REX12-Tx-E electronic circuit protector

Description

The compact and flexible all-in-one solution REX consists of several coordinated modules. It comprises the EM12-T type supply modules for the plus and minus potential, via a single or double channel REX12-T electronic circuit protector, which can be mounted side by side in any number, and the PM12-T potential extension modules for plus and minus multiplication. The 12.5 mm slim modules are designed completely in push-in technology and thus allow a tool-free and time-saving wiring.

The protection modules can be mounted on the mounting rail side by side in combination with the EM12-T and the PM12-T, just as needed. Furthermore, no additional accessories are required, as they can be connected electrically via flap-hinged mechanism. The REX12-T circuit protector offers selective overcurrent protection, by reacting faster to short circuits and overload than the connected switch mode power supply. Capacitive loads up to 20.000µF are switched on without any problem. The circuit protectors are available in all common fixed and adjustable current ratings ranging from 1 A to 10 A. Besides the UL508listed approval, UL 121201, Class Division and NEC Class2, REX12-T exclusively meets the requirements of cable protection according to EN60204- 1.

Features

- Combination of supply modules, overcurrent protection and power distribution
- Selective load protection via electronic trip curve
- No accessories required for connecting the components
- Width per channel only 12.5 mm (1-channel) or 6.25 mm (2-channels)
- Fixed and adjustable current ratings 1 A – 10 A
- Integral fail-safe element, adjusted exactly to current rating
- Switching capacitive loads up to 20,000 µF
- Manual ON/OFF/Reset momentary switch
- Clear status indication by means of LED and signal contact
- Connection via push-in terminals including orange release buttons

Benefits

- Saves costs, as no further accessories are required
- Saves 50 % time by way of innovative and flexible mounting and connection technology
- Saves space, as modules are only 12.5 mm wide
- Flexibility by simple mounting/demounting and modularity
- Cuts inventory costs, as only one product is required for all current ratings

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Preferred types – for more details on all configurations please see page 4

Preferred types are E-T-A products most frequently used by E-T-A customers. We produce our preferred types in very high quantities. At the same time, our preferred types have shorter delivery times than other versions.

Preferred types

Preferred types	Short description	Preferred current rating (A)						
REX12-TA1-E	**1-channel**	**2**	**4**	**6**	**10**	**2/2**	**4/4**	**6/6**
REX12-TA1-107-DC24V-		x	x	x	x			
REX12-TA2-E	**2-channel**	**2**	**4**	**6**	**10**	**2/2**	**4/4**	**6/6**
REX12-TA2-107-DC24V-						x	x	x
REX12D-TE2-E	**2-channel, adjustable**	**1A – 10A**						
REX12D-TE2-100-DC24V-		x						

Approvals

NEC Class2

Data sheet

The current data sheet is available on our website: www.e-t-a.de/e359

Conformity

Technical data (T_U = +23 °C, U_B = DC 24 V)

REX12-Txx-xxx circuit protectors

REX12-TA1-107-DC24V-xA-E	1-channel
REX12-TA2-107-DC24V-xA/xA-E	2-channel
REX12D-TE2-100-DC24V-xA-xA-E	2-channel

The REX12-TAx-E is operated at the EM12-T-E in standard mode. The REX12D-TE2-E can be operated at the EM12D-T as well as at the EM12-T-E. The operating mode EM12D-T (COM-Mode) or the EM12-T-E (standard mode) is recognized automatically. The following indications refer exclusively to the standard mode.

Operating voltage U_B	DC 24 V (18...30 V)

Quiescent current I_0

REX12-Tx1-E 1-channel	in ON-condition:	typically 5 mA
REX12-TA2-E 2-channel	in ON-condition:	typically 8 mA
REX12D-TE2-E 1A-4A 2-channel	in ON-condition:	typically 9 mA
REX12D-TE2-E 1A-10A 2-channel	in ON-condition:	typically 12 mA

Reverse polarity protection	Yes
Power failure-bridging time	up to 10 ms
Current rating I_N REX12-Tx1-E REX12-TA2-E REX12D-TE2-E	Currents: 1 A, 2 A, 3 A, 4 A, 6 A, 8 A, 10 A 1 A/1 A, 2 A/2 A, 3 A/3 A, 4 A/4 A, 6 A/6 A 1 A-4 A, 1 A-10 A Condition as delivered max. current rating
Visual status indication of operating mode via LED load current	Green: Load circuit connected Green/Orange flashing: Warning limit 90 % reached Orange: Overload or short circuit until disconnection Red: - after an overload / short circuit disconnection - after undervoltage release of operating voltage in ON condition with autoreset LED off: Device switched off by means of ON/OFF momentary switch or no operating voltage

Load circuit

Load output	Power MOSFET switching output (high side switching)
Load current warning limit (I_{WLimit})	typically 0.9 x I_N
hysteresis	typically 5 %
Overcurrent trip (I_{OL}) with trip times (t_{OL})	typically I_{OL}: I_N x 1.05 t_{OL}: 3s typically I_{OL}: I_N x 1.35 t_{OL}: 0.5s typically I_{OL}: I_N x 2.00 t_{OL}: 0.1s typically I_{OL}: I_N x 2.50 t_{OL}: 0.012s
short circuit-trip time (t_{SC})	typically under short-circuit conditions (I_{SC}) t_{SC}: 0.002 s[2)] see time/current characteristic
Influence of ambient temperature on overload disconnection and load current - warning limit	see temperature factor table

