

# Safety relay/expansion relay

# BT50(T)

## Approvals:

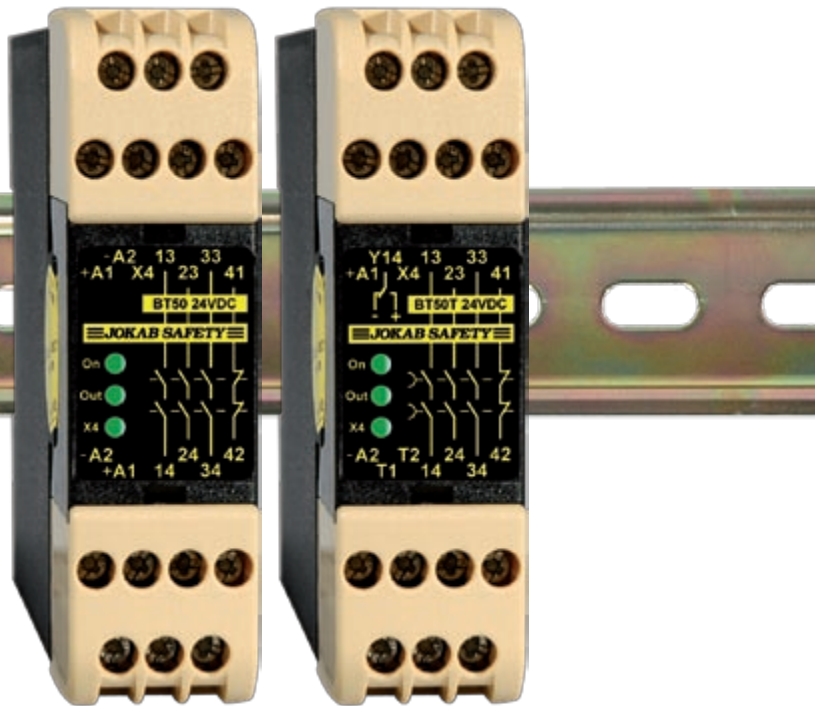
TÜV Nord  

## Safety relay for:

Emergency stop  
Interlocked hatch  
Expansion of Pluto

## Features:

Single and "dual" channel  
Test/"reset" input  
Width 22.5 mm  
LED indication  
3 NO/1NC relay outputs  
Supply 24 VDC  
Quick release connector blocks  
BT50 - Additional power terminals  
BT50T - One changeover relay with a double information output (Y14)  
BT50T - Delay times selectable from 0 - 1.5 s



### Safety relay/expansion relay to Pluto

The BT50 is designed to connect safety devices, such as emergency stops, directly in the voltage supply circuit to the relay. Despite a maximum built-in width of 22.5 mm the relay is very powerful.

With 3NO safety outputs, 1NC output (for monitoring purposes), a test input and complete internal supervision, the BT50 is quite unique. In addition, delayed outputs (BT50T) can be ordered.

In order for the safety outputs to close, the supply voltage, e.g. by means of an emergency stop button, must be connected to A1 and A2 and the test input closed. After actuation of the relay the test input can be opened again.

The test input is intended to supervise that contactors or valves have dropped/returned before a new start can be permitted. The test input can also be used for starting and the start button can be supervised (see the connection example on the next page).

### More outputs

By connecting a BT50 to a safety relay/PLC 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 by using just one safety-PLC.

### Safety level

BT50 have an internal redundant and monitored safety function. Power failure, internal component faults or external interference cannot result in dangerous functions.

Input via A1 on its own is not protected from short

circuiting, and therefore installation is critical for the safety level to be achieved. To achieve a higher safety level a screened cable can be used and/or connection made to both A1 and A2 (see the example on the next page).

### Regulations and standards

The BT50 is designed and approved in accordance with appropriate directives and standards. See technical data.

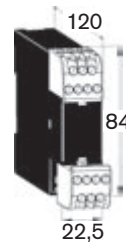
### Connection examples

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

## Technical data – BT50(T)

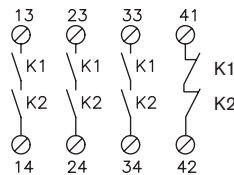
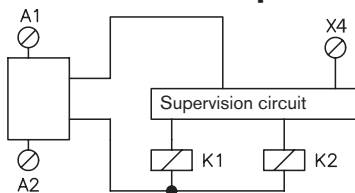
<b>Manufacturer</b>	ABB AB/Jokab Safety, Sweden
<b>Article number/Ordering data</b> BT50 BT50T	2TLJ010033R0000 2TLJ010033R1000
<b>Colour</b>	Black and beige
<b>Operational voltage</b>	24 VDC + 15%/-25%
<b>Power consumption</b>	1,4 W/1,8 W
<b>Relay Outputs</b>	3 NO + 1 NC
<b>Max. switching capacity</b> Resistive load AC Inductive load AC Resistive load DC Inductive load DC	6A/250 VAC/1500 VA AC15 240VAC 2A 6A/24 VDC/150 W DC13 24VDC 1A
<b>Max. res. load total switching capacity:</b>	12A distributed on all contacts
<b>Min. load</b>	10mA/10 V(if load on contact has not exceeded 100 mA)
<b>Contact material</b>	Ag + Au flash
<b>Fuses Output (External)</b>	5A gL/gG
<b>Conditional short-circuit current (1 kA)</b>	6A gG
<b>Max Input Wire res. at nom. voltage</b>	200 Ohms
<b>Response time at deactivation (input - output)</b>	Version B <20 ms or delayed max 1500 ms (old version of BT50 <60 ms)

