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TURCK

IO-Link Power Distribution
How To

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Introduction

Purpose
The purpose of this document is to guide customers installing TURCK IO-Link products. NFPA 79, State and Local code governing the installation of electrical devices and components take precedence over any circuit presented in this manual – circuits presented in this manual are for demonstrative purpose only.

All respective safety measures and accident protection guidelines must be considered carefully and without exception.

Product Covered
BL20-E-GW-EN + BL20-E-4IOL
BL67-GW-EN (> VN 03-00) + BL67-4IOL
TBEN-S2-4IOL
BLCEN-xx-4IOL
TBEN-L1-8IOL

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IO-Link Power Distribution for Modular I/O

BL20-E-4IOL

The BL20-E-4IOL provides access to the U_L ('load' or 'output') bus via the terminals $+U_L$ and GND_L. Optionally, power to the IOLink field devices can be routed from a terminal strip common to $+U_L$ and GND_L. Optionally, end users can fuse individual sensors according to the sensor manufacturer's recommendations.

Note U_L must be fused according to the respective BL20 documentation, see below.

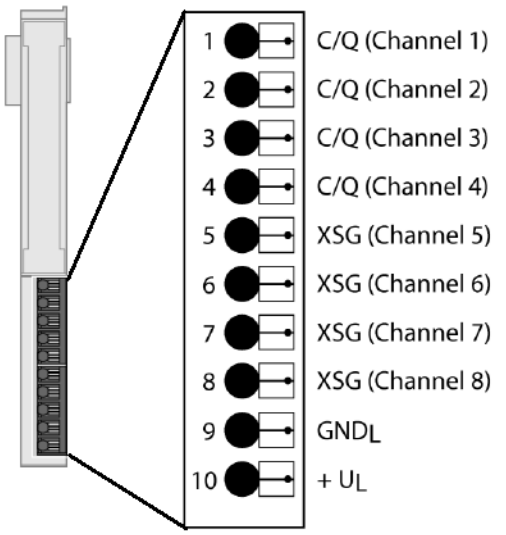

Figure 1. Bl20-E-4IOL Terminal Assignment

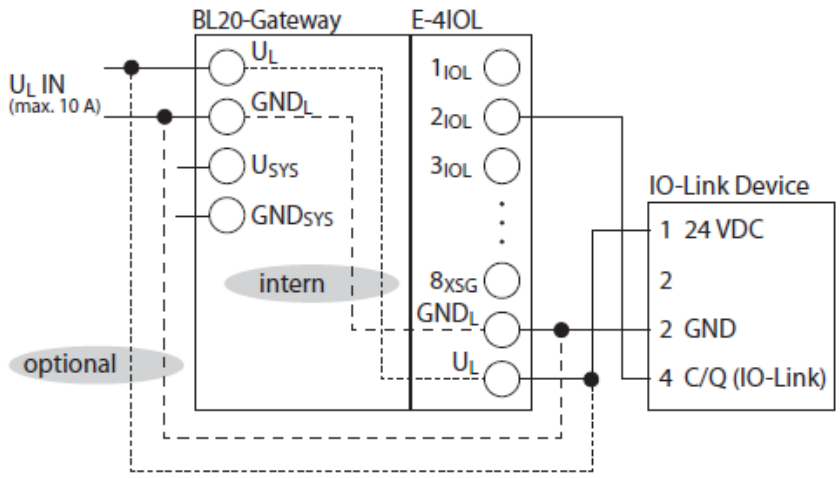

Figure 2. BL20-E-4IOL Power Wiring

ATTENTION!

Insufficient fuse protection of U_L

Damage to the electronics

➤ U_L has to be protected by a fuse with max. 8 A/10 A (depending on type of gateway). More information can be found in the respective gateway manuals.

ATTENTION!

Wrong ground potential

Damage to the electronics

➤ The IO-Link devices must be supplied with the same potential as U_L of the gateway or the BR/PF module (if used).

ATTENTION!

Wrong supply of IO-Link devices

Damage to the electronics

➤ The IO-Link devices must only be supplied with the voltage provided at the supply terminals

BL67: V_{sens} (pin 1 and 3)

BL20: U_L (terminal 9 and 10)

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BL67-4IOL

The BL67-4IOL provides field power via the V_{SENS} bus ('Sensor' bus) via the pins $+V_{SENS}$ and GND. V_{SENS} is derived from the V_I ('Input') terminal on the BL67-GW-EN (> VN 03-00) and is short circuit and overload protected to 4 Amps. Optionally, end users can fuse individual sensors according to the sensor manufacturer's recommendations. Supply range is 18…30 VDC for Vi and Vo.

