Electronic circuit protection type ESX10-TC is designed to ensure selective disconnection of 12VDC load systems.

12VDC power supplies, which are widely used in industry today, will shut down the output in the event of an overload with the result that one faulty load in the system can lead to complete disconnection of all loads.

Through selective disconnection the ESX10-TC responds much faster to overload or short circuit conditions than the switch-mode power supply. This is achieved by active current limitation. The ESX10-TC limits the highest possible current to 1.3 to 1.8 times the selected rated current of the circuit protector. Thus it is possible to switch on capacitive loads of up to 20,000 μF, but they are disconnected only in the event of an overload or short circuit.

For optimal alignment with the characteristics of the application the current rating of the ESX10-TC can be selected in fixed values from 1.0 A...10 A. Failure and status indication are provided by a multicolor LED and an integral short-circuit-proof status output or a relay signal contact. Remote operation is possible by means of a remote reset signal or a remote ON/OFF control signal. The manual ON/OFF button allows separate actuation of individual load circuits.

The ESX10-TC, with a width of only 12.5 mm, can be snapped onto symmetrical rails for easy installation and control cabinet space savings.

Upon detection of overload or short circuit in the load circuit, the MOSFET of the load output will be blocked to interrupt the current flow. The load circuit can be re-activated via the remote electronic reset input, control input or manually by means of the ON/OFF button.

**Features**

- Selective load protection, electronic trip characteristics
- Active current limitation for safe connection of capacitive loads up to 20,000 μF and on overload/short circuit
- Current ratings 1 A...10 A at 12VDC
- Reliable overload disconnection with 1.1 x In plus, even with long load lines or small cable cross sections (see table 3)
- Manual ON/OFF button (S1)
- Control input IN+ for remote ON/OFF signal (option)
- Electronic reset input RE (option)
- Clear status and failure indication through LED, status output SF
- Integral fail-safe element adjusted to current rating
- Width per unit only 12.5 mm
- Rail mounting
- Ease of wiring through busbar LINE+ and 0 V
- Hazardous area approved – Class 1 Div 2, Zone 2 (ATEX)
### Electronic Circuit Protection

**ESX10-TC 12VDC**

#### Technical data (Tambient = 25°C, operating voltage U_S = 12VDC)

<table>
<thead>
<tr>
<th>Operating data</th>
<th>Status output SF</th>
<th>ESX10-TC-114/-124/</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating voltage U_p</td>
<td>12VDC (9...18 V)</td>
<td>Electrical data plus-switching signal output, connects U_p to terminal 12 of module 17plus nominal data: 12VDC / max. 0.2 A (short circuit proof) status output is internally connected to GND with a 10 kΩ resistor</td>
</tr>
<tr>
<td>Current rating I_p</td>
<td>fixed current ratings: 1 A, 2 A, 3 A, 4 A, 6 A, 10 A</td>
<td>Status OUT ESX10-TC-124 (signal status OUT), +12 V = S1 is ON, load output connected through 0V = S1 is ON, load output blocked and/or switch S1 is OFF red LED lit</td>
</tr>
<tr>
<td>Closed current I_K</td>
<td>ON condition: typically 20...30 mA depending on signal output</td>
<td>OFF condition 0 V level at status output when: • switch S1 is in ON position, but device is still in switch-on delay • switch S1 is OFF, or control signal OFF, device is switched off • no operating voltage U_p</td>
</tr>
<tr>
<td>Status indication by means of</td>
<td>• multicolor LED: GREEN: unit is ON, power-MOSFET is switched on - status output SF ON, supplies +12VDC ORANGE: in the event of overload or short circuit until electronic disconnection RED: - unit electronically disconnected - load circuit/Power-MOSFET OFF - low voltage (&lt; 3.25 V) - after switch-on till the end of switch-on delay OFF: - manually switched off ($S1 = OFF$) or device is dead - undervoltage • status output SF (option) • ON/OFF condition of switch S1</td>
<td></td>
</tr>
<tr>
<td>Load circuit</td>
<td>Reset input RE</td>
<td>ESX10-TC-124</td>
</tr>
<tr>
<td>Load output</td>
<td>Electrical data voltage: max. +32VDC high &gt; 4.5VDC ≤ 18VDC low ≤ 2.5VDC &gt; 0 V power consumption typically 1.4 mA (+12VDC) min. pulse duration typically 10 ms</td>
<td></td>
</tr>
<tr>
<td>Overload disconnection</td>
<td>Reset signal RE (terminal 22)</td>
<td>The electronically blocked ESX10-TC-124 may remotely be reset via an external momentary switch due to the falling edge of a +12 V pulse. A common reset signal can be applied to several devices simultaneously. Switched on devices remain unaffected.</td>
</tr>
<tr>
<td>Short-circuit current I_K</td>
<td>Control input IN+</td>
<td>ESX10-TC-114</td>
</tr>
<tr>
<td>active current limitation (see table 1)</td>
<td>Electrical data see reset input RE</td>
<td></td>
</tr>
<tr>
<td>Trip time for electronic disconnection</td>
<td>Control signal IN+ (terminal 21)</td>
<td>+12V level (HIGH): device will be switched on by a remote ON/OFF signal 0 V level (LOW): device will be switched off by a remote ON/OFF signal</td>
</tr>
<tr>
<td>see time/current characteristics typically 3 s at $I_{LOAD} &gt; 1.1 I_L$ typically 3 s...50 ms at $I_{LOAD} &gt; 1.8 I_L$ (or $1.5 I_L/1.3 I_L$)</td>
<td>Switch S1 ON/OFF</td>
<td>unit can only be switched on with S1 if a HIGH level is applied to IN+</td>
</tr>
<tr>
<td>Temperature disconnection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>internal temperature monitoring with electronic disconnection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low voltage monitoring load output</td>
<td></td>
<td></td>
</tr>
<tr>
<td>with hysteresis at voltage dips &lt; 500 ms, no reset required: load &quot;OFF&quot; at U_B &lt; 3.2 V</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Starting delay t_{start}</td>
<td></td>
<td></td>
</tr>
<tr>
<td>typically 10 ms</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disconnection of load circuit</td>
<td></td>
<td></td>
</tr>
<tr>
<td>electronic disconnection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Free-wheeling circuit</td>
<td>external free-wheeling diode recommended with inductive load</td>
<td></td>
</tr>
<tr>
<td>Several load outputs must not be connected in parallel</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
ESX10-TC 12VDC

