

Expansion relay E1T



6

More outputs

By connecting expansion relays to a safety relay it is easy to increase the number of safe outputs. This means that an unlimited number of dangerous machine operations and functions can be stopped from one safety relay.

Safe soft stop

When a gate is opened a program stop is first given to the machine's PLC/servo which brakes the dangerous operations in a soft and controlled way. The safety outputs then break the power to the motors, that is, when the machine has already stopped. Normally between 0.5 and 1 second is needed to brake a dangerous machine operation softly.

Soft stop ensures many advantages:

- The machine lasts longer.
- Parts being processed are not damaged.
- Restart from stopped position is enabled and simplified.

A safe soft stop is achieved by means of a safety relay which gives the program stop, and an expansion relay, E1T, which gives safe delayed stop signals. See section "Connection examples". The drop time delay on a E1T can as standard be selected from 0 to 3 seconds. By connecting several E1T's in series even longer times can be achieved.

When are delayed safe stops used?

Delayed safety stop signals can be used for emergency stops according to EN ISO 13850:2008 § 4.1.4. Stop category 1, i.e. a controlled stop with power to the actuator(s) available to achieve the stop and then removal of power when stop is achieved.

Approvals:



Safety relay for:

- More safety outputs
- Delayed safety outputs

Features:

- Width 22.5 mm
- Supply 24 VDC
- LED output indication
- 4 NO relay outputs
- Single or dual channel operation option
- Quick release connector blocks

Stop category 1 may also be permitted when it is not possible to gain physical access to the machine before the safe stop is affected e.g:

- Gates, access time is normally over 1 sec.
- Covers and gates which are locked until dangerous operations and functions have been stopped.
- Long distances between a safety device and a dangerous machine function.

Safety level

The E1T has twin stop functions, that is, two relays with mechanically operated contacts. A monitored stop function is achieved by connecting the test output (terminals X1 and X2) to the test or reset input on the safety relay which is being expanded.

One condition for a safe delayed stop is that the delay time cannot increase in the event of a fault. The E1T complies with this requirement.

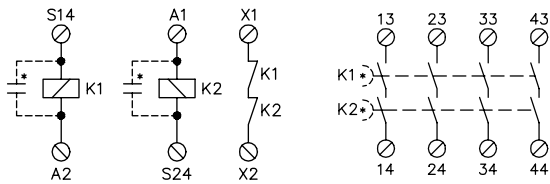
Regulations and standards

The E1T is designed and approved in accordance with appropriate directives and standards. See technical data.

Connection examples

For examples of how our safety relays can solve various safety problems, please see the section "Connection examples".

Technical description – E1T



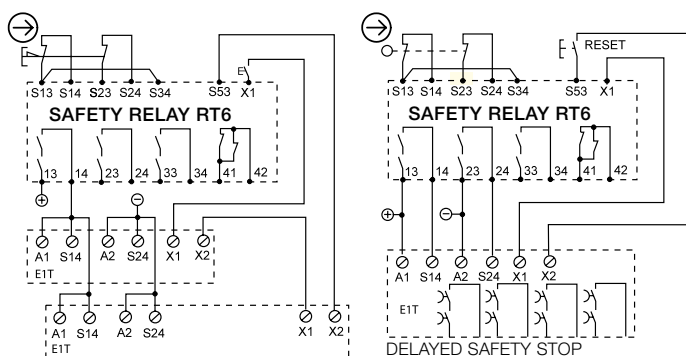
The E1T has to be connected to a safety relay in order to fulfill the necessary safety requirements (see connection examples below). The safety relay controls and monitors the E1T (The E1T can be connected for single or dual channel operation - see below). When the inputs S14 and S24 close, relays K1 and K2 are activated. A stop signal is given, K1 and K2 drop, if the inputs are opened or during power failure. K1 and K2 drop either directly or after a delay* (if incorporated). Delay time of module is fixed and shown on front panel of device. The delay circuit is so arranged that the design time cannot be exceeded.

To check that both the relays K1 and K2 drop during a stop signal they must be monitored. This is achieved by connecting X1 and X2 to the test or reset input on the safety relay which is expanded (see below). K1 and K2 are mechanically operated relays, therefore, if one of the output contacts should stick closed then the relay's contact in X1-X2 cannot be closed thus preventing a new ready signal being given to the safety relay.

Inductive loads should be equipped with an arc suppressor to protect the output contacts.

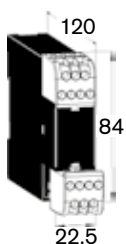
Diodes are the best arc suppressors but will increase the switch off time of the load.

Electrical connection – E1T



Single channel expansion of outputs for a safety relay connected to an emergency stop.

Dual channel expansion with delayed safety outputs for a safety relay monitoring a gate.



Connector blocks are detachable (without cables having to be disconnected)

Technical data – E1T

Article number	E1T 0 s 24 VDC E1T 0.5 s 24 VDC E1T 1 s 24 VDC E1T 1.5 s 24 VDC E1T 2 s 24 VDC E1T 3 s 24 VDC	2TLA010030R0000 2TLA010030R1000 2TLA010030R2000 2TLA010030R3000 2TLA010030R4000 2TLA010030R5000
Colour		Grey
Operational voltage		24 VDC ± 15%
Power consumption		1.5 W
Relay Outputs		4 NO
Max. switching capacity		
Resistive load AC		6A/250 VAC/1500VA
Inductive load AC		AC15 240 VAC 2A
Resistive load DC		6A/24 VDC/150W
Inductive load DC		DC13 24 VDC 1A
Max. total switching capacity		12A distributed on all contacts
Min. switching load		10 mA/10 V (if load on contact has not exceeded 100 mA)
Contact material		Ag + Au flash
Fuses output (external)		5A gL/gG
Conditional short-circuit current (1 kA)		6A gG
Maximum external resistance at a nominal voltage		150 Ohm (S14, S24)
Response time at deactivation (input - output)		< 0,020 s, 0,5 s, 1 s, 1,5 s, 2 s, 3 s, ± 20%
Response time at activation (input-output)		<30 ms
Terminals (max. screw torque 1 Nm)		
Single strand:		1x4 mm ² / 2x1.5 mm ²
Conductor with socket contact:		1x2.5 mm ² / 2x1 mm ²
Mounting		35 mm DIN-rail
Protection class		
enclosure		IP40 IEC 60529
terminals		IP20 IEC 60529
Impulse withstand voltage		2.5kV
Pollution degree		2
Operating temperature range		-10°C – +55°C (with no icing or condensation)
Operating humidity range		35% to 85%
LED indication		Output status
Weight		220 g
Performance (max.)		PL e/Cat. 4
Functional test: The relays must be cycled at least once a year.		(EN ISO 13849-1:2008) SIL 3 (EN 62061:2005) PFH ₀ 1.55E-08
Conformity		2006/42/EC, 2006/95/EC, 2004/108/EC EN 62061:2005 EN ISO 13849-1:2008