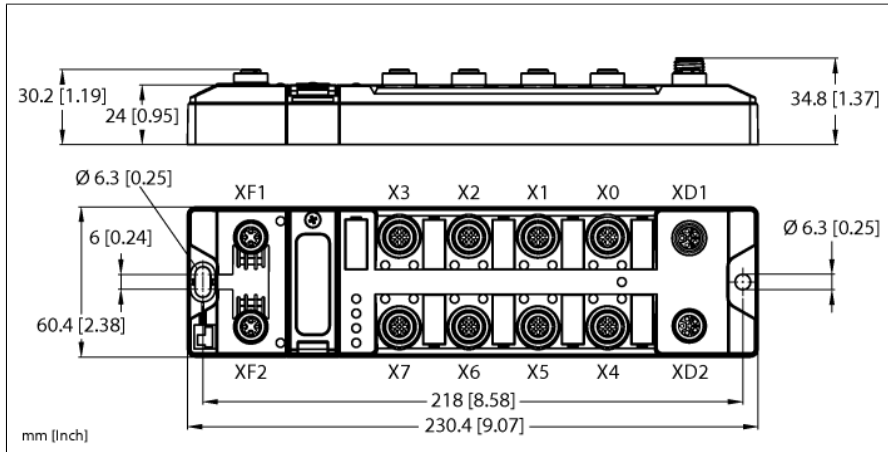


# Compact multiprotocol I/O module for Ethernet

## 8 IO-Link Master Channels

## 16 Universal Digital PNP Channels, Channel Diagnostics

### TBEN-LL-8IOLA



|                                |  |
|--------------------------------|--|
| Type                           | TBEN-LL-8IOLA  |
| ID                             | 100029880  |
| <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<br>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  |
| ARGEE functionality            | Supported  |
| <b>Modbus TCP</b>              |  |
| Addressing                     | Static IP, DHCP  |
| Supported function codes       | FC1, FC2, FC3, FC4, FC6, FC15, FC16, FC23  |
| Number of TCP connections      | 8  |
| Input register start address   | 0 (0x0000 hex)   |
| Output register start address  | 2048 (0x0800 hex)  |

- PROFINET device, EtherNet/IP device, Modbus TCP server, CC-Link IE field basic
- 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
- Galvanically isolated voltage groups support passive safety
- ATEX zone 2/22
- CCC-Ex
- 5-pin M12 slots for IO-Link master
- IO-Link master port class A
- IO-Link protocol 1.1
- Programmable ARGEE

| Ethernet/IP                     |                                   |
|---------------------------------|-----------------------------------|
| 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                               |
| Output Assembly Instance        | 102                               |
| Configuration Assembly Instance | 106                               |

| 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                               |

| CC-Link                    |                            |
|----------------------------|----------------------------|
| Interface                  | CC-Link IE Field Basic     |
| Type                       | Intelligent device station |
| Message Transmission       | Yes                        |
| Profile specification      | CSP+                       |
| Max. occupied stations     | 4                          |
| IP change mechanism        | Yes                        |
| Acyclic SLMP communication | Yes                        |

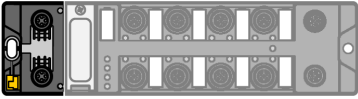


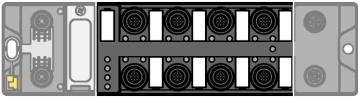
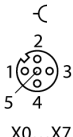
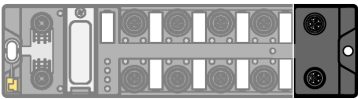
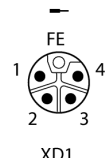
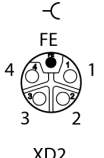
| Digital inputs            |  |
|---------------------------|--|
| Number of channels        | 8 DXP + 8 SIO  |
| Connectivity inputs       | M12, 5-pin   |
| Input type                | PNP  |
| Type of input diagnostics | Channel diagnostics  |
| Switching threshold       | SIO: EN 61131-2 type 1, PNP<br>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<br>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<br>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<br>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<br>UKCA<br>ATEX zone 2/22<br>CCC-Ex<br>FCC statement,<br>UV resistant acc. to DIN EN ISO 4892-2A (2013) |
| UL Certificate                       | cULus LISTED 21 W2, Encl.Type 1 IND.CONT.EQ.   |
| Note on ATEX/IECEX                   | The Quick Start Guide with information on use in Ex areas must be observed.                                |

|                            |   |
|----------------------------|---|
| <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<br>IP67<br>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>1 = TX +<br/>2 = RX +<br/>3 = TX -<br/>4 = RX -<br/>flange = FE</p><br> <p>1 = RX +<br/>2 = TX +<br/>3 = RX -<br/>4 = TX -<br/>flange = FE</p>                                   |
|    | <p><b>Accessories</b><br/>         Accessories:<br/>         Connection cable , 2-channel (example):<br/>         RK 4.4T-2-RS 4.4T<br/>         Ident no. U2445<br/>         Splitter, 1-channel (example):<br/>         YB2-FSM 4.5-2FKM 4.5<br/>         Ident no. U0875-78</p> | <p>I/O slot, M12 × 1</p>  <p>1 = V<sub>aux1</sub> (V1)<br/>2 = DXP (V1)<br/>3 = GND (V1)<br/>4 = C/Q (V1)<br/>5 = n.c.<br/>X0...X7</p>   |
|  |  | <p>M12 power supply, L-coded</p>  <p>1 = 24VDC V1<br/>2 = GND V2<br/>3 = GND V1<br/>4 = 24VDC V2<br/>FE<br/>XD1</p><br> <p>1 = 24VDC V2<br/>2 = GND V1<br/>3 = GND V2<br/>4 = 24VDC V1<br/>FE<br/>XD2</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<br>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<br>Undervoltage diagnosis response is parameter-dependent              |
|     |           | Off         |  |
| PWR | Green     | On          | V <sub>1</sub> , power supply OK   |
|     |           | Off         | V <sub>1</sub> , power supply off or V <sub>1</sub> , undervoltage                           |

**LED Status I/O**

| LED   | Color | Status   | Description                                       |
|---|-------|----------|---|
| LED 0, 2, 4, 6, 8, 10, 12, 14<br>IO-Link port 1–8<br>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<br>IO-Link port 1–8<br>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 |                   |