E-T-A ESX60D electronic circuit protector

Description

The ESX60D is a double channel smart electronic circuit protector, forming an intelligent power distribution system with the CPC20 bus controller and power distribution module 18plus-***ControlPlex***®.

By means of its communication interface, the recorded measuring values and status messages are forwarded first to the CPC20 via the proprietary device bus ***ELBus***® and then to a superordinate programmable control unit. This allows flexible adjustment of the current rating and its parameters to the requirements of the system and its direct controllability. So the user can import the relevant information regarding his DC 24 V voltage supply and process it accordingly.

The ESX60D electronic circuit protector offers adjustment of the current rating via a field bus system or via CPC20's integral web server.

At a width of only 12.5 mm, the double-channel ESX60D provides selective protection for all DC 24 V load circuits. This is achieved by a combination of active electronic current limitation in the event of a short circuit and a configurable overload disconnection.

A typical application is the protection of DC 24 V switch-mode power supplies which are widely used in factory automation today. In the event of a faulty overload, the output voltage of the switch mode power supply is turned down. This will cause a voltage break-down with all connected loads. Not only does this frequently cause undefined fault conditions, but it can even lead to complete machine stoppages or system downtimes.

This is exactly where the ESX60D comes in, because it responds faster to overload conditions than the switch mode power supply and so it protects the entire system against voltage dips of the supply voltage.

The max. possible overcurrent is limited to 1.4 times or 1.8 times the selected current rating. This allows switching on capacitive loads up to min. 20,000 µF, disconnection is effected in the event of overload or short circuit or at undervoltage and overheating.

Suitable for the following types:

Controller	**CPC20**
Power distribution system	**18plus-*ControlPlex*®**

ESX60D

Features

- Communication capability with superordinate control units which are programmable from memory
- Import and adjust parameters of the device
- Remote control of load outputs and selective load protection, electronic trip curve
- All types of loads can be connected (DC 24 V motors upon request)
- Active current limitation when switching on capacitive loads of min. 20,000 µF and in case of overload/short circuit
- Two channels
- Whole-number adjustable current ratings from 1 A to 10 A by means of a superordinate control unit, independent of the channel
- Reliable parameterisable overload disconnection (factory setting: 1.2 x I_N) even with long load lines or small cable cross sections
- Manual ON/OFF momentary switch per channel
- Clear status indication through LED per channel and signalling to the superordinate control system
- Integral fail-safe element
- Low voltage drop
- Installation width for two channels only 12.5 mm
- Pluggable onto Module 18plus-***ControlPlex***®

Your benefits

- Permanent data logging and transmission.
- Enhanced system availability through intelligent interfaces.
- High flexibility of system planning due to parameterising capability.

Approvals

c UL us LISTED

(In connection with the 18plus-***ControlPlex***®, CPC20 modules)

Compliances

CE RoHS REACH

Approvals

Authority	Standard	File-Certificate No.	Voltage ratings
UL	UL 2367	E306740	DC 24 V
UL	UL 508 listed CSA C22.2 No.14	E492388	DC 24 V

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Technical data (T_{amb} = 25 °C, U_B = DC 24 V)

Operating data		
Operating voltage U_B	DC 24 V (18 … 30 V)	
Current rating range I_N	adjustable ratings 1 A ... 10 A in 1 A-steps	
Supply status	ON	
Closed current I_0	in ON condition:	typically 26 mA
Status indication by means of multicoloured LED	green	load circuit connected
	green/ reached orange blinking	load current warning limit
	red	after disconnection due to overload, short circuitor high temperature or in the event of undervoltage or internal failure
	orange	device switched off via the communication interface
	OFF	device was switched off via ON/OFF button or operating voltage is off or low
Low voltage monitoring of operating voltage	OFF	at typically U_B < 16.0 V
	ON	at typically U_B < 17.5 V return to previous switching condition when voltage is restored
Fail-safe element	integral fail-safe element 15 A (blade fuse) 350 A rupture capacity	
Temperature monitoring	internal temperature monitoring with electronic disconnection	
Load circuit		
Load output	Power MOSFET switching output (plus switching)	
	factory settings	**range**
Rated current	1 A	1 … 10 A
Switch-on behaviour	condition latest state	condition latest state, OFF, ON
Load current warning limit (I_{WLimit})	80 % I_N	50 … 100 % I_N
Warning limit hysteresis	5 %	5…20 %
Short-circuit limitation	active current limitation at I_{KS} = 180 % I_N (I_N = 1 … 5 A) I_{KS} = 140 % I_N (I_N = 6 … 10 A	
Overload detection	120 % I_N ± 10 %	105 … 135 % I_N ± 10 %
Trip time at overload at short circuit	3 s thermally limited (see time/current characteristics)	50 ms …10 s
ON delay t_{Start}	100 ms	100 ms … 2.5 s
Disconnection of the load circuit	electronic disconnection without physical isolation	

Technical data (T_{amb} = 25 °C, U_B = DC 24 V)