Because the BL67-4IOL draws power off of the V_{SENS} bus a short to the V_{SENS} pin will cause the BL67 station to stop communicating until the short is cleared unless the power supply supplying Vsens is large enough to withstand the inrush current experienced during the short circuit protection circuit test cycle, the short circuit protection circuitry tests the circuit to see if the short is clear approximately every ½ second. A power supply that can handle this inrush current should be used to keep the BL67 station and downstream Ethernet devices communicating. Generally a 10 Amp or larger supply will suffice.

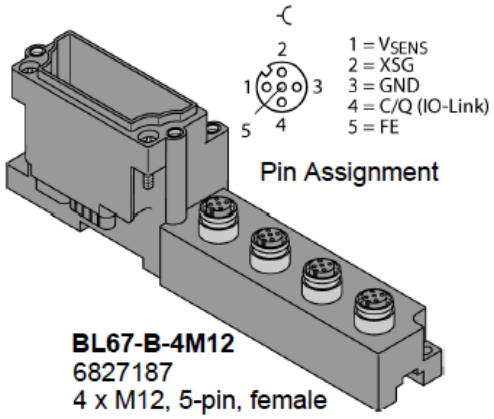

Figure 3. Bl67-4IOL IOLink Port Pin Assignment

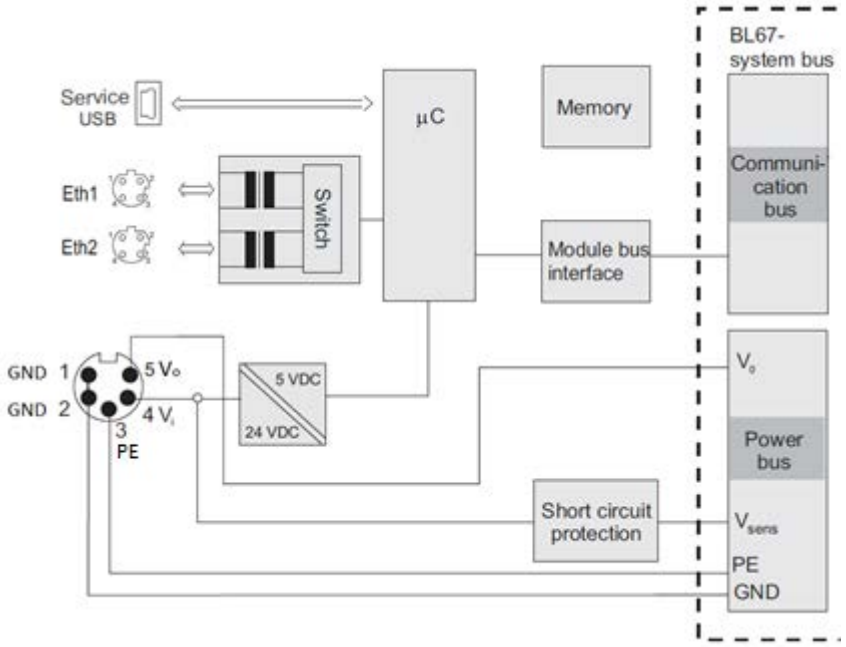

Figure 4. BL67-GW-EN (> VN 03-00) Internal Power Wiring

ATTENTION!

Wrong supply of IO-Link devices

Damage to the electronics

➤ The IO-Link devices must only be supplied with the voltage provided at the supply terminals

BL67: V_{sens} (pin 1 and 3)

BL20: U_L (terminal 9 and 10)

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Potential Groups using Power Feed Modules

With either the BL20 or BL67 Modular I/O system Power Feed modules can be added to break the station up into potential groups. This strategy also allows 'refreshing' V_I and V_O allowing each potential group to provide the maximum amount of current (in the case of VI 4 Amps) to each group. Please refer to the respective gateway and power feed datasheets for details.

In the diagram below each IOL module pictured can deliver approximately 2 Amps (i.e. each potential group can deliver up to 4 Amps of power via Vsens, other modules using Vsens will reduce the amount of current available for IO-Link devices).

