

Description – ESX300-S plus

The hot pluggable **ESX300-S plus** electronic circuit protector ensures reliable overcurrent protection by means of electronic current limitation and load disconnection. It reliably prevents the destruction of electronic sub-assemblies or load lines in power supply systems in a voltage range of DC +24 V, DC +48 V and DC +60 V. Thanks to a selective load disconnection, a voltage dip is prevented in the event of a failure and other faultless devices in the circuit remain working. The integral bus interface can forward the recorded measuring values and status messages to the RC110 control interface to use them for automatically triggering actions or for data collection and monitoring. The electronic circuit protectors type ESX300-S plus are available in various current ratings from 2A to 24A. As an option, the current ratings 16 A, 20 A and 24 A can be connected in parallel to protect loads rated up to 60 A. *

* available in Q1 2019.

Features

- Voltage ratings DC +24 V, DC +48 V, DC +60 V
- Current ratings 2 A up to 24 A
- Integral bus interface
- Status LEDs for failure indication on site
- Electronic current limitation

Further information

The current data sheet as well as other relevant documents are available on our website: www.e-t-a.de/d850



Benefits

- Maximum protection through electronic current limitation and load disconnection
- Maximum system availability through selective protection
- System stability in the event of a short circuit through avoidance of voltage dips
- Risk reduction through active, remotely controlled disconnection of equipment (optionally with RC110)
- Effective failure indication (overvoltage, undervoltage, short circuit etc.)
- Installation and removal possible with your system live, no system downtimes
- 100% fail-safe through fail-safe element

Technical data ($T_{amb} = 25\text{ °C}$, $U_B = \text{DC } 48\text{ V}$)

Rated voltage U_B	DC +24 V, DC +48 V DC +60 V (adjustable via slide switch)
Current rating range I_N	2 A / 5 A / 8 A / 12 A / 16 A / 20 A / 24 A
Parallel connection of several ESX300-S plus* (only available for Power-D-Box CP with load outputs on the rear)	16 A / 20 A / 24 A can be connected in parallel by means of jumpers (see accessories page 4). This allows protection of loads up to 60 A.
Power consumption I_0	typically 16 mA
Trip current	typically $1.2 \times I_N$
Low voltage monitoring	factory settings: typically (18 V < U) 24 V typically (40 V < U) 48 V typically (54 V < U) 60 V
Oversvoltage monitoring	factory settings: typically (30 V < U) 24 V typically (57 V < U) 48 V typically (72 V < U) 60 V

Load circuit

Load output	Power-MOSFET-switching output (minus-switching), no physical isolation
Trip times	typically <20 ms at short circuit typically <30 sec. at overcurrent
Inductive load	external free wheeling diode recommended
Capacitive load	max. 7,000 μF
Temperature disconnection	Typically at $T_{amb} 105\text{ °C}$

Technical data:

Design	rack without enclosure
Terminals	plug-in type, blade terminals DIN 46244-A 6.3-0.8 and 2.8- 0.5
Degree of protection	operating area IP20 (when rack is fully populated and SUB-D connectors are plugged in) Terminal area IP00 DIN 40050
Mass	typically 50 g
Mounting position	vertical, cooling by means of convection

Status indication / momentary switch (operating conditions see table 1)

Status LEDs	red, green
Momentary switch	switch on or off

General data

Leakage current in the off state	typically 1 mA
Back-up fuse	not required due to integral fail-safe element

Environmental conditions

Ambient temperature	-20 °C...+55 °C without condensation see EN50240-1
Storage temperature	-20 °C ... +70 °C
Humidity	96 hours at 95% RH, 40 °C, to IEC 60068-2-78, climate class 3K3 to EN60721

Marking and approvals

ESD	4 kV/air 8 kV
EMC requirements	to EN 61000-6-3 / EN 61000-6-2
Vibration resistance	3 g to IEC 60068-2-6,
Marking	CE in accordance with EMC directive (EN 61000-6-3 & EN 61000-3-2)
Conformity	EN 60950-1 / UL 60950-1 compliant (when installed / in PDB)

