Lighting Control Relays
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
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 ±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 is 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 EEI 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**

<table>
<thead>
<tr>
<th>Ballast Voltage</th>
<th>Relay Load Rating</th>
<th>Number of Luminaries per Relay Pole</th>
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</thead>
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</table>

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% if their rated current. Capacities will be slightly less when nonregulated ballasts are used.

**Coil Ratings**

<table>
<thead>
<tr>
<th>Relay Type</th>
<th>Relay Rating Amps</th>
<th>Coil Current 120V 50/60 Hz Inrush</th>
<th>Coil Current 120V 50/60 Hz Continuous</th>
<th>Coil Current 240V 50/60 Hz Inrush</th>
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<td>.060</td>
<td>.150</td>
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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

<table>
<thead>
<tr>
<th>Poles</th>
<th>Amps</th>
<th>Volts</th>
<th>Photocell Case</th>
<th>Receptacle</th>
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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**

**MR-TD Specification 6245**
1-Pole, 30 Amp Relays

MR-XD Specification 6283

RLY-XG Specification 6785
2-Pole, 30 Amp Relays

MR-WC Specification 6407

MR-WI Specification 6400

Connections for Type MR-WC 2 Pole 30 Ampere Relay.

Connections for Type MR-WI 2 Pole 30 Ampere Relay.
2-Pole, 30 Amp Relays

**MR-WO Specification 6585**

**MTR-WG Specification 6793**

Connections for Type MR-WO, MR-WG, and MR-WG.

Connections for Type MTR-WG and MTR-WG 2-Pole 30 and 60 Ampere Relays.
1-Pole, 60 Amp Relays

MR-KD Specification 6559

MR-KG Specification 6551
1-Pole, 60 Amp Relays

**MR-HG Specification 6398**

**MR-HHF Specification 6651**
2-Pole, 60 Amp Relays

MR-UD Specification 6342

MR-UG Specification 6338
2-Pole, 60 Amp Relays

MR-ZH Specification 6406

MR-ZD Specification 6308
1-Pole, 100 Amp Relays

MR-FG Specification 6379

MR-ESA Specification 6682
1-Pole, 100 Amp Relays

MR-YG Specification 6314

MR-YO Specification 6442