

Description

The requirements regarding modern machinery and equipment are constantly growing. System transparency, remote maintenance and remote access are getting more and more important in international competition. Early notification in the event of any disturbances and a fast response to current problems will increase system availability, save costs and improve the overall stability of the production process.

E-T-A provides the ideal solution for machine and panel builders with the intelligent protection system comprising the REX12D-T circuit protector and the EM12D interface module. The system combines the well-proven quality of DC24V overcurrent protection with the communication options of the IO link system. It allows complete transparency of the DC24V power supply and provides all necessary information for a reliable production process in this sector.

The 12.5 mm wide modules feature push-in technology for wiring with press release buttons and allow no-tool time-saving and maintenance-free wiring. The supply module is designed for DC 24 V and 40 A and accommodates max. 10 mm² with wire end ferrule as a plus (+) supply. On the load output side the circuit protector can be wired with 2.5 mm². It is exactly tailored to the needs of machine and panel builders. And what is more: no additional accessories are required when connecting the individual components electrically and mechanically. This helps save time and money!

Features

- Control, diagnosis and monitoring via IO link
- Combination of supply module and electronic circuit protector
- Double channel selective load protection by means of electronic trip curve
- No accessories required for connecting the components
- Width per channel only 6.25 mm (2-channel)
- Fixed current ratings from 2 A, 4 A, 6 A, 8 A and 10 A
- Integral fail-safe element, adjusted to current rating
- Switching capacitive loads up to 20,000 µF
- Manual ON/OFF/reset momentary switch
- Connection via push-in terminals including press release buttons

Benefits

- Increases machine availability through high transparency and remote diagnosis
- Saves cost – no further accessories required
- Saves time through innovative and flexible mounting and connection technology
- Saves space – with a width of only 6.25 mm per channel (2-channel)
- Provides flexibility through ease of mounting, disassembly and modular design

Approvals and standards

| Approval authority | Standard | Rated voltage | Current rating range |
|--------------------|---|---------------|----------------------|
| UL | UL 2367 | DC 24 V | 2 A...10 A |
| UL | UL60947 / cULus508 listed under preparation | DC 24 V | 2 A...10 A |



Technical data (T_{amb} = +23 °C, U_B = DC 24 V)

| REX12D-TAx-xxx circuit protectors | | |
|---------------------------------------|---|--|
| REX12D-TA1-100-DC24V-xA | | 1-channel |
| REX12D-TA2-100-DC24V-xA/xA | | 2-channel |
| Operating voltage U _B | DC 24 V (18...30 V) | |
| Closed-circuit current I ₀ | REX12D-TA1 1-channel in ON condition: typically 7 mA REX12D-TA2 2-channel in ON condition: typically 10 mA | |
| Reverse polarity protection | yes | |
| Power failure buffering time | up to 10 ms | |
| Current ratings I _N | fixed ratings: | |
| REX12D-TA1 | 8 A, 10 A | |
| REX12D-TA2 | 2 A / 2 A, 4 A / 4 A, 6 A / 6 A | |
| current ratings | | |
| Visual status indication by LED | green: | load circuit connected |
| | green/orange blinking: | load current warning limit reached 50 % – 100 % |
| | orange: | - overload reached, switch-off delay depending on the load current, active for max. 3 s - circuit protector was switched off by the superordinate control unit, LED is permanently orange |
| | red: | - after disconnection due to overload or short circuit - after undervoltage release of operating voltage in ON condition with autoreset |
| | OFF: | Device was switched off via ON/OFF momentary switch, or due to lacking operating voltage or faulty initialisation of the circuit protector |

| Load circuit | | |
|--|--|---|
| Load output | power MOSFET switching output (plus switching) | |
| Load current warning limit (I _{WLimit}) | typically 0.5 - 1.0 x I _N (parameterisable) | |
| hysteresis | typically 5 % | |
| Overload current disconnection (I _{OL}) with trip times (t _{OL}) | typically I _{OL} : I _N x 1.05 typically I _{OL} : I _N x 1.35 typically I _{OL} : I _N x 2.00 typically I _{OL} : I _N x 2.50 | t _{OL} : 3s t _{OL} : 0.5,5s t _{OL} : 0.1s t _{OL} : 0.012 s |
| short circuit trip time (t _{SC}) | typically at short circuit (I _{SC}) | t _{SC} : 0.002 s ¹⁾ |
| | see time/current characteristic 1) depending on the power source | |

