

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.

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 CO₂ 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 at 24 V DC at < 3 V DC	2.5 mA 4 mA < 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

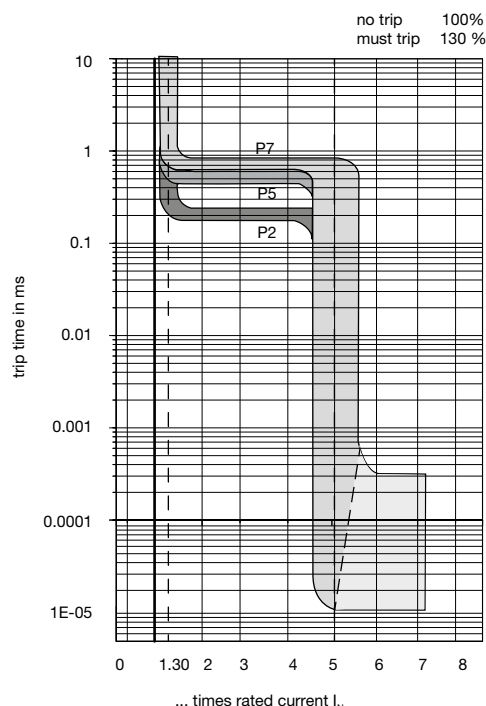
Temperature shock ISO 16750-4; 2010 (Ice water shock test;
submersion test)

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_{amb} = 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

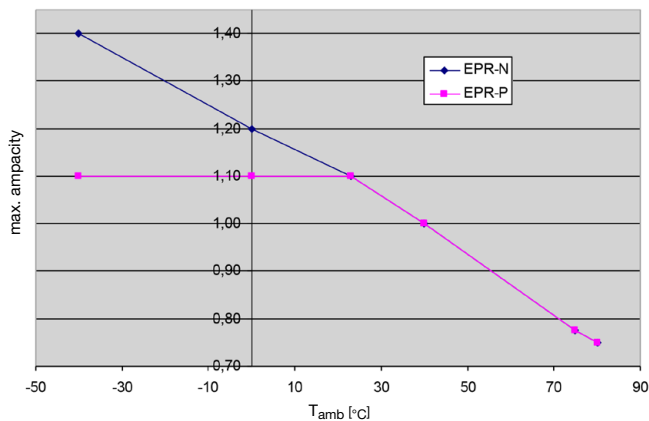
150 A protected version only

175 A protected version only

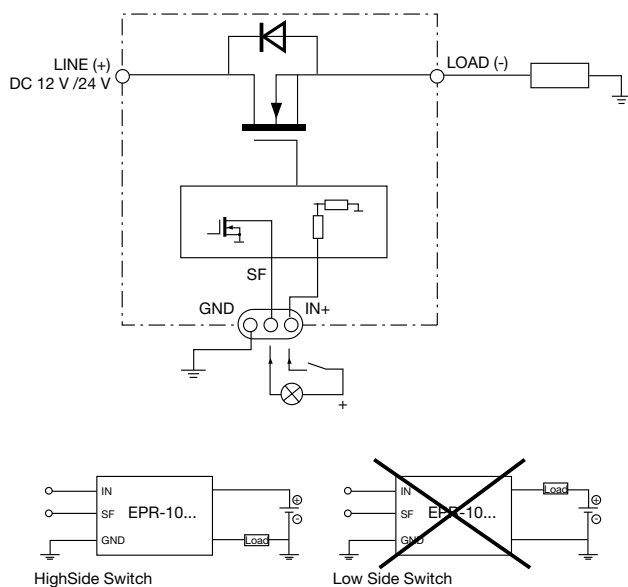
200 A both versions

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

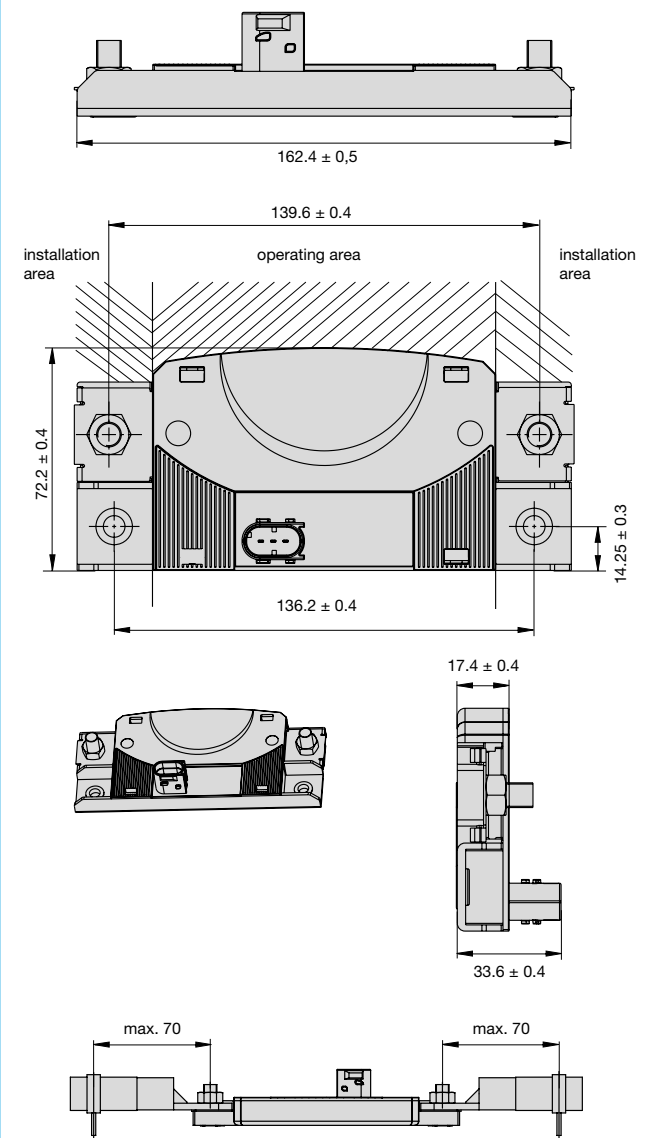
Derating curve



Schematic diagram



Dimensions



All dimensions without tolerances are for reference only. E-T-A reserves the right change specifications at any time in the interest of improved design, performance and cost effectiveness, the right to make changes in these specifications without notice is reserved. Product markings may not be exactly as the ordering codes. Errors and omissions excepted.

