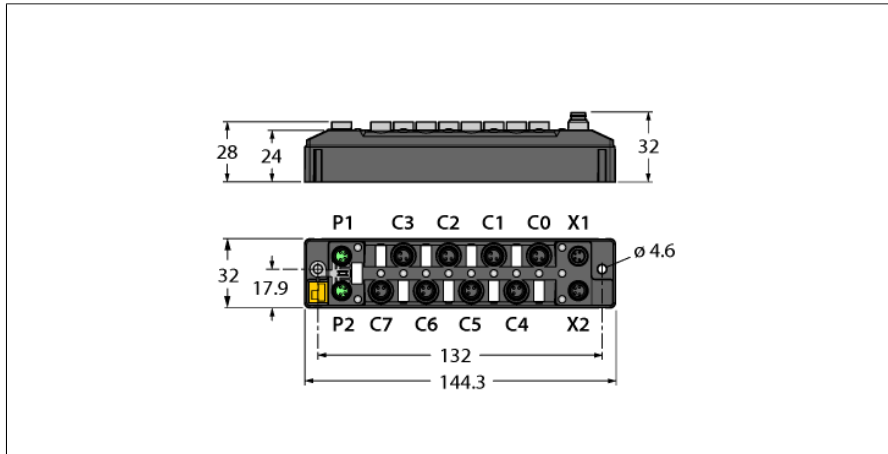


Compact Multiprotocol I/O Module for Ethernet

4 Digital PNP Inputs and 4 Digital PNP Outputs 2 A

TBEN-S1-4DIP-4DOP



Type	TBEN-S1-4DIP-4DOP
ID	6814021
Supply	
Supply voltage	24 VDC
Admissible range	18...30 VDC Total current max. 4 A per voltage group Total current V1 + V2 max. 5.5 A at 70 °C per module
Voltage supply connection	2 × M8, 4-pin, A-coded
Operating current	V1: max. 150 mA
Sensor/actuator supply	supply of ports C0-C3 from V1 short-circuit proof, 0.5 A for group C0-C3
Sensor/actuator supply	supply of ports C4-C7 from V2 short-circuit proof, 0.5 A for group C4-C7
Electrical isolation	galvanic isolation of the voltage groups V1 and V2, voltages up to 500 VAC
System data	
Fieldbus transmission rate	10/100 Mbps
Fieldbus connection technology	2 × M8, 4-pin
Protocol detection	automatic
Web server	default: 192.168.1.254
Service interface	Ethernet via P1 or P2
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 or Modbus TCP server
- Integrated Ethernet switch
- Supports 10 Mbps/100 Mbps
- 2 × M8, 4-pin, Ethernet fieldbus connection
- PROFINET S2 system redundancy
- Glass fiber reinforced housing
- Shock and vibration tested
- Fully potted module electronics
- Protection classes IP65, IP67, IP69K
- 4-pin M8 male connector for power supply
- Galvanically isolated voltage groups
- ATEX zone 2/22
- CCC-Ex
- Input diagnostics per group
- Max. 2 A per output
- Output diagnostics per channel
- Programmable ARGEE

Ethernet/IP	
Addressing	acc. to EtherNet/IP specification
Quick Connect (QC)	< 500 ms
min. RPI	2 ms
Device Level Ring (DLR)	supported
Class 3 connections (TCP)	3
Class 1 connections (CIP)	10
Input Assembly Instance	103
Output Assembly Instance	104
Configuration Assembly Instance	106

PROFINET	
Version	2.35
Addressing	DCP
Conformance class	B (RT)
MinCycleTime	1 ms
Fast Start-Up (FSU)	< 500 ms
Diagnostics	acc. to PROFINET alarm handling
Topology detection	supported
Automatic addressing	supported
Media Redundancy Protocol (MRP)	supported
System redundancy	S2
Netload class	3

