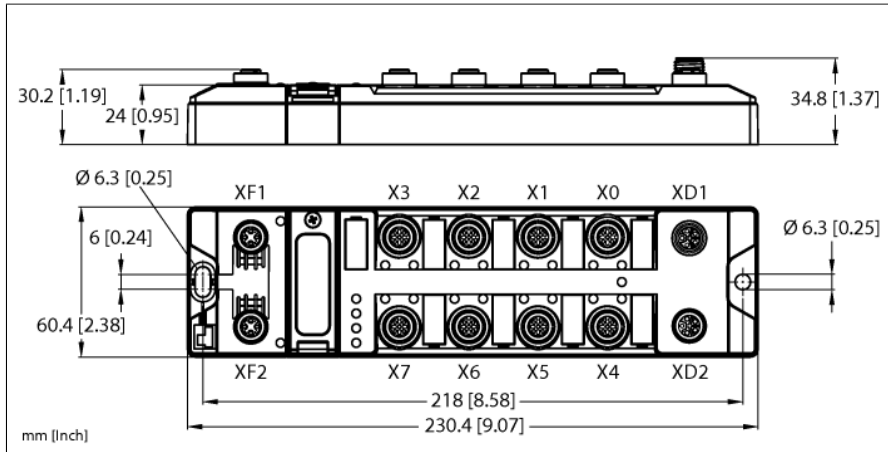


# Compact multiprotocol I/O module for IOT

## 8 IO-Link Master Channels

## 16 Universal Digital PNP Channels, Channel Diagnostics

### TBEN-LL-8IOLA-IOT1



ID	100052327
<b>Supply</b>	
Supply voltage	24 VDC
Admissible range	18...30 VDC Pass-through current XD1–XD2 max. 16 A per voltage group Total current max. 9 A per voltage group V1
Voltage supply connection	M12, L-coded
Operating current	V1: max. 300 mA, min. 120 mA
Sensor/actuator supply	Supply from V1 Short-circuit proof, max. 2 A per slot
Electrical isolation	galvanic isolation of the voltage groups V1 and V2, voltages up to 500 VAC
Fault exclusion	Yes, acc. to EN ISO 13849-2, appendix D.2
<b>System data</b>	
Fieldbus transmission rate	10/100 Mbps
Fieldbus connection technology	2 x M12, 4-pin, D-coded
Protocol detection	automatic
Service interface	Ethernet via XF1 or XF2
<b>Ethernet/IP</b>	
Addressing	acc. to EtherNet/IP specification
Quick Connect (QC)	< 150 ms
min. RPI	2 ms
Device Level Ring (DLR)	supported
Class 3 connections (TCP)	3
Class 1 connections (CIP)	10
Input Assembly Instance	101
Configuration Assembly Instance	106

- PROFINET device, EtherNet/IP device
- Send IO-Link data via MQTT and TAS Edge
- Integrated Ethernet switch
- Supports 10 Mbps/100 Mbps
- 2 x M12, 4-pin, D-coded, Ethernet fieldbus connection
- PROFINET S2 system redundancy
- Glass fiber reinforced housing
- Shock and vibration tested
- Fully potted module electronics
- Protection classes IP65, IP67, IP69K
- M12, 5-pin, L-coded male connector for power supply
- 5-pin M12 slots for IO-Link master
- IO-Link master port class A
- IO-Link protocol 1.1

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
System redundancy	S2
Netload class	3

MQTT	
MQTT-Version	V3.1.1
Protocol version	MQTT via WSS (WebSockets)
QoS	0 and 1
Security	Unsecure TLS 1.2 TLS 1.2
Payload	54199
Synchronization	SNTP
Name resolving	DNS for cloud connections
TLS-Version	TLS 1.2
Supported Cipher Suites	TLS_ECDHE_RSA_WITH_AES128_CBC_SHA256 TLS_ECDHE_RSA_WITH_AES128_GCM_SHA256 TLS_ECDHE_RSA_WITH_CHACHA20_POLY1305_SHA256 TLS_ECDHE_ECDSA_WITH_AES128_CBC_SHA256 TLS_ECDHE_ECDSA_WITH_AES128_GCM_SHA256 TLS_ECDHE_ECDSA_WITH_CHACHA20_POLY1305_SHA256
Device certificate	Programmable for HTTPS/MQTTS with MTLS
Root-of-Trust-Certificate	Programmable for MQTTS

