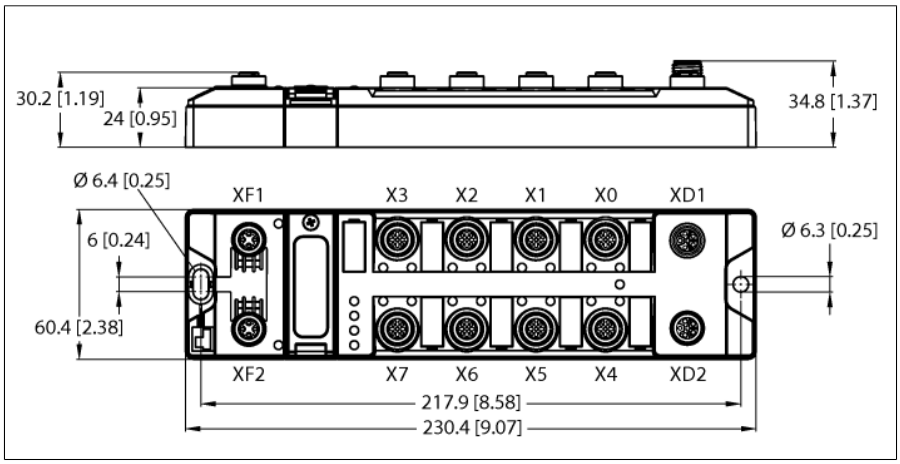
Compact multiprotocol I/O module for Ethernet
8 IO-Link Master Channels
4 Universal Digital PNP Channels, 2 A, Channel Diagnostics
TBEN-LL-8IOL



- **PROFINET Device, Ethernet/IP Device or Modbus TCP Slave**
- **Integrated Ethernet switch**
- **10 Mbps/100 Mbps supported**
- **2 × M12, 4-pin, D-coded Ethernet field-bus connection**
- **Glass fiber reinforced housing**
- **Shock and vibration tested**
- **Fully potted module electronics**
- **Protection classes IP65, IP67, IP69K**
- **M12, L-coded connector for power sup-ply**
- **M12 ports for IO-Link master, 5-pin**
- **IO-Link master port class A and port class B**
- **IO-Link Protocol 1.1**

Type designation	TBEN-LL-8IOL
Ident-No.	100003910
Supply	
Supply voltage	24 VDC
Admissible range	18…30 VDC Total current max. 9 A per voltage group Total current V1 + V2 max. 11 A
Voltage supply connection	M12 L-coded connector
Sensor/Actuator supply V_{AUX1}	Supply from V1 Short-circuit proof, max. 4 A per X0 & X4, max. 2 A per slot X1-X3, X5-X7
Sensor/Actuator supply V_{AUX2}	Class B supply from V2 Short-circuit proof, max. 4 A per X4 & X5, max. 2 A per X6 & X7
Electrical isolation	galvanic isolation of the voltage groups V1 and V2, voltages up to 500 VAC
System data	
Fieldbus transmission rate	10 Mbps/100 Mbps
Fieldbus connection technology	2 x M12, 4-pin, D-coded
Protocol detection	automatic
Service interface	Ethernet via XF1 or XF2
Modbus TCP	
Addressing	Static IP, DHCP
Supported function codes	FC1, FC2, FC3, FC4, FC5, FC6, FC15, FC16, FC23
Number of TCP connections	8
Input register start address	0 (0x0000 hex)
Output register start address	2048 (0x0800 hex)
Ethernet/IP	
Addressing	acc. to EtherNet/IP specification
Quick Connect (QC)	< 150 ms
Device Level Ring (DLR)	supported
Class 3 connections (TCP)	3
Class 1 connections (CIP)	10
Input Assembly Instance	101
Output Assembly Instance	102
Configuration Assembly Instance	106

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PROFINET	
Version	2.35
Addressing	DCP
Conformance class	B (RT)
MinCycleTime	1 ms
Fast Start-Up (FSU)	< 150 ms
Diagnostics	acc. to PROFINET alarm handling
Topology detection	supported
Automatic addressing	supported
Media Redundancy Protocol (MRP)	supported
Netload class	3
Digital inputs	
Number of channels	4 DXP + 8 SIO
Connectivity inputs	M12, 5-pin
Input type	PNP
Type of input diagnostics	Channel diagnostics
Switching threshold	EN 61131-2 type 3, pnp
Low level signal voltage	< 5 V
High level signal voltage	> 11 V
Low level signal current	< 1.5 mA
High level signal current	> 2 mA
Input delay	0.05 ms
Electrical isolation	Galvanically isolated to the fieldbus voltages up to 500 VAC
Digital outputs	
Number of channels	4 DXP
Connectivity outputs	M12, 5-pin
Output type	PNP
Type of output diagnostics	Channel diagnostics
Output voltage	24 VDC from potential group
Output current per channel	2 A, short-circuit proof
IO-Link	
Number of channels	8
IO-Link	Pin 4 in IOL mode
IO-Link specification	Version 1.1
IO-Link port type	Class A and Class B
Frame type	Supports all specified frame types
Supported devices	Max. 32 byte input / 32 byte output
Transmission rate	4.8 kbps (COM 1) / 38.4 kbps (COM 2) / 230 kbps (COM 3)
Standard/Directive conformity	
Vibration test	acceleration to 20 g acc. to EN 60068-2-6
Shock test	acc. to EN 60068-2-27
Drop and topple	acc. to EN 60068-2-31/IEC 60068-2-32
Electromagnetic compatibility	acc. to EN 61131-2
Approvals and certificates	CE, FCC, FM Class I, Zone 2, UV-resistant in accordance with DIN EN ISO 4892-2A (2013)
UL Certificate	cULus LISTED 21 W2, Encl.type 1 IND.CONT.EQ.