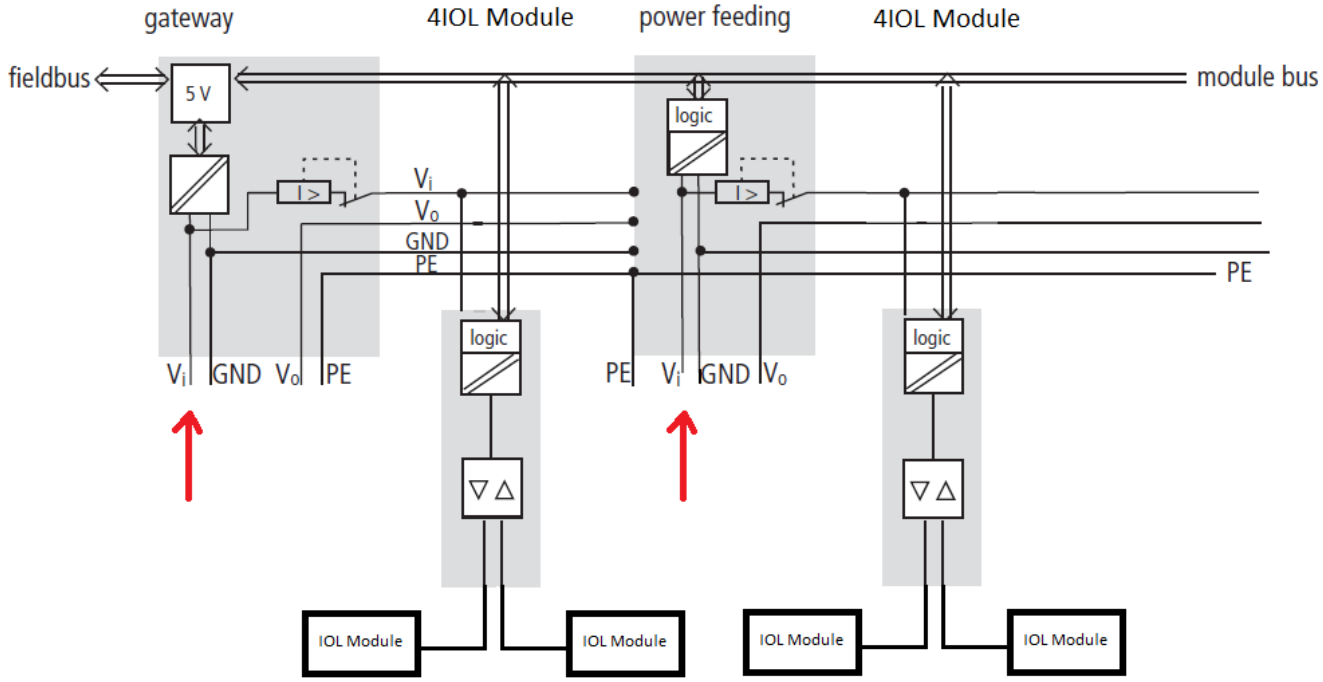

Figure 5. Modular System Power Distribution with additional Power Feed Module

Figure 6. BL67 System with Power Feed Module

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BLCEN-xx-4IOL

BLCompact stations provide power via the V_{SENS} bus ('Sensor' bus) via the pins $+V_{SENS}$ and GND. V_{SENS} is derived from the V_I ('Input') terminal on the BLCompact block and is short circuit and overload protected to either 1 or 2 amps depending on the combination of modules, please see the respective BLCompact datasheet section 'Max. Current Vi' for specific current delivery capabilities. Optionally, end users can fuse individual sensors according to the sensor manufacturer's recommendations. Supply range is 18…30 VDC for Vi and Vo.

Because the BLCompact feeds power off of the V_{SENS} pin a short to the V_{SENS} bus will cause the BLCompact station to stop communicating until the short is cleared. Because the V_{SENS} short circuit protection IC has a large inrush current during the test cycle (the IC tests the circuit to see if the short is clear approximately every ½ second) a power supply that can handle this inrush should be used to keep other stations on the bus communicating. Generally a 10 Amp or larger supply will suffice.

