TURCK TBSB-L4-CS09 Switchbox User Guide

TBSB-…
Abschaltbox TBSB-…
Quick Start Guide
Doc no. 100002645

Contents

TBSB-L4-CS09 Switchbox

ttps://www.turck.de/de/search.php?q_simple=TBSB-&searchType=StandardWithProducts&x=0&y=0

Additional documents

Besides this document the following material can be found on the Internet at www.turck.com:

- Data sheet
- Declarations of conformity (current version)
- Approvals

For your safety

Intended use
The switch-off box is used to safely switch off the actuator voltage V2 in a supply line within a system. The device is designed in IP65 and can be mounted directly in the field.
Depending on the wiring the device can be used in safety applications upt ot Cat. 4 and PLe in accordance with EN ISO 13849-1 or SIL 3 in accordance with EN IEC 61508.

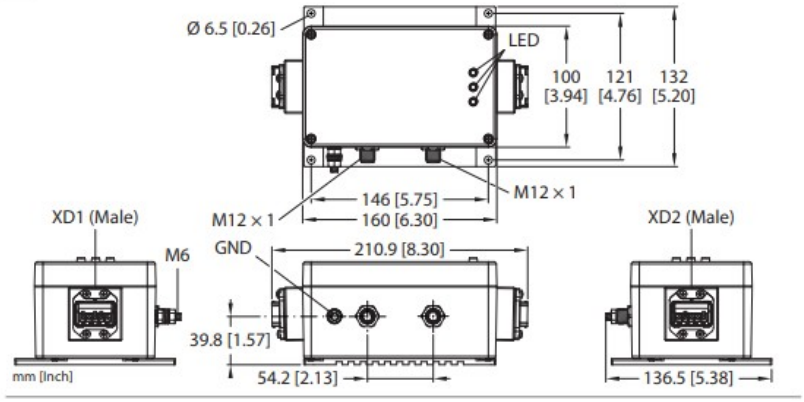
DANGER
Application outside the permissible operating and ambient conditions
Danger to life if misused
▶ Always observe the technical data and the voltage values.
The device must only be used as described in these instructions. Any other use is not in accordance with the intended use. Turck accepts no liability for any resulting damage.
Foreseeable misuse
The device is not suitable for:

- The use in explosive areas
- Outdoor use
- The permanent use in liquids

General safety instructions

- The device must only be fitted, installed, operated, parameterized and maintained by trained and qualified personnel.
- The switch-off box is part of a safety-related overall system. The overall system must always be evaluated as a whole with regard to the requirements of EN IEC 61508 and EN ISO 13849-1 .

1



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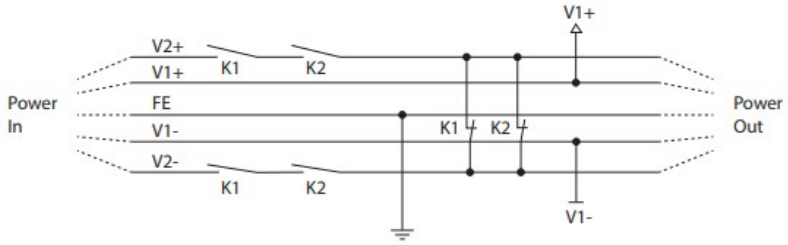


Product description

Device overview
→ fig. 1: Dimensions, connectors (example: TBEN-A2-CS16 with cooling plate)
Functions and operating modes
The switch-off box TBSB switches off the actuator voltage safely. → fig. 2
In order to be able to safely switch off the actuator voltage 2-channel, a safe output of the Turck Safety I/O

modules in PM configuration is connected to the M12 connector ES (TBSB-L…-…, TBSB-A1-…) or X1 (TBSB-A2-…). The connection is made either via the AD-FSM4.211-FSM4.211 adapter (available as an accessory for TBSB-L…-…, TBSB-A1-…) or directly (TBSB-A2-…). To monitor the switch-off function, the Turck safety I/O module is connected to the feedback loop of the switch-off box via the M12 plug connector (TBSB-L…-…, TBSB-A1-…) or X0 (TBSB-A2-…). → fig. 3

Installing

Fasten the device with four suitable M4 screws on a flat, pre-drilled and grounded mounting surface. The maximum tightening torque for fixing the mounting screws is 2,3 Nm.

