

Your Global Automation Partner

TURCK

TBIL-S....

Compact I/O Hubs with IO-Link

Instructions for Use



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1 About These Instructions

These operating instructions describe the structure, functions and the use of the product and will help you to operate the product as intended. Read these instructions carefully before using the product. This is to avoid possible damage to persons, property or the device. Retain the instructions for future use during the service life of the product. If the product is passed on, pass on these instructions as well.

1.1 Target groups

These instructions are aimed at qualified personal and must be carefully read by anyone mounting, commissioning, operating, maintaining, dismantling or disposing of the device.

1.2 Explanation of symbols used

The following symbols are used in these instructions:



DANGER

DANGER indicates a dangerous situation with high risk of death or severe injury if not avoided.



WARNING

WARNING indicates a dangerous situation with medium risk of death or severe injury if not avoided.



CAUTION

CAUTION indicates a dangerous situation of medium risk which may result in minor or moderate injury if not avoided.



NOTICE

NOTICE indicates a situation which may lead to property damage if not avoided.



NOTE

NOTE indicates tips, recommendations and useful information on specific actions and facts. The notes simplify your work and help you to avoid additional work.



CALL TO ACTION

This symbol denotes actions that the user must carry out.



RESULTS OF ACTION

This symbol denotes relevant results of actions.

1.3 Additional documents

The following additional documents are available online at www.turck.com:

- Data sheet
- Commissioning manual IO-Link devices
- IO-Link parameter manuals for IO-Link devices
- EU Declaration of Conformity

1.4 Feedback about these instructions

We make every effort to ensure that these instructions are as informative and as clear as possible. If you have any suggestions for improving the design or if some information is missing in the document, please send your suggestions to techdoc@turck.com.

2 Notes on the Product

2.1 Product identification

This instruction is valid for following devices:

- TBIL-S3-8DIP
- TBIL-S3-8DXP
- TBIL-S4-8DIP
- TBIL-S4-8DXP

2.2 Scope of delivery

The scope of delivery includes:

- I/O hub
- Dummy plugs for M8 or M12 connectors
- Label clips

2.3 Legal requirements

The device falls under the following EU directives:

- 2014/30/EU (electromagnetic compatibility)
- 2011/65/EU (RoHS Directive)

2.4 Turck service

Turck supports you with your projects, from initial analysis to the commissioning of your application. The Turck product database under www.turck.com contains software tools for programming, configuration or commissioning, data sheets and CAD files in numerous export formats.

The contact details of Turck subsidiaries worldwide can be found on p. [▶ 34].

3 For Your Safety

The product is designed according to state-of-the-art technology. However, residual risks still exist. Observe the following warnings and safety notices to prevent damage to persons and property. Turck accepts no liability for damage caused by failure to observe these warning and safety notices.

3.1 Intended use

These devices are designed solely for use in industrial areas.

The block modules of the TBIL-S... series are IO-Link devices and serve as I/O hub between field devices (sensors/actuators) and the IO-Link master. The hub has eight digital I/O channels. Depending on the module type, eight digital inputs (TBIL-S...8DIP) for connecting digital sensors or eight digital DXP channels (TBIL-S...8DXP) for connecting digital sensors or actuators are provided. On devices with DXP channels, each I/O channel can be used as either a digital input or output without additional configuration.

The device is designed in IP65/IP67/IP69K and can be mounted directly in the field.

The devices may 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.

3.2 General safety notes

- The device may only be assembled, installed, operated, parameterized and maintained by professionally-trained personnel.
- The device may only be used in accordance with applicable national and international regulations, standards and laws.
- The device only meets the EMC requirements for industrial areas and is not suitable for use in residential areas.

4 Product Description

The I/O hubs of the TBIL-S... series connect up to eight digital sensors or up to eight sensors or actuators with one IO-Link master port.

The following device types are available:

- TBIL-S3-8DIP: 8 digital input channels, 8 M8 connectors
- TBIL-S3-8DXP: 8 digital I/O channels, 8 M8 connectors, each channel can be used as digital input or output without additional configuration
- TBIL-S4-8DIP: 8 digital input channels, 4 M12 channels
- TBIL-S4-8DXP: 8 digital I/O channels, 4 M12 connectors, each channel can be used as digital input or output without additional configuration

The devices are designed in a fully encapsulated housing with degree of protection IP65/IP67/IP69K.

