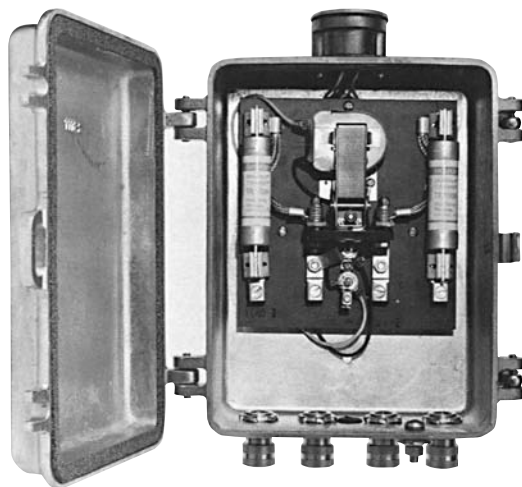


TYPICAL CONNECTIONS FOR 2 POLE 60 AMPERE RELAY TYPE MR-ZD.

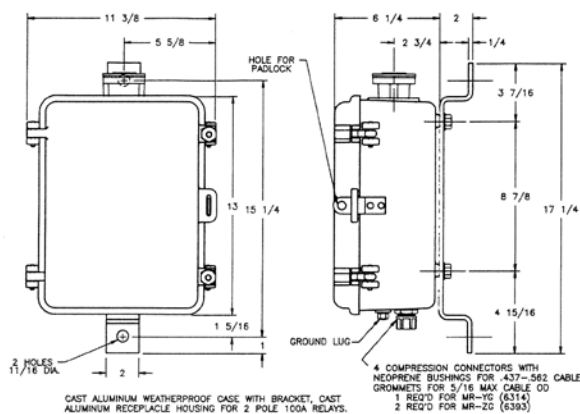


1-Pole, 100 Amp Relays

MR-YG Specification 6314

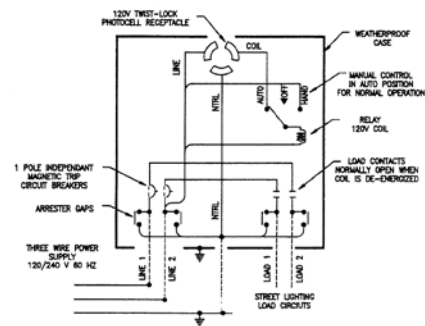
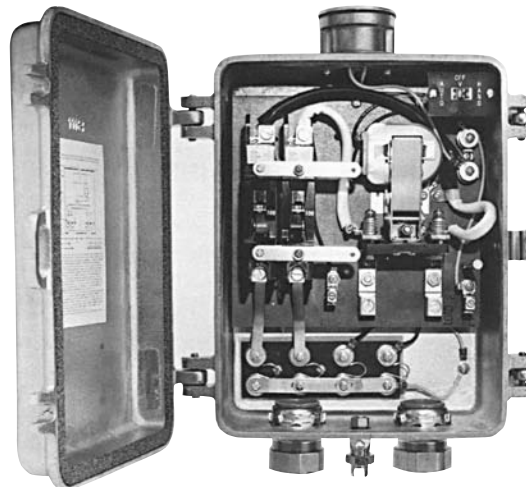


CONNECTIONS FOR TYPE MR-YG 2 POLE 100 AMPERE RELAY.

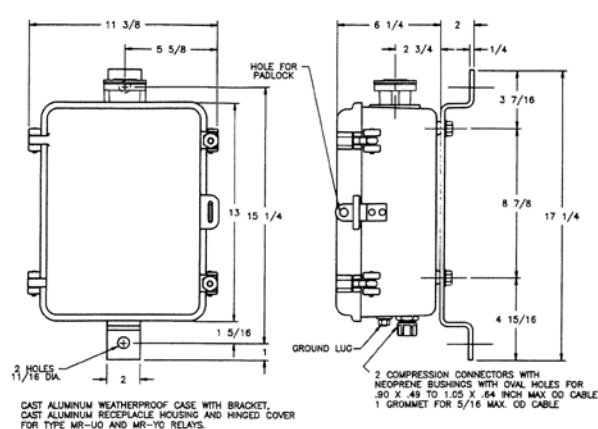


CAST ALUMINUM WEATHERPROOF CASE WITH BRACKET, CAST ALUMINUM RECEPTACLE HOUSING FOR 2 POLE 100A RELAYS.

MR-YO Specification 6442



CONNECTIONS FOR TYPE MR-YO, MR-YO, AND MR-YO.



CAST ALUMINUM WEATHERPROOF CASE WITH BRACKET, CAST ALUMINUM RECEPTACLE HOUSING AND HINGED COVER FOR TYPE MR-YO AND MR-YO RELAYS.