Connecting

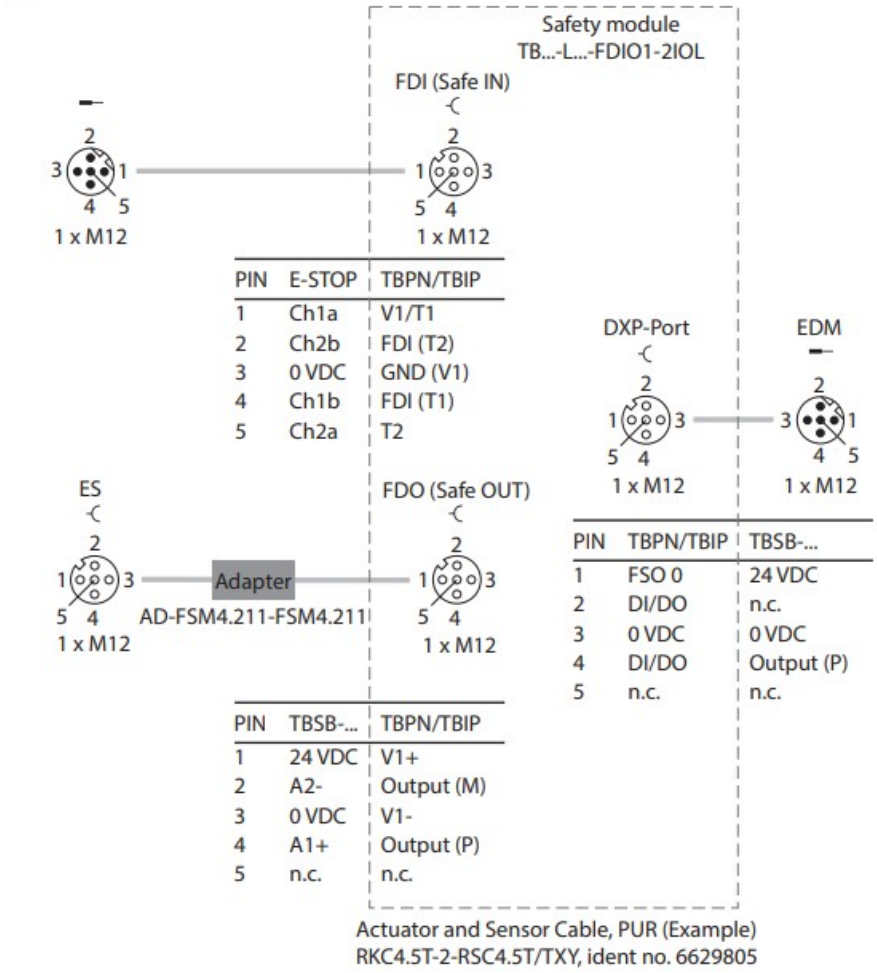
WARNING
Cross-connections due to improper connection of the connecting cables
Danger to life if misused
▶ Install and connect the cables safely and separately in accordance with EN 60204-1.
▶ If the safe installation of the cables is not possible: install cables with cross-circuit protection.

Connecting Turck safety I/O modules to TBSB
▶ TBSB-L…-… und TBSB-A1-…: Connect the Turck safety I/O module via the adapter AD-FSM4.211-FSM4.211 according to the pin assignment and the schematic diagram (see “Wiring Diagrams”) to the connector ES. The adapter (ID 6631954) is not included in the scope of delivery and is available as accessory under www.turck.com.
▶ TBSB-A2-…: Connect the Turck safety I/O module via the according to the pin assignment and the schematic diagram (see “Wiring Diagrams”) to the connector X1.
▶ TBSB-…-…: Connect the Turck safety module according to the pin assignment and the schematic diagram (see” Wiring diagrams”) to the feedback loop EDM (TBSB-L…-…, TBSB-A1-…) or X0 (TBSB-A2-…).
The maximum tightening torque for the M12 connectors is 0.8 Nm.

DANGER
Conditions 4/PLe or SIL 3 not achieved
Danger to life if misused!

- Monitor inputs, feedback loop (EDM) and output V2 by means of a higher-level controller which fulfills Cat. 4/PLe in accordance with EN ISO 13849-1 or SIL 3 in accordance with EN IEC 61508.
- Always monitor voltage V2 and feedback loop (EDM) in the on and off state to to detect all errors and to achieve a diagnostic coverage of 99 %.

3



⚠ WARNING

Use of incorrect or defective power supply unit

Danger to life due to dangerous voltages on touchable parts

▶ Only use for SELV or PELV power supplies in accordance with EN ISO 13849-2, which Connecting the supply voltage allow a maximum of 60 VDC or 25 VAC in the event of a fault.