Switching in OFF condition:	- manually on the device with the ON/OFF momentary switch - by means of a superordinate command of the communication interface - after disconnection due to overload or short circuit - temporarily at undervoltage - at excess temperature of the device - during ON delay - with internal device failure
Leakage current in OFF condition	typically <1 mA
Voltage drop	typically 12 mV/A
Capacitive loads	min. 20,000 µF
Inductive loads	external free-wheeling diode recommended for inductive load
Dielectric strength	max. DC 33 V
Parallel connection of several load outputs	not permitted
Terminals	**LINE+ / GND / ELB / ADR / LOAD+**
blade terminals	6.3 mm to EN 60934 - 6.3 x 0.8 for LINE+ / GND / ELB 2.8 mm to EN 60934 - 2.8 x 0.8 for ADR / LOAD
Housing material	moulded
Mounting	on Module 18plus-***ControlPlex®***
Ambient temperature	0 ... +60 °C (without condensation, cf. EN 60204-1)
Storage temperature	-40 ... +70 °C
Damp heat	IEC 60068-2-30 Db, 40 °C, 2 cycles @ 24 hrs
Vibration resistance	3 g, test to IEC 60068-2-6 test Fc
Degree of protection	IEC 60529, DIN VDE 0470 operating area IP30 terminal area IP00
EMC requirements (EMC Directive, CE Logo)	emitted interference: EN 61000-6-3 noise immunity: EN 61000-6-2
Insulation co-ordination (IEC 60934)	0.5 kV / pollution degree 2 reinforced insulation in the operating area
Insulation resistance (OFF condition)	n/a, only electronic disconnection
Dimensions (h x w x d)	12.5 x 70 x 60 mm (tolerances to DIN ISO 286 part 1 IT13)
Mass	approx. 40 g

Notes

- The user has to ensure that the cable cross section of the load circuit in question complies with the current rating of the ESX60D used.
- In addition special precautions must be taken in the system or machine (e.g. use of a safety PLC) which reliably prevent an automatic re-start of parts of the system (cf. Machinery Directive 2006/42/EG and EN 60204-1, Safety of Machinery). In the event of a failure (short circuit/overload) the load circuit will be disconnected electronically by the ESX60D.

Communication interface

Overview of commands:

- Write/read of configuration (parameters) independent of the channel
  - Switch-on behaviour (latest state, OFF, ON)
  - ON delay (50 ms ... 2500 ms)
  - Current ratings 1 A up to 10 A, integer
  - Overload disconnection (105 % ... 135 % I_N)
  - Trip time at short circuit (50 ... 10,000 ms)
  - Current limit value (50 % ... 100 %)
  - Hysteresis limit value (5 % ... 20 %)

- Reading of product information
  - Product type
  - Serial number
  - Hardware version
  - Software version
  - Assembly order number
  - Production facilities number

- Reading of measuring values
  - Error memory
  - Trip counter
  - Statistical values
  - Reason of last trip
  - Status / event of device
  - Load voltage
  - Load current
  - Operating voltage
  - Temperature of device
  - Bar chart memory

- Switch on/off or reset load output
- Reset error memory
- Reset statistical values
- Reset trip counter
- Read / delete bar chart memory
- Set parameters to factory setting

Order numbering code

Type No.

ESX60D Intelligent electronic circuit protector, with current limitation

Mounting method

S plug-in type

Design

A 1 load output terminal per channel, adjustable current ratings xA/ xA

Number of channels

2 2 channels

Version

1 without physical isolation

Signal input

0 current rating adjustable via communication interface

Signal output

0 without signal output

Operating voltage

DC 24 V voltage rating DC 24 V

Current rating range

1 A - 10 A adjustable

ESX60D-S	**A**	**2**	**-**	**1**	**0**	**0**	**-**	**DC24V**	**-** **1A-10A**

ordering example

Please be informed that we have minimum ordering quantities to be observed.

Derating (U_B = DC 24 V, cont. operation or effective currents in 1 min, without forced convection)

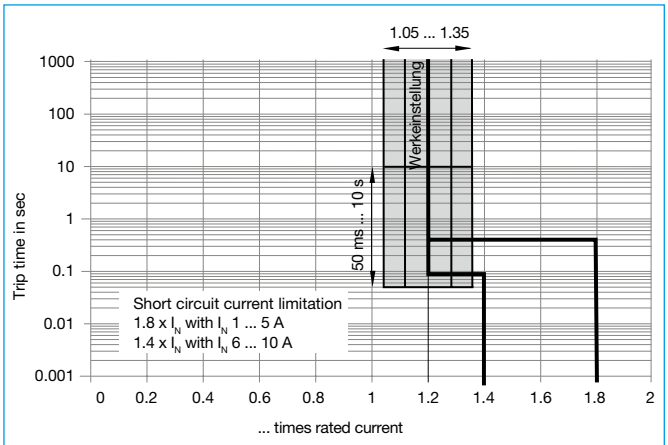
The internal temperature monitoring prevents overheating of the electronic circuit protector by disconnecting the causal load current. In order to ensure trouble-free operation, the max. load currents must be observed.

