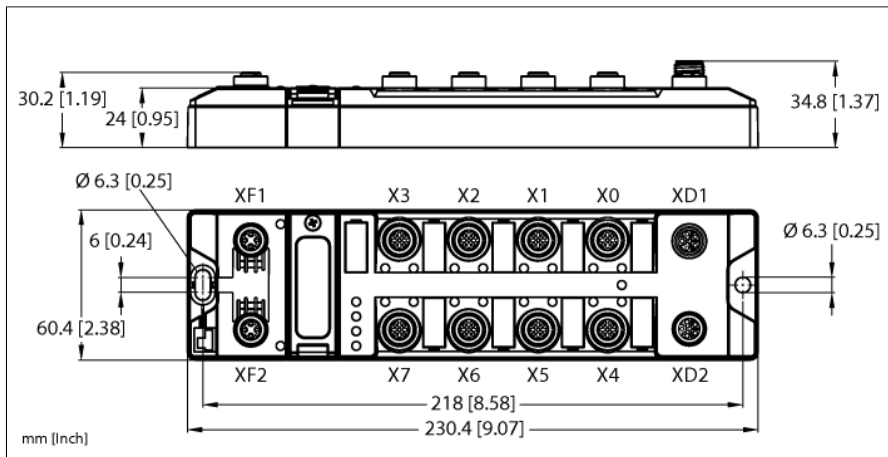


Compact multiprotocol I/O module for Ethernet

16 Digital PNP Inputs

TBEN-LL-16DIP



Type	TBEN-LL-16DIP
ID	100004250
Supply	
Supply voltage	24 VDC
Admissible range	18...30 VDC Pass-through current XD1–XD2 max. 16 A per voltage group Device current max. 9 A per voltage group V1 UL derating for > 55 °C: Total current max. 6 A per voltage group
Voltage supply connection	M12, L-coded
Operating current	V1: max. 150 mA
Sensor/actuator supply	Ports X0–X7 powered by V1 short-circuit proof, 120 mA per port
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
Power dissipation, typical	≤ 5 W
System data	
Fieldbus transmission rate	10/100 Mbps
Fieldbus connection technology	2 × M12, 4-pin, D-coded
Protocol detection	automatic
Service interface	Ethernet via XF1 or XF2
BEEP functionality	Supported
ARGEE functionality	Supported
Modbus TCP	
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 × 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
- Input diagnostics per port
- Programmable ARGEE

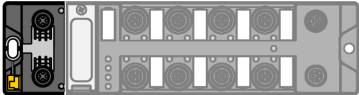
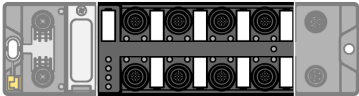
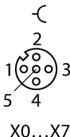
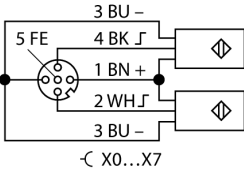
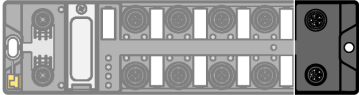
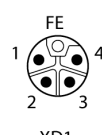
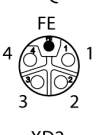
Ethernet/IP	
Addressing	acc. to EtherNet/IP specification
Quick Connect (QC)	< 150 ms
min. RPI	2 ms
Device Level Ring (DLR)	supported
Class 3 connections (TCP)	3
Class 1 connections (CIP)	10
Input Assembly Instance	101
Output Assembly Instance	102
Configuration Assembly Instance	106

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	1
IP change mechanism	Yes
Acyclic SLMP communication	Yes

Digital inputs	
Number of channels	16
Connectivity inputs	M12, 5-pin
Input type	PNP
Type of input diagnostics	Group diagnostics
Switching threshold	EN 61131-2 Typ 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	2.5 ms
Electrical isolation	Galvanically isolated to the fieldbus Voltage proof up 500 VDC

Standard/Directive conformity	
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 UKCA ATEX zone 2/22 CCC-Ex FCC statement, 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.
General Information	
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	193 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

		M12 × 1 Ethernet  XF1 1 = TX + 2 = RX + 3 = TX - 4 = RX - flange = FE  XF2 1 = RX + 2 = TX + 3 = RX - 4 = TX - flange = FE
		M12 × 1 Input  X0...X7 1 = V_{aux}1 2 = Signal In 3 = GND V1 4 = Signal In 5 = FE  X0...X7
		M12 power supply, L-coded  XD1 1 = 24VDC V1 2 = GND V2 3 = GND V1 4 = 24VDC V2 FE  XD2

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/ARGE 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 ₊ power supply OK
		Off	V ₊ power supply off or V ₊ undervoltage

LED Status I/O

LED	Color	Status	Description
LED 0...15	Green	On	Input active
	Red	Flashing	Power overload at the corresponding port. Both port LEDs are flashing.
		Off	Input 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	