Technical data ($T_{amb} = +23\text{ °C}$, $U_B = \text{DC } 24\text{ V}$)

| | | |
|---|--|--|
| 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 % between LINE+ and LOAD+ | | |
| I_N : 2 A | typically 110 mV | I_N : 70 % typically 80 mV |
| I_N : 4 A | typically 115 mV | I_N : 70 % typically 80 mV |
| I_N : 6 A | typically 170 mV | I_N : 70 % typically 110 mV |
| I_N : 8 A | typically 160 mV | I_N : 70 % typically 105 mV |
| I_N : 10A | typically 180 mV | I_N : 70 % typically 120 mV |
| Fail-safe element (integral blade fuse adjusted to I_N) | I_N : 2 A I_N : 4 A I_N : 6 A I_N : 8 A I_N : 10 A | fail-safe I_N : 2 A fail-safe I_N : 4 A fail-safe I_N : 6.3 A fail-safe I_N : 8 A fail-safe I_N : 10 A |
| operating voltage monitoring with regard to low voltage | OFF at typically ON at typically with automatic ON and OFF switching | $U_B < 16.0\text{ V}$ $U_B > 17.5\text{ V}$ |
| Switch-on delay - with power ON | channel 1: channel 2: | typically 100 ms typically 200 ms |
| - when switching on via ON/OFF momentary switch or - after undervoltage | channel 1: channel 2: | typically 5 ms typically 100 MS typically 5 ms typically 5 ms |
| Disconnection of the load circuit | <ul style="list-style-type: none"> - manually on the device with the ON/OFF momentary switch - remote control via the superordinate control unit - after an overload / short circuit disconnection with storage (no automatic reset) - temporarily at undervoltage - at no operating voltage | |
| Switch on of load circuit - momentary switch ON/OFF | The circuit protector can be switched on by the superordinate control unit or otherwise directly on the device. These two options are linked with AND. Switch-on is only possible if switched on from both positions. If the circuit protector was switched off either by the control unit or by the momentary switch directly on the device, switch-on has to be effected also from the corresponding position. | |
| - Apply operating voltage | For switch-on the device has to be supplied with operating voltage. The device re-starts with the last stored condition. | |
| Reset function | A blocked load output (blocked by overload / short circuit) can be reset by the ON/OFF momentary switch or by the superordinate control unit. | |
| Leakage current in load circuit in OFF condition | typically < 1 mA | |
| Capacitive loads | up to 20,000 μF | |
| Free-wheeling diode | external free-wheeling circuit at inductive load (rating according to load) | |
| Parallel connection of several load outputs | not allowed | |
| Screw terminals | LOAD+ | |
| Push-in terminal PT 2.5 | 0.14 mm ² ...2.5 mm ² , flexible | |
| Stripping length | 8 mm...10 mm | |
| Dimensions (w x h d) | 12.5 x 98.5 x 80 mm | |
| Mass | | |
| REX12D-TA1-xxx 1-channel | approx. 58 g | |
| REX12D-TA2-xxx 2-channel | approx. 62 g | |