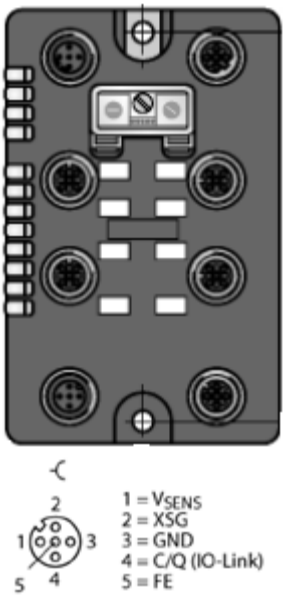

Figure 7. BLCEN-4M12MT-4IOL IOLink Port Pin Assignment

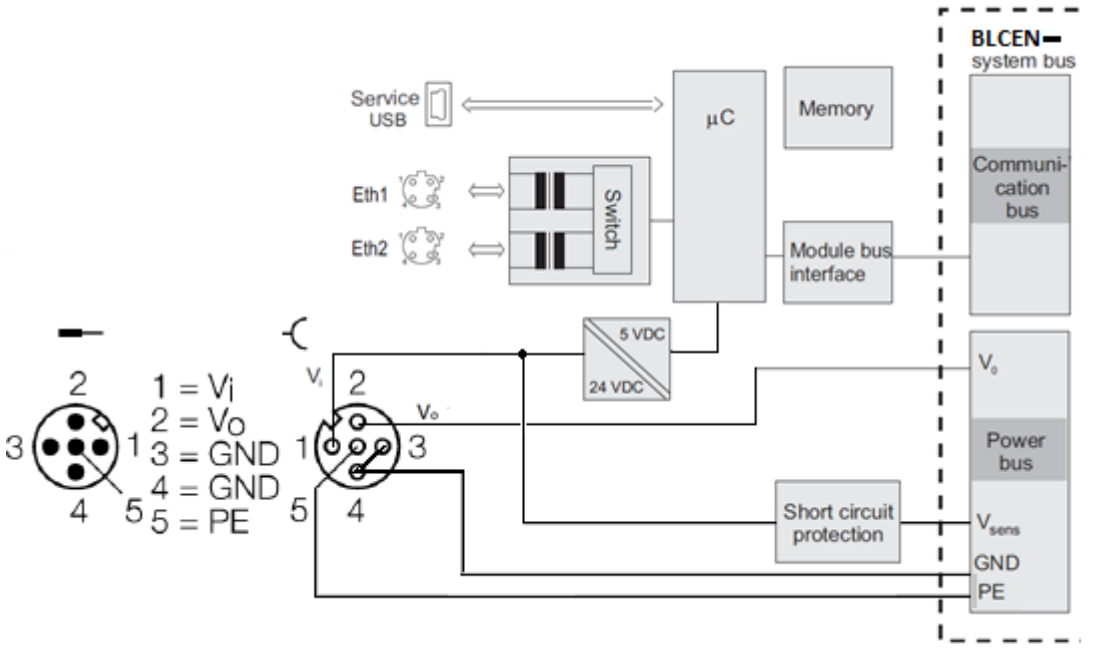

Figure 8. BLCompact Internal Power Wiring

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TBEN-S2-4IOL

TBEN-S2-4IOL stations provide power via the V2 bus ('Auxiliary Supply' bus) via the pins +V2 and –V2. V2 is not short circuit protected. Supply range is 18…30 VDC for V1 and V2. Optionally, end users can fuse individual sensors according to the sensor manufacturer's recommendations.

Note. V2 is not short circuit protected and must be limited (fused) to 4 A max. M8 cables rated to 4A must be used, PKGC 4M-*-PSGC 4M or similar 'C' body M8 cordsets from TURCK.