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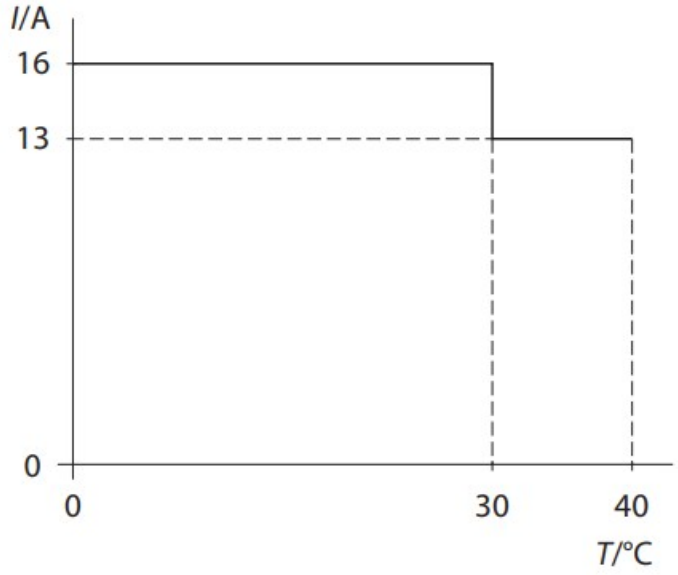


DANGER

Danger of short circuits

Danger to life if misused!

▶ TBSB-L…-CS09 (UL condition): Protect supply voltages V1 and V2 at the supply against short-circuit with an external overcurrent protection device that limits the current to max. 10 A and the voltage to max. 30 VDC. Protect supply voltages V1 and V2 at the supply against short-circuit with an external overcurrent protection device that limits the current to max. 10 A and the voltage to max. 30 VDC.

▶ TBSB-A…-…, TBSB-LL-…: Protect the supply voltages against short circuits by an overcurrent protection device, e.g. a fuse.

▶ Only use the devices with overcurrent protection devices.

▶ Connect the device to the supply voltage according to the pin assignment (see “Wiring diagrams, supply voltage“).

Grounding the device

Connect the device to ground via the grounding screw below the Power OUT connection. The minimum tightening torque for the grounding screws is 2.3 Nm.

Commissioning

The switch-off box can be put into operation without further configuration.

Operating

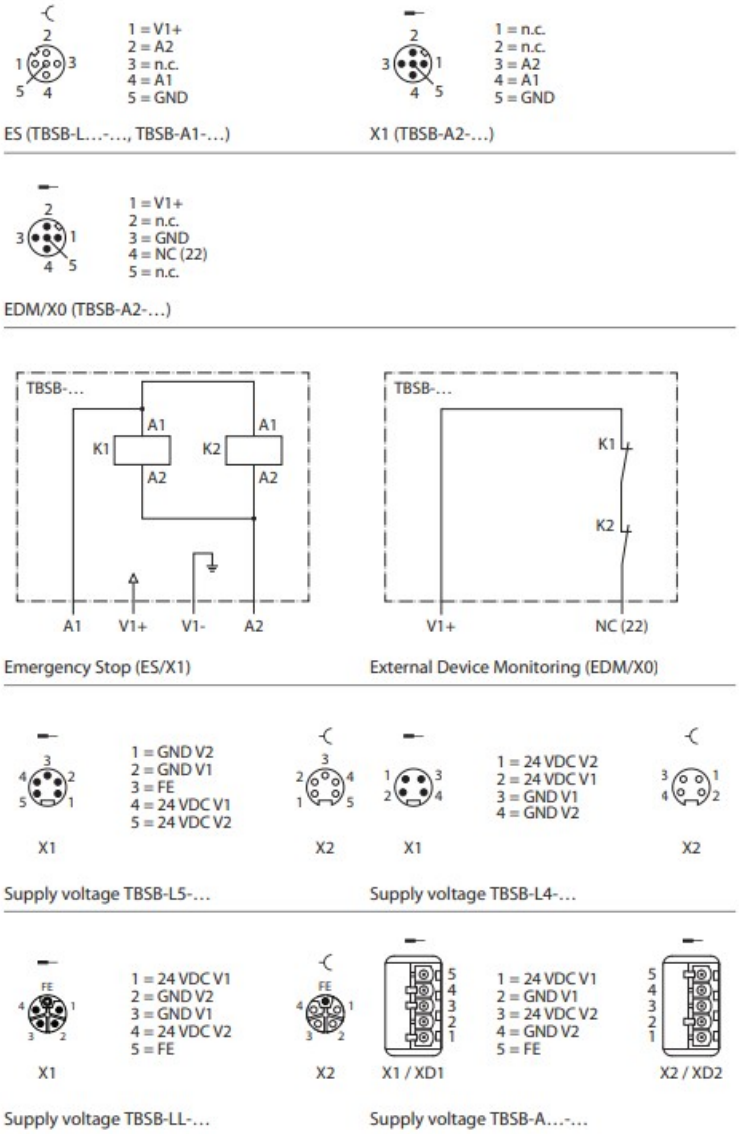
Derating for TBSB-A2–…

→ fig. 4: Derating curve

LED displays

LED	Meaning
V1	Sensor voltage applied
V2	Actuator voltage switched
Q1/Q2	Control voltage applied to contactors K1 and K2

Wiring diagrams



Repair

The device must not be repaired by the user. Take defective devices out of operation and return them to Turck for an error analysis. Observe our return acceptance conditions when returning the device to Turck.

