

## Description

The electronic power relay EPR10 is a solid state relay for high continuous currents. It is suitable for use in utility vehicles and special vehicles where reliability and functional safety are at a premium. At DC 24 V, the EPR10 allows a continuous load of up to 200 A.

The EPR10 is available in two different versions: EPR10-N is a relay and has no protective function. Two performance classes are available (up to 100 A and up to 200 A). EPR10-P is a protective relay and monitors both the load current and the thermal load. In the event of a critical condition, the device will automatically interrupt the circuit and will issue a group fault signal.

**Note:** We are preparing a separate version for applications where the current can flow in both directions. The present EPR10 design only allows one current direction.

**US patent number:** US 10,021,788 B2  
US 10,070,514 B2

## Applications

Powerful loads in DC 12 V and DC 24 V on-board electrical systems, which have to be supplied continuously with currents from 75 A to 200 A and which have to be switched frequently:

- Pumps
- Ventilations
- Cooling systems

## Benefits

- 80 % less space requirement than similar conventional solid state relays:
  - no heat sink required
  - low internal resistance through parallel connection of power semi-conductors
  - technically mature heat management
  - cooling through connecting cables
- Low investment costs:
  - blade fuses in sub-paths and heat sinks superfluous because the EPR protects against overcurrent and short circuit
- Minimised maintenance costs:
  - enhanced availability due to a much longer life span compared to mechanical relays
  - very high resistance against dust, humidity, vibration and shock due to the sealed electronic circuitry
- Less CO<sub>2</sub> emission:
  - due to low internal resistance
  - due to minor holding power
- Flexible design:
  - the device switches without a sound and can therefore be installed in the passenger cabin without being noticed.

## Approvals

Approval authority	Logo	Directive
KBA	E1 10R-05 7759	ECE R10 Rev. 05
	CE	2004/108/EG



**EPR10**

## Technical data (25 °C)

Load circuit		
System voltage	12 V DC / 24 V DC	
Max. continuous current	EPR10-N (relay version without protective function) 100 A or 200 A (please also see derating information)	
Current rating range	EPR10-P (with protective function) 75 A, 100 A, 125 A, 150 A, 175 A, 200 A	
Max. overvoltage	36 V DC	
Max. switch-off current	Resistive loads (L/R < 0,3 ms)	Inductive loads Last (L/R < 2 ms)
EPR10-N - 100 A	700 A	100 A
EPR10-N - 200 A	1400 A	200 A
EPR10-P - 75 A	375 A	75 A
EPR10-P - 100 A	500 A	100 A
EPR10-P - 125 A	625 A	125 A
EPR10-P - 150 A	750 A	150 A
EPR10-P - 175 A	875 A	175 A
EPR10-P - 200 A	1000 A	200 A
Voltage drop	85 mV	
Max. switching frequency	1 Hz	
Reverse polarity protection	without Note: Observation of correct polarity when connecting the device is imperative to avoid damage of the relay.	
Load output	HSS	
Leakage current	< 10 µA	
Control circuit		
Connector	Tyco HDSCS 3-pole part number 1-1418448-1 Pin assignment: 1 = GND (chassis) 2 = SF (output group fault) 3 = IN (control input)	
Control voltage	ON 6 ... 32 V DC OFF: 0 ... 3 V DC	
Max. overvoltage	36 V DC	
Control current	at 12 V DC 2.5 mA at 24 V DC 4 mA at < 3 V DC < 10 µA	
Rising edge	< 5 ms	
Signal outputs		
Reverse polarity protection	without	
Switch type	“low side switch”	

## Technical data (25 °C)

Voltage 0 ... 32 V DC

Max. leakage current 20 µA

Max. load current 2 A

### General

Typical life > 1,000,000 cycles

Trip current only EPR10-P (with protective function)  
1.3 times rated current ± 15 %

Trip time only EPR10-P (with protective function)  
selectable between 0.2 / 0.5 / 0.7 s ± 15 %

Excess temperature only EPR10-P (with protective function);  
circuit will be disconnected with excess  
temperature;  
(reset after 500 ms OFF condition)

Temperature range -40...+85 °C in operation  
-55...+90 °C for storage

Degree of protection IP57

Vibration > 6 g

Chemical resistance oil, grease, alcohol, urea, extinguishing  
agents, battery acid, salt mist, detergents,  
humidity

### Enclosure and mounting

Material of enclosure moulded, V0 flammability rating

Terminals tin-plated copper

Terminal studs stainless steel

Max. tightening torque 15 Nm (for M8 studs)