4.1 Device overview

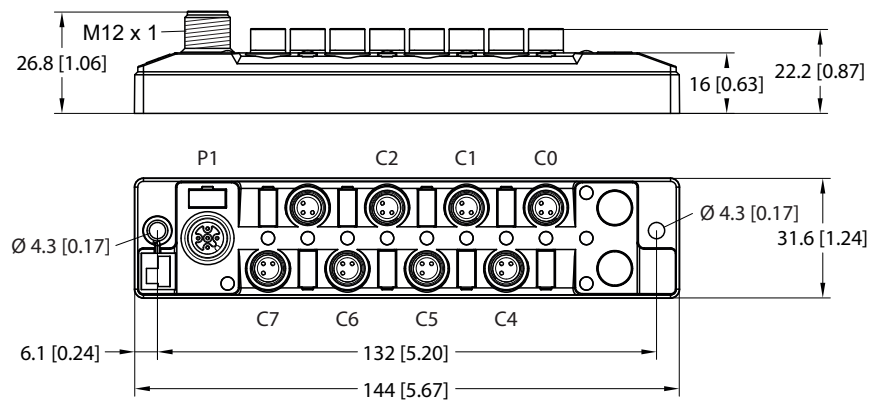


Fig. 1: Dimensions TBIL-S3-...

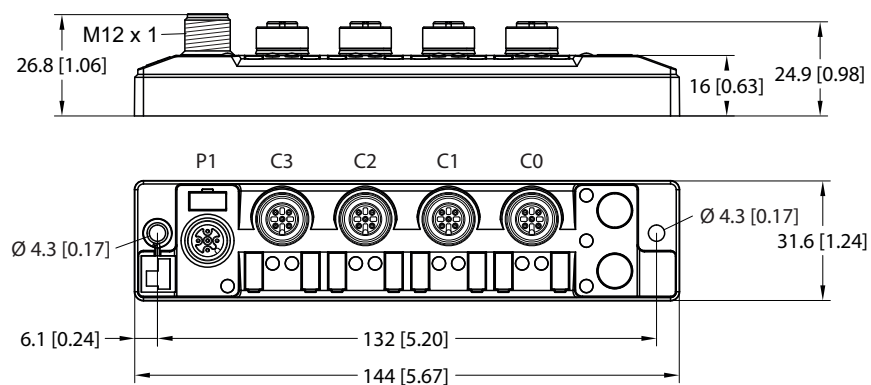


Fig. 2: Dimensions TBIL-S4-...

4.2 Properties and features

- Fibre-glass reinforced housing
- Shock and vibration tested
- Fully potted module electronics
- Protection class IP65/IP67/IP69K
- IO-Link diagnostics for short-circuit and supply over- and undervoltage
- TBIL-S3-...: 1 digital input channel or 1 universal digital channels per connector
- TBIL-S4-...: 2 digital input channels or 2 universal digital channels per connector
- Metal connectors

4.3 Operating principle

I/O hubs receive binary sensor signals from the process level at the digital inputs and transmit them via an IO-Link master to a higher-level controller. Output commands sent by a controller via an IO-Link master are forwarded to connected binary actuators via the I/O hub output channels.

4.4 Functions and operating modes

The I/O hubs with IO-Link of the TBIL-S series connect up to eight digital sensors or eight digital sensors and actuators with one IO-Link master port.

The device provides diagnostics for power supply and short circuit of the sensors and actuators on the IO-Link master.

5 Mounting

The device is mounted via four M4 screws on a flat and pre-drilled mounting surface.

- ▶ Attach the module to the mounting surface with two M4 screws. The maximum tightening torque for the screws is 1.3 Nm

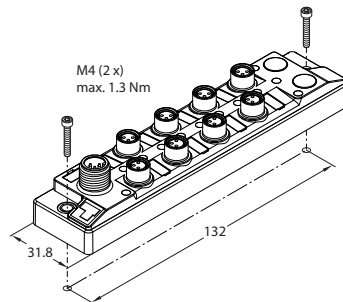


Fig. 3: Mounting the device to a mounting surface (example: TBIL-S3-...)

5.1 Grounding the device

- ▶ When mounting on a mounting plate, fasten the device with an M4 metal screw.
- ⇒ The FE connection of the device is connected to the reference potential of the installation via the M4 metal screw.

6 Connecting



NOTICE

Intrusion of liquids or foreign bodies through leaking connections
Loss of protection class IP65/IP67/IP69K, device damage possible

- ▶ Tighten connectors with a tightening torque of 0.6 Nm.
- ▶ Only use accessories that guarantee the protection class.
- ▶ Always seal unused connectors with suitable screw caps or blind caps.

6.1 Connecting the supply voltage and IO-Link



WARNING

Incorrect or defective power supply unit

Danger to life due to dangerous voltages on touchable parts

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

For the connection to IO-Link and the supply voltage, a 5-pin M12 connector is available.

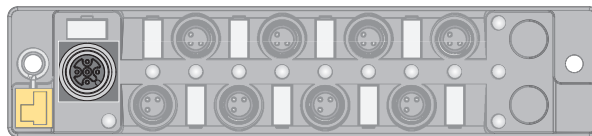


Fig. 4: M12 connector for the connection to IO-Link

- ▶ Connect the device to the supply voltage and IO-Link according to the pin assignment.

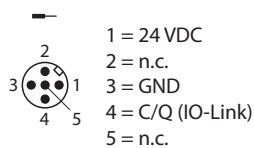


Fig. 5: Pin assignment IO-Link

6.2 Connecting digital sensors and actuators

Connecting digital sensors and actuators– TBIL-S3-...

