

# RELAYS, CONTACTORS, SOLENOIDS, AND POWER DISTRIBUTION

High-Performance Power Management  
Designed for Reliable Operation In Extremes of  
Temperature, Shock, Vibration and Altitude

# SOLUTIONS FOR HIGH-PERFORMANCE SWITCHING

## Relays, Contactors, Solenoids, and Power Distribution

TE Connectivity (TE) high-performance relays, contactors and switches are designed specifically to operate in extremely rigorous environments in military and aerospace applications. Our relay products include COTS (commercial off-the-shelf), Mil-Spec, plus highly specialized, and custom-designed products. These high-performance products are designed to withstand extreme shock, vibration, temperature and altitude.

### Brands You Trust

Among our portfolio are some of the more respected brands in the high performance switching industry:

- **CII** military and aerospace relays, sensors and custom solenoids
- **HARTMAN** aerospace power relays, contactors, sensors and power distribution units
- **KILOVAC** high voltage relays, contactors, protective relays and power distribution units

This brochure provides an overview of our product line. It includes products with switching capabilities from dry circuit up through 1000 A. Some relays are capable of switching up to 6 GHz signals, while others can handle voltages up to 70 kV. Other types combine solid-state circuits with electromechanical or solid state outputs to create timers, sensors, monitors and controllers. And they are specifically designed for operation in extremes of temperature, shock, vibration and altitude.

### Relays

TE's high-performance relays are designed to perform reliably in extremely rigorous environments in military and aerospace applications. Our balanced force design provides the benefits of consistently high contact pressure, reduced bounce and less arching, helping to lead to extended contact life.

### Contactors

TE delivers the switching performance demanded by aerospace and defense applications with our lightweight contactors, which offer continuous current ratings up to 1000 A and voltages up to 1800 VDC in very compact, sealed packages.

### Solenoids

Our solenoids are also designed and manufactured on a custom basis to precisely meet your demanding high-performance actuation requirements. We offer a broad range of coil, termination and plunger options, and push, pull and combination motion is available.

### Power Distribution

HARTMAN AC and DC power distribution units (PDUs) and KILOVAC HVDC PDUs are designed, built and qualified to meet your specific requirements, serving the commercial and military industries.

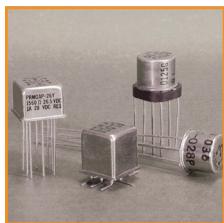
**TE Components . . . TE Technology . . . TE Know-how . . .**  
AMP | Agastat | CII | Hartman | Kilovac | Microdot | Nanonics | Polamco | Raychem | Rochester | DEUTSCH  
SEACON Phoenix | L.L. Rowe | Phoenix Optix | AFP | SEACON

Get your product to market faster with a smarter, better solution.

## Relays, Contactors, Solenoids, and Power Distribution



### PRODUCTS



#### CII TO-5 and .100 Grid Low Signal Relays

- Miniature hermetically sealed relays
- Non-latching
- Through hole and gull-wing surface mount terminals
- High frequency models capable of switching up through 6 GHz
- Excellent isolation, insertion loss and VSWR
- MIL-PRF-28776 and MIL-PRF-39016 qualifications products available



#### Time Delay Relays and Sensors

- Solid-state timing circuitry with either electromechanical or solid state output
- Sensors for voltage, frequency or phase
- Most types offer a variety of enclosures and mounting options
- Customized models available with tighter timing or sensing tolerance
- Several models qualified to MIL-PRF-83726



#### CII 1/5, 1/2 and Full-Size Crystal Can Relays

- Hermetically sealed
- Terminals are arranged on .200" grid (1/2 and full size) or .150" grid (1/5 size)
- Plain case or choice of various mounting brackets or mounting studs
- Non-latching and latching designs
- Choice of straight pins or solder hooks
- MIL-R-5757, MIL-PRF-39016, MS27245 and MS27247 qualified products available



#### KILOVAC Lightweight DC Relays and Contactors

- Make and break current ratings from 5 to 600 A
- For switching from 28 to 1800 Vdc
- Small, lightweight, hermetically sealed units have gas or vacuum dielectric
- Wide variety of mounting and termination styles
- Contacts available in Form A, Form B, Form C and latching arrangements
- Versions with current sensing and overcurrent trip capabilities



#### CII Mid-Range Relays

- 5 to 50 A relays in compact or standard size cases
- Balanced force design with permanent magnet drive
- Terminal styles include socket pins, solder pin PCB terminals, and solder hook terminals
- Numerous mounting options
- Hermetically sealed, welded construction
- MIL-PRF-6106 and MIL-PRF-83536 qualifications products available



#### KILOVAC High-Voltage Relays

- Voltage isolation to 70 kV
- Current carrying capability to 110 A
- Up to 10 million cycles
- Various contact forms available
- Flange, panel and PC board mounting styles



#### Solid-State Relays and Power Controllers

- Various models have switch ratings from 90 mA up to 100 A and 270 Vdc
- AC, DC and bidirectional output
- Available for panel or PC board mounting
- Some types incorporate circuit protection, switch status, and trip status
- Most are qualified to MIL-PRF-28750D or associated DSCC drawings



#### KILOVAC High-Reliability Relays and Contactors for Space Applications

- High voltage relays rated for isolation to 15 kV
- 5, 10 and 15 A powerswitching relays for make and break applications
- Contactors for high current power switching to 500 A
- Latching and non-latching models
- Lightweight, hermetically sealed construction