Technical data ($T_{amb} = +23\text{ °C}$, $U_B = \text{DC } 24\text{ V}$)

| | |
|--|---|
| General data | |
| Housing material | moulded |
| Mounting | symmetrical rail to EN 60715-35x7.5 |
| Ambient temperature | -25 °C...+60 °C (without condensation, cf. EN 60204-1) |
| Storage temperature | -40 °C - +70 °C |
| Mounting temperature | +5 °C...+60 °C |
| Humidity | 96 hrs / 95 % RH 40 °C to IEC 60068-2-78-Cab climate class 3K3 to EN 60721 |
| Vibration | 3g test to IEC 60068-2-6, test Fc |
| Degree of protection | IEC 60529, DIN VDE 0470 IP30 |
| EMC requirements (EMC directive, CE logo) | noise emission: EN 61000-6-3 susceptibility: EN 61000-6-2 |
| Insulation co-ordination (IEC 60934) | 0.5 kV / pollution degree 2 |
| Dielectric strength | max. DC 30 V (load circuit) |
| Insulation resistance (OFF condition) | n/a, only electronic disconnection |
| Electronic modules for side-by-side mounting REX12D-TA1-xxx 1-channel REX12D-TA2-xxx 2-channel | max. 16 channels |
| Approvals | CE logo, UL 2367, File # E306740, (UL60947 / UL 508, File # E...) under preparation |

Overview of ordering number codes

| | |
|----------------------------------|--|
| Supply module | EM12D-TIO-000-DC24V-40A |
| Circuit protector: 1-channel | REX12D-TA1-100-DC24V-8A REX12D-TA1-100-DC24V-10A |
| Protection modules: 2-channel | REX12D-TA2-100-DC24V-2A/2A REX12D-TA2-100-DC24V-4A/4A REX12D-TA2-100-DC24V-6A/6A |

Instructions for installation

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

Temperature factor / continuous duty

The time/current characteristic depends on the ambient temperature. In order to avoid premature trip, the rating of the circuit protector has to be multiplied with a temperature factor and has to be accounted for when mounted side-by-side (see chapter Technical Information)

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 side-by-side, the devices can carry max. 80 % of their rated load or a different rating has to be selected (see chapter Technical Information).

Note:

With high temperatures, the load current warning threshold "warn limit typically $0.8 \times I_N$ " will be reduced in accordance with the temperature factor.

Ordering number code

| | | | |
|---|---|-------|---|
| Type | | | |
| REX12D intelligent 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 | | | |
| 2 2 channels | | | |
| Version | | | |
| 1 without physical isolation | | | |
| Signal input | | | |
| 0 without signal input | | | |
| Signal output: | | | |
| 0 status output | | | |
| Operating voltage | | | |
| DC 24 V voltage rating DC 24 V | | | |
| Current ratings | | | |
| 8 A (only 1-channel) | | | |
| 10 A (only 1-channel) | | | |
| 2 A / 2 A (only 2-channel) | | | |
| 4 A / 4 A (only 2-channel) | | | |
| 6 A / 6 A (only 2-channel) | | | |
| REX12D-T | A | 1 - 1 | 0 0 - DC24V - 10 A example 1-channel |
| REX12D-T | A | 2 - 1 | 0 0 - DC24V - 6 A / 6 A example 2-channel |

Notes

- The intelligent EM12D-TIO supply module is only meant for use with extra-low voltage (DC 24 V).
- Connection to a higher or not reliably disconnected voltage can cause hazardous conditions or damages.
- Only the intended circuit protectors must be used.
- The technical data of the circuit protectors used have to be observed.
- The entire power distribution system must only be installed by qualified personnel.
- Only after expert installation must the device be supplied with power.
- After tripping of the circuit protector and before reset, the cause of the failure (short circuit or overload) must be remedied.
- The national standards (e.g. for Germany DIN VDE 0100) have to be observed for installation and selection of feed and return cables.
- For convenient adjustment and configuration by means of projecting software a master data file (GSDML file) will be made available for downloading on the E-T-A homepage.