For connecting digital sensors and actuators, the TBIL-S3 variants provide eight 3-pin M8 connectors.

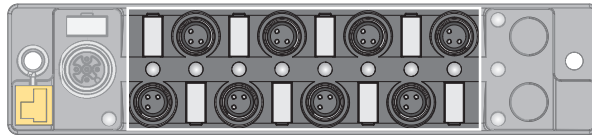


Fig. 6: TBIL-S3-...: M8 connector for connecting digital sensors and actuators

- ▶ Connect the sensors and actuators to the device according to the pin assignment.

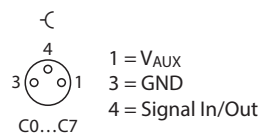


Fig. 7: Pin assignment TBIL-S3-8DXP

Connecting Digital Sensors and Actuators – TBIL-S4-...

For connecting digital sensors and actuators, the TBIL-S4 variants provide four 5-pin M12 connectors.

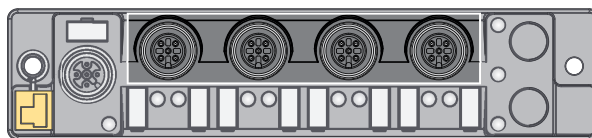


Fig. 8: TBIL-S4-...: M12 connector for connecting digital sensors and actuators

- ▶ Connect the sensors and actuators to the device according to the pin assignment.

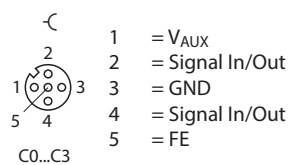


Fig. 9: Pin assignment TBIL-S4-8DXP

7 Parameterizing and Configuring

This chapter contains the description of selected device parameters that are common for operating the device.

The device-specific parameter manuals at www.turck.com contain a detailed description of all IO-Link indices of the devices according to IODD.

7.1 Parameters

IO-Link object directory – ISDU device parameters: Direct Parameter Page

ISDU Index Hex. (dec.)	Sub index	Object name	Access	Length in bytes	Meaning/default value
0x00 (0)		Direct Parameter Page 1	read only	16	
	0x03	Minimum cycle time	read only	1	
	0x05	IO-Link version ID	read only	1	17
	0x08	Vendor ID	read only	2	ID for Turck: 0x013D
	0x09				
	0x0A	Device ID	read only	3	E.g. TBIL-S3-8DXP: 0x1E2213
	0x0B				
	0x0C				

IO-Link object directory – ISDU device parameters: Identification

ISDU Index Hex. (dec.)	Object name	Access	Length [Byte]	Meaning/ default value	Comment
0x10 (16)	Vendor Name	read only	16	Turck	
0x11 (17)	Vendor Text	read only	32	www.turck.com	
0x12 (18)	Product Name	read only	32	E. g. TBIL-S3-8DXP	
0x13 (19)	Product ID	read only	16	Ident no. of the device. E. g. 100002595 for TBIL-S3-8DXP	
0x14 (20)	Product Text	read only	32	I/O hub	
0x15 (21)	Serial Number	read only	16	Sequential serial number	
0x16 (22)	Hardware ID	read/ write	8	Hardware version of the device, e. g. V1.0	

ISDU Index Hex. (dec.)	Object name	Access	Length [Byte]	Meaning/ default value	Comment
0x17 (23)	Firmware Revision	read only	16	Firmware version of the device, e. g. V1.0.7.0	
0x18 (24)	Application Specific Tag	read/write	32	Default "***"	Customer-specific or application-specific data can be stored in this field.
0x19 (25)	Function Tag	read/write	32	Default "***"	The application-specific device function can be stored in this field.
0x1A (26)	Location Tag	read/write	32	Default "***"	The application-specific installation location of the device can be stored in this field.

IO-Link object directory – ISDU device parameters: Preferred Index (parameters and diagnostics of the digital in- and outputs)

ISDU Index Hex. (dec.)	Object name	Access	Length [Byte]	Meaning
0x40 (64)	Parameter ID	read/write	4	Customer-specific ID, for free use
0x41 (65)	Inverting Input	read/write	1	Invert digital input
0x42 (66)	Activate Output	read/write	1	Activate output (only valid for TBIL-S...- 8DXP)
0x43 (67)	Impulse Stretching Input	read/write	8	Pulse stretching input
0x44 (68)	Short Circuit Recovery	read/write	1	Manual output reset after overcurrent (only valid for TBIL-S...- 8DXP)
0x45 (69)	Failsafe	read/write	2	Output After Error (only valid for TBIL-S...- 8DXP)
0x46 (70)	Under Voltage Diagnostics	read/write	2	Undervoltage Diagnosis (defining the threshold value for the undervoltage diagnostics)
Diagnostics				
0x50 (80)	Supply Error	read only	2	<ul style="list-style-type: none"> ■ Over- and undervoltage supply ■ Overcurrent V_{AUX} connector C0...C7 or C0...C3
0x51 (81)	Output Short Circuit	read only	1	Overcurrent output 0...7 (only valid for TBIL-S...- 8DXP)

Invert Digital Input – 0x41 (65), sub index 0

This parameter inverts the state of the digital input in the process image.

