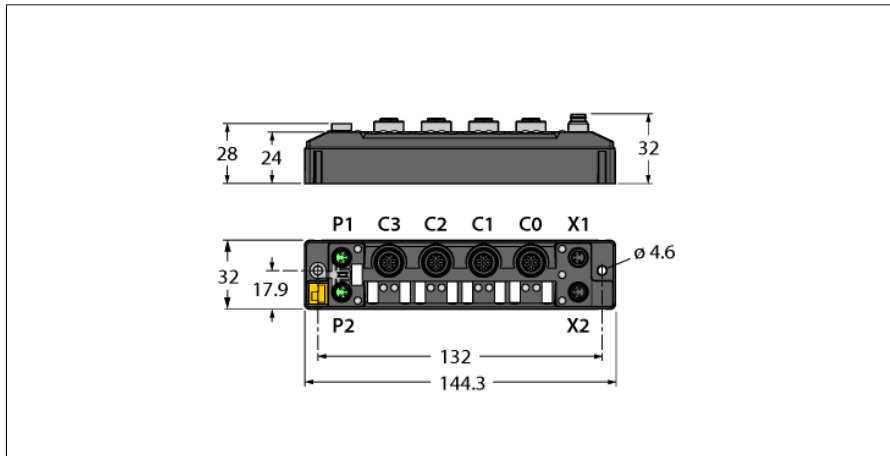


# Compact Multiprotocol I/O Module for Ethernet

## 4 Analog Outputs, Configurable as Voltage or Current

### TBEN-S2-4AO



- EtherNet/IP™, Modbus® TCP, or PROFINET® slave
- Integrated Ethernet switch
- 10 Mbps / 100 Mbps supported
- 2 x male M8, 4-pin, Ethernet-Fieldbus connection
- Glass fiber reinforced housing
- Shock and vibration tested
- Fully potted module electronics
- Protection classes IP65, IP67, IP69K
- FLC/ARGEE programmable
- Each channel can be selected for voltage
- Output ranges:
  - Voltage: 0/1...5 V, +/-10 V, 0/2...10 V
  - Current: 0 / 4...20 mA
- Male M8, 4-pin, for power supply
- Separated power groups for safety shutdown

<b>Type designation</b>	TBEN-S2-4AO
Ident-No.	6814028
<b>Supply</b>	
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 x M8, 4-pin
Operating current	V1: min. 50 mA, max. 110 mA
	V2: min.30 mA, max. 70 mA
Sensor/Actuator supply $V_{aux2}$	supply of ports C0-C3 from V2
Electrical isolation	not short-circuit proof, max. 4 A per group C0-C3
	galvanic isolation of the voltage groups V1 and V2, voltages up to 500 VAC

<b>System data</b>	
Fieldbus transmission rate	10 Mbps/100 Mbps
Fieldbus connection technology	2 x M8, 4-pin
Protocol detection	automatic
Web server	default: 192.168.1.254
Service Interface	Ethernet via P1 or P2

<b>Field Logic Controller (FLC)</b>	
Supported from firmware version	3.0.2.0
Released from ARGEE version	2.0.25.0

<b>Modbus TCP</b>	
Addressing	Static IP, BOOTP, 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)

<b>EtherNet/IP™</b>	
Addressing	acc. to EtherNet/IP™ specification
Quick Connect (QC)	< 500 ms
Device Level Ring (DLR)	supported
Number of TCP connections	3
Number of CIP connections	10
Input Assembly Instance	103
Output Assembly Instance	104
Configuration Assembly Instance	106

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**TURCK**  
*works*

Industrial  
Automation

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#### PROFINET

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

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#### Analog outputs

Number of channels	4
Operating modes	Voltage, current
Resolution	16 bit

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#### Operating mode voltage

Load resistor	1 k $\Omega$
Output signal type	Common ground
Output signal range	0...10V, +/- 10V, 2...10V, 0...5V, 1...5V
Cycle time	4 ms
Basic error at 25 °C	0.1 %
Repeat accuracy	0.05 %
Temperature coefficient	< 20 ppm/°C
Error total (FSR)	$\leq$ 0.23%

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#### Operating mode current

Load resistor	600 $\Omega$
Output signal type	Common ground
Output signal range	0...20 mA, 4...20 mA
Cycle time	4 ms
Basic error at 25 °C	0.15 %
Repeat accuracy	0.05 %
Temperature coefficient	< 20 ppm/°C
Error total (FSR)	$\leq$ 0.28 %

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#### 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
Electro-magnetic compatibility	acc. to EN 61131-2
Approvals and certificates	CE
UL conditions	cULus LISTED 21 W2, Encl.Type 1 IND.CONT.EQ.

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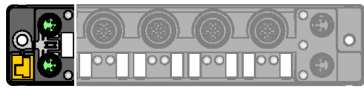
#### General Information

Dimensions (W x L x H)	32 x 144 x 32mm
Operating temperature	-40...+70 °C
Storage temperature	-40...+85 °C
Altitude	max.5000 m
Protection class	IP65 IP67 IP69K
MTTF	244 years acc. to SN 29500 (Ed. 99) 20 °C
Housing material	PA6-GF30
Housing color	Black
Material label	Polycarbonate
Halogen-free	yes
Mounting	2 mounting holes $\square$ 4.6 mm

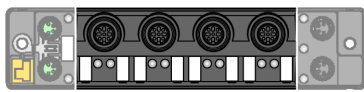
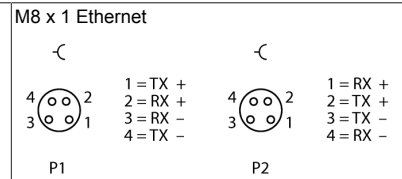
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Note the numbering of the IO range:  
From firmware version 3.0.2.0 and higher ports C0 to C3 and channels CH0 to CH3 are counted. For more details on the corresponding change see manual.