Electronic Circuit Protection

Technical data

(Tambient = 25°C, operating voltage Us = 12VDC)

General data

Fail-safe element:
backup fuse for ESX10-T not required
because of the integral
redundant fail-safe element

Terminals

screw terminals
M4
max. cable cross section
20-6 AWG (0.5 - 10 mm²)

Flexible with wire end ferrule w/wo plastic sleeve
20-13 AWG (0.5 - 2.5 mm²)

Flexible with TWIN wire end ferrule with plastic sleeve
20-9 AWG (0.5 - 6 mm²)

Wire stripping length
10 mm

Tightening torque (EN 60934)
1.2 Nm

Auxiliary contacts
screw terminals M3
max. cable cross section
23-13 AWG (0.25 – 2.5 mm²)

Wire stripping length
8 mm

Tightening torque (EN 60934)
0.5 Nm

Housing material
moulded

Table 1:

voltage drop, current limitation, max. load current

current rating
In
voltage drop, typ.
Uon at In
ca.
2.5 V

active current limitation
Ia
ca.
2.5 V

max. load current at 100% ON duty
Ia
ca.
16.4 A

max. load current at 40°C
Ia
ca.
16.4 A

max. load current at 50°C
Ia
ca.
16.4 A

Attention: when mounted side-by-side without convection the ESX10-TC should not carry more
than 80% of its rated load with 100% ON duty due to thermal effects.

Please note:

• The user should ensure that the cable cross sections of the relevant load
  circuit are suitable for the current rating of the ESX10-TC used.

• Automatic start-up of machinery after shut down must be prevented
  (Machinery Directive 98/37/EG and EN 60204-1). In the event of a short
  circuit or overload the load circuit will be disconnected electronically by
  the ESX10-TC.

• Refer to UL file for proper wiring and installation techniques.

Table 2: ESX10-TC - Ordering Information

<table>
<thead>
<tr>
<th>Version</th>
<th>Signal input</th>
<th>Signal output</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Control input</td>
<td>Remote Status</td>
</tr>
<tr>
<td></td>
<td>ON/OFF Reset</td>
<td>OUT Positive 12V</td>
</tr>
<tr>
<td>ESX10-TC-114</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>ESX10-TC-124</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>

Table 3: Specifications

Protection

IEC/EN60079-0 /-14/-15
II 1G Ex nA II B T4 Gc X

EMC

EN 61000-6-3
noise immunity to EN 61000-6-2

Insulation co-ordination

0.5 kW/2 pollution degree 2, re-inforced insulation in operating area

CE logo

to 2004/108/EG and 94/9/EG

UL

UL2167, File No E300740
UL508, File No E322549
UL 1604, File No E300204

ATEX

IEC/EN60079-0 /-14/-15
II 1G Ex nA II B T4 Gc X

Mounting

symmetrical rail to EN 50022-35x7.5

Ambient temperature

-20...+60 °C (without condensation, see EN 60204-1)
(with condensation upon request)

Storage temperature

-20...+70 °C

Humidity

96 hrs/95 % RH/40 °C to IEC 60068-2-78-Cab
climate class 3K3 to EN 60721

Vibration

3 g, test to IEC 68-2-6 test Fc

Degree of protection

housing: IP20 DIN 40050
terminals: IP20 DIN 40050

EMC

(EMC directive, CE logo)
susceptibility: EN 61100-6-2

Insulation co-ordination

0.5 kW/2 pollution degree 2

IEC 60064
re-inforced insulation in operating area

dielectric strength

max. 18VDC (load circuit)