Max. load current with symmetrical split onto channels:

T_{AMB} = 25 °C		T_{AMB} = 40 °C		T_{AMB} = 50 °C		T_{AMB} = 60 °C	
10 A	10 A	8 A	8 A	6.5 A	6.5 A	6 A	6 A

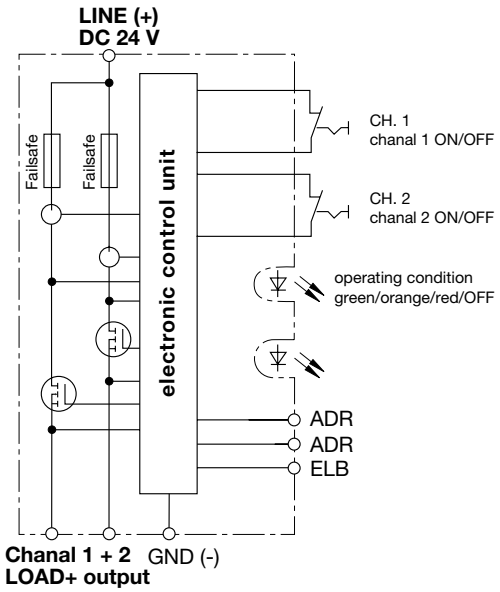
In the event of forced convection, the max. current may be increased by up to 20 % until the rated current is reached.

Typical time/current characteristic (T_{amb} = 25 °C, U_B = DC 24 V)



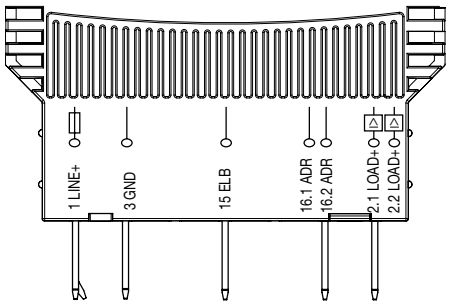
- Without the current limitation there would be a much higher overcurrent in the event of an overload or short circuit.

Schematic diagram ESX60D

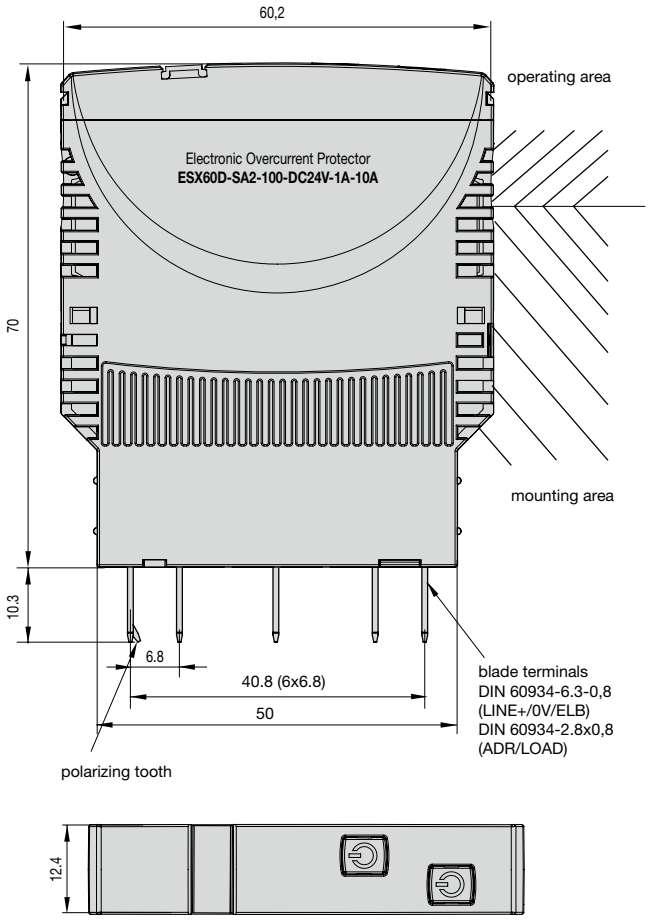


Wiring diagrams

ESX60D
with communication and address contact

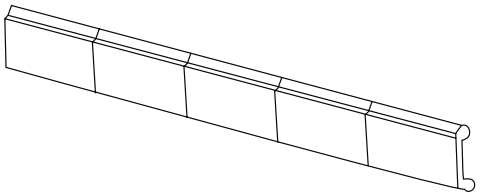


Dimensions ESX60D

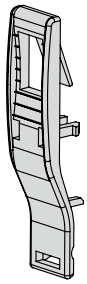


Accessories

X22297750
White label, unmarked, packing qty = 50 pcs
(10 strips, 1 strip holds 5 pcs)



Retaining clip Y 311 978 01
Retaining clip for ESX60D



Installation example with ESX60D with optional retaining clip