Voltage drop in load circuit at I_N and at I_N 70 % for REX12-Txx-E between LINE+ and LOAD+

I_N: 1A	typically 180 mV	I_N: 70 %	typically 125 mV
I_N: 1 A-CL2	typically 180 mV	I_N: 70 %	typically 125 mV
I_N: 2A	typically 110 mV	I_N: 70 %	typically 80 mV
I_N: 2 A-CL2	typically 110 mV	I_N: 70 %	typically 80 mV
I_N: 3A	typically 120 mV	I_N: 70 %	typically 85 mV
I_N: 3 A-CL2	typically 130 mV	I_N: 70 %	typically 90 mV
I_N: 4A	typically 115 mV	I_N: 70 %	typically 80 mV
I_N: 4 A-CL2	typically 180 mV	I_N: 70 %	typically 120 mV
I_N: 6A	typically 170 mV	I_N: 70 %	typically 110 mV
I_N: 8A	typically 160 mV	I_N: 70 %	typically 105 mV
I_N: 10A	typically 180 mV	I_N: 70 %	typically 120 mV

2) depending on power source

Technical data (T_U = +23 °C, U_B = DC 24 V)

REX12D-TE2-100-DC24V-1A-4A-CL2-E

I_N: 1 A-CL2	typically 50 mV	I_N: 70 %	typically 42 mV
I_N: 2 A-CL2	typically 90 mV	I_N: 70 %	typically 70 mV
I_N: 3 A-CL2	typically 135 mV	I_N: 70 %	typically 95 mV
I_N: 4 A-CL2	typically 180 mV	I_N: 70 %	typically 120 mV

REX12D-TE2-100-DC24V-1A-10A-E

I_N: 1A	typically 30 mV	I_N: 70 %	typically 28 mV
I_N: 2A	typically 39 mV	I_N: 70 %	typically 34 mV
I_N: 3A	typically 48 mV	I_N: 70 %	typically 40 mV
I_N: 4A	typically 57 mV	I_N: 70 %	typically 46 mV
I_N: 5A	typically 66 mV	I_N: 70 %	typically 52 mV
I_N: 6A	typically 74 mV	I_N: 70 %	typically 59 mV
I_N: 7A	typically 83 mV	I_N: 70 %	typically 65 mV
I_N: 8A	typically 92 mV	I_N: 70 %	typically 71 mV
I_N: 9A	typically 101 mV	I_N: 70 %	typically 77 mV
I_N: 10A	typically 110 mV	I_N: 70 %	typically 83 mV

Fail-safe element (integrated fuse adapted to respective current rating I_N)	I_N: 1 A	fail-safe I_N: 1 A
	I_N: 1 A- CL2	fail-safe I_N: 1 A
	I_N: 2 A	fail-safe I_N: 2 A
	I_N: 2 A- CL2	fail-safe I_N: 2 A
	I_N: 3 A	fail-safe I_N: 3.15 A
	I_N: 3 A- CL2	fail-safe I_N: 4 A
	I_N: 4 A	fail-safe I_N: 4 A
	I_N: 4 A- CL2	fail-safe I_N: 4 A
	I_N: 6 A	fail-safe I_N: 6.3 A
	I_N: 8 A	fail-safe I_N: 8 A
	I_N: 10 A	fail-safe I_N: 10 A
	I_N: 1 A/1 A	fail-safe I_N: 1 A/ 1 A
	I_N: 1 A/ -4 A-CL2	fail-safe I_N: 1 A/ 1 A
	I_N: 2 A/2 A	fail-safe I_N: 2 A/ 2 A
	I_N: 2 A/2 A-CL2	fail-safe I_N: 2 A/ 2 A
	I_N: 3 A/3 A	fail-safe I_N: 3.15 A/ 3.15 A
	I_N: 3 A/3 A-CL2	fail-safe I_N: 4 A/ 4 A
	I_N: 4 A/4 A	fail-safe I_N: 4 A/ 4 A
	I_N: 4 A/4 A-CL2	fail-safe I_N: 4 A/ 4 A
	I_N: 6 A/6 A	fail-safe I_N: 6.3 A/ 6.3 A
	I_N: 1 A-4 A-CL2	Fail Safe I_N: 4 A
	I_N: 1 A- 1 A	fail-safe I_N: 16 A

Operating voltage sensing for low voltage	OFF at typically U_B < 16.0 V ON at typically U_B > 19.0 V hysteresis typically 2 V with automatic OFF and ON operation
ON delay - when Power ON	channel 1: typically 100 ms (REX12-TAx-E) channel 2: typically 200 ms (REX12-TAx-E) channel 1: typ. 1.500 ms (REX12D-TE2-E) channel 2: typ. 1.600 ms (REX12D-TE2-E)
- when operating via the ON /OFF-button or	channel 1: typically 5 ms channel 2: typically 100 ms
- after low voltage	channel 1: typically 5 ms channel 2: typically 5 ms
Disconnection of the load circuit	- Manually at the device via the ON/OFF button - after an overload / short circuit disconnection with saving (no automatic reset) - temporarily in case of low voltage - with no operating voltage
Switching on the load circuit - ON/OFF button	Device can only be switched on when operating voltage is applied
- Applying the operating voltage	The device starts operation in last saved condition.