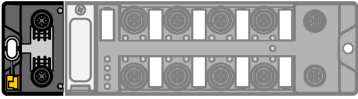


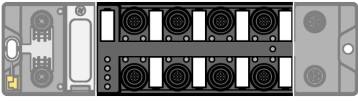
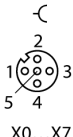
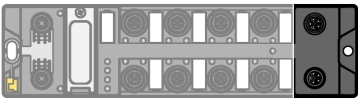
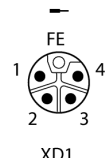
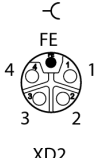
Digital inputs	
Number of channels	8 DXP + 8 SIO
Connectivity inputs	M12, 5-pin
Input type	PNP
Type of input diagnostics	Channel diagnostics
Switching threshold	SIO: EN 61131-2 type 1, PNP DXP: EN 61131-2 type 3, PNP
Low-level signal voltage	< 5 V
High level signal voltage	> 11 V
Low level signal current	< 1.5 mA
High level signal current	> 2 mA
Input delay	0.05 ms
Electrical isolation	Galvanic isolation from the fieldbus Voltages up to 500 VAC

Digital outputs	
Number of channels	8 DXP + 8 SIO
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	Pin 2: 2 A, short-circuit proof Pin 4: 0.5 A, short-circuit proof

<b>IO-Link</b>	
Number of channels	8
IO-Link	Pin 4 in IOL mode
IO-Link specification	V 1.1
IO-Link port type	Class A
Frame type	Supports all specified frame types
Supported devices	Max. 32 bytes in/32 bytes out per port
Transmission rate	4.8 kbps (COM 1)/38.4 kbps (COM 2)/230 kbps (COM 3)

<b>Standard/Directive conformity</b>	
Vibration test	Acc. to EN 60068-2-6 Acceleration up to 20 g
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 and UKCA FCC statement, UV resistant acc. to DIN EN ISO 4892-2A (2013)
UL Certificate	cULus LISTED 21 W2, Encl.Type 1 IND.CONT.EQ.

<b>General Information</b>	
Dimensions (W x L x H)	60.4 x 230.4 x 34.8 mm
Ambient temperature	-40...+70 °C
Storage temperature	-40...+85 °C
Altitude	Max. 5000 m
Protection class	IP65 IP67 IP69K
MTTF	114 years acc. to SN 29500 (Ed. 99) 20 °C
Housing material	PA6-GF30
Housing color	Black
Connector material	Nickel-plated brass
Window material	Lexan
Material screw	303 stainless steel
Material label	Polycarbonate
Halogen-free	yes
Mounting	2 mounting holes □ 6.3 mm

		<p>Ethernet, M12 × 1</p>  <p>XF1</p> <p>1 = TX + 2 = RX + 3 = TX - 4 = RX - flange = FE</p>  <p>XF2</p> <p>1 = RX + 2 = TX + 3 = RX - 4 = TX - flange = FE</p>
	<p><b>Accessories</b>          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</p>	<p>I/O slot, M12 × 1</p>  <p>X0...X7</p> <p>1 = V<sub>aux</sub>1 (V1) 2 = DXP (V1) 3 = GND (V1) 4 = C/Q (V1) 5 = n.c.</p>
		<p>M12 power supply, L-coded</p>  <p>XD1</p> <p>1 = 24VDC V1 2 = GND V2 3 = GND V1 4 = 24VDC V2 FE</p>  <p>XD2</p> <p>1 = 24VDC V2 2 = GND V1 3 = GND V2 4 = 24VDC V1 FE</p>

## 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
BUS	Green	On	Active connection to a client
		Flashing	Steady flashing: ready for operation 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
ERR	Green	On	No diagnostics available
	Red	On	Diagnostics available Undervoltage diagnosis response is parameter-dependent
PWR	Green	On	V <sub>+</sub> power supply OK
		Off	V <sub>+</sub> power supply off or V <sub>+</sub> undervoltage

## 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
		On	IO-Link power 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 DXP	Green	On	Digital input or output active
		Red	On
		Flashing	V <sub>AUX1</sub> supply overload
		Off	Input or output inactive

**Process Data Mapping of the Single Protocols**

For more details on the corresponding protocols see manual.

## Accessories

Type code	Ident-No.		Dimension drawing
TB-SG-L	100014865	Protective housing for TBEN-L and TBIL-M block I/O modules for use in ATEX Zone 2/22	