Format	Length
Byte	1 byte

1 bit per channel

Default values are shown in **bold**.

Value	Meaning
0	No
1	yes

Input signal inverted

- TBIL-S3-8DIP
- TBIL-S3-8DXP

Byte 0							
Bit offset							
7	6	5	4	3	2	1	0
C7P4	C6P4	C5P4	C4P4	C3P4	C2P4	C1P4	C0P4

- TBIL-S4-8DIP
- TBIL-S4-8DXP

Byte 0							
Bit offset							
7	6	5	4	3	2	1	0
C3P2	C3P4	C2P2	C2P4	C1P2	C1P4	C0P2	C0P4



NOTE

This parameter can also be set for all connectors of the module via the IODD.

Activate Output – 0x42 (66), sub index 0

This parameter activates or deactivates the output function of the digital channel.

Format	Length
Byte	1 byte

Default values are shown in **bold**.

Value	Meaning
0	No Output function deactivated, channel can only be used as input
1	Yes Output function activated, channel can be used as in- or output

■ TBIL-S3-8DXP

Byte 0							
Bit offset							
7	6	5	4	3	2	1	0
C7P4	C6P4	C5P4	C4P4	C3P4	C2P4	C1P4	C0P4

■ TBIL-S4-8DXP

Byte 0							
Bit offset							
7	6	5	4	3	2	1	0
C3P2	C3P4	C2P2	C2P4	C1P2	C1P4	C0P2	C0P4



NOTE

This parameter can also be set for all connectors of the module via the IODD.

Impulse Stretching Input – 0x43 (67)

This parameter defines the duration of the pulse stretching for digital input edges in multiples of 10 ms. This allows that even short signals with longer PLC cycle times can be detected.

Format	Length
Array of byte	8 byte

1 byte per channel

Default values are shown in **bold**.

Value	Meaning
0	Disabled Pulse stretching deactivated
1	1...255 Pulse stretching input [*10 ms]

- TBIL-S3-8DIP
- TBIL-S3-8DXP

Byte offset							
0	1	2	3	4	5	6	7
Sub index							
8	7	6	5	4	3	2	1
C7P4	C6P4	C5P4	C4P4	C3P4	C2P4	C1P4	C0P4

- TBIL-S4-8DIP
- TBIL-S4-8DXP

Byte offset							
0	1	2	3	4	5	6	7
Sub index							
8	7	6	5	4	3	2	1
C3P2	C3P4	C2P2	C2P4	C1P2	C1P4	C0P2	C0P4



NOTE

This parameter can also be set for all connectors of the module via the IODD.

Short Circuit Recovery – 0x44 (68), Subindex 0

This parameter defines if a manual reset is necessary after an overcurrent occurred at the digital channel.

Format	Length
Byte	1 byte

1 bit per channel

Default values are shown in **bold**.

Value	Meaning
0	No Automatic recovery mode
1	Yes Controlled recovery mode (output has to be reset manually)

■ TBIL-S3-8DXP

Byte 0							
Bit offset							
7	6	5	4	3	2	1	0
C7P2	C6P4	C5P4	C4P4	C5P2	C2P4	C1P4	C0P4

■ TBIL-S4-8DXP

Byte 0							
Bit offset							
7	6	5	4	3	2	1	0
C3P2	C3P4	C2P2	C2P4	C1P2	C1P4	C0P2	C0P4



NOTE

This parameter can also be set for all connectors of the module via the IODD.

Failsafe – 0x45 (69), sub index 0

This parameter defines the behavior of the output in case of an interruption of the IO-Link communication.

Format	Length	
Array of byte	2 byte	2 bit per channel

Default values are shown in **bold**.

Value		Meaning
00	0	Set output to 0
01	1	Set output to 1
10	Current value	Hold current value
11	reserved	

■ TBIL-S3-8DXP

Byte 1				Byte 0			
Bit offset				Bit offset			
6	4	2	0	6	4	2	0
C7P4	C6P4	C5P4	C4P4	C3P4	C2P4	C1P4	C0P4

■ TBIL-S4-8DXP

Byte 1				Byte 0			
Bit offset				Bit offset			
6	4	2	0	6	4	2	0
C3P2	C3P4	C2P2	C2P4	C1P2	C1P4	C0P2	C0P4



NOTE

This parameter can also be set for all connectors of the module via the IODD.

Under Voltage Diagnostics – 0x46 (70), Subindex 0

This parameter defines threshold value for the undervoltage diagnostics.

Format	Length
Array of byte	2 byte

1 bit per module

Default values are shown in **bold**.

Value	Meaning
0	Standard (IEC 61131-2) lower threshold: 19.2 V upper threshold: 20.4 V
1	Extended lower threshold: 17.5 V upper threshold: 18.5 V

Byte 0							
Bit offset							
7	6	5	4	3	2	1	0
-	-	-	-	-	-	-	Threshold

Byte 1							
Bit offset							
7	6	5	4	3	2	1	0
-	-	-	-	-	-	-	-

Meaning of parameter bits

Name	Meaning
Cx	Port no.
Py	Pin no.