Technical data (T_U = +23 °C, U_B = DC 24 V)

Enquire adjusted current rating with REX12D-TE2-E	Enquiry of currently adjusted current independent of the operating mode (COM or standard), possible for each channel directly on the REX12D-TE2-E. Enquiry mode is started by pushing the button between ≥ 2 seconds and < 5 seconds. After releasing the button, the LED is RED for 333 ms to indicate start of enquiry. Then the LED flashes with a pulse/pause ratio of 1:2 at a frequency of 1 Hz ORANGE to indicate the set current value. After reaching the set current rating, after repeated indication of the RED LED for 333 ms the signalling starts again. The enquiry mode is quitted after 5 times of indication of the set current rating or by pressing the button and the display changes to current operating mode. The enquiry mode is available in all operating modes (ON, OFF, LOW VOLTAGE and TRIPPED)
Settings for the current rating for REX12D-TE2-E	The adjustment mode directly at the REX12D-TE2-E is only available in the standard mode. The adjustment mode is started directly per channel by pushing the button for ≥ 5 seconds. After releasing the button, the LED is RED for 333 ms to indicate the start of adjusting. The LED flashes with a pulse/pause ratio of 1:4 at a frequency of 0.6 Hz GREEN. After reaching the maximum adjustment value the indication starts again. The overflow of the maximum setting value after 1 ampere is indicated by the RED LED lighting up (333 ms). The adjustable current rating is taken over by pressing the button during the flashing of 1 ampere up to the maximum adjustment value. If the button is pressed, e.g. after the 7. flashing of the GREEN LED, 7 ampere are taken over for the current rating and the indication changes to the current operating mode. again. If the button is not pressed, the adjustment mode will be left after the 5 times of signalling of the current rating range, without taking over a new current rating and the indication changes to the current operating mode again. The adjustment mode is available in all operating modes (ON, OFF, LOW VOLTAGE and TRIPPED). Go to video **Mounting and operation:**
Reset	A closed load output (closed due to overcurrent/short circuit) can be reset by pressing the ON/OFF button
Leakage current in load circuit in OFF condition	typically <1 mA

Technical data (T_U = +23 °C, U_B = DC 24 V)

Capacitive loads depending on:	up to 20.000 µF Cable attenuation, used power supply, load current and current rating
Free-wheeling diode	external free-wheeling circuit at inductive load (rating according to load)
Parallel connection of several load outputs	not allowed
Status output SM	Status output indicator in REX system
Electrical data minus switching signal output	Group signalling is implemented in connection with EM12-T supply module
Screw terminals LOAD+	
Push-in terminal PT2,5	0,14 mm² to 2,5 mm², flexible AWG24 – AWG14 str.
Stripping length	8 mm to 10 mm
Dimensions (w x h x d)	12.5 x 80 x 98.5 mm
Weight REX12-TA1-xxx-E 1-channel REX12-TA2-xxx-E 2-channel REX12D-TE2-xxx-E 2-channel	 approx. 57 g approx. 58 g approx. 62 g
General data	**REX/EM/PM**
Housing material	plastic
Housing assembly	mounting rail to EN 60715-35x7.5
Ambient temperature (T_U)	-25 °C ... +60 °C (without condensation, cf. EN 60204-1)
Storage temperature	-40 °C ... +70 °C
Mounting temperature	+5 °C ... +60 °C
Damp heat	96 hrs/95 % relat. Humidity/40 °C to IEC 60068-2-78-Cab climate class 3K3 to EN 60721
Operating height	2.000m above sea level NN 3.000 m above sea level NN to +55 °C 4.000 m above sea level NN to +50 °C
Operation pressure	4 bar above atmospheric pressure
Corrosion-proof only PM and EM-accessories	96 hrs in 5 % salt mist to IEC 60068-2-11 Test Ka
Vibration resistance	5 g test to IEC 60068- -2- 2 test Fc
Degree of protection actuating area REX12: Screw terminal range EM, PM:	IEC 60529, DIN VDE 0470 IP30 IP20
EMV-requirements (EMV directive, CE-marking)	Emitted interference: EN 61000-6-3 Resistance to disturbances: EN 61000-6-2
Insulation coordination (IEC 60934)	0.5 kV/pollution degree 2
Dielectric strength	max. DC 30 V (load circuit)
Isolation resistance (Off-condition)	not applicable, electronic disconnection only
Conformity	CE-marking

Approvals/Standards

Approval authority	Test standard	File No	Voltage ratings	Current rating range
UL	UL 2367, UL 1310 NEC Class2	E306740	DC 24 V	1 ... 10 A, 1 A, 1 A, 2 A, 4 A, 1 A ... 4 A
UL	UL 121201 CSA C22.2 No. 213 (Class I, Division 2, Groups A, B, C, D)	E320024	DC 24 V	1 ... 10 A
UL	UL 508 listed, CSA C22.2 No. 14	E492388	DC 24 V	1 A ... 10 A

PM and EM – accessories approvals see technical data of accessories

Preferred types described briefly

Preferred types are E-T-A products most frequently used by E-T-A customers. We produce our preferred types in very high quantities. At the same time, our preferred types have shorter delivery times than other versions.