<b>Terminals (Max. screw torque 1 Nm)</b> Single strand: Conductor with socket contact:	2x1.5 mm <sup>2</sup> 2x1mm <sup>2</sup> .
<b>Mounting</b>	35 mm DIN-rail
<b>Protection class enclosure/terminals</b>	IP 40/20 IEC 60529
<b>Impulse Withstand Voltage</b>	2.5kV
<b>Pollution Degree</b>	2
<b>Operating temperature range</b>	-10°C to +55°C (with no icing or condensation)
<b>Operating humidity range</b>	35% to 85%
<b>LED indication</b>	Electrical Supply, Relay and X4
<b>Weight</b>	200 g
<b>Performance (max.)</b> Functional test: The relays must be cycled at least once a year.	Category 4/PL e (EN ISO 13849-1:2008) SIL 3 (EN 62061:2005) PFH <sub>d</sub> 1.22E-08
<b>Conformity</b>	2006/42/EC, 2006/95/EC, 2004/108/EC EN 954-1:1996, EN 62061:2005 EN ISO 13849-1:2008



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

## Technical description – BT50(T)



When supply voltage is connected to A1 and A2, relays K1 and K2 are activated. K1 and K2 drop if the supply voltage is disconnected. Both relays K1 and K2 must drop for them to be activated again. Another requirement is that the test circuit, A1 - X4, must be closed for the outputs to be activated. Thereafter A1 - X4 can either be open or constantly closed.

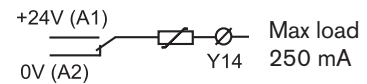
The supervising circuit ensures that both K1 and K2 have dropped before they can be reactivated. The stop function complies with the requirement that a component fault

or external interference cannot lead to a dangerous function.

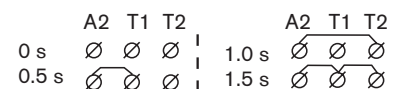
The safety outputs consist of contacts from K1 and K2 connected internally in series across terminals 13 - 14, 23 - 24, and 33 - 34. These contacts are used to cut the power to components which stop or prevent hazardous movements/functions. It is recommended that all switched loads are adequately suppressed and/or fused in order to provide additional protection for the safety contacts.

The NC output 41 - 42 should only be used for monitoring purposes e.g. indication lamp for emergency stop pressed.

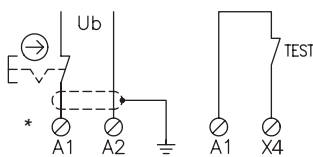
### BT50T - Info. output



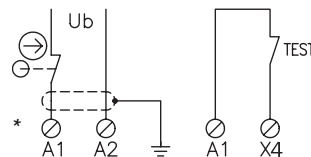
### BT50T - Delay times



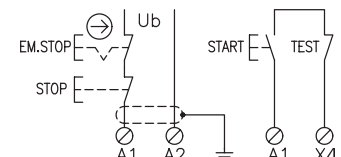
## Electrical connection – BT50(T)



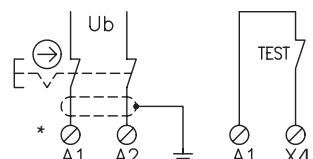
Emergency stop with reset when emergency button returns.



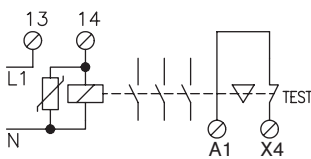
Hatch with automatic reset.



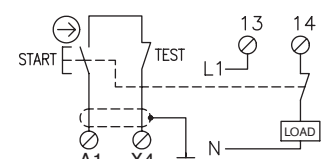
BT50 as emergency stop and control relay with Start and Stop function.



Emergency stop with dual connection direct to the supply voltage.



Controlled monitoring of external contactor, relay, valve or ABB Jokab Safety's expansion relays.



Monitoring to ensure that the On button is not stuck in pressed position. A short circuit over the closing contact is not monitored.

\* BT50 has additional power terminals A1 and A2.