Dimensions 163 mm x 73 mm x 35 mm

Mass ≤ 250 g

Recommended cross sections	current ratings [A]	cable cross section [mm²]
	75	25
	100	35
	125	50
	150	50
	175	70
	200	95

## Tests

Chemical resistance ISO 16750-5; 2010 (interior,  
under the hood, exterior)

Vibration resistance ISO 16750-3: 2012 (test VIII)

Mechanical Shock ISO 16750-3: 2012  
(Test for devices on rigid points on  
the body and on the frame)

Corrosion resistance ISO 16750-4; 2010 (5.5.1 severity level 4)

Humidity ISO 16750-4 2010 (5.6.2.3)

Temperature change ISO 16750-4; 2010 (5.3.1)

Elektromagnetic Regulation no. 10 of the United Nations  
Economic Commission  
Compatibility (EMC) for Europe (UN/ECE) —  
Harmonisation of vehicle regulations regard-  
ing electromagnetic compatibility  
EN 61000-6-2: 2005  
EN 61000-6-3: 2007

Electrostatic EN 61000-6-2: 2005

Discharge (ESD) EN 61000-6-3: 2007

Humidity ISO 16750-4; 2010

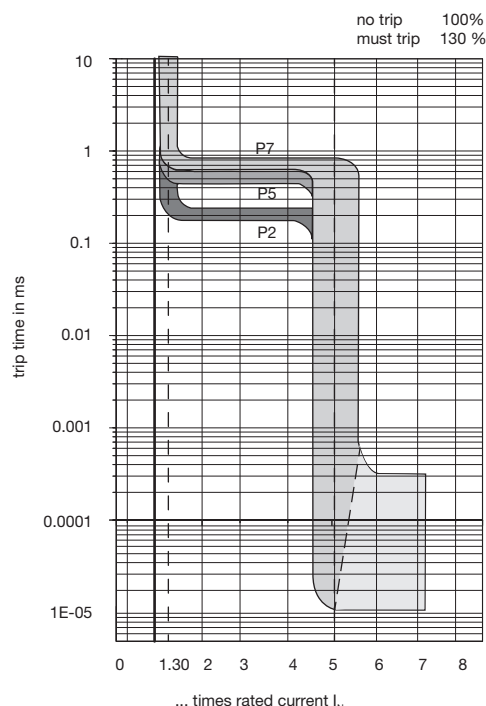
Temperature shock ISO 16750-4; 2010 (Ice water shock test;  
submersion test)

Free fall ISO 16750-3; 2012

Degree of protection IP57 (except terminals of load circuit)

Material moulded enclosure including epoxy with  
flammability rating VO UL 94: 1996

## Time/current characteristic (T<sub>amb</sub> = 25 °C)



## Order numbering code

### Type No.

EPR10 Electronic Power Relay

### Protective function

N0 without protection

P2 overcurrent trip at 1.3 x  $I_N$  after 200 ms

P5 overcurrent trip at 1.3 x  $I_N$  after 500 ms

P7 overcurrent trip at 1.3 x  $I_N$  after 700 ms

### Design

F1 flat design

### Terminals / control cable

G1 M8 terminal studs / Tyco connectors (HDSCS)

with 2 M8 nuts

G2 M8 terminal studs / Tyco connectors (HDSCS)