8 Operating

8.1 Process input data

TBIL-S3-8DIP

Byte no.	Bit offset							
	7	6	5	4	3	2	1	0
Inputs								
0	C7P4	C6P4	C5P4	C4P4	C3P4	C2P4	C1P4	C0P4
Module diagnostics								
1	Group diagnostics	-	-	-	-	Under-voltage	-	Over-voltage
Connector diagnostics – overcurrent sensor supply								
2	Overcurrent C7	Overcurrent C6	Overcurrent C5	Overcurrent C4	Overcurrent C3	Overcurrent C2	Overcurrent C1	Overcurrent C0

TBIL-S3-8DXP

Byte no.	Bit offset							
	7	6	5	4	3	2	1	0
Inputs								
0	C7P4	C6P4	C5P4	C4P4	C3P4	C2P4	C1P4	C0P4
Module diagnostics								
1	Group diagnostics	-	-	-	-	Under-voltage	-	Over-voltage
Connector diagnostics – overcurrent sensor supply								
2	Overcurrent C7	Overcurrent C6	Overcurrent C5	Overcurrent C4	Overcurrent C3	Overcurrent C2	Overcurrent C1	Overcurrent C0
Channel diagnostics – overcurrent output								
3	Overcurrent C7P4	Overcurrent C6P4	Overcurrent C5P4	Overcurrent C4P4	Overcurrent C3P4	Overcurrent C2P4	Overcurrent C1P4	Overcurrent C0P4

TBIL-S4-8DIP

Byte no.	Bit offset							
	7	6	5	4	3	2	1	0
Inputs								
0	C3P2	C3P4	C2P2	C2P4	C1P2	C1P4	C0P2	C0P4
Module diagnostics								
1	Group diagnostics	-	-	-	-	Under-voltage	-	Over-voltage
Connector diagnostics – overcurrent sensor supply								
2	-	-	-	-	Overcurrent C3	Overcurrent C2	Overcurrent C1	Overcurrent C0

TBIL-S4-8DXP

Byte no.	Bit offset							
	7	6	5	4	3	2	1	0
Inputs								
0	C3P2	C3P4	C2P2	C2P4	C1P2	C1P4	C0P2	C0P4
Module diagnostics								
1	Group diagnostics	-	-	-	-	Under-voltage	-	Over-voltage
Connector diagnostics – overcurrent sensor supply								
2	-	-	-	-	Overcurrent C3	Overcurrent C2	Overcurrent C1	Overcurrent C0
Channel diagnostics – overcurrent output								
3	Overcurrent C3P2	Overcurrent C3P4	Overcurrent C2P2	Overcurrent C2P4	Overcurrent C1P2	Overcurrent C1P4	Overcurrent C0P2	Overcurrent C0P4



NOTE

The diagnostics can also be accessed via IO-Link indices.

Meaning of process data bits

Designation	Meaning	
Inputs		
CxPy	0	Input inactive
	1	Input active
		Cx: Port no. Py: Pin no.
Module diagnostics		
Group diagnostics	0	No diagnostics
	1	Module diagnostics active
		<ul style="list-style-type: none"> ▶ Evaluate the bit to monitor the diagnostics cyclically. <ul style="list-style-type: none"> ⇒ Bit = 0: no diagnostics active ⇒ Bit = 1: Module diagnostics ▶ Bit = 1: Evaluate further diagnostic bits to determine the origin of the diagnostic message.
Undervoltage	0	No diagnostics
	1	Undervoltage of supply voltage
Overvoltage	0	No diagnostics
	1	Overvoltage of supply voltage
Connector diagnostics – overcurrent sensor supply		
Overcurrent Cx	0	No diagnostics
	1	Overload of the sensor supply at the connector. The sensor/actuator supply is protected in groups. If an overload occurs at one slot, all diagnostic bits of a group are active. Groups: <ul style="list-style-type: none"> ■ TBIL-S3-...: C0...C3, C4...C7 ■ TBIL-S4-...: C0...C1, C2...C3

Designation	Meaning		
Channel diagnostics – overcurrent output			
Overcurrent CxPy	0	No diagnostics	Cx: Port no.
	1	Overload at the output/short-circuit	Py: Pin no.

8.2 Process output data

TBIL-S3-8DXP

Byte no.	Bit offset							
	7	6	5	4	3	2	1	0
Outputs								
0	C7P4	C6P4	C5P4	C4P4	C3P4	C2P4	C1P4	C0P4

TBIL-S4-8DXP

Byte no.	Bit offset							
	7	6	5	4	3	2	1	0
Outputs								
0	C3P2	C3P4	C2P2	C2P4	C1P2	C1P4	C0P2	C0P4

Meaning of process data bits

Designation	Meaning		
CxPy	0	Output inactive	Cx: Port no.
	1	Output active	Py: Pin no.