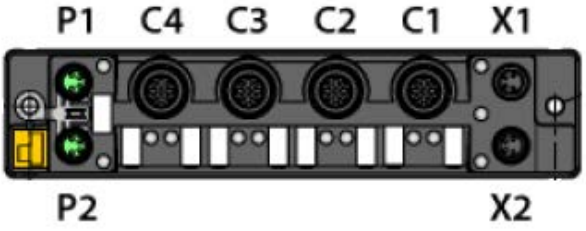

Figure 9. TBEN-S2-4IOL

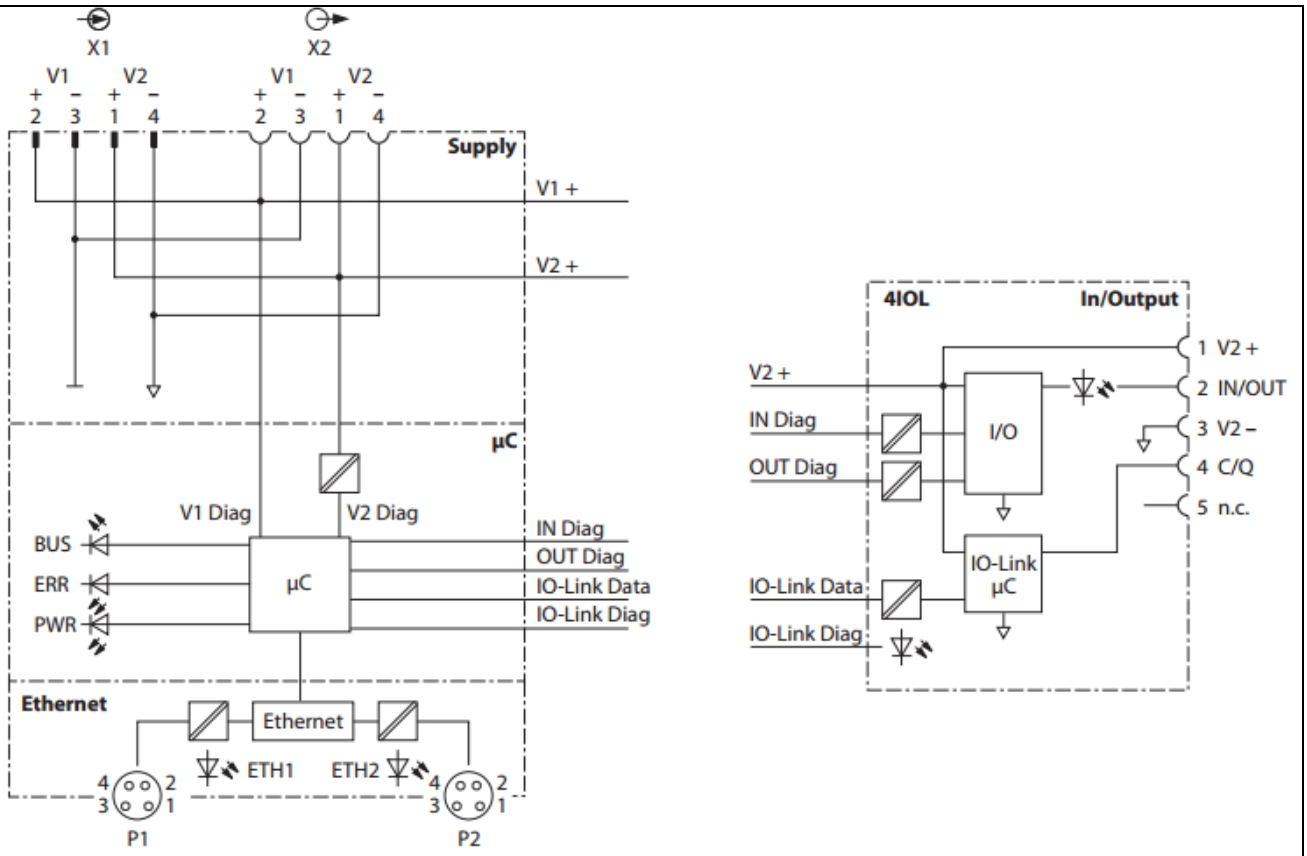

Figure 10. TBEN-S2-4IOL Internal Power and IOLink Port Wiring

ATTENTION!

Wrong supply of IO-Link devices (Class A)

Damage to the electronics

➤ The IO-Link devices (Class A) must only be supplied with the voltage provided at the supply terminals

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TBEN-L1-8IOL

TBEN-L1-8IOL stations provide device power to Class A and Class B IOlink ports via the V1 bus ('Auxiliary Supply' bus 1) via the pins +V1 and –V1. Power for outputs is provided on Class B IOLink ports by V2 ('Auxiliary Supply' bus 2), this power can be switched to kill outputs wired to Class B IOLink ports (C3…C7) by switching V2. Supply range is 18…30 VDC for V1 and V2. Optionally, end users can fuse individual sensors according to the sensor manufacturer's recommendations.