## Relays, Contactors, Solenoids, and Power Distribution



### KILOVAC Lightweight Contactors Designed to Switch up to 1000 Vdc and 1000 A

- Interrupt currents up to 3300 A
- Voltage isolation from 5 to 1800 Vdc
- One-or two-pole models with normally open or normally closed main contacts
- Non-position sensitive, hermetically sealed models for side or bottom mounting
- Available with a variety of auxiliary contact arrangements
- Latching and non-latching types



### HARTMAN and Wilmar Sensors, Monitors and Protective Relays

- Overcurrent, undercurrent and over/undercurrent sensors and indicators
- Overvoltage, undervoltage and over/undervoltage sensors and monitors
- Overfrequency, under frequency and over/underfrequency sensors
- Phase loss/rotation sensors and ground power monitors
- Time delay versions available
- Smart Contactors—RCCB, RPC & ELCU versions



### HARTMAN Lightweight 28 Vdc Contactors

- Main contact ratings to 1000 A
- Available with a variety of auxiliary contact arrangements
- SPST and SPDT main contact forms
- Standard, reverse current, and automatic dropout types
- Hermetically or gasket-sealed IP67 models in conventional or bus bar mounting versions
- Optional Hall effect current sensing



### CII Custom-Designed, Linear Motion, Tubular High-Performance Solenoids

- From 0.5" (12.7 mm) diameter models producing only a few ounces (<1 N) of force at very short strokes, to 3" (76.2 mm) diameter models capable of 100 lb (445 N) force at 1" (25.4 mm) strokes
- Push, pull or combination motion is available
- Broad range of coil, termination, plunger options



### HARTMAN DC Contactors for Space Applications

- Lightweight construction with hermetically sealed panel mount enclosure
- Main contact ratings of 100 A at 28 Vdc or 35 Vdc
- Main contact arrangements to 2PDT, double break
- 2PDT auxiliary contacts
- Efficient magnetic latching design with self-deenergizing coil



### AGASTAT Time Delay Relays and Sensors

- Solid-state timing circuitry with either electromechanical or solid state output
- Sensors for voltage, frequency or phase
- Most types offer a variety of enclosures and mounting options
- Customized models available with tighter timing or sensing tolerance



### HARTMAN AC Contactors

- Main contact ratings to 800 A; arrangements to 4PDT
- Available with a variety of auxiliary contact arrangements
- Side stable, latching and center off models
- Hermetically or gasket sealed
- More compact, lighter weight models as well as traditional designs
- Bus bar mount versions available



### Rotary Relays for High Shock and Vibration Naval Applications

- Contacts will not chatter when relay is subjected to 2000 ft-lb. shock blows
- Panel mount relays are often used aboard combat naval vessels
- Contact arrangements from 4PDT up through 24PDT
- Rated to carry maximum currents of up to 10 A
- AC and DC coils



**Customized Lightweight Power Distribution Units**

- For primary and secondary power distribution
- Modular systems consist of various plug-in and bus bar line-replaceable modules (LRMs) installed on a panel mounting system or backplane

- LRM may be contactors, circuit breakers, sensing units, ELCUs, etc.
- Backplanes, designed as a fault-free zone with no moving parts, are intended as a permanent installation on the mother vehicle

- Optional current/voltage sensing, fuses, circuit breakers, power monitors, etc.
- Weight-saving and space-saving designs reduce OEM labor requirements and ease maintenance
- Optional integration of generator control units and logic control units

**Qualified Parts Listing**

Turn to TE Connectivity (TE) for rugged, reliable products that meet tough military QPL and DSCC specification standards.

<b>Mil-PRF-39016: Electromagnetic Relays</b>	<b>Mil-PRF-28750: Solid-State Relays</b>	<b>Mil-PRF-83536: Electromagnetic Relays</b>	
M39016/6	M28750/5	M83536/1	
M39016/7	M28750/6	M83536/2	
M39016/9	M28750/7	M83536/5	
M39016/10	M28750/9	M83536/6	
M39016/11	M28750/10	M83536/9	
M39016/13	<b>Mil-PRF-28776: Hybrid Relays</b>		
M39016/14	M28776/1	M83536/15	
M39016/15	M28776/3	M83536/16	
M39016/16	M28776/4	M83536/32	
M39016/17	M28776/5	M83536/33	
M39016/18	M28776/6	M83536/36	
M39016/19	M28776/7	M83536/37	
M39016/20	<b>Mil-R-5757: Electrical Relays</b>		
M39016/21	M5757/1	M83725/1	
M39016/22	M5757/7	M83725/2	
M39016/23	M5757/8	M83725/4	
M39016/24	M5757/10	M83725/5	
M39016/25	M5757/13	M83725/10	
M39016/26	M5757/23	M83725/16	
M39016/31	<b>Mil-PRF-6106: Electromagnetic Relays</b>		
M39016/32	MS27245	M83725/18	
M39016/34	MS27247	M83725/21	
M39016/35	MS27418	M83725/22	
M39016/36	M6106/19	M83725/23	
M39016/37	<b>Mil-PRF-83726: Time-Delay Relays</b>		
M39016/38	M83726/28	<b>DSCC Spec Relays</b>	
M39016/40	M83726/29	85092	
M39016/41	M83726/30	86031	
M39016/42	M83726/31	88062	
M39016/43		89116	
M39016/44		90091	
M39016/53		MS18-1002	
M39016/54			

## LET'S CONNECT

We make it easy to connect with our experts and are ready to provide all the support you need. Just call your local support number or visit [www.te.com/industrial](http://www.te.com/industrial) to chat with a Product Information Specialist.

### Technical Support

[te.com/support-center](http://te.com/support-center)

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EMEA/South Africa	+800 0440 5100	Australia	+61 2 9554 2695
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[te.com/relays](http://te.com/relays)

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Consult TE for the latest dimensions and design specifications.

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