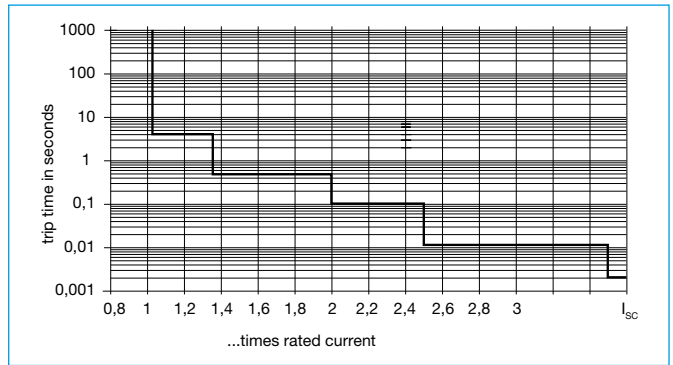
Please observe separate user manual of the EM12D-TIO.

CAUTION

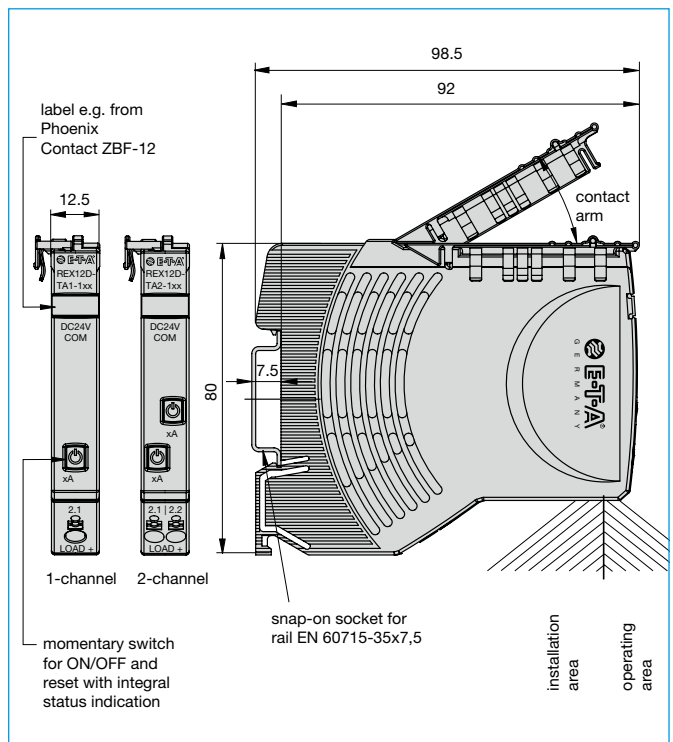


Electrostatically sensitive sub-assemblies can be destroyed by voltages far below the human perception threshold. These voltages already occur if you touch a component or electrical terminals of a sub-assembly without being electrostatically discharged. The damage of a sub-assembly caused by an overvoltage is often not immediately recognised, but will be noticed only after a longer operating time.

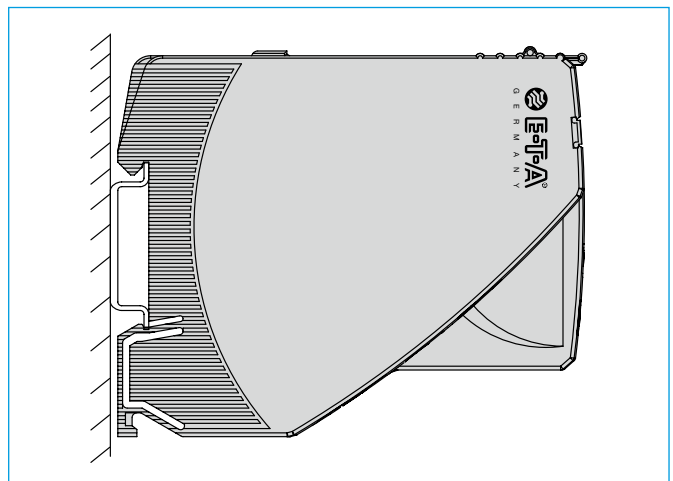
Typ. time/current characteristic ($T_{amb} = +23^{\circ}C, U_B = DC 24 V$)



Dimensions with connection diagram: REX12D-TAx-xxx circuit protectors



Mounting position: REX... preferred mounting position horizontal



Description – EM12D-T supply module

The EM12D-T supply module receives the DC 24 V supply voltage, e.g. from a switched mode power supply, and distributes it to the installed intelligent circuit protectors via the integral connector arm of the REX12D-T. The communication interface of the EM12D-T, which is designed as an IO link device, allows a great number of diagnosis and control commands to a superordinate IO link master of the control level.