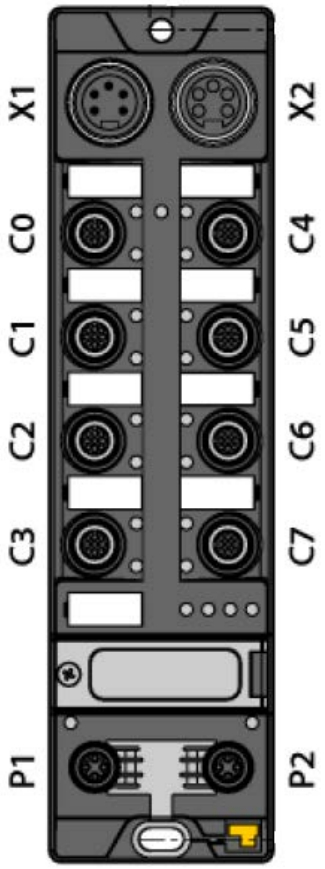

Figure 11. TBEN-L1-8IOL

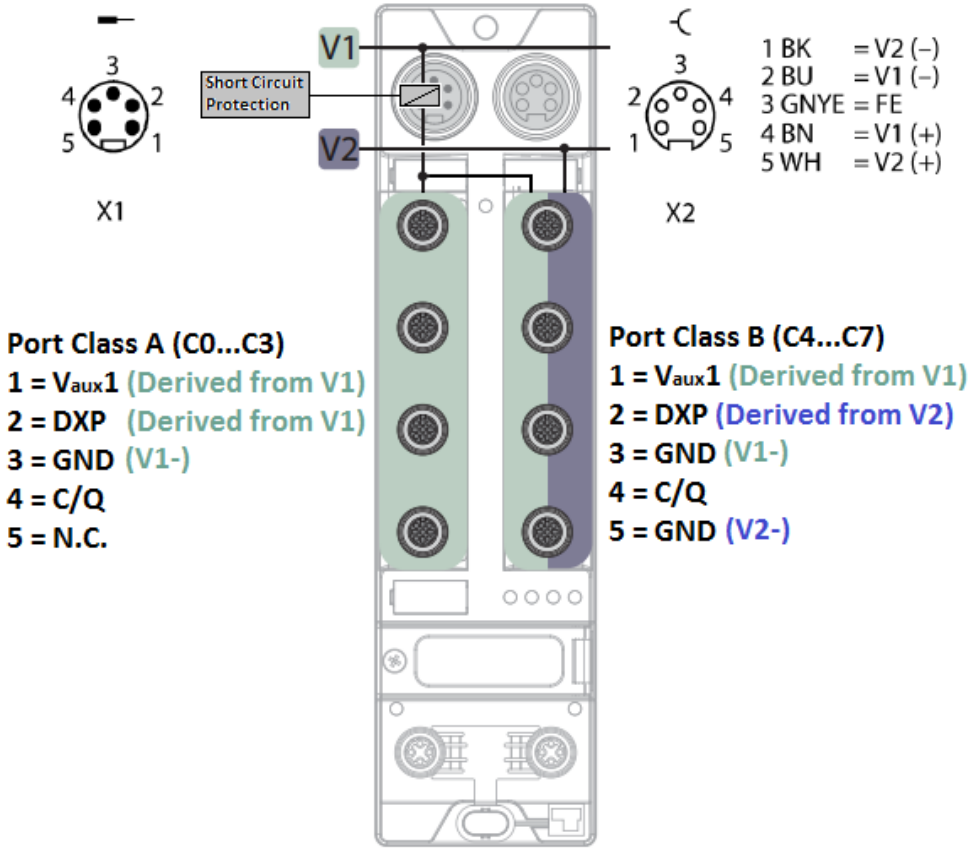

Figure 12. TBEN-L1-8IOL Internal Power and IOLink Port Wiring

Supply	
Supply voltage	24 VDC
Admissible range	18…30VDC total current of max. 9 A per voltage group IO-Link 20.4…28.8 VDC
Sensor/Actuator supply V_{AUX1}	Supply from V1, short-circuit-proof, max. 4 A for C0 and C4, max. 2 A per slot C1-C3, C5-C7
Sensor/Actuator supply V_{AUX2}	Class B supply from V2 short-circuit-proof, max. 2 A per slot C0-C7
Electrical isolation	galvanic isolation of the voltage groups V1 and V2, voltages up to 500 VAC

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IO-Link Power Distribution for TBIL Stations

TBIL-M1-16DIP

The TBIL-M1-16DIP provides 16 discrete input signals via IO-Link, sensor supply is fed from Pin 1, supply range is 18…30 VDC. Sensor supply is not short circuit protected. This station should be used in conjunction with an IO-Link master that provides short circuit protected current up to 4A max or the station supply should be fused to 4 Amps.

