

Industries: Machine Builders · Process Equipment · Industrial Controls

Audiences: Systems Integrators · Control Engineers · Design Engineers

Value Proposition: Reduced Downtime · Design Efficiency · Increased Flexibility

New ESX10-T Series Electronic Circuit Protection

Weidmüller has expanded its line of circuit protection devices to include a new line of electronic circuit protection. The ESX10-T Series circuit protectors have **remote reset** capabilities that operate through the use of an electronic signal. These circuit protection devices are compact and combine electronic trip characteristics and active current limitation to allow selective disconnection of loads that are connected to 24VDC power supplies. Selective load protection prevents complete shutdown of the system by quickly disconnecting the faulty path when an overload or short circuit occurs.

The ESX10-T limits the highest possible current to 1.3 to 1.8 times the selected rated current of the device and will trip in seconds, preventing the SMPS from an overload condition.

The new ESX10-T Series are UL1604 Listed (Class 1, Division 2, Zone 2) and UL2367 Listed. UL508 and CSA approvals are in process.

These circuit protection devices are ideal for use in applications where items such as circuitry, load components, and electrical wiring need to be protected.



Features

Customer Benefits

Remote Resettable	Remote operation is possible by means of an electronic remote reset signal or a remote ON/OFF control signal
UL1604 listed (Class 1 Div 2); UL2367 listed	Approved for both general and hazardous locations
Slim/small profile/form factor	With a 12.5mm width this unit allows for more efficient use of DIN-rail and cabinet space
Multicolor LED	Provides clear status and failure indication
Detailed Markings	Wiring diagrams that are clear, easy to read and understand
Jumpering	Custom designed jumpers allow for quick installation of many circuits

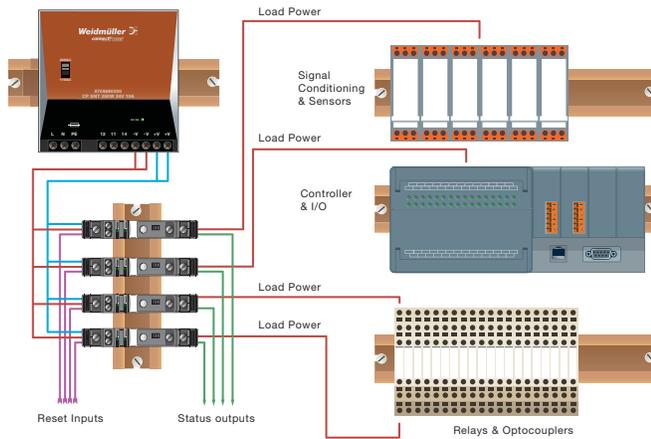
Applications

Petro Chemical, Water and Wastewater, Oil and Gas

- Anywhere there is a need for circuit protection to be placed in hazardous locations
- Applications requiring remote reset capability
 - Eliminates cost to dispatch repair personnel
 - Eliminates the need to open an enclosure
 - Reduces maintenance personnel exposure to electrical components

Applications:

Figure 1



The most common application of this product involves the protection of the 24 VDC power supply in a control panel. These circuit protectors are placed in between the 24 VDC power distribution terminals and the load.

In the event of an over current or short circuit condition the protector disconnects the current path before the DC power supply voltage begins to dip. Most switch mode DC power supplies will only supply approximately 120% (usually less!!!) of it rated current for just a few seconds before the output voltage level drops off dramatically. When the power supply voltage drops below a certain level (approx 18-20 VDC) all circuits are affected and this lower voltage will likely cause operational errors in all of the devices connected to the power supply output.

The primary reason for using these products is to eliminate the fact that one failure could cause an overall failure of the entire electrical panel. This is important for the safety of operators and being able to shut down a piece of equipment safely (ex. returning a piece of machinery to "home position" without "crashing" a tool) without causing product loss, loss of process data (ex. allowing a computer/PLC shutdown).

This circuit protection is designed to open the current path of only the circuit experiencing the failure and allowing the power supply to operate normally, and not affect the operation of the rest of the control/electrical panel.

The status indication can be used to notify maintenance or a machine operator that there has been a failure in part of the electrical cabinet or panel.

The LED indication signals exactly which load circuit has the problem. This is useful when troubleshooting the panel.

An external reset signal can be sent to the circuit protector from a remote location. This allows a circuit to be reset after the fault is cleared from a remote location. (Figure 1)

Key Questions...