Preferred types

Preferred types	Short description	Preferred current rating (A)						
REX12-TA1-E	**1-channel**	**2**	**4**	**6**	**10**	**2/2**	**4/4**	**6/6**
REX12-TA1-107-DC24V-		x	x	x	x			
REX12-TA2-E	**2-channel**	**2**	**4**	**6**	**10**	**2/2**	**4/4**	**6/6**
REX12-TA2-107-DC24V-						x	x	x
REX12D-TE2-E	**2-channel, adjustable**	**1A-10**						
REX12D-TE2-100-DC24V-		x						

Order numbering code – REX12-T

type
REX12 Electronic circuit protector with PT connection technology

Mounting method
T rail mounting

Design
A 1 Load output terminal per channel, fixed current ratings xA or xA/xA

Number of channels
1 1 channel (only 1 channel)
2 2 channels (only 2 channels)

Version
1 without physical isolation

Signal input
0 without signal input

Signal output
7 status output

Operating voltage
DC 24 V Current rating DC 24 V

Current ratings
1 A (only 1 channel)
2 A (only 1 channel)
3 A (only 1 channel)
4 A (only 1 channel)
6 A (only 1 channel)
8 A (only 1 channel)
10 A (only 1 channel)
1 A/1 A (only 2 channels)
2 A/2 A (only 2 channels)
3 A/3 A (only 2 channels)
4 A/4 A (only 2 channels)
6 A/6 A (only 2 channels)

Approval
CL2 Class2 (only for 1 A, 2 A, 3 A, 4 A versions)
E UL 121201 Class I Division II

REX12 - T A 1 - 1 0 7 - DC24V - 10 A - E Example 1 channel
REX12 - T A 2 - 1 0 7 - DC24V - 4A/4A-CL2-E Example 2 channels

Order numbering code – REX12D-TE2

type
REX12D Intelligent electronic circuit protector with PT connection technology

Mounting method
T rail mounting

Design
E 1 Load output terminal per channel, adjustable current ratings xA/xA, adjustable standard and COM-Mode

Number of channels
2 2 channels

Version
1 without physical isolation

Signal input
0 without signal input

Signal output
0 without signal output

Operating voltage
DC 24 V Current rating DC 24 V

Current ratings
1 A– 1 A (only 2 channels)
1 A- 1 A (only 2 channels)

Approvals
CL2 Class2 (only for 1 A - 4 A version)
E UL 121201 Class I Division II