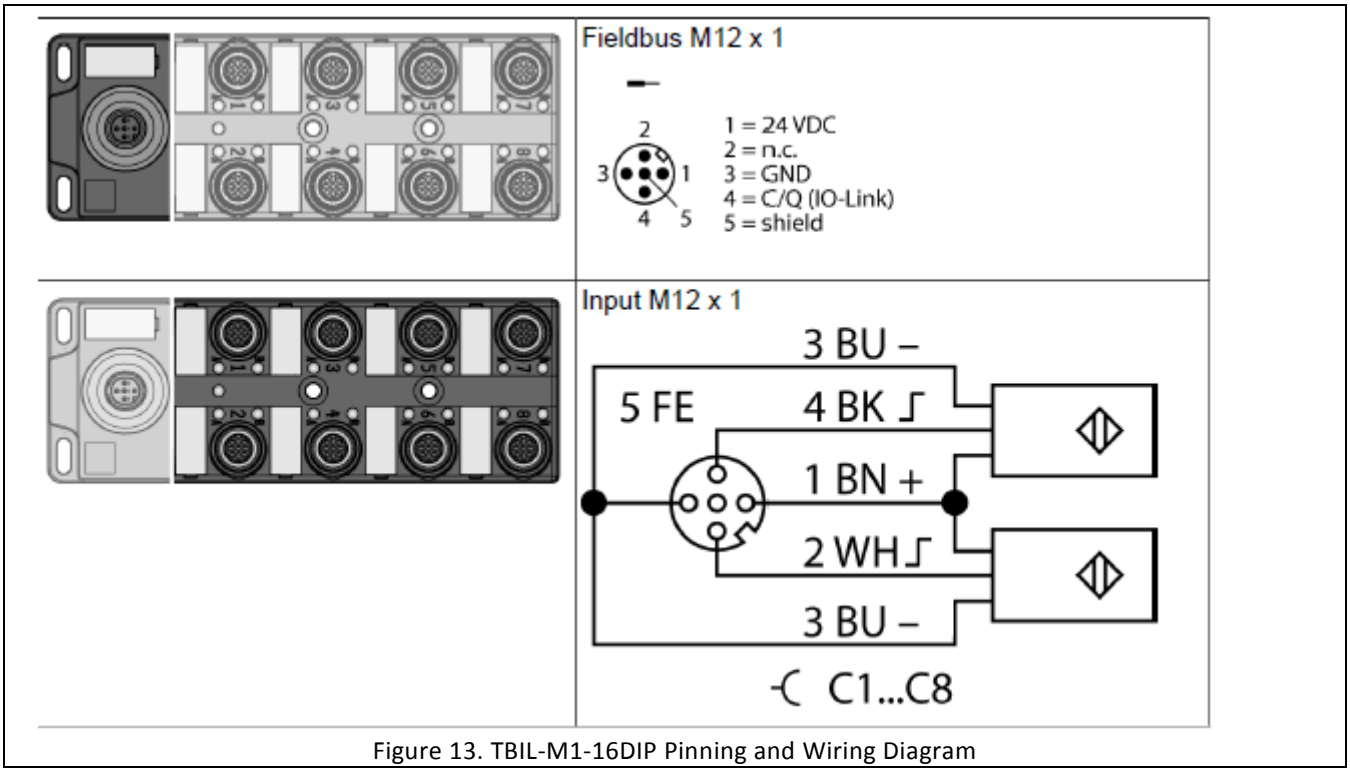

Figure 13. TBIL-M1-16DIP Pinning and Wiring Diagram

Inputs	
Number of channels	16 digital PNP inputs (EN 61131-2)
Input voltage	18 … 30 VDC, e.g. from supply voltage
Low level signal voltage	-3…5 VDC (EN 61131-2, type 1 and 3)
High level signal voltage	11…30 VDC (EN 61131-2, type 1 and 3)
Input delay	0.25 ms
Max. input current	15 mA
Electrical isolation	Inputs to FE 500VDC

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TBIL-M1-8DOP

The TBIL-M1-8DOP provides 8 discrete output signals via IOLink, output supply is fed the Fieldbus M12x1 connector from Pin 1, supply range is 18…30 VDC, max current is 4A. Output supply is short circuit protected to 0.5 A per channel.

