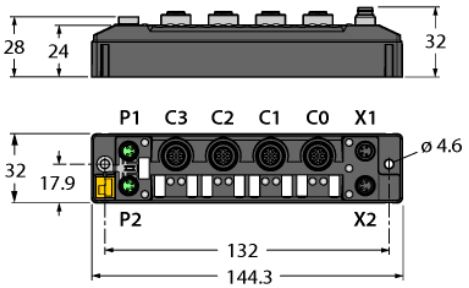
Compact Multiprotocol I/O Module for Ethernet
2 Configurable Serial Interfaces and 4 Universal Digital Channels
TBEN-S2-2COM-4DXP



Type	TBEN-S2-2COM-4DXP
ID	6814031

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 V2: max. 50 mA
Sensor/actuator supply	Ports C0-C1 powered by V1 Short-circuit proof, 24 V:1.2 A; 5 V:0.5 A per port
Sensor/actuator supply	Ports C2-C3 powered by V2 Short-circuit proof, 0.14 A per port
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
ARGEE functionality	Supported

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)

- PROFINET device, EtherNet/IP device or Modbus TCP server
- 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
- 4-pin M8 male connector for power supply
- Galvanically isolated voltage groups
- ATEX Zone 2/22
- Input diagnostics per group
- Max. 0.5A per output
- Output diagnostics per channel
- Two freely selectable digital channels per port
- Two serial ports can be selected as RS485 or RS232
- Up to eight Modbus RTU slaves integrated per serial interface
- Four freely selectable digital channels as input or output
- Programmable ARGEE

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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

Serial interface	
Signal type	RS232 or RS485
Number of channels	2

Operating mode RS232	
Signal low level	-18 to -3 VDC
Signal high level	3 to 18 VDC
Transmission signals	TxD, RxD
Transmission rate	300 to 230400 bps
Transmission type	Full duplex
Cable length	15 m at 19200 Bd (max. line capacitance < 2000 pF)

Operating mode RS485	
Transmission signals	TX/RX+, TX/RX-
Transmission rate	300 to 230400 bps
Transmission type	2-wire half duplex
Terminating resistor	Internal or external
Biasing	Internal or external
Line impedance	120 Ω
Cable length	Twisted pair up to 1000 m

Digital inputs	
Number of channels	4
Connectivity inputs	M12, 5-pin
Input type	PNP
Type of input diagnostics	Channel 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	0.05 ms
Electrical isolation	Galvanically isolated to the fieldbus Voltage proof up 500 VDC

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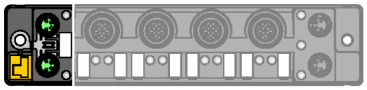
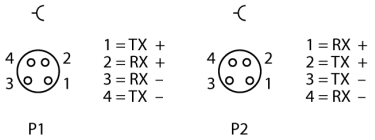
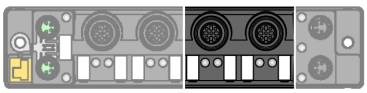
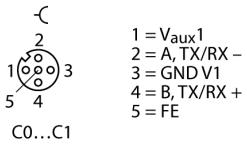
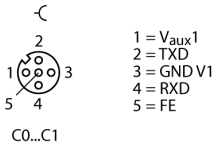
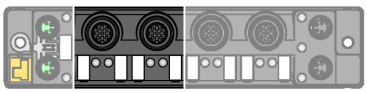
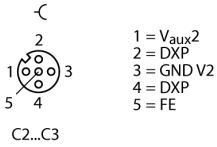
Digital outputs	
Number of channels	4
Connectivity outputs	M12, 5-pin
Output type	PNP
Type of output diagnostics	Channel diagnostics
Output voltage	24 VDC from potential group
Output current per channel	0.5 A, short-circuit proof
Load type	EN 60947-5-1: DC-13
Short-circuit protection	yes
Electrical isolation	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 and UKCA 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 Zones 2 and 22 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	179 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

		M8 x 1 Ethernet 
	**Note** General information on the modes of operation: Factory setting: Operating Mode: RS485	
	Operating Mode: RS485 RS485 cable (example): Ident. no. 7030331 RK4.5T-2-RS4.5T/S2503 length: 2 m Ident. no. 7030332 RK4.5T-5-RS4.5T/S2503 length: 5 m RS485 splitter: Ident. no. 6930573 VT2-FKM5-FKM5-FSM5 RS485 terminating resistor: Ident. no. 6934908 RSE57-TR2/RFID	M12 x 1 I/O Port 
	Operating Mode: RS232	M12 x 1 I/O Port 
		M12 x 1 I/O Port 

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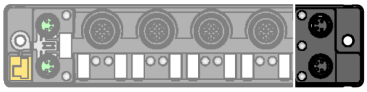
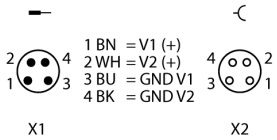


