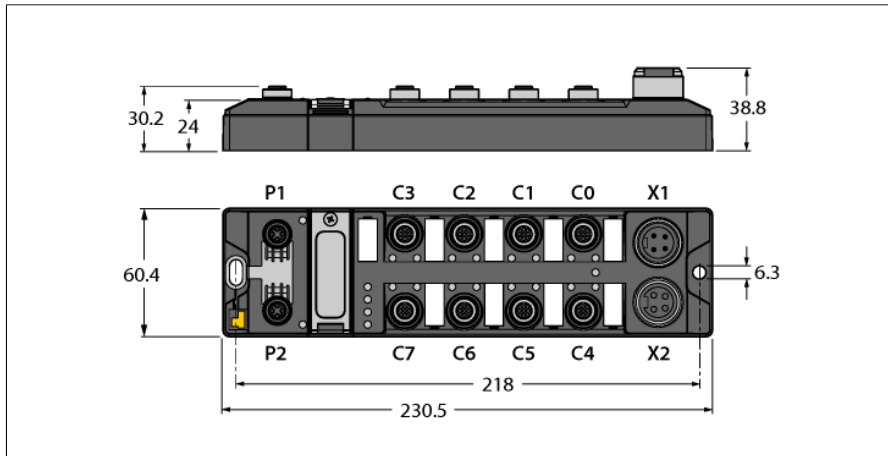


Compact Multiprotocol I/O Module for Ethernet

16 Digital PNP Inputs

TBEN-L4-16DIP



- PROFINET® device, EtherNet/IP™ device or Modbus® TCP slave
- Integrated Ethernet switch
- Supports 10 Mbps/100 Mbps
- 2x M12, 4-pin, D-coded, Ethernet fieldbus connection
- Glass fiber reinforced housing
- Shock and vibration tested
- Fully potted module electronics
- Protection classes IP65, IP67, IP69K
- 7/8" connector for power supply, 4-pin
- Input diagnostics per port
- FLC/ARGEe programmable

Type designation		TBEN-L4-16DIP
Ident-No.		6814009
Supply		
Supply voltage		24 VDC
Admissible range		18...30 VDC
		Total current max. 9 A per voltage group V1
Voltage supply connection		4-pin male 7/8" connector X1
Sensor/Actuator supply V _{AUX1}		supply of ports C0-C7 from V1
		short-circuit proof, 120 mA per port
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
Web server		Default: 192.168.1.254
Service interface		Ethernet via P1 or P2
Field Logic Controller (FLC)		
ARGEe Firmware Version		3.2.9.0
ARGEe Engineering Version		2.0.24.0
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
PROFINET		
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

Compact Multiprotocol I/O Module for Ethernet

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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	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.

General Information

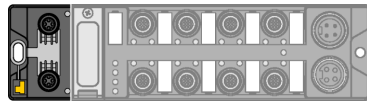
Dimensions (W x L x H)	60.4 x 230.4 x 39mm
Operating temperature	-40...+70 °C
Storage temperature	-40 °C ... +85 °C
Altitude	max. 5000 m
Protection class	IP65 IP67 IP69K
MTTF	205 years acc. to SN 29500 (Ed. 99) 20 °C
Housing material	PA6-GF30
Housing color	Black
Window material	Lexan
Material screw	303 stainless steel
Material label	Polycarbonate
Halogen-free	yes
Mounting	2 mounting holes □ 6.3 mm

Note the numbering of the IO range:
From firmware version 3.2.9.0 and higher ports C0 to C7 and channels CH0 to CH15 are counted. The process data image is unchanged. For more details on the corresponding change see manual.

Compact Multiprotocol I/O Module for Ethernet

16 Digital PNP Inputs

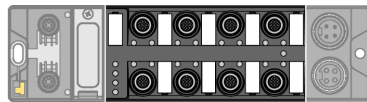
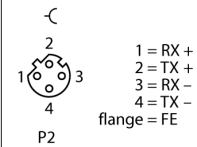
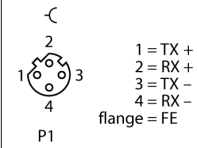
TBEN-L4-16DIP



Accessories

Ethernet cable (example):
RSSD RSSD 441-2M
Ident no. U-02482

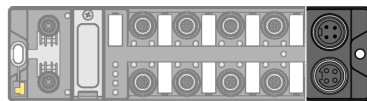
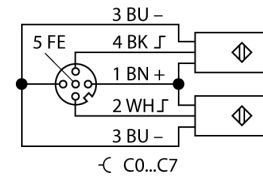
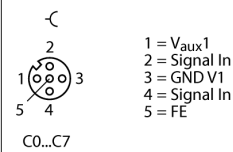
M12 x 1 Ethernet