8.3 LED displays

The device has the following LED indicators:

- IO-Link communication
- I/O status

8.3.1 IO-Link

IO-Link LED	Meaning
Green flashing (1 Hz)	IO-Link communication OK, valid process data are sent
Red	IO-Link communication error or module error
Red flashing (1 Hz)	IO-Link communication OK, invalid process data or diagnostic message
Off	No voltage supply

8.3.2 Channel LEDs

TBIL-S...-8DIP

LED 0...7	Meaning (input)
Green	Input inactive
Red flashing (0.5 Hz)	Overload of the sensor supply In devices with group diagnostics, all connector-LEDs of the supply group flash simultaneously in case of an error.
Red	–
Off	Input inactive

TBIL-S...-8DXP

LED 0...7	Meaning (input)	Meaning (output)
Green	Input inactive	Output active
Red flashing (0.5 Hz)	Overload of the sensor supply In devices with group diagnostics, all connector-LEDs of the supply group flash simultaneously in case of an error.	
Red	–	Output active, overload/overcurrent at output
Off	Input inactive	Output inactive

8.4 Evaluating diagnostic data

Group diagnostics: Supply Error– 0x50 (80), sub index 0

The group diagnosis indicates errors in the module and sensor supply:

- Group diagnostics: Diagnostics pending at the module
- Over- or undervoltage, per module
- Overcurrent sensor supply V_{AUX} , per connector

Format	Length
Array of Bytes	2 byte

0 = no diagnostics

1 = diagnostic message pending

Byte 0							
Bit offset							
15	14	13	12	11	10	9	8
Group diagnostics	-	-	-	-	Undervoltage supply	-	Overvoltage supply

TBIL-S3-...

Byte 1							
Bit offset							
7	6	5	4	3	2	1	0
Overcurrent V_{AUX} C7	Overcurrent V_{AUX} C6	Overcurrent V_{AUX} C5	Overcurrent V_{AUX} C4	Overcurrent V_{AUX} C3	Overcurrent V_{AUX} C2	Overcurrent V_{AUX} C1	Overcurrent V_{AUX} C0

TBIL-S4-...

Byte 1							
Bit offset							
7	6	5	4	3	2	1	0
-	-	-	-	Overcurrent V_{AUX} C3	Overcurrent V_{AUX} C2	Overcurrent V_{AUX} C1	Overcurrent V_{AUX} C0

Output Short Circuit– 0x51 (81), Sub Index 0

Indicates an overcurrent at the corresponding digital output.

Format	Length
Byte	1 byte

0 = no diagnostics

1 = diagnostic message

TBIL-S3-8DXP

Byte 0							
Bit offset							
7	6	5	4	3	2	1	0
Over-current C7P4	Over-current C6P4	Over-current C5P4	Over-current C4P4	Over-current C3P4	Over-current C2P4	Over-current C1P4	Over-current C0P4

TBIL-S4-8DXP

Byte 0							
Bit offset							
7	6	5	4	3	2	1	0
Over-current C3P2	Over-current C3P4	Over-current C2P2	Over-current C2P4	Over-current C1P2	Over-current C1P4	Over-current C0P2	Over-current C0P4

8.5 IO-Link Events

Event Code	Description	Event Mode	
0x5110	Overvoltage supply	0xF4 (appears) 0xB4 (disappears)	Supply voltage too high
0x5111	Undervoltage supply	0xF4 (appears) 0xB4 (disappears)	Supply voltage too low
0x7710	Overcurrent V_{AUX} connector x or overcurrent output x	0xF4 (appears) 0xB4 (disappears)	Group event for Overcurrent: <ul style="list-style-type: none"> ■ Overcurrent of the sensor supply at one of the connectors or ■ overcurrent at one of the outputs (DO0...DO7) <p>The mapped diagnostics in the process image of the inputs show which slot or output detects an overcurrent.</p>

8.6 IO-Link error codes

Error code	Description	
0x8011	Index not available	
0x8012	Sub index not available	
0x8023	Access denied	Index cannot be written
0x8030	Parameter value out of range	
0x8033	Parameter length overrun	Length of data to be written does not match the length defined for this parameter.
0x8034	Parameter length overrun	
0x8035	Function not available	Function not available in the device
0x8041	Inconsistent parameter set	

9 Troubleshooting

If the device does not function as expected, first check whether ambient interference is present. If there is no ambient interference present, check the connections of the device for faults.

If there are no faults, there is a device malfunction. In this case, decommission the device and replace it with a new device of the same type.

10 Maintenance

Ensure that the plug connections and cables are always in good condition.

The devices are maintenance-free, clean dry if required.

11 Repair

The device must not be repaired by the user. The device must be decommissioned if it is faulty. Observe our return acceptance conditions when returning the device to Turck.

11.1 Returning devices

Returns to Turck can only be accepted if the device has been equipped with a Decontamination declaration enclosed. The decontamination declaration can be downloaded from <https://www.turck.de/en/retoure-service-6079.php> and must be completely filled in, and affixed securely and weather-proof to the outside of the packaging.