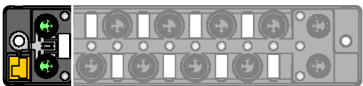
Digital inputs	
Number of channels	4
Connectivity inputs	M8, 3-pin
Input type	PNP
Type of input diagnostics	Group diagnostics
Switching threshold	EN 61131-2 Typ 3, PNP
Low-level signal voltage	< 5 V
High level signal voltage	> 11 V
Low level signal current	< 1.5 mA
High level signal current	> 2 mA
Input delay	0.2 ms/3 ms
Electrical isolation	Galvanically isolated to the fieldbus Voltage proof up 500 VDC

Digital outputs	
Number of channels	4
Connectivity outputs	M8, 3-pin
Output type	PNP
Type of output diagnostics	Channel diagnostics
Output voltage	24 VDC from potential group
Output current per channel	2.0 A, short-circuit proof
Load type	EN 60947-5-1: DC-13
Short-circuit protection	yes
Electrical isolation	Galvanically isolated to the fieldbus Voltage proof up 500 VDC

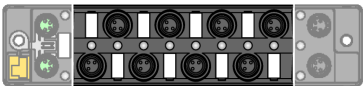
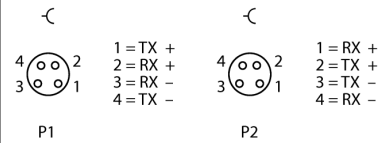
Standard/Directive conformity	
Vibration test	Acc. to EN 60068-2-6 Acceleration up to 20 g
Shock test	acc. to EN 60068-2-27
Drop and topple	acc. to EN 60068-2-31/IEC 60068-2-32
Electromagnetic compatibility	Acc. to EN 61131-2
Approvals and certificates	CE UKCA ATEX zone 2/22 CCC-Ex FCC statement, UV 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)	32 x 144 x 32 mm
Ambient temperature	-40...+70 °C
Storage temperature	-40...+85 °C
Altitude	Max. 5000 m
Protection class	IP65 IP67 IP69K
MTTF	264 years acc. to SN 29500 (Ed. 99) 20 °C
Housing material	PA6-GF30
Housing color	Black
Connector material	Nickel-plated brass
Material label	Polycarbonate
Halogen-free	yes
Mounting	2 mounting holes □ 4.6 mm

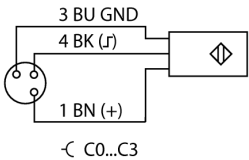
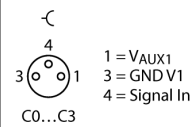
Note the numbering of the IO range:
From firmware version 3.1.4.0 and higher slots C0 to C7 and channels CH0 to CH7 are counted. For more details on the corresponding change see manual.



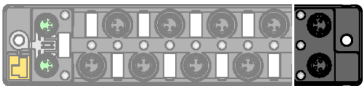
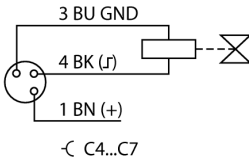
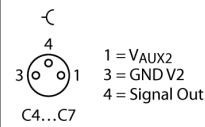
M8 x 1 Ethernet



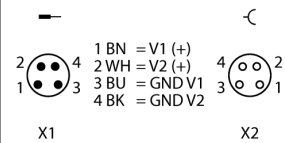
M8 x 1 Input



Output M8 x 1



M8 x 1 Voltage Supply



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
	Red/ Green	Alternating	Waiting for assignment of an IP address, DHCP or BootP
	OFF	Power off	
ERR	Green	On	No diagnostics available
	Red	On	Diagnostics available
			Undervoltage diagnosis response is parameter dependent
	LED response master in the Beep network:		
	Green	1 Hz, 250 ms off	Cyclical IO data exchange
	Green/red	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	V ₁ and V ₂ power supply OK
	Red	On	V ₂ power supply off or V ₂ undervoltage
		Off	V ₁ power supply off or V ₁ undervoltage

LED Status I/O

LED	Color	Status	Description
LED 0 ... 3	Green	ON	Input active
	Red	flashing	Overload of the power supply port. All LEDs of the affected group C0-C3 are flashing
		OFF	Input inactive
LED 4 ... 7	Green	ON	Output active
	Red	ON	Output active with overload/short circuit
		Flashing	Overload of the port supply. All LEDs of the affected group C4-C7 are flashing
		OFF	Output inactive
LED 7	White	Flashing	Blink/Wink command active

Process Data Mapping of the Single Protocols

For more details on the corresponding protocols see manual.