REX12D-T E 2 - 1 0 0 - DC24V- 1 A-10 A CL2- E ordering example

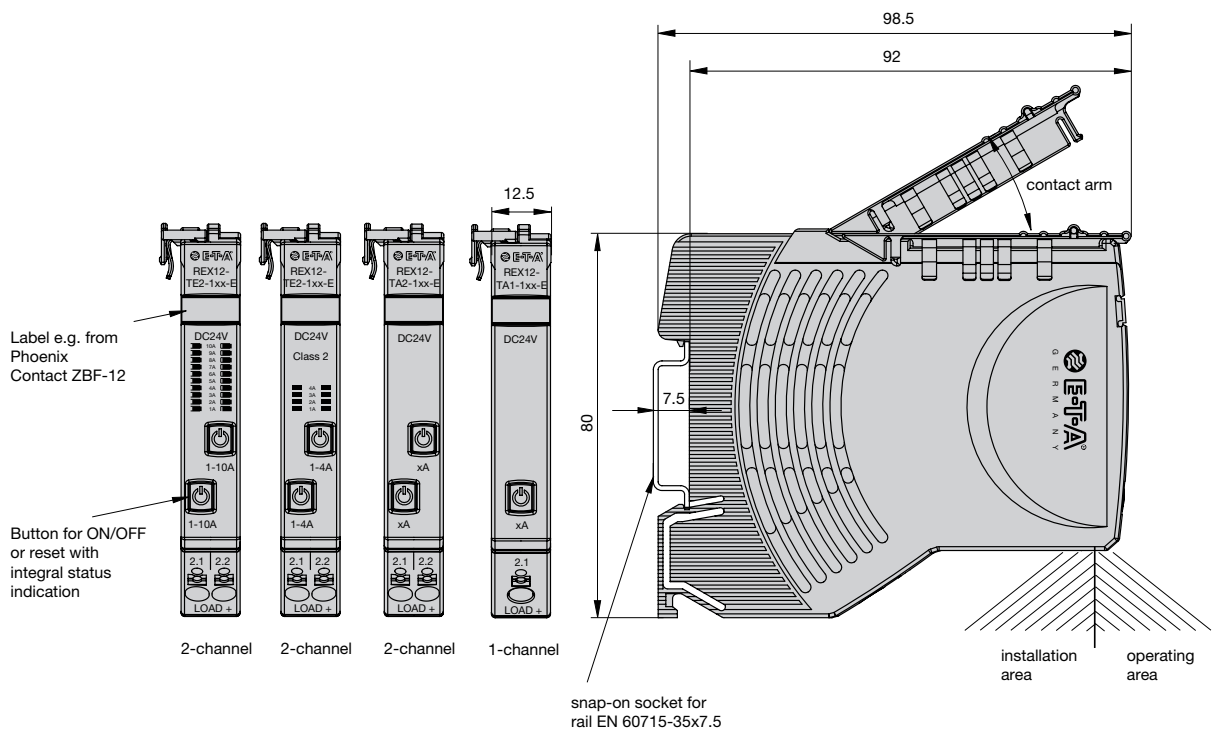
Custom designed versions

Looking for a version you cannot find in our order numbering code? Please get in touch. We will gladly find a solution for you.

Overview of ordering number codes

Supply module:	EM12-T01-001-DC24V-40A-E
Circuit protectors: 1-channel	REX12-TA1-107-DC24V-1A-E REX12-TA1-107-DC24V-1A-CL2-E (Class2) REX12-TA1-107-DC24V-2A-E REX12-TA1-107-DC24V-2A-CL2-E (Class2) REX12-TA1-107-DC24V-3A-E REX12-TA1-107-DC24V-3A-CL2-E (Class2) REX12-TA1-107-DC24V-4A-E REX12-TA1-107-DC24V-4A-CL2-E (Class2) REX12-TA1-107-DC24V-6A-E REX12-TA1-107-DC24V-8A-E REX12-TA1-107-DC24V-10A-E
Circuit protectors: 2-channel	REX12-TA2-107-DC24V-1A/1A-E REX12-TA2-107-DC24V-1A/1A-CL2-E (Class2) REX12-TA2-107-DC24V-2A/2A-E REX12-TA2-107-DC24V-2A/2A-CL2-E (Class2) REX12-TA2-107-DC24V-3A/3A-E REX12-TA2-107-DC24V-3A/3A-CL2 (Class2) REX12-TA2-107-DC24V-4A/4A-E REX12-TA2-107-DC24V-4A/4A-CL2 (Class2) REX12-TA2-107-DC24V-6A/6A-E
circuit protectors 2-channel, adjustable	REX12D-TE2-100-DC24V-1A-4A-CL2-E (Class 2) REX12D-TE2-100-DC24V-1A-10A-E

Dimensional drawing with terminal drawing: REX12-TA1-xxx-E/REX12-TA2-xxx-E/ REX12D-TE2-xxx-E circuit protectors



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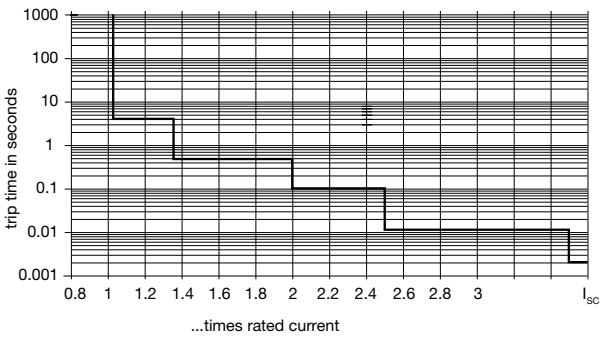
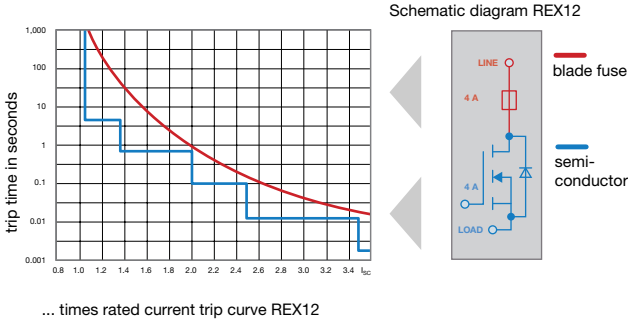
Typical time/current characteristic (T_U = +23 °C, U_B = DC 24 V)



Principle characteristic curve and schematic diagram REX12



Temperature factor/Permanent current rating

The time/current characteristic depends on the ambient temperature. To determine the maximum permissible load current, the rated device current must be multiplied by the temperature factor and the series mounting factor must be taken into account.