Order numbering code

type	ESX300	electronic circuit protector
Version	S	standard, pluggable (Front plate, without housing)
Interfaces	3	ELBus® interface
Voltage range	1	DC Plus 18 V – 72 V
Additional functions	0	without
Current ratings		2 A 5 A 8 A 12 A 16 A 20 A 24 A
ESX300 - S-3 10 0 - 24 A Ordering example		

Status indication via

- Status LEDs (red/green):
- ELBus® interface (optional)

Table 1 operating states: status indication by LED

operating condition	load output	LED green	LED red	auxiliary contact N/C (optional)
no error -> OFF	locked	flashing slowly	OFF	open
normal operation	connected	ON	OFF	open
error undervoltage with device OFF (18 V < U) → 24 V (40 V < U) → 48 V (54 V < U) → 60 V	locked	OFF	ON	closed
error overvoltage with device OFF (30 V > U) → 24 V (57 V > U) → 48 V (72 V > U) → 60 V	locked	OFF	ON	closed
overcurrent error detected ($I > I_N < 1.2 \times I_N$) overcurrent failure has to be detected for approx. 30 sec before disconnection is effected	connected	ON	flashing fast	open
error - overcurrent or short circuit disconnection	locked	OFF	ON	closed
error undervoltage (18 V < U) → 24 V (40 V < U) → 48 V (54 V < U) → 60 V	connected	ON	ON	closed
error overvoltage (30 V > U) → 24 V (57 V > U) → 48 V (72 V > U) → 60 V	connected	ON	ON	closed
error, no voltage or internal error	locked ¹	OFF	OFF	closed
error high temperature	locked ¹	OFF	flashing slowly	closed
remote disconnection	locked	flashing fast	OFF	-----

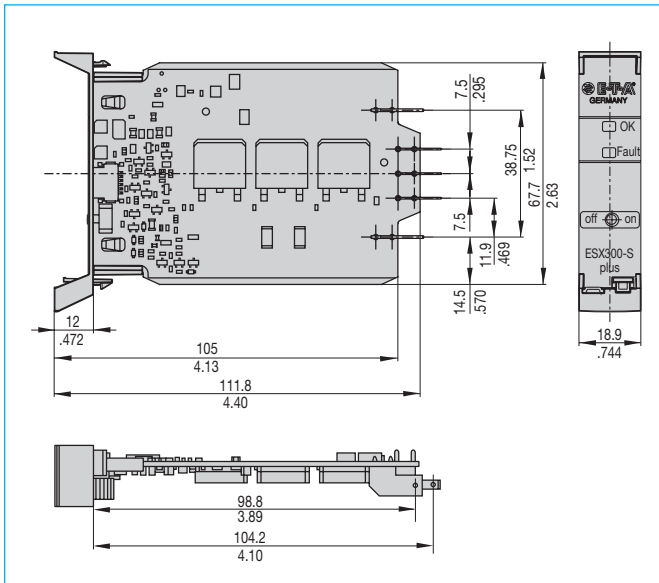
Table 2: Current rating, voltage drop, load capacity

current rating range I_N	typical voltage drop U_{ON} at I_N	active current limitation typically	trip time typ. at $1,2 \times I_N$	fail-safe element	max. load current at 100 % ON duty	max. capacitive load (μ F)
					$T_{AMB} = 40 \text{ }^\circ\text{C}$	
2 A	130 mV	$1.20 \times I_N$	0.2 – 3 s	4 A	2 A	1500
5 A	130 mV	$1.20 \times I_N$	0.2 – 3 s	10 A	5 A	2000
8 A	200 mV	$1.20 \times I_N$	0.2 – 3 s	10 A	8 A	3000
12 A	150 mV	$1.20 \times I_N$	0.2 – 3 s	20 A	12 A	4000
16 A	200 mV	$1.20 \times I_N$	0.2 – 3 s	20 A	16 A	5000
20 A	160 mV	$1.20 \times I_N$	0.2 – 3 s	30 A	20 A	6000
24 A	200 mV	$1.20 \times I_N$	0.2 – 3 s	30 A	24 A	7000