M8 x 1 Voltage Supply



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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/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	No diagnostics available
	Red	On	Diagnostics available Undervoltage diagnosis response is parameter dependent
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 TX	Green	Flashing	Data being sent
LED RX	Green	Flashing	Data being received
	Red	Flashing	Data is received, protocol error (Parity, Baudrate, ASCII/RTU)
	Red	On	Buffer overflow received data
LED TX and RX	Red	simultaneously flashing	Overload of the power supply slot. Both LEDs of the corresponding port are flashing simultaneously
	Red	alternately flashing	Configuration error. Both LEDs of the corresponding port are flashing alternately
DXP 4…7	Green	ON	Input or output active
	Red	ON	Output active with overload/short circuit
		Flashing	Overload of the port supply. Both LEDs of the corresponding port are flashing.
		OFF	Input or output inactive
DXP 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 or 0x8000: Structure according to general register mapping

Offset process output data:

0x0800 or 0x9000: Structure according 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 Assignment/Port/Pin:

Channel		-	-	-	-	-	-	-	-	Ch7	Ch6	Ch5	Ch4	-	-	-	-
		-	-	-	-	-	-	-	-	DI7	DI6	DI5	DI4	-	-	-	-
Port Pin		-	-	-	-	-	-	-	-	C3P2	C3P4	C2P2	C2P4	-	-	-	-

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							
COM0	0x0000	0x0000	-								Status *1)							
COM0	0x0001	0x0002	-								RXFL *2)							
COM0	0x0002	0x0004	UCT MSB *2)								UCT LSB *2)							
COM0 Data Block 1	0x0003 … 0x000E	0x006 … 0x001D	Input Byte 0…23, 0x00…0x17															
COM0 Block 2…7	…		…															
COM0 Data Block 8	0x0057 … 0x0062	0x00AF … 0x00C5	Input Byte 168…191, 0xA8…0xBF															
COM1	0x0063	0x00C6	-								Status *1)							
COM1	0x0064	0x00C8	-								RXFL *1)							
COM1	0x0065	0x00CA	UCT MSB *2)								UCT LSB *2)							
COM1 Data Block 1	0x0066 … 0x0071	0x00CC … 0x00E2	Input Byte 0…23, 0x00…0x17															
COM1 Block 2 … Block 7	…		…															
COM1 Data Block 8	0x00BA … 0x00C5	0x0175 … 0x18B	Input Byte 168…191, 0xA8…0xBF															
COM0	0x00C6	0x018C	MBS Error *2)								Diag							

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COM1	0x00C7	0x018E	MBS Error *2)								Diag							
COM0 *2)	0x00C8	0x0190	SCB 1 Status MSB								SCB 1 Status LSB							
	…	…	SCB 8 Status MSB								SCB 8 Status LSB							
	0x00CF	0x019E																
COM1 *2)	0x00D0	0x01A0	SCB 1 Status MSB								SCB 1 Status LSB							
	0x00D7	0x01AE	SCB 8 Status MSB								SCB 8 Status LSB							
COM0 *2)	0x00D8	0x01B0	MEXT SCB1 MSB								MEXT SCB1 MSB							
	…	…	MEXT SCB8 MSB								MEXT SCB8 MSB							
	0x00DF	0x01BE																
COM1 *2)	0x00E0	0x01C0	MEXT SCB1 MSB								MEXT SCB1 MSB							
	…	…	MEXT SCB8 MSB								MEXT SCB8 MSB							
	0x00E7	0x01CE																
4DXP Digital Inputs	0x00E8	0x01D0	-	-	-	-	-	-	-	-	DI7	DI6	DI5	DI4	-	-	-	-
4DXP Diagnostics	0x00E9	0x01D2	ERR7	ERR6	ERR5	ERR4	-	-	-	-	VERR V2C67	VERR V2C45	-	-	-	-	-	-
Module Status	0x00EA	0x01D4	-	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							
COM0	0x0000	0x0000	-								Control Bits *1)							
COM0	0x0001	0x0002	-								TXFL *1)							
COM0	0x0002	0x0004	-								RXLC *1)							
COM0 Data Block 1	0x0003 … 0x000E	0x0006 … 0x001C	Output Byte 0…23, 0x00…0x17															
COM0 Block 2…7	…	…	…															
COM0 Data Block 8	0x0057 … 0x0062	0x00AE … 0x00C4	Output Byte 168…191, 0xA7…0xBF															
COM1	0x0063	0x00C6	-								Control Bits *1)							
COM1	0x0064	0x00C8	-								TXFL *1)							
COM1	0x0065	0x00CA	-								RXFL *1)							
COM0 Data Block 1	0x0066 … 0x0071	0x00CC … 0x000E2	Output Byte 0…23, 0x00…0x17															
COM0 Block 2…7	…	…	…															
COM0 Data Block 8	0x00BA … 0x00C5	0x0175 … 0x018A	Output Byte 168…191, 0xA7…0xBF															
4DXP Digital Outputs	0x00C6	0x018C	-	-	-	-	-	-	-	-	DO7	DO6	DO5	DO4	-	-	-	-

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
DIx	Digital input channel x	DOx	Digital output channel x
Diag	Module Diagnostics Available	ERR x	Overcurrent output channel x
VERRV2Cxy	Overcurrent supply VAUX1 channel x and y		
RXFL	Received Frame Length	TXFL	Transmit Frame Length
RXLC	Receive Frame Length		
UCT	MODBUS Server Cycle Time	MEXT	MODBUS Server Timing
SCB	MODBUS Server Configuration Block	MBS	MODBUS Server
*1)	Data valid for RS Raw mode		
*2)	Data valid for Modbus RTU mode		
	For more details on status and diagnosis bits see manual.		

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