Technical data (T_{amb} = +23 °C, U_B = DC 24 V)

| | |
|----------------------------------|--|
| Operating voltage U _B | DC 24 V (18...30 V) |
| Operating current I _B | max. 40 A |
| Reverse polarity protection | yes |
| Quiescent current I ₀ | typ. 20 mA |
| Insulation co-ordination | 0.5 kV / pollution degree 2 |
| Power failure buffering time | up to 10 ms |
| Screw terminals | LINE+ |
| Push-in terminal PT 10 | 0.5 mm ² ...10 mm ² , flexible |
| Stripping length | 18 mm...10 mm |
| Screw terminals | 0 V |
| Push-in terminal PT 2.5 | 0.14 mm ² ...2.5 mm ² , flexible |
| Stripping length | 8 mm...10 mm |
| Dimensions (w x h d) | 12.5 x 98 x 80 mm |
| Mass | approx. 56 g |

| | |
|--|------------------|
| Electronic modules for side-by-side mounting | |
| REX12D-TA1 1-channel | |
| REX12D-TA2 2-channel | max. 16 channels |

| | |
|---|--|
| Visual indication of operating condition via multicoloured LED: | green: faultless operation communication to IO link master available |
|---|--|

green blinking: independent operation no communication to IO link master

red: critical fault detected no communication to IO link master

orange: non-critical fault detected communication to IO link master available

orange blinking: non-critical fault detected no communication to IO link master

red blinking: bootloader mode active no communication to IO link master

| | |
|--------------------|-------------------------------------|
| IO link connection | X81 COM interface to IO link master |
| connector 1: | IO link L+ DC +24V |
| connector 2: | IO link C/Q |
| connector 3: | IO link L- |

When wiring and connecting to the point-to-point communication IO link, the installation and wiring regulations of the PROFIBUS-DP User Organisation (PNO) have to be observed.

| | |
|---|------------------------------------|
| Push-in terminals PT xx connector, 3-pole (plugged on) stripping length | 0.25 – 0.5 mm ² 6 mm |
|---|------------------------------------|

Communication interface

Overview of commands:

Writing/reading of configuration (parameters)

- Current limit value (50 %...100 %)

Reading of static product information

- Current ratings
- Product type
- Serial number
- Hardware version
- Software version

Reading of dynamic product information / measuring values

- Error memory
- Trip counter
- Reason of last trip
- Status / event of device
- Load voltage
- Load current

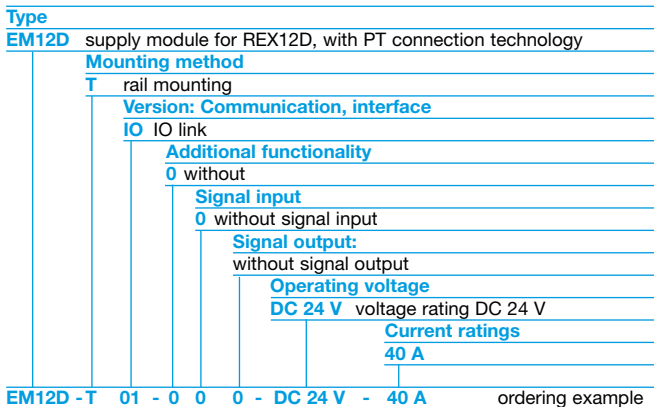
Control commands

- Switch on/off or reset load output
- Reset error memory
- Reset trip counter
- Set parameters to factory setting