without M8 nuts

### Load and control

HS HSS

### Version

S0 standard

### System voltage

D2 DC 12 V / 24 V

### Current ratings (at 25°C)

75 A protected version only

100 A both versions

125 A protected version only

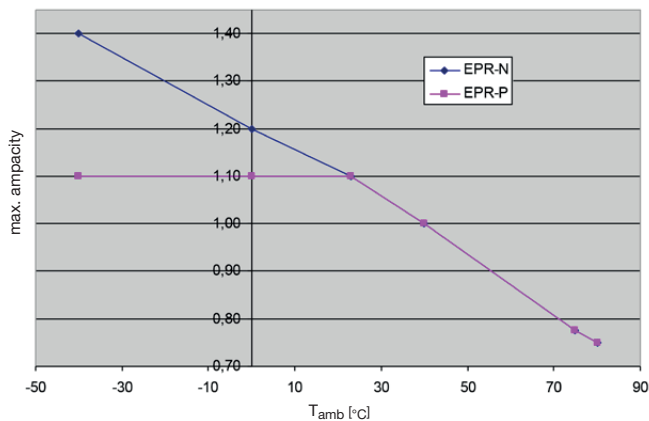
150 A protected version only

175 A protected version only

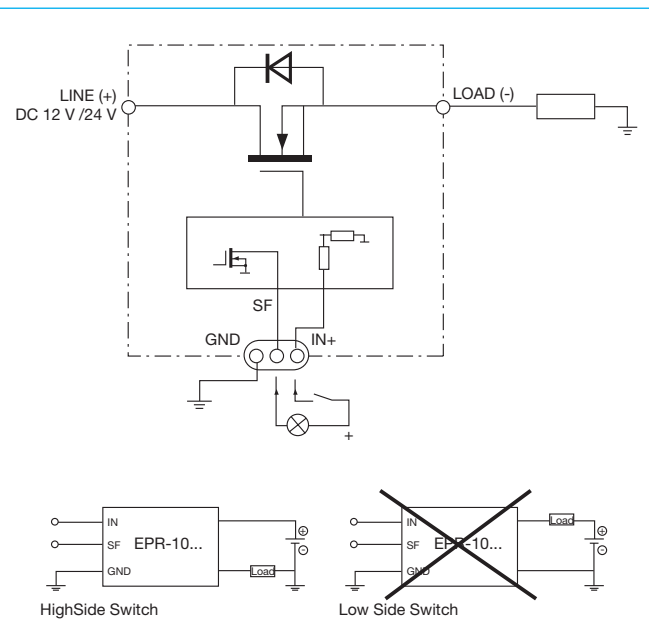
200 A both versions

EPR10 - P7 F1 G2 - HS S0 D2 - 200A ordering example

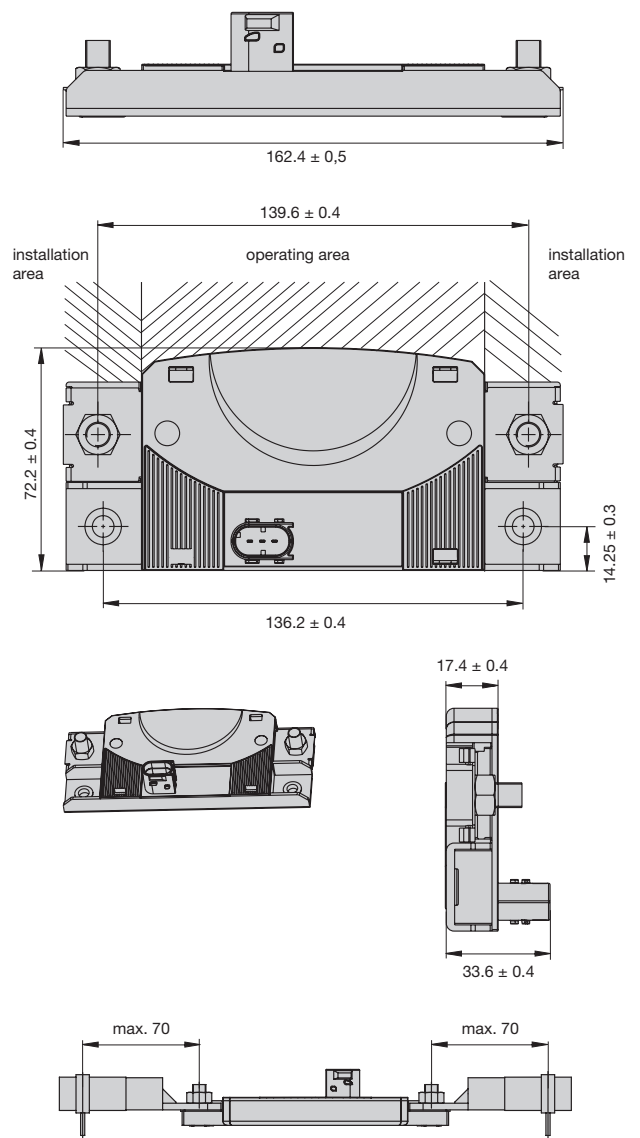
## Derating curve



## Schematic diagram



## Dimensions





# Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

## E-T-A Circuit Breakers:

[EPR10-P5F1G1-HSS0D2-150A](#) [EPR10-P5F1G1-HSS0D2-100A](#) [EPR10-P5F1G1-HSS0D2-200A](#) [EPR10-P2F1G1-HSS0D2-200A](#) [EPR10-P7F1G2-HSS0D2-200A](#) [EPR10-P7F1G1-HSS0D2-200A](#)