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

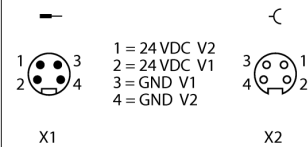
M12 x 1 Input



Accessories

Power supply cable (example):
RSM RKM 40-2M
Ident no. U2280-0

7/8" Power Supply



Compact Multiprotocol I/O Module for Ethernet

16 Digital PNP Inputs

TBEN-L4-16DIP

Module Status LED

LED	Color	Status	Description	
ETH1 / ETH2	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 master	
		Flashing	Steady flashing: Ready 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	Diagnostics disabled	
	Red	On	Diagnostics enabled	
			V ₂ undervoltage diagnosis is parameter-dependent	
	LED response master in the Beep network:			
	Green	1 Hz, 250 ms off	Cyclical IO data exchange	
	Red/Green	1 Hz, 250 ms red	Cyclical IO data exchange, diagnostics available	
	Green/Red	1 Hz, alternating	Discovery mode active	
	Red		Discovery mode active, diagnostics available	
	PWR	Green	ON	Power supply V ₁ OK
			OFF	V ₁ power off or below defined tolerance of 18 V

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

Compact Multiprotocol I/O Module for Ethernet

16 Digital PNP Inputs

TBEN-L4-16DIP

Process Data Mapping of the Single Protocols

For more details on the corresponding protocols see manual.

Modbus TCP Register Mapping

	Reg	Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Inputs (RO)	0x0000	DI15 C7P2	DI14 C7P4	DI13 C6P2	DI12 C6P4	DI11 C5P2	DI10 C5P4	DI9 C4P2	DI8 C4P4	DI7 C3P2	DI6 C3P4	DI5 C2P2	DI4 C2P4	DI3 C1P2	DI2 C1P4	DI1 C0P2	DI0 C0P4
Status (RO)	0x0001	-	FCE	-	-	CFG	COM	V1	-	V2	-	-	-	-	-	-	Diag Warn
Diag (RO)	0x0002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	I/O Diag
I/O Diag (RO)	0xA000									SCS7	SCS6	SCS5	SCS4	SCS3	SCS2	SCS1	SCS0

EtherNet/IP™ data mapping with activated scheduled diagnostics, default settings

	Word	Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Input data (station -> scanner)																	
GW status	0	-	FCE	-	-	CFG	COM	V1	-	V2	-	-	-	-	-	-	Diag Warn
Inputs	1	DI15 C7P2	DI14 C7P4	DI13 C6P2	DI12 C6P4	DI11 C5P2	DI10 C5P4	DI9 C4P2	DI8 C4P4	DI7 C3P2	DI6 C3P4	DI5 C2P2	DI4 C2P4	DI3 C1P2	DI2 C1P4	DI1 C0P2	DI0 C0P4
Diag 1	2	-	-	Sched Diag	-	-	-	-	-	-	-	-	-	-	-	-	I/O Diag
Diag 2	3									SCS7	SCS6	SCS5	SCS4	SCS3	SCS2	SCS1	SCS0

EtherNet/IP™ data mapping with activated summarized diagnostics

	Word	Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Input data (station -> scanner)																	
GW status	0	-	FCE	-	-	CFG	COM	V1	-	V2	-	-	-	-	-	-	Diag Warn
Inputs	1	DI15 C7P2	DI14 C7P4	DI13 C6P2	DI12 C6P4	DI11 C5P2	DI10 C5P4	DI9 C4P2	DI8 C4P4	DI7 C3P2	DI6 C3P4	DI5 C2P2	DI4 C2P4	DI3 C1P2	DI2 C1P4	DI1 C0P2	DI0 C0P4
Diag 1	2									-							I/O Diag

PROFINET process data

	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Inputs	0	DI8 C4P2	DI7 C4P4	DI6 C3P2	DI5 C3P4	DI4 C2P2	DI3 C2P4	DI2 C1P2	DI1 C1P4
	1	DI16 C8P2	DI15 C8P4	DI14 C7P2	DI13 C7P4	DI12 C6P2	DI11 C6P4	DI10 C5P2	DI9 C5P4

Key:

DIx	Digital input channel x	CFG	I/O Configuration error
DOx	Digital output channel x	FCE	I/O-ASSISTANT Force Mode active
Cx	Port x	I/ODiag	I/O diagnostics connected
Px	Pin x	SchedDiag	Manufacturer-specific diagnostics configured and active
DiagWarn	Diagnostic at least on 1 channel	SCSx	Short-circuit at port x
V1	Undervoltage V1	SCG1	Short-circuit supply ports C0-C3
V2	Undervoltage V2	SCG2	Short-circuit supply ports C4-C7
COM	Communication error on internal module bus	SCOx	Short-circuit output channel x