Temperature factor table:

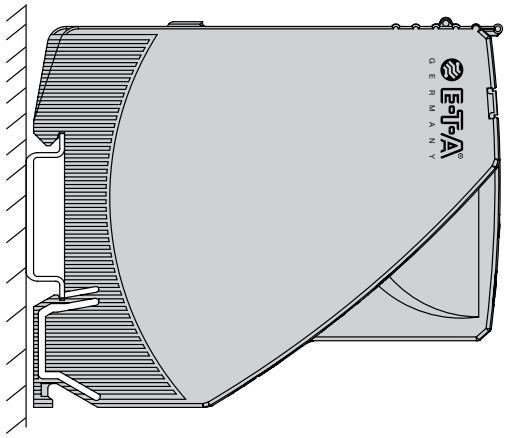
Ambient temperature [°C]	0	10	23	40	50	60
Temperature factor	1	1	1	0.95	0.90	0.85

Note:
When mounted in series, the rated device current can be supplied to a maximum of 80 % or must be oversized accordingly (see Technical Information at E-T-A: www.e-t-a.de/ti_d).

With high temperatures, the load current warning threshold »warn limit typically 0.9 x I_N« will be reduced in accordance with the temperature factor!

Current rating selection of the circuit protector ≤ Current rating of the power source.

Mounting position REX... preferred mounting position horizontal



Description – EM12-T-E supply module

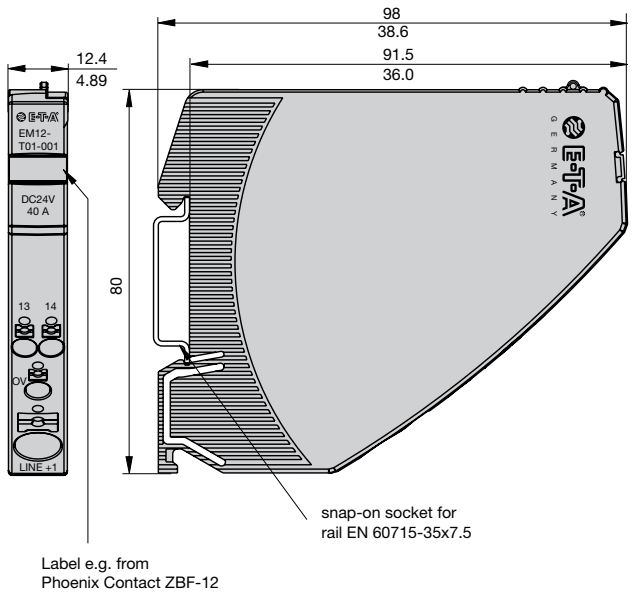
The EM12-T-E supply module receives the DC 24 V supply voltage, e.g. from a timed switched mode power supply, and distributes it to the installed circuit protectors via the integral connector arm of the REX12-T-E.

The potential-free Si auxiliary contact in the EM12-T-E indicates any detected failures through the circuit protector, e.g. to the superordinate control unit (CPU).

Technical data (T_U = +23 °C, U_B = DC 24 V)

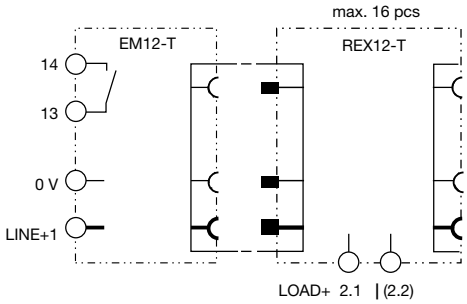
Operating voltage U_B	DC 24 V (18 ... 30)
Operating voltage I_B	max. 40 A
Reverse polarity protection	Yes
Signalling	**EM12-T01-001-DC24V-40A-E**
Closed current I_0	typical 10 mA
Potential-free Si auxiliary contact	max. DC 30 V/0.5 A min. 10 V/1 mA
Si group signalisation Terminal: Si (13) / Si (14)	auxiliary contact, closing contact
Normal condition:	Auxiliary contact closed based on all protection modules - when ON, continuous load output - when OFF, load output off
Error condition:	Auxiliary contact open based on one or more protection modules - after an overload/short circuit disconnection - after undervoltage release of operating voltage in ON condition with autoreset - with no operating voltage U_B in the supply module
Insulation co-ordination	0.5 kV/pollution degree 2
Power failure- bridging time for Si	up to 10 ms
Screw terminals	**LINE+**
Push-in terminal PT 10 Stripping length	0.5 mm² to 10 mm², flexible AWG20 – AWG8 str. 18 mm
Screw terminals	**0 V / Si 13 / Si 14**
Push-in terminal PT2.5 Stripping length	0.14 mm² to 2.5 mm², flexible AWG24 – AWG14 str. 8 mm to 10 mm
Dimensions (w x h x d)	12.5 x 80 x 98 mm
Mass	approx. 52 g
Circuit protectors can be mounted side-by-side REX12-Tx1-x-E or REX12-TA2-x-E or REX12D-TE2-E 2-channel	max. 16 pieces