Overview of ordering number codes

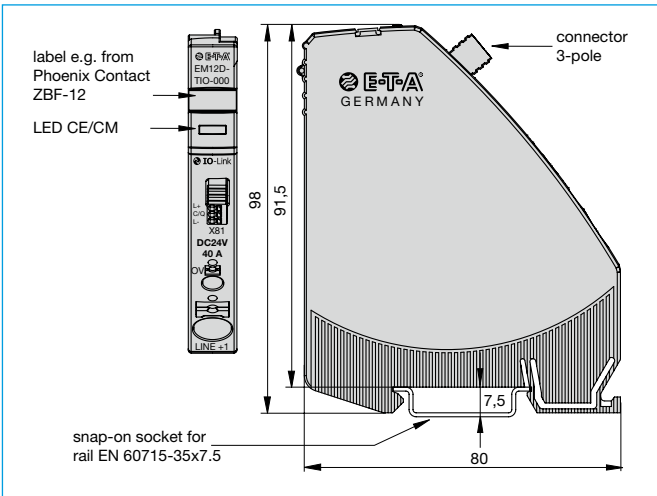
| | |
|---------------|------------------------|
| Supply module | EM12-TIO-000-DC24V-40A |
|---------------|------------------------|

Ordering number code – EM12D

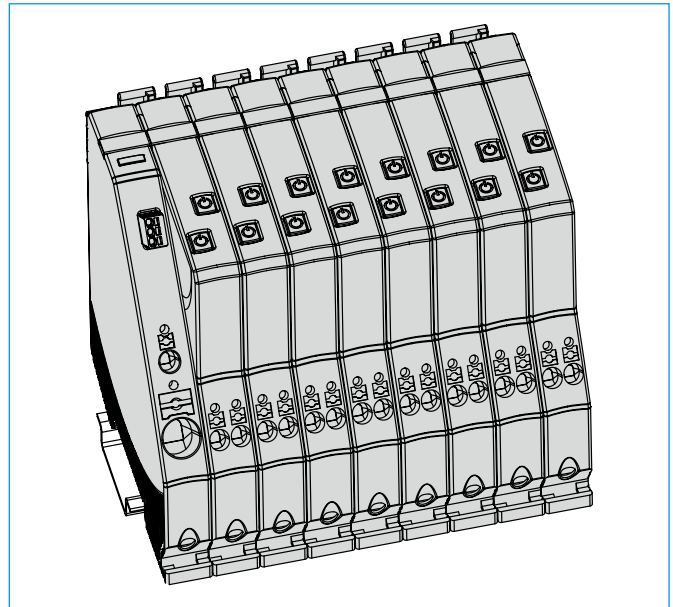


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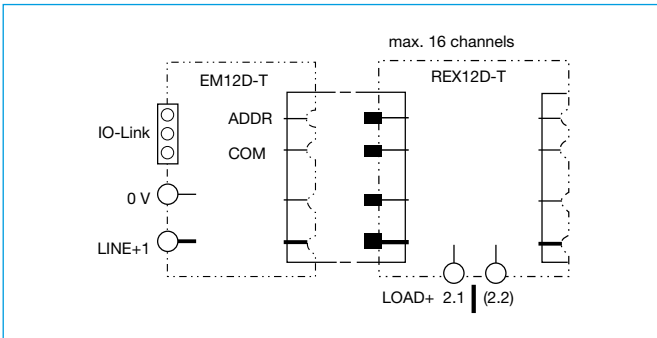
Dimensions EM12D-TIO-xxx supply module



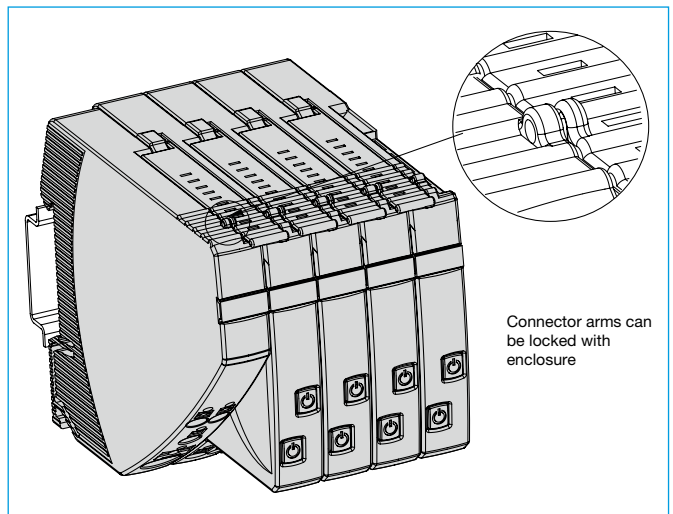
Application example: EM12D-TIO-xxx with REX12D-xxx