Modbus TCP

Register Addressing (16-bit)

Offset Process Input Data: 0x0000, structure acc. to general register mapping

Offset Process Output Data: 0x0800: Structure acc. to general register mapping

EtherNet/IP™

Word addressing (16-bit)

Process input data (station -> scanner):

Status word is located in front of the general process data!

	Reg/ 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
GW status	0x0000		-	FCE	-	-	CFG	COM	V1	-	V2	-	-	-	-	-	-	Diag Warn
	0x0001		Structure according to general register mapping															
	...																	

Process output data (scanner -> station):

Control word is located in front of the general process data!

	Reg/ 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
Control	0x0000		reserved															
	0x0001		Structure according to general register mapping															
	...																	

PROFINET:

Byte addressing (8-bit)

Offset Process Input Data: 0x0000, structure acc. to general register mapping

Offset Process Output Data: 0x0000: Structure acc. to general register mapping

General register mapping:

Address details are relative, offset of the respective protocol is to be observed.

Channel/port/pin assignment:

Channel		-	-	-	-	-	-	-	-	-	Ch7	Ch6	Ch5	Ch4	Ch3	CH2	CH1	CH0
		-	-	-	-	-	-	-	-	-	DO7	DO6	DO5	DO4	DI3	DI2	DI1	DI0
Port		-	-	-	-	-	-	-	-	-	C7	C6	C5	C4	C3	C2	C1	C0
Pin		-	-	-	-	-	-	-	-	-	P4	P4	P4	P4	P4	P4	P4	P4

Process input data:

	Reg/ 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
		Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
			MSB								LSB							
Digital inputs	0x0000	0x0000	-	-	-	-	-	-	-	-	-	-	-	-	DI3	DI2	DI1	DI0
Diagnostics	0x0001	0x0002	-	-	-	-	ERR3	ERR2	ERR1	ERR0	-	-	-	-	-	-	VERR V2 CH47	VERR V1 CH03
Latch input	0x0002	0x0004	-	-	-	-	-	-	-	-	-	-	-	-	DI3	DI2	DI1	DI0
Counter Ch0	0x0003	0x0006	Counter value LSB															
	0x0004	0x0008	Counter value MSB															
Frequency Ch0	0x0005	0x000A	Frequency MSB								Frequency LSB							
Status	0x0006	0x000C	-	-	-	-	-	-	-	-	Status							
PWM diagnos- tics Ch3	0x0007	0x000E	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	PWM OUT ERR
Module status	0x0008	0x0010	-	FCE	-	-	-	COM	V1	-	V2	-	-	-	-	-	-	DIAG

Process output data:

	Reg/ 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
		Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
			MSB								LSB							
Digital outputs	0x0000	0x0000	-	-	-	-	-	-	-	-	-	-	-	-	DO7	DO6	DO5	DO4
Latch reset	0x0001	0x0002	-	-	-	-	-	-	-	-	-	-	-	-	DI3	DI2	DI1	DI0
Control	0x0002	0x0004	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	CNT_ RST
PWM Ch3	0x0003	0x0006	-	-	-	-	-	-	-	-	Duty cycle							

Legend:

V1	Undervoltage V1	CFG	I/O configuration error
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V2	Undervoltage V2	FCE	I/O-ASSISTANT Force Mode active
Cx	Port x	Px	Pin x
DIx	Digital input channel x	DOx	Digital output channel x
Diag	Module diagnostics available	ERR x	Overcurrent output channel x
VERRVxCHyz	Overcurrent supply VAUXx channel y to z	PWMOUTERR	Overcurrent PWM output
VERRVxPyCz	Overcurrent supply VAUXx, pin y, port z	VAUXxPyCz	Supply VAUXx, pin y, port z
		CNT_RST	Counter reset