Dimensional drawing EM12-T01-xxx-E supply module



Schematic diagram EM12-Txx-xxx-E with REX12-xx-E

EM12-T01-001-DC24V-40A-E



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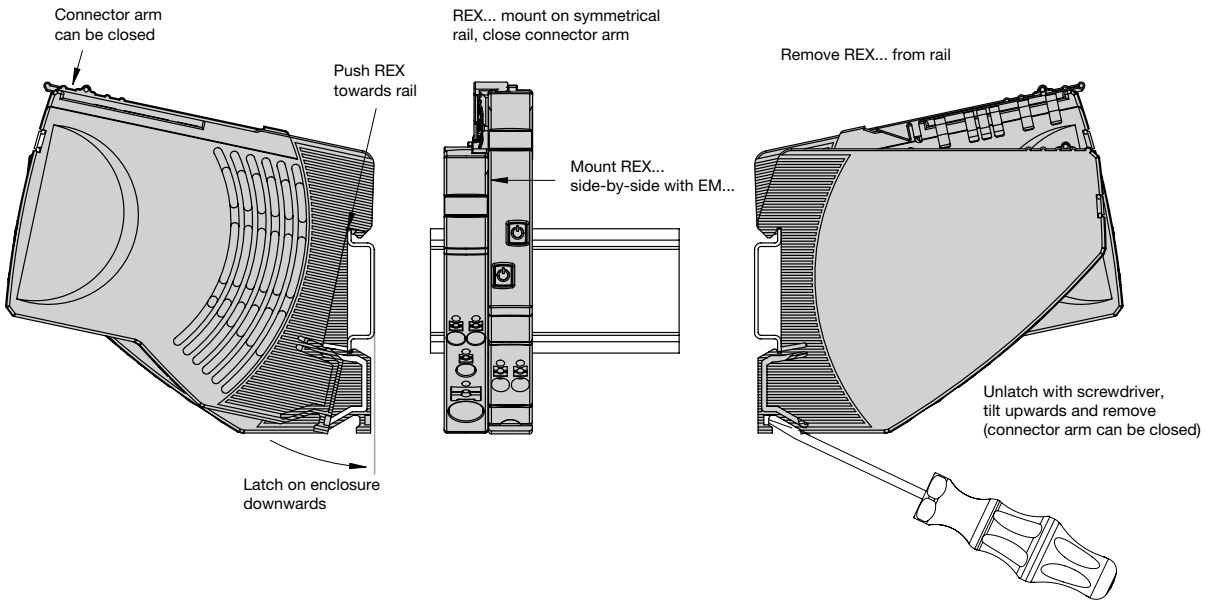
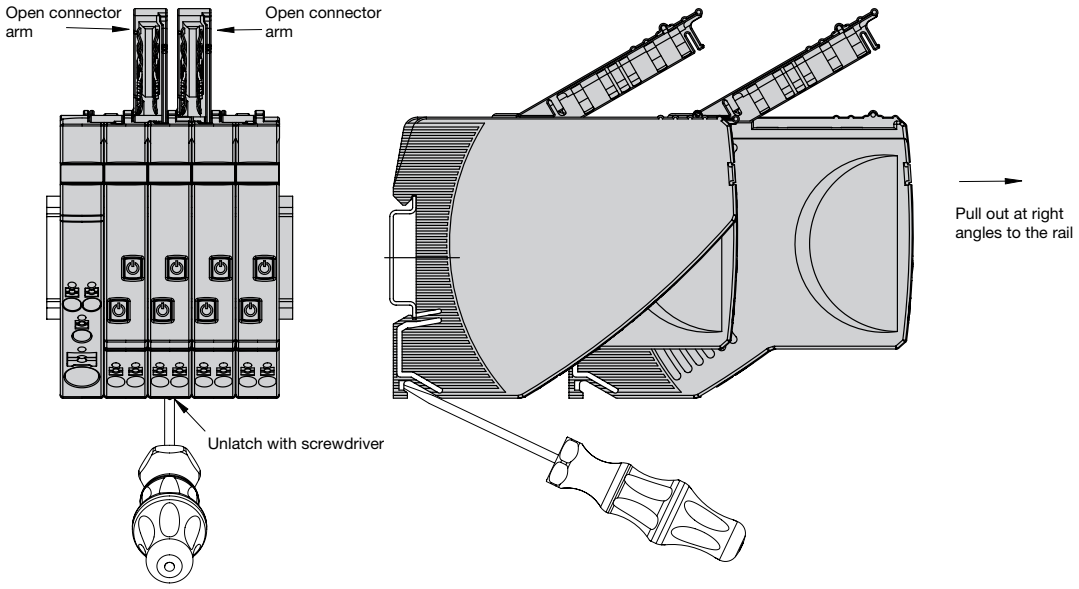
Application example: REX... assembled/disassembled on mounting rail



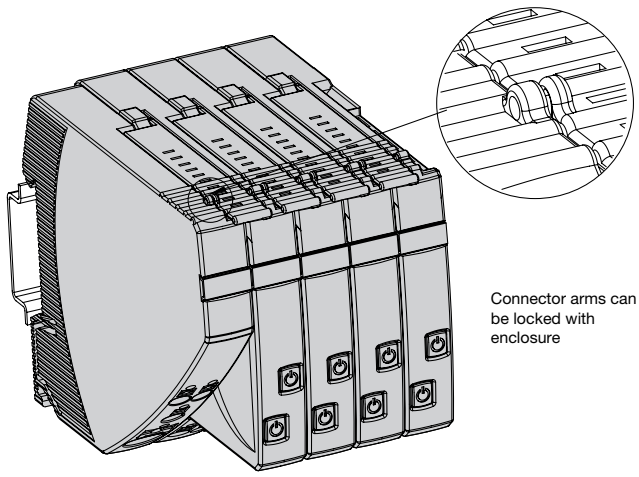
Application example: REX... Replacement/disassembly from group