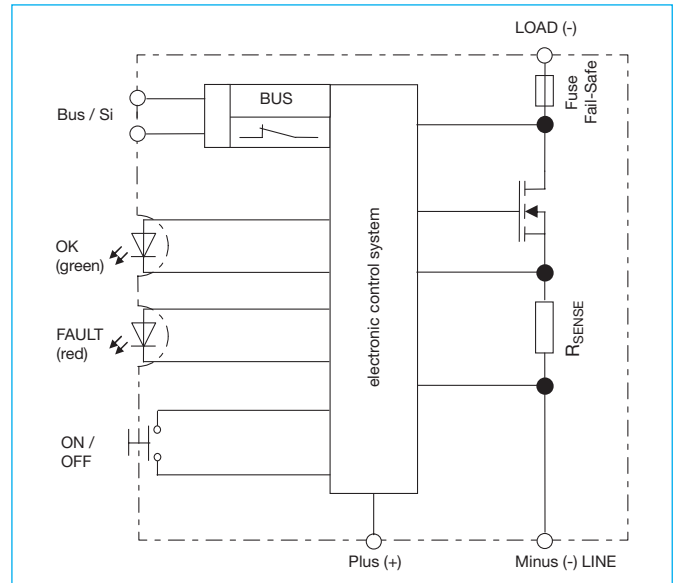
Note: The total current of neighbouring devices must not exceed 44 A.
The derating factor at an ambient temperature of > 40 °C is 0.8 times rated current.

7

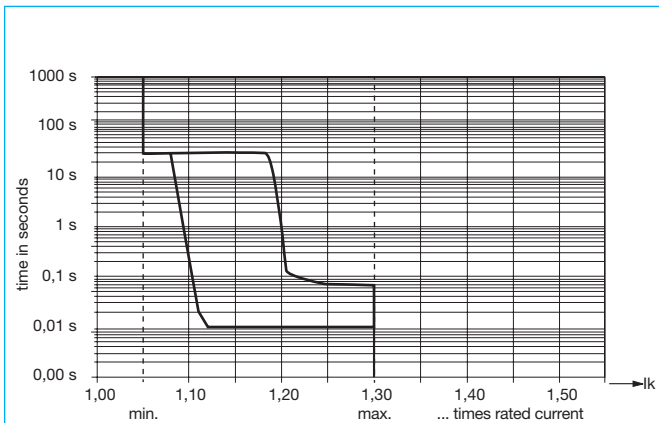
Dimensions



Schematic diagram

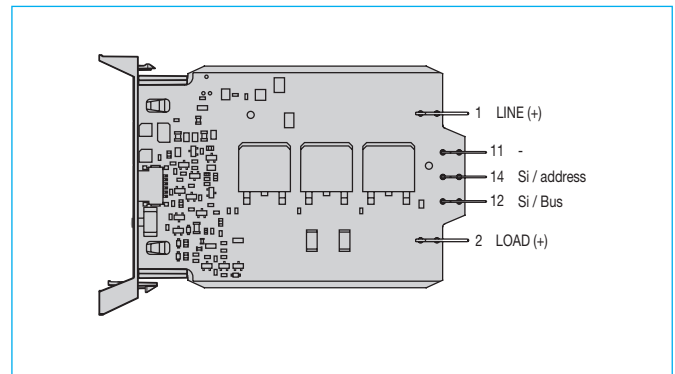


Time/current characteristics



- The electronic current limitation typically begins in at $1.2 \times I_N$. This means: under all overload conditions (independent of power supply and load circuit resistance) typically 1.2 times rated current is applied until disconnection. The trip time varies between 10 ms and 30 s depending on the multiple of the current rating.
- Without the current limitation getting into effect at typically $1.2 \times I_N$ there would be a much higher overcurrent in the event of an overload or short circuit.

Connection diagram (pin assignment)



Configuration of voltage range

Diagram of the ESX300-S plus showing the voltage range configuration slide control. The terminals are labeled: 1 LINE (+), 11 -, 14 Si / address, 12 Si / Bus, and 2 LOAD (+).

- Configuration of the voltage range is via a slide control on the pcb.
 - 24 V (voltage range 20 V to 30 V)
 - 48 V (voltage range 40 V to 57 V)
 - 60 V (voltage range 54 V to 72 V)
- Depending on the configured voltage range, the voltage specification for undervoltage or overvoltage detection will change as well. Factory pre-set voltage of the ESX300-S plus is 48 V.

For further information please see installation instruction ControlPlex® Rack.