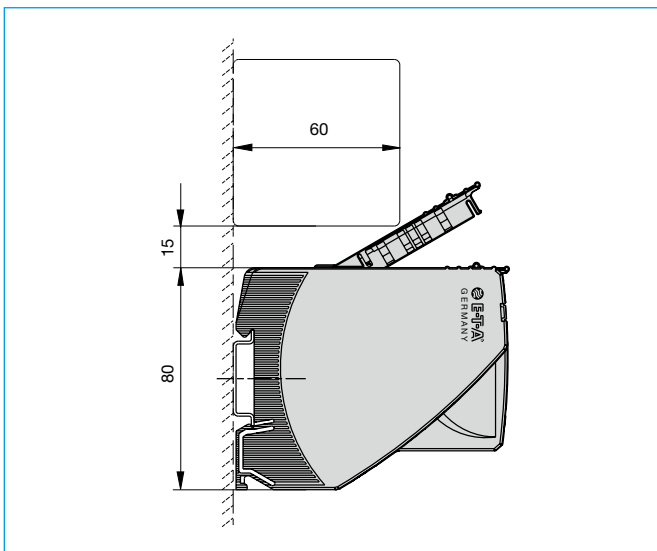
Schematic diagram EM12D-TIO-xxx with REX12D-xxx



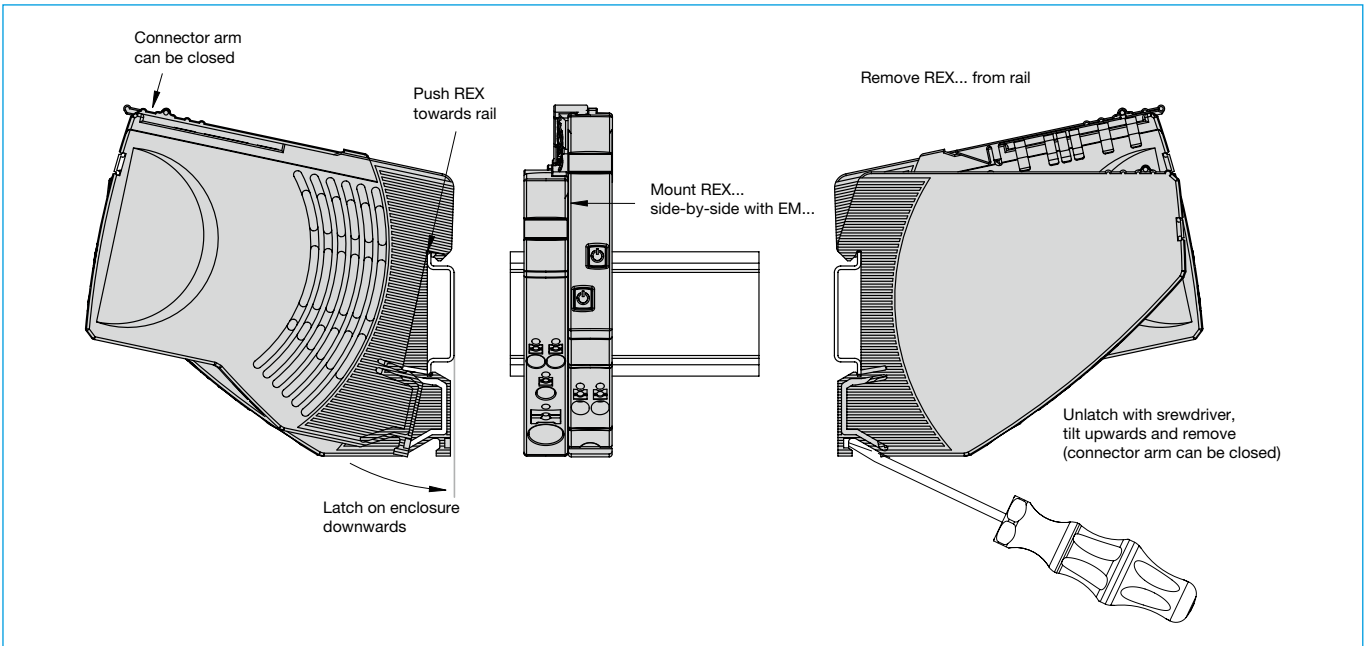
Application example: REX... Locked connector arms