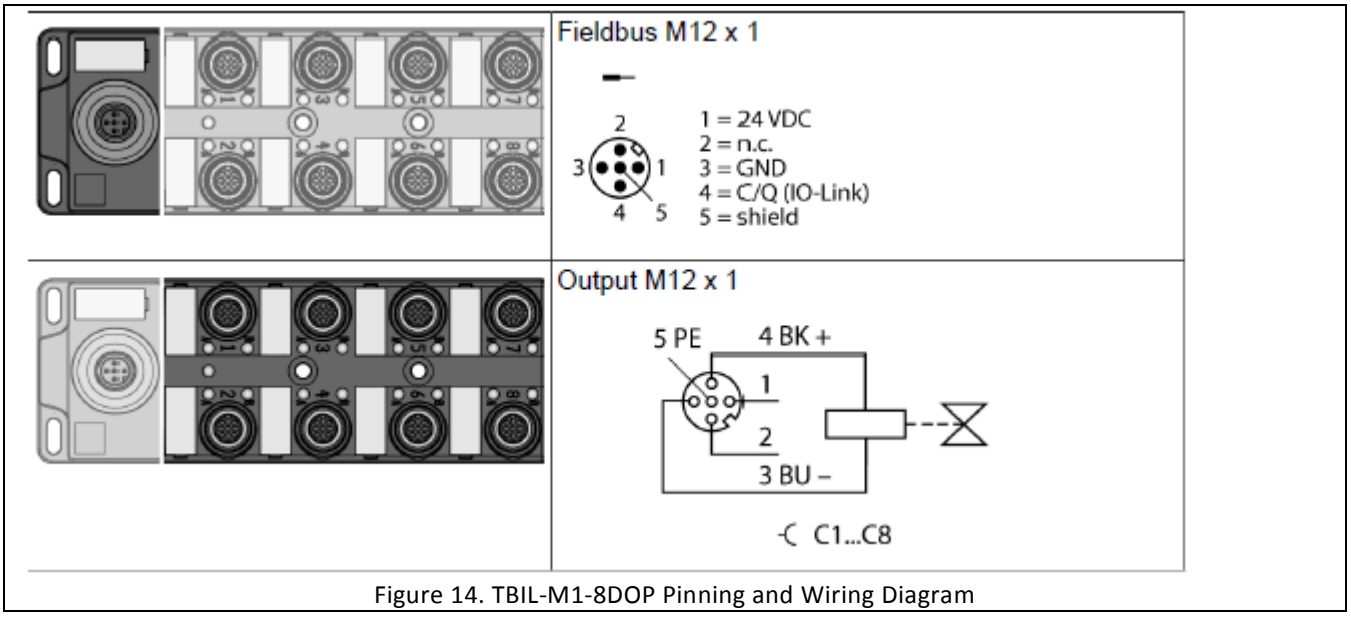

Figure 14. TBIL-M1-8DOP Pinning and Wiring Diagram

Outputs	
Output voltage	24 VDC
Output current per channel	0.5 A, short-circuit proof
Output delay	2 ms
Load type	resistive, inductive, lamp load
Simultaneity factor	0.75
	Gesamtstrom max. 4A pro Modul
Electrical isolation	Outputs to FE 500VDC

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TBIL-M1-16DXP

The TBIL-M1-16DXP provides 16 DXP input/output programmable discreet points via IOLink, input and output supply voltage is fed from Pin 1 which is short circuit protected, supply range is 20.4…28.8 VDC. Output current is short circuit protected to 0.5 A per channel. 4A max per module.

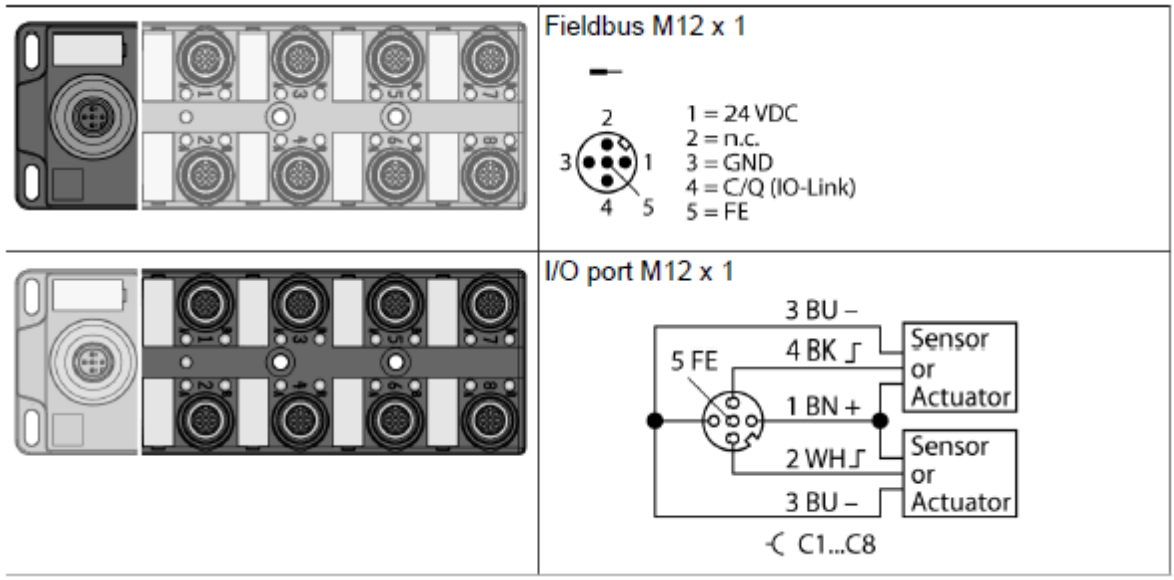

Figure 15. TBIL-M1-16DXP Pinning and Wiring Diagram

Inputs	
Number of channels	16 digital PNP inputs (EN 61131-2)
Low level signal voltage	-3…5 VDC (EN 61131-2, type 1 and 3)
High level signal voltage	11…30 VDC (EN 61131-2, type 1 and 3)
Outputs	
Output voltage	24 VDC
Output current per channel	0.5 A, short-circuit proof
Load type	resistive, inductive, lamp load
Simultaneity factor	0.75 total current max. 4 A per module

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