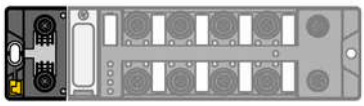
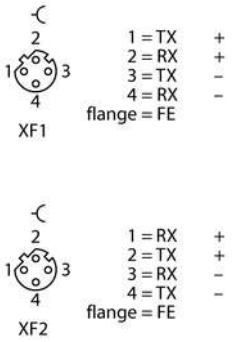
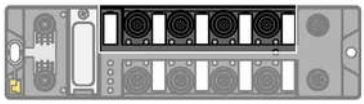
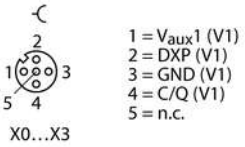
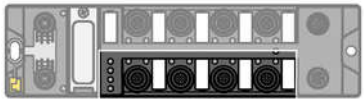
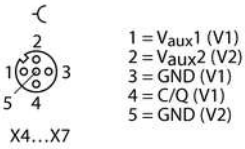
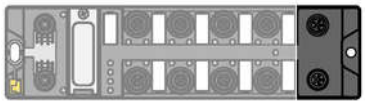
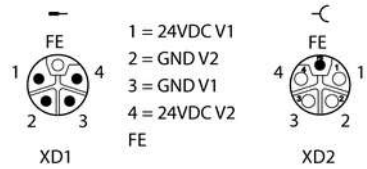
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General Information	
Dimensions (W x L x H)	60.4 x 230.4 x 39mm
Operating temperature	-40…+70 °C
Storage temperature	-40 °C … +85 °C
Altitude	max. 5000 m
Protection class	IP65 IP67 IP69K
MTTF	160 years acc. to SN 29500 (Ed. 99) 20 °C
Housing material	PA6-GF30
Housing color	Black
Window material	Lexan
Material screw	303 stainless steel
Material label	Polycarbonate
Halogen-free	yes
Mounting	2 mounting holes □ 6.3 mm

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	**Accessories** Ethernet cable (example): RSSD RSSD 441-2M Ident no. U-02482	M12 × 1 Ethernet 
	**Accessories** Accessories: Connection cable , 2-channel (example): RK 4.4T-2-RS 4.4T Ident no. U2445 Splitter, 1-channel (example): YB2-FSM 4.5-2FKM 4.5 Ident no. U0875-78	M12 × 1 I/O port 
	**Accessories** Pin 1: V_{AUX1} can be switched off via process data Pin 4: IO-Link data (C/Q) or digital input (SIO mode) X4…X7: IO-Link Master Class B Pin 2: switchable Class B supply (V_{AUX2}) Accessories: Appropriate IO-Link cable for example: ID number 6625604 2m: RKC4T-2-RSC4T/TXL ID number 6625730 5 m: RKC4T-5-RSC4T/TXL Further lengths and variants in the product catalog or on request	M12 × 1 I/O port 
	**Accessories** Power supply cable (example): RKP46PL-*-RSP46PL Ident no. 777038984 Field wireable connector (example): RK56PL-S-0 Ident no. U2-33832	M12 power supply, L-coded 

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Module Status LED

LED	Color	Status	Description
L/A	Green	On	Ethernet Link (100 Mbps)
		Flashing	Ethernet communication (100 Mbps)
	yellow	On	Ethernet link (10 Mbps)
		Flashing	Ethernet communication (10 Mbps)
		Off	No Ethernet link
BF MS	Green	On	Active connection to a master
		Flashing	Steady flashing: Ready Sequence of 3 flashes in 2 seconds: FLC/ARGEE active
	Red	On	IP-address conflict or Restore Mode or Modbus timeout
		Flashing	Blink/Wink command active
	Green/Red	Alternating	Autonegotiation and/or waiting for DHCP/Boot-P addressing
		Off	Power off
SF NS	Green	On	Diagnostics disabled
	Red	On	Diagnostics enabled V_2 undervoltage diagnosis is parameter-dependent
PWR	LED response parameter (PWR) at V_2 Undervoltage = "red"		
	Green	On	V_1 and V_2 power on
	Red	On	V_2 power off or below defined tolerance of 18 V
		Off	V_1 power off or below defined tolerance of 18 V
	LED response parameter (PWR) at V_2 Undervoltage = "green"		
	Green	On	V_1 and V_2 power on
		Flashing	V_2 power off or below defined tolerance of 18 V
		Off	V_1 power off or below defined tolerance of 18 V

LED Status I/O

LED	Color	Status	Description
LED 0, 2, 4, 6, 8, 10, 12, 14 IO-Link Port 1-8 IO-Link Mode	Green	Flashing	IO-Link communication, process data valid
	Red	Flashing	IO-Link communication, process data invalid
		On	IO-Link supply OK, no IO-Link Communication
		Off	Port inactive
LED 0, 2, 4, 6, 8, 10, 12, 14 IO-Link Port 1-8 SIO Mode	Green	On	Digital Input signal is present
		Off	No input signal
LED 1, 3, 5, 7 DXP	Green	On	Digital input or output active
	Red	On	Output active with overload/short circuit
		Flashing	Overload supply $V_{AUX\,1}$
		Off	Input or output inactive
LED 9, 11, 13, 15 IO-Link Class B VAUX2	Green	On	V_{AUX2} active on Pin 2
	Red	On	V_{AUX2} active on Pin 2 with overload/short circuit
		Flashing	Overload supply $V_{AUX\,1}$
		Off	V_{AUX2} inactive on Pin 2

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Process Data Mapping of the Single Protocols

For more details on the corresponding protocols see manual.

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