12 Disposal



The devices must be disposed of correctly and must not be included in general household garbage.

13 Technical Data

13.1 General technical data

Technical Data	
Connectors	
IO-Link	M12, 5-pin
Input/output	
■ TBIL-S3-...	M8, 3-pin
■ TBIL-S4-...	M12, 5-pin
Permissible torques	
■ IO-Link	0.8 Nm
■ I/O channels	M8: 0.4 Nm M12: 0.6 Nm
■ Mounting (M4 screws)	1.3 Nm
IO-Link	
IO-Link specification	Specified according to version 1.1
Parameterization	FDT/DTM, IODD
Transmission rate	COM 2: 38.4 kbit/s
Transmission physics	Corresponds to 3-wire physics (PHY2)
Standard/directive conformity	
Vibration test	According to EN 60068-2-6
Shock test	According to EN 60068-2-27
Drop and topple	According to IEC 60068-2-31/IEC 60068-2-32
Electro magnetic compatibility	According to EN 61131-2/-6-4
Approvals	CE, cULus
UL conditions	Housing type 1, pollution degree 2, relative humidity ≤ 95 %, for indoor applications Use UL-certified cables (CYJV or PVVA) that are suitable for the application in terms of voltage and current.
General Information	
Dimensions (B × L × H)	31.6 × 144 × 26.8 mm
Weight	Max. 140 g
Operating temperature	-40...+70 °C
Storage temperature	-40...+85 °C
Protection class	IP65/IP67/IP69K (not evaluated by UL)
Overvoltage category	II
Housing material	PA6-GF30
Housing color	Black
Halogen-free	Yes
Mounting	2 mounting holes, Ø 4.3 mm

13.2 Technical data – TBIL-S...-8DIP

Technical Data	
Power supply	
Operating/load voltage	18...30 VDC
Operating current	< 120 mA
Sensor/actuator supply V_{AUX}	Supply connectors C0...C7 or C...C3 0.5 A per channel group, short-circuit protected with diagnostics channel groups: ■ TBIL-S3-8DIP: C0...C3, C4...C7 ■ TBIL-S4-8DIP: C0...C1, C2...C3
Total current	Max. 4 A per module
Inputs	
Number of channels	8 digital pnp inputs (EN 61131-2)
Input voltage	18... 30 VDC from supply voltage
Signal voltage, low level	-3...5 VDC (EN 61131- 2, type 1 and 3)
Signal voltage, high level	11...30 VDC (EN 61131- 2, type 1 and 3)
Input delay	0.010 ms
Max. input current	15 mA
Potential isolation	Inputs to FE, 500 VDC
IO-Link	
Minimum cycle time	2.2 ms

13.3 Technical data – TBIL-S...-8DXP

Technical Data	
Power supply	
Operating/load voltage	18...30 VDC
Operating current	< 120 mA
Sensor/actuator supply V_{AUX}	Supply connectors C0...C7 or C...C3 0.5 A per channel group, short-circuit protected with diagnostics channel groups: ■ TBIL-S3-8DXP: C0...C3, C4...C7 ■ TBIL-S4-8DXP: C0...C1, C2...C3
Total current	Max. 4 A per module
Inputs	
Number of channels	8 digital pnp inputs (EN 61131-2)
Input voltage	18... 30 VDC for example from supply voltage
Signal voltage, low level	-3...5 VDC (EN 61131- 2, type 1 and 3)
Signal voltage, high level	11...30 VDC (EN 61131- 2, type 1 and 3)
Input delay	0.010 ms
Max. input current	15 mA
Potential isolation	Inputs to FE, 500 VDC
Outputs	
Number of channels	8 digital pnp outputs
Type of output diagnostics	Channel diagnostics
Output voltage	24 VDC from supply voltage
Output current per channel	0.5 A, short-circuit-proof
Output delay	0.15 ms
Load type	Ohmic, inductive lamp load
Load type (UL condition)	Resistive, pilot duty
Potential isolation	Outputs to FE, 500 VDC
IO-Link	
Minimum cycle time	2.8 ms

14 Appendix: EU Declaration of Conformity

EU-Konformitätserklärung Nr.: 5035-4M
 EU Declaration of Conformity No.:



Wir/ We: **HANS TURCK GMBH & CO KG**
WITZLEBENSTR. 7, 45472 MÜLHEIM A.D. RUHR

erklären in alleiniger Verantwortung, dass die Produkte
 declare under our sole responsibility that the products

Kompakte I/O Module in IP20/IP67: **FDN20-*, FNDL-*, FDNP-*, FDP20-*, FGDP,**
 Compact I/O modules in **FGEN-*, FLDP-*, FLIB-*, FXEN-*, TBDP-*,**
 IP20/IP67: **TBEN-*, TBIL-*, TBEC-*, FEN20-***

auf die sich die Erklärung bezieht, den Anforderungen der folgenden EU-Richtlinien durch Einhaltung der
 to which this declaration relates are in conformity with the requirements of the following EU-directives by compliance with the following
 standards:

EMV - Richtlinie /EMC Directive EN 61131-2:2007 (Abschnitte / section 8, 9, 10)	2014 / 30 / EU	26.02.2014
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RoHS – Richtlinie /RoHS Directive EN IEC 63000:2018	2011 / 65 / EU	08.06.2011
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Weitere Normen, Bemerkungen:
 additional standards, remarks:

Zusätzliche Informationen:
 Supplementary information:

Mülheim a. d. Ruhr, den 29.09.2020

Ort und Datum der Ausstellung /
 Place and date of issue

i.V. Dr. M. Linde, Leiter Zulassungen /Manager Approvals
 Name, Funktion und Unterschrift des Befugten /
 Name, function and signature of authorized person

15 Turck Subsidiaries - Contact Information

Germany	Hans Turck GmbH & Co. KG Witzlebenstraße 7, 45472 Mülheim an der Ruhr www.turck.de
Australia	Turck Australia Pty Ltd Building 4, 19-25 Duerdin Street, Notting Hill, 3168 Victoria www.turck.com.au
Belgium	TURCK MULTIPROX Lion d'Orweg 12, B-9300 Aalst www.multiprox.be
Brazil	Turck do Brasil Automação Ltda. Rua Anjo Custódio Nr. 42, Jardim Anália Franco, CEP 03358-040 São Paulo www.turck.com.br
China	Turck (Tianjin) Sensor Co. Ltd. 18,4th Xinghuazhi Road, Xiqing Economic Development Area, 300381 Tianjin www.turck.com.cn
France	TURCK BANNER S.A.S. 11 rue de Courtalin Bat C, Magny Le Hongre, F-77703 MARNE LA VALLEE Cedex 4 www.turckbanner.fr
Great Britain	TURCK BANNER LIMITED Blenheim House, Hurricane Way, GB-SS11 8YT Wickford, Essex www.turckbanner.co.uk
India	TURCK India Automation Pvt. Ltd. 401-403 Aurum Avenue, Survey. No 109 /4, Near Cummins Complex, Baner-Balewadi Link Rd., 411045 Pune - Maharashtra www.turck.co.in
Italy	TURCK BANNER S.R.L. Via San Domenico 5, IT-20008 Bareggio (MI) www.turckbanner.it
Japan	TURCK Japan Corporation Syuuhou Bldg. 6F, 2-13-12, Kanda-Sudacho, Chiyoda-ku, 101-0041 Tokyo www.turck.jp
Canada	Turck Canada Inc. 140 Duffield Drive, CDN-Markham, Ontario L6G 1B5 www.turck.ca
Korea	Turck Korea Co, Ltd. B-509 Gwangmyeong Technopark, 60 Haan-ro, Gwangmyeong-si, 14322 Gyeonggi-Do www.turck.kr
Malaysia	Turck Banner Malaysia Sdn Bhd Unit A-23A-08, Tower A, Pinnacle Petaling Jaya, Jalan Utara C, 46200 Petaling Jaya Selangor www.turckbanner.my

Mexico	Turck Comercial, S. de RL de CV Blvd. Campestre No. 100, Parque Industrial SERVER, C.P. 25350 Arteaga, Coahuila www.turck.com.mx
Netherlands	Turck B. V. Postbus 297, NL-8000 AG Zwolle www.turck.nl
Austria	Turck GmbH Graumanngasse 7/A5-1, A-1150 Wien www.turck.at
Poland	TURCK sp.z.o.o. Wroclawska 115, PL-45-836 Opole www.turck.pl
Romania	Turck Automation Romania SRL Str. Siriului nr. 6-8, Sector 1, RO-014354 Bucuresti www.turck.ro
Russian Federation	TURCK RUS OOO 2-nd Pryadilnaya Street, 1, 105037 Moscow www.turck.ru
Sweden	Turck Sweden Office Fabriksstråket 9, 433 76 Jonsered www.turck.se
Singapore	TURCK BANNER Singapore Pte. Ltd. 25 International Business Park, #04-75/77 (West Wing) German Centre, 609916 Singapore www.turckbanner.sg
South Africa	Turck Banner (Pty) Ltd Boeing Road East, Bedfordview, ZA-2007 Johannesburg www.turckbanner.co.za
Czech Republic	TURCK s.r.o. Na Brne 2065, CZ-500 06 Hradec Králové www.turck.cz
Turkey	Turck Otomasyon Ticaret Limited Sirketi Inönü mah. Kayisdagi c., Yesil Konak Evleri No: 178, A Blok D:4, 34755 Kadiköy/ Istanbul www.turck.com.tr
Hungary	TURCK Hungary kft. Árpád fejedelem útja 26-28., Óbuda Gate, 2. em., H-1023 Budapest www.turck.hu
USA	Turck Inc. 3000 Campus Drive, USA-MN 55441 Minneapolis www.turck.us

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