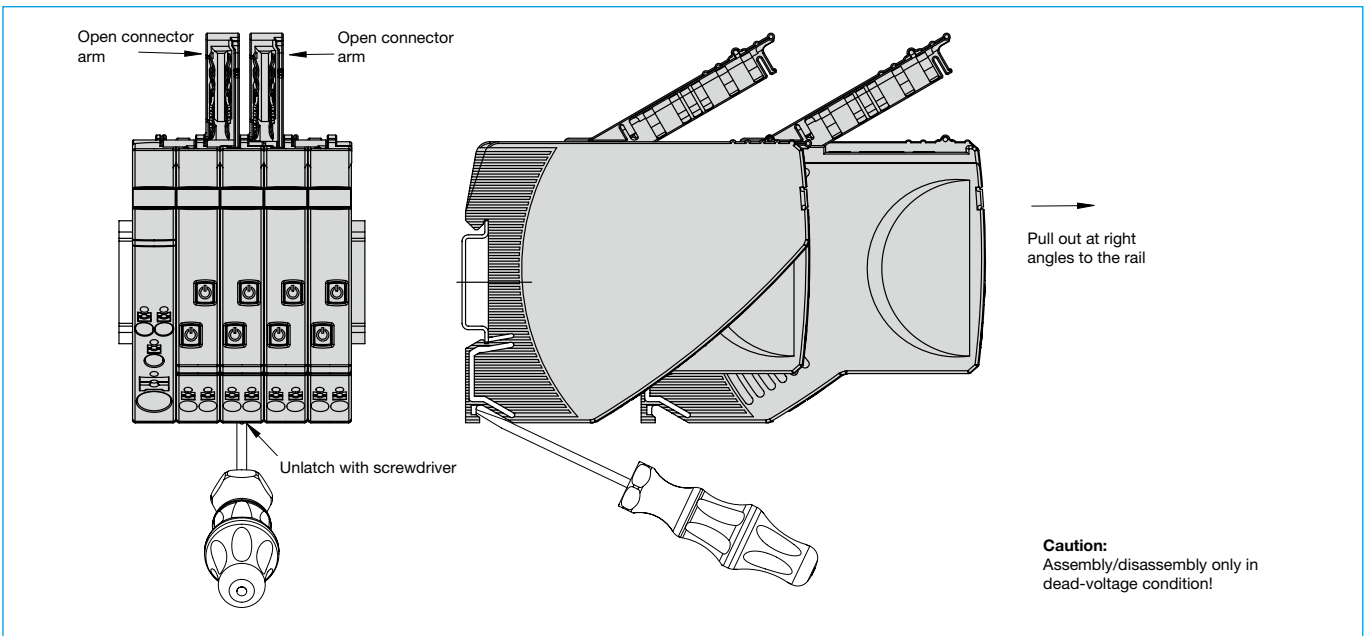
Application example: REX12(D)-T... distance between cable duct and connector arm



Application example: REX... mounting on or removing from symmetrical rail



Application example: REX... Replacement or disassembly



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.

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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.