

# RELAYS, CONTACTORS, SENSORS, SOCKETS AND POWER DISTRIBUTION UNITS

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

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# SOLUTIONS FOR HIGH-PERFORMANCE SWITCHING

## Relays, Contactors, Sensors, Sockets and Power Distribution Units

TE Connectivity (TE) high-performance relays, contactors sensors, sockets and power distribution units are designed specifically to operate in extremely rigorous environments in military and aerospace applications. Our relay products include standard catalog, 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.

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### Brands You Trust

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

- **CII** military and aerospace relays, midrange time delay relays, and MDR rotary relays
- **DRI** electromechanical hermetically sealed relays and sockets for applications that require dependability and long life
- **KILOVAC** high voltage relays, contactors, protective relays and power distribution units
- **HARTMAN** aerospace power relays, contactors, sensors 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.

### Power Distribution

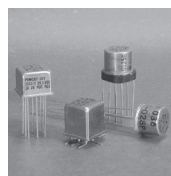
HARTMAN AC and DC power distribution units (PDUs) and KILOVAC HVDC PDUs are designed, built and qualified to meet your specific requirements, serving the commercial and military industries.



# RELAYS FOR RELIABLE SWITCHING IN HARSH ENVIRONMENTS

TE's high performance CII relays provide enhanced switching and electrical specifications for demanding environments. The high performance relays are engineered to perform reliably in the harsh conditions encountered in aerospace, defense and marine applications. These are available in multiple pole contacts with ratings that range from 1 to 60A with MIL and VG qualifications on many versions.

The high performance relays are available in many mounting and terminal configurations to fit your specific application.



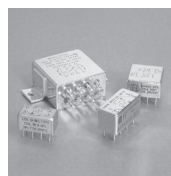
## CII TO-5 and .100 Grid Low Signal Relays

- Up to 1 amp switching
- 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



## CII MDR Series

- 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



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

- 2 to 10 amp switching
- 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



## 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



## 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

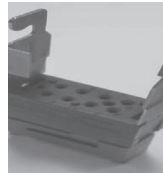
# ROBUST AND DEPENDABLE RELAYS AND SOCKETS FOR DEMANDING APPLICATIONS

TE Connectivity (TE)'s DRI manufacturing facilities located in Long Island, New York and Bangalore, India, are well positioned to effectively support activities in the aerospace, military, rail, and space markets. With a dedicated and innovative engineering, design, and operations staff, based on the DEUTSCH relays knowledge and experiences, DRI has the capabilities to respond to the most severe of custom applications. The team is committed to exceeding customer expectations, through open communications and professional service, and to be proactive in addressing customer concerns, and supporting their requirements.



## Non-Latching Relays

- Balanced force design provides the benefit of consistently high contact pressure, reduced bounce, and less arching leading to extended contact life
- A variety of coil options are available which allow AC or DC control
- Welded hermetically sealed, non-corrosive enclosure
- Portfolio includes 1 to 6 pole, 5 to 50 Amp devices
- Wide choice of mounting and terminal styles



## Relay Sockets

- Standard, low profile, snap lock and track mounted versions
- PCB and panel mountable
- Fixed stud and keyed/loose stud mounting stud options
- Mounting hardware and contact size options



## Latching Relays

- Balanced force design provides the benefit of consistently high contact pressure, reduced bounce, and less arching leading to extended contact life
- 12 and 28 Vdc coils, optional suppression
- Welded hermetically sealed, non-corrosive enclosure
- Portfolio includes 2 and 4 pole, 5 to 15 Amp devices
- Wide choice of mounting and terminal styles



## Rail Relays

- Non-latching; relays built to SNCF NF F62-002 standards
- Hermetically sealed, non corrosive enclosure
- Integral "Non-overlapping" characteristics
- 1 and 3 Amp, 72 Vdc switching
- AC and DC coils
- Variety of contact configurations and package sizes
- It is impossible to close any of the Normally Open contacts with any of the Normally Closed contacts

This applies if the relay is energized or not for all coil supply values



## Time Delay Relays

- Fixed delay on operate, fixed delay on release, adjustable delay on operate and adjustable delay on release
- Meets or exceeds electrostatic discharge MIL-STD-1686 Class Non-Sensitive
- Welded hermetically sealed, non-corrosive enclosure
- Portfolio includes 2 pole 10 Amp, 4 pole 10 Amp, and 3 pole 25 Amp devices
- Time delay from 0.1 to 500 seconds (2PDT, 10A) and 0.1 to 600 seconds (4PDT, 10A)

# KILOVAC DC CONTACTORS: HIGH VOLTAGE, LIGHTWEIGHT, ENVIRONMENTALLY SEALED

Engineered for aerospace and defense applications, our DC contactors are rated to make, break and carry 500 amps, with overload ratings up to 2,000 amps. We offer DC contactors with either electronic or mechanical economizers, or we can provide basic contactors to which you may apply your own economizer circuits.



## KILOVAC Lightweight DC Relays and Contactors

- Make and break current ratings from 5 to 1000 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



## 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



## 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



## 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



## Solid-State Relays and Power Controllers

- SiC (Silicon Carbide) metal oxide semiconductor field-effect transistor Technology, ultra-low  $R_{on}$
- Class ratings for 75 A, 150 A, and 300 A at 270 VDC with customizations for further voltage and current expansion
- Integrated precharge and soft-off function
- 16-bit intelligent microcontroller
- I<sup>2</sup>T Function, AS33201 or custom trip curve
- Serial interface (I<sup>2</sup>C) with customizations to other protocols



## 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 PRODUCTS: LIGHTWEIGHT, HERMETICALLY SEALED

Our HARTMAN relays and contactors are engineered to switch electrical power in aerospace and space applications, including airplanes, space shuttles, and deep space probes. Light weight and environmentally (gasket) sealed, our HARTMAN AC and DC contactors are designed to meet the applicable requirements of MIL-PRF-6106 and/or specific customer specifications. Light weight and environmentally sealed, they excel in severe conditions or altitudes above 50,000 feet, offering multiple contact configurations.



## HARTMAN 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 and ELCU versions



## 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



## 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
- VG Qualified product available



## 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

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# POWER DISTRIBUTION UNITS DESIGNED TO PERFORM IN HARSH ENVIRONMENTS

HARTMAN AC and DC power distribution units (PDUs) and KILOVAC DC PDUs from TE Connectivity are designed, built and qualified to meet your specific requirements. We have a half-century of experience providing PDUs for the aerospace industry, serving both commercial and military customers.



## 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
- LRMs 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

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## Connect With Us

We make it easy to connect with our experts and are ready to provide all the support you need. Visit [te.com/support](https://te.com/support) to chat with a Product Information Specialist.

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