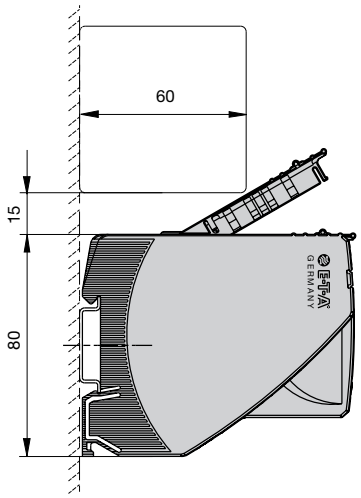
Instructions for installation:

Mounting or actuation of the REX connector arm must only be effected at dead-voltage. For start-up the REX connector arm must be closed.

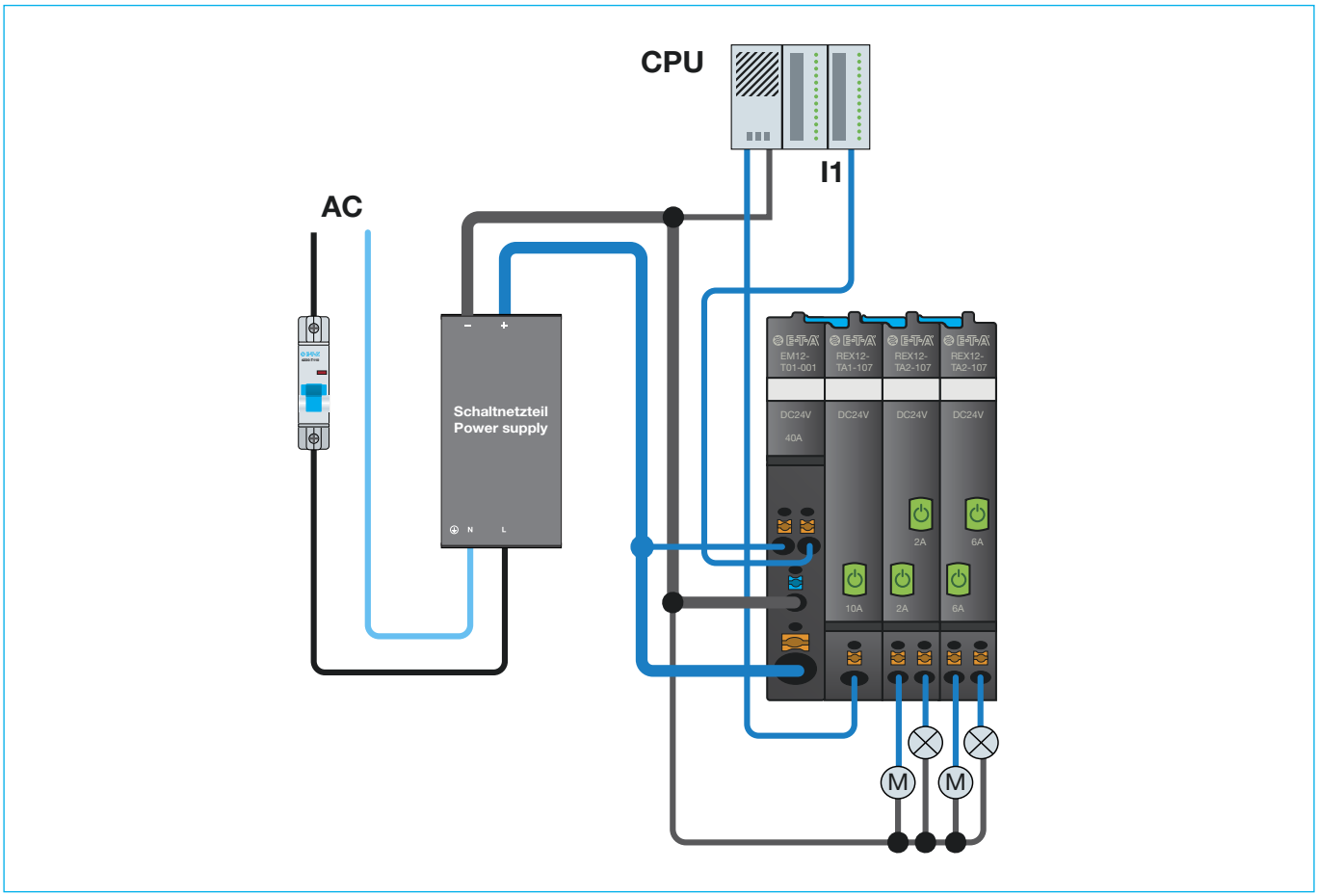
Application example: REX... Sealing



Application example: REX12(D)-T…E distance cabel duct arm



Application example: EM12-T… EM12-T...-E with REX12-TAx...-E



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