- How do you currently power active devices and electronics in your automation control panels?
- Do you use switch mode 24VDC power supplies for equipment in your panels or machines?
- Are you satisfied with the reliability of your DC power sources?
- Are you satisfied with the time it takes to identify and troubleshoot power-related failures in your control panels?
- Are you protecting your critical loads, such as PLCs and Ethernet switches, from power supply failures? If so, how?

Active current limitation allows the ESX10-T to respond to overload or short-circuit conditions much faster than the power supply. It limits the highest possible current flow to 1.3 to 1.8 times the rated capacity and is capable of switching on capacitive loads up to 20,000 μ F - with circuit disconnection only when there is an overload or short circuit condition.

Use of Circuit Breakers to protect DC powered loads

Normal thermal-magnetic circuit breakers take 5-15 times the rated current to shut down very quickly (< 1 second). If a thermal-magnetic breaker were used, a switch mode power supply would almost certainly dip to a "low voltage" and stop supplying power to everything connected to it before the breaker would trip. (Figure 2 & 3)

Figure 2:
201 series thermal-magnetic circuit breaker trip curve

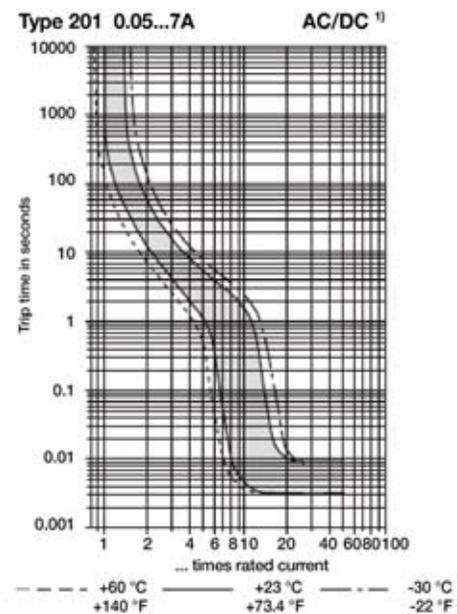


Figure 3:
ESX10-T Trip Curve

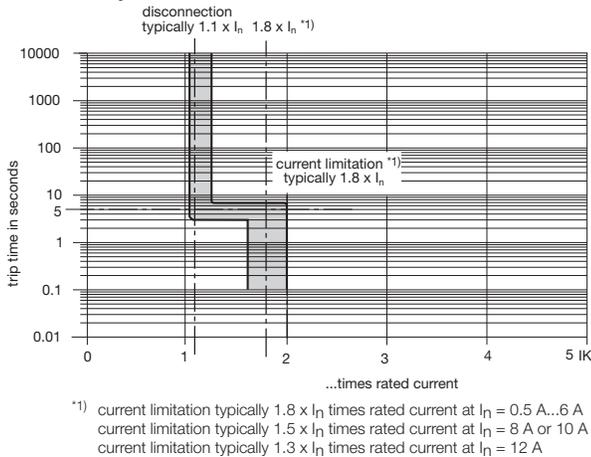
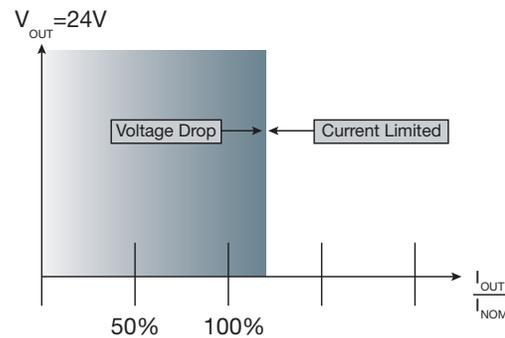


Figure 4:
Characteristic output curve of typical switch mode power supply



Use of Fuses

Using fuses to protect a DC power distribution from a switch mode power supply is another option – but this too has its drawbacks. First of all, these fuses will be drastically affected by ambient temperature. The higher the ambient temperature – the lower the current level the fuse opens at. Colder ambient temperatures are a similar issue – the lower the ambient temperature, the higher current necessary to make the fuse open. This condition brings unpredictable failures – some of which may not really be failures.