Disposal

Defective or faulty devices must not, in any event, be put back into circulation. Send those devices back to Turck for testing and disposal.

Device	ID		
T858-L5-0509	100002112		
TBSB-L4-CS09	100003273		
TBS8-A1-0512	100003274		
TBSB-A2-CS16	100047460		
TBSB-LL-CS16	100003275		
Connector	Meaning		
X1	Power IN	TBSB-L5-…	7/8″ male, 5-pin
		TBSB-14-…	7/8″ male, 4-pin
		TBSB-A1-…	AIDA male
		TBSB-LL-…	MI2 male, L-coded, 5-pin
XD1		TBSB-A2-…	AIDA male
X2	Power OUT	TBSB-L5-…	7/8′ female, 5-pin
		T8S8-14-…	7/8′ female, 4-pin
		TBSB-A1-…	AIDA male
		TBSB-LL-…	MI 2 female, L-coded, 5-pin
XD2		TBSB-A2-…	AIDA male
EDM	External Device Monitoring	TBSB-1…-…	MI2 male, 5-pin, A-coded
		TBSB-A1-…	
XO	(feedback loop)	TBSB-A2-…	
ES	Emergency Stop	TBSB-1…-…	MI2 female, 5-pin, A-coded
		TBSB-A1-…	
X1		TBSB-A2-…	M12 male, 5-pin, A-coded
Power supply			
V1	24 VDC		
V2	24 VDC		

Permissible range	19.6…27.6 VDC	TBSB-A1-CS12	TBSB-…-CS16
Operating current	TBSB-L…-CS09	12 A	16 A
	9 A		
Potential isolation	Galvanic isolation of V1 and V2 voltage group, voltage proof up to 500 VDC		
Power loss, typical	≤ 6 W		
EDM load	Max. 200 mA at 24 VDC		
Output circuit protection			
	TBSB-L…-CS09	TBSB-A1-CS12	TBSB-…-CS16
	10 A	12 A	16 A
Safety characteristic data			
B10d acc. to EN/ISO 13849-1: 2015	300000	175000	90000
Rated breaking current	9 A	12 A	16 A
Max. number of switching cycles	1 cyc/h		
Performance Level	PLe acc. to ISO 13849-1:2015		
SIL level	SIL 3 acc. to EN IEC 61508-1-2010		
Category	Category 4 acc. to ISO 13849-1:2015		
DC	0… 99 % acc. to ISO 13849-1:2015		
Operating life	20 years		
General Information			
Operating altitude	2000 m		
Operating temperature	-25…+40 °C, TBSB-A2-CS16: -25…35 °C for 16 A		
Storage temperature	-25…+50 °C, TBSB-A2-CS16: -25…40 °C for 12 A		

Protection class	**IP65**
Housing material	Aluminium
Material screw	303 stainless steel
Material seal	Polyurethane
Assembly	Bolted
Torque cover screws	Max. 3.00 Nm/min. 1.50 Nm
Torque ground screw	Max. 2.30 Nm/min. 1.20 Nm
Enclosure	Acc. to IEC/EN 60529
Tests	
Drop and topple	Acc. to IEC 60068-2-31/IEC 60068-2-32
Shock tests	Acc. to IEC 60068-2-27
■ Contactor closed	5 g for 11 ms on Z and X axis, 10 g for 11 ms on Y axis
■ Contactor opened	10 g for 11 ms on Z and X axis, 6 g for 11 ms on Y axis
Vibration test	Acc. to IEC 60068-2-6
■ Contactor closed	4 g, 5…300 Hz
■ Contactor opened	2 g, 5…300 Hz
Approvals and markings	
CE, UKCA	
CUL US	Only TBSB-L4-CS09 and TBSB-L5-CS09
TÜV (Approved Safety Function)	

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Documents / Resources

	**TURCK TBSB-L4-CS09 Switchbox** [pdf] User Guide TBSB-L4-CS09 Switchbox, TBSB-L4-CS09, Switchbox

References

- Turck.com
- Turck.com
- User Manual