Insulation resistance

n/a, only electronic disconnection

Dimensions (W x H x D)

12.5 x 80 x 83 mm

Mass

approx. 65 g

Table 3: Specifications

Protection

to EN6052
housing IP00, terminals IP00

EMC

emitted interference to EN 61000-6-3
noise immunity to EN 61000-6-2

Insulation co-ordination

0.5 kW / pollution degree 2, re-inforced insulation in operating area to

IEC60064 / IEC60664

CE logo

to 2004/108/EG and 94/9/EG

UL

UL2167, File No E300740
UL508, File No E322549
UL 1604, File No E300204

ATEX

IEC/EN60079-0 /-14/-15
II 1G Ex nA II B T4 Gc X

* Control force input on/off
** Reset input only to reset under fault conditions
**ESX10-TC Signal inputs / outputs (wiring diagram)**

**ESX10-TC-114**
with control input IN+ (+12VDC)
with status output SF
(+12 V = load output ON)

operating condition: SF +12 V = OK
fault condition: SF 0 V

**ESX10-TC-124**
with reset input RE
(+12VDC ↓)
with status output SF
(+12 V = load output ON)

operating condition: SF +12 V = OK
fault condition: SF 0 V

**ESX10-TC-124-...**
with reset input RE
(+12VDC ↓)
with status output SF
(+12 V = load output ON)

**Schematic diagram**
(Example)

**Terminal wiring diagram**
(Example)

**Dimensions**

[Dimensions diagram with measurements]
• The trip time is typically 3 seconds in the range between 1.1 and 1.8 x \( I_n \). 

• Electronic current limitation occurs at typically 1.8 x \( I_n \) which means that under all overload conditions (independent of the power supply and the resistance of the load circuit) the max. overload before disconnection will not exceed 1.8 x \( I_n \) times the current rating. Trip time is between 100 ms and 3 sec (depending on overload or at short circuit).

• Without this current limitation a considerably higher overload current would flow in the event of an overload or short circuit.
Accessories for ESX10-TC

Mounting procedure:
Before wiring, insert busbars into protection block.
Max. 10 insertion/removal cycles for busbars.

Recommendation:
Every 10 units busbars should be interrupted and fed in anew.

Table of lengths for busbars:
(see accessories)

<table>
<thead>
<tr>
<th>No. of Units</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length of busbar [mm] + 0.5 mm</td>
<td>22</td>
<td>34.5</td>
<td>47</td>
<td>59.5</td>
<td>72</td>
<td>84.5</td>
<td>97</td>
<td>10.95</td>
<td>122</td>
</tr>
</tbody>
</table>
ESX10-TC 12VDC

Accessories for ESX10-TC

Description
The ESX10-TC features an integral power distribution system. The following wiring modes are possible with various pluggable current and signal busbars:
- LINE +(12VDC)
- 0 V

Caution: The electronic devices ESX10-TC require a 0 V connection

<table>
<thead>
<tr>
<th>Description</th>
<th>Part No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Busbars for LINE+ and 0 V</td>
<td>6720005315</td>
</tr>
<tr>
<td>max. load with one line entry</td>
<td>I_{max}</td>
</tr>
<tr>
<td>(recommended: center line entry)</td>
<td>50 A</td>
</tr>
<tr>
<td>max. load with two line entries</td>
<td>I_{max}</td>
</tr>
<tr>
<td>length:</td>
<td>500 mm</td>
</tr>
<tr>
<td>TS32 rail adapter</td>
<td>9102100000</td>
</tr>
</tbody>
</table>

(Remove protection walls/barriers before using adapter.)

For detailed installation instructions and approvals contact Weidmuller at 1-800-849-9343 or go to www.weidmuller.com
Accessories

**Busbars for LINE+ and 0 V**
- max. load with one line entry (recommended: centre line entry)
- max. load with two line entries
grey insulation, length: 500 mm
6720005315

**Busbars for LINE+ and 0 V**
grey insulation
max. number of plug-on operations 10:
6720005335, (3-unit-block ESX10-T), length: 34.5 mm
6720005336, (4-unit-block ESX10-T), length: 47 mm
6720005337, (5-unit-block ESX10-T), length: 59.5 mm
packing unit: 10 pcs
6720005474, (8-unit-block ESX10-T), length: 97 mm
6720005475, (10-unit-block ESX10-T), length: 122 mm
packing unit: 4 pcs

**Connector bus link –K10**
suitable for auxiliary contacts (series connection)
6720005476 (1.5 mm2, brown),

**Supply module for LINE+ and 0 V**
suitable for ESX10-T... versions
ampacity Imax 50 A
AD-TX-EM01