A typical 5A AGC fuse ($1\frac{1}{4} \times \frac{1}{4}$ " fast fuse) requires a 25A current (5 times nominal) flowing to open a fuse in 1 second. (Source: Bussmann AGC specification sheet) Switch mode power supplies

cannot supply this amount of current and the voltage level will drop off before the fuse opens– see Figure 4.

Conventional protective devices like thermal-magnetic circuit breakers cannot manage this as they either respond too slowly or are susceptible to nuisance tripping due to in-rush currents.

Upon detection of an overload or short circuit in the load circuit, the power-MOSFET switching output of the ESX10-T interrupts the current flow at 1.1 times rated current after 3 seconds.

Failure and status indication are provided by a multicolor LED and status output signal.

Specifications and Approvals

The new ESX10-T Electronic Circuit Protection is just 2.76 inches high by 0.5 inch wide and allows direct mounting on a 35 mm DIN-rail, consequently simplifying installation and saving cabinet space.

The ESX10-T is approved to UL 2367 as a "Solid State Overcurrent Protector" and is available in fixed current ratings from 0.5 – 12A.

It is also UL1604 (Class I, Division 2, Zone 2) approved for hazardous locations. UL508 and CSA approvals are in process.

Competitive Position

Feature	Weidmüller  ESX10-T	Siemens SITOP	MURR MICO 4
Approval	cULus Class 1, Division 2	cULus	cULus
Ensured level of current rating	Yes	No	No
Need for fusing	No	Yes	No
Single channel	Yes	No	No
Remote reset capable	Yes	No	No
Reset individual channel	Yes	No	No
Automatic re-connect	Yes	No	No

Sales Tools

Sales tools are available for download on the web at <https://B2B.weidmuller.com>
 Order hard copies using the literature request form provided on the site.

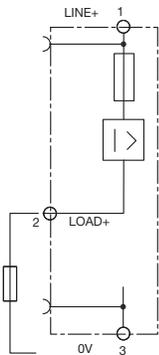
Sales Tool	Purpose
LIT0806	Datasheet

Availability

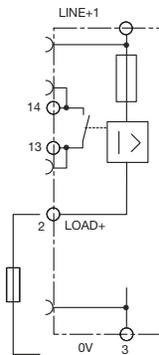
The following products are available:

	ESX10-TA-100	ESX10-TB-101	ESX10-TB-102	ESX10-TB-114	ESX10-TB-124
Current Rating (amps)					
Circuit Protection Part Number	N/O Contact Part Number	N/C Contact Part Number	Control Input Part Number	Reset Input Part Number	
0.5	6720005305	6720005320	6720005340	6720005360	6720005380
1	6720005301	6720005321	6720005341	6720005361	6720005381
2	6720005302	6720005322	6720005342	6720005362	6720005382
3	6720005303	6720005323	6720005343	6720005363	6720005383
4	6720005304	6720005324	6720005344	6720005364	6720005384
6	6720005306	6720005326	6720005346	6720005366	6720005386
8	6720005308	6720005328	6720005348	6720005368	6720005388
10	6720005310	6720005330	6720005350	6720005370	6720005390
12	6720005312	6720005332	6720005352	6720005372	6720005392

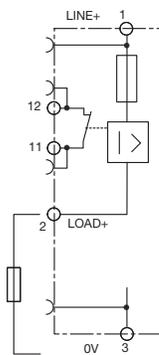
Version	Signal input			Signal output			Status output	
	without Signal Input	Control input ON/OFF Reset	Remote Reset	without Signal Output	single signal N/O (normally open NO)	single signal N/C (normally closed NC)	without Signal Output	Status output = OK
ESX10-TA-100	x			x			x	
ESX10-TB-101	x				x		x	
ESX10-TB-102	x					x	x	
ESX10-TB-114		x						x
ESX10-TB-124			x	x				x



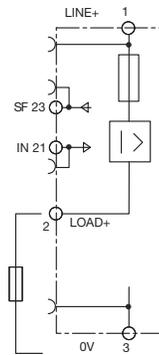
ESX10-TA-100



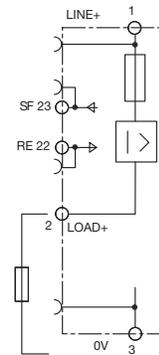
ESX10-TB-101



ESX10-TB-102



ESX10-TB-114



ESX10-TB-124

Pricing

Please reference the Distributor Resource Center for all your pricing concerns at the following link: <https://B2B.weidmuller.com>