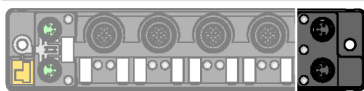
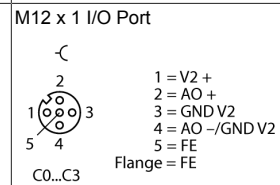
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**4 Analog Outputs, Configurable as Voltage or Current**  
**TBEN-S2-4AO**



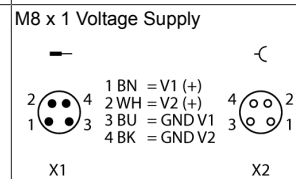
**Accessories**  
It is strongly recommended to use only ready-made Ethernet cables!  
Ethernet cable (example):  
M8-M8:  
PSGS4M-PSGS4M-4413-1M  
Ident. no. U-55718  
M8-RJ45:  
PSGS4M-RJ45S-4413-1M  
Ident. no.: U-55725  
M8-M12:  
RSSD-PSGS4M-4413-1M  
Ident. no.: U-58840



**Operating Mode: Voltage and Current**



**Accessories**  
Power supply cable (example):  
M8-M8 2 m  
PKG 4M-2-PSG 4M  
Ident. no. U99-10815



**Compact Multiprotocol I/O Module for Ethernet**  
**4 Analog Outputs, Configurable as Voltage or Current**  
**TBEN-S2-4AO**



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**Module LED Status**

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/ARGEE 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	Diagnostics disabled
	Red	ON	Diagnostics enabled V <sub>1</sub> undervoltage diagnosis is parameter-dependent
PWR	Green	ON	V <sub>1</sub> and V <sub>2</sub> power on
	Red	ON	V <sub>2</sub> power off or below defined tolerance of 18 V
		OFF	V <sub>1</sub> power off or below defined tolerance of 18 V

**LED Status I/O**

LED	Color	Status	Description
AO 0...3	Green	ON	Output active
	Red	flashing	Voltage: Short-circuit at output
		~4Hz	Current: Wire-break at output
	OFF	Input inactive	

# Compact Multiprotocol I/O Module for Ethernet

## 4 Analog Outputs, Configurable as Voltage or Current

### TBEN-S2-4AO

#### 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
Outputs (RO)	0x0800	Channel 0 MSB								Channel 0 LSB							
	0x0801	Channel 1 MSB								Channel 1 LSB							
	0x0802	Channel 2 MSB								Channel 2 LSB							
	0x0803	Channel 3 MSB								Channel 3 LSB							
Diag	0x0000							WBR	OVL							WBR	OVL
LSB Channel 1																	
MSB Channel 2																	
LSB Channel 3	0x0001							WBR	OVL							WBR	OVL
MSB Channel 4																	
Status (RO)	0x0002		FCE					V1	V2								DIAG

#### EtherNet/IP data mapping

	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)																	
Status word	0x0000		FCE					V1	V2								DIAG
Diag	0x0001							WBR	OVL							WBR	OVL
LSB channel 1																	
MSB channel 2																	
LSB channel 3	0x0002							WBR	OVL							WBR	OVL
MSB channel 4																	
Output data (scanner -> station)																	
Status word	0x0000																
Outputs	0x0001	Channel 0 MSB								Channel 0 LSB							
	0x0002	Channel 1 MSB								Channel 1 LSB							
	0x0003	Channel 2 MSB								Channel 2 LSB							
	0x0004	Channel 3 MSB								Channel 3 LSB							

#### PROFINET process data

	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Inputs	0	DI8	DI7	DI6	DI5	DI4	DI3	DI2	DI1
		C4P2	C4P4	C3P2	C3P4	C2P2	C2P4	C1P2	C1P4
	1	DI16	DI15	DI14	DI13	DI12	DI11	DI10	DI9
		C8P2	C8P4	C7P2	C7P4	C6P2	C6P4	C5P2	C5P4
Outputs	0	DO8	DO7	DO6	DO5	DO4	DO3	DO2	DO1
		C4P2	C4P4	C3P2	C3P4	C2P2	C2P4	C1P2	C1P4
	1	DO16	DO15	DO14	DO13	DO12	DO11	DO10	DO9
		C8P2	C8P4	C7P2	C7P4	C6P2	C6P4	C5P2	C5P4

Key:

V1	Undervoltage V1	CFG	I/O configuration error
V2	Undervoltage V2	FCE	I/O-ASSISTANT Force Mode active
Cx	Port x	Px	Pin x
I/ODiag	I/O diagnostics connected		
Diag	Diagnostic at least on 1 channel		
CJE	Cold junction error	RTDSC	Overcurrent (RTD only)
ULVE	Upper limit value exceeded	V1AOL	Overcurrent supply VAUX1
WBR	Wire-break	OFL	Overflow
UFL	Underflow	LLVU	Lower limit value underrun
OVL	Overload		