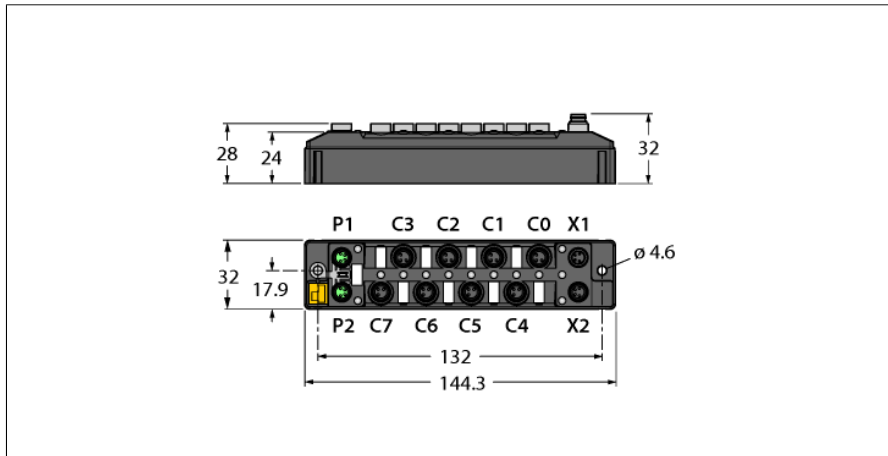


# Compact Multiprotocol I/O Module for Ethernet

## 8 Digital PNP Outputs 0.5 A

### TBEN-S1-8DOP



- PROFINET device, EtherNet/IP device or Modbus TCP slave
- Integrated Ethernet switch
- Supports 10 Mbps / 100 Mbps
- 2x M8, 4-pin, Ethernet fieldbus connection
- Glass fiber reinforced housing
- Shock and vibration tested
- Fully potted module electronics
- Protection classes IP65, IP67, IP69K
- M8, 4-pin connector for power supply
- Galvanically isolated voltage groups
- Max. 0.5A per output
- Output diagnostics per channel
- FLC/ARGEЕ programmable

|                                          |                                                                            |
|------------------------------------------|----------------------------------------------------------------------------|
| <b>Type designation</b>                  | TBEN-S1-8DOP                                                               |
| Ident-No.                                | 6814022                                                                    |
| <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 × M8, 4-pin                                                              |
| Operating current                        | V1: max. 150 mA                                                            |
| Sensor/Actuator supply V <sub>AUX2</sub> | supply of ports C0-C7 from V2                                              |
|                                          | short-circuit proof, 0.5 A for group C0-C3, C4-C7                          |
| Electrical isolation                     | 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 × 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>      |                                                                            |
| ARGEЕ Firmware Version                   | 3.1.4.0                                                                    |
| ARGEЕ Engineering Version                | 2.0.24.0                                                                   |
| <b>Modbus TCP</b>                        |                                                                            |
| 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)                                                          |
| <b>Ethernet/IP</b>                       |                                                                            |
| Addressing                               | acc. to EtherNet/IP specification                                          |
| Quick Connect (QC)                       | < 500 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                                                                        |

# Compact Multiprotocol I/O Module for Ethernet

## 8 Digital PNP Outputs 0.5 A

### TBEN-S1-8DOP

#### 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                       |

#### Digital outputs

|                            |                                                                   |
|----------------------------|-------------------------------------------------------------------|
| Number of channels         | 8                                                                 |
| Connectivity outputs       | M8, 3-pol                                                         |
| 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 resistance                                   |
| Load type                  | EN 60947-5-1: DC-13                                               |
| Short-circuit protection   | yes                                                               |
| Electrical isolation       | Galvanically isolated to the fieldbus<br>Voltage proof up 500 VDC |

#### Standard/Directive conformity

|                               |                                                                          |
|-------------------------------|--------------------------------------------------------------------------|
| Vibration test                | acceleration to 20 g<br>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,<br>FCC,<br>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

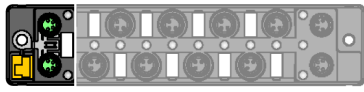
|                        |                                           |
|------------------------|-------------------------------------------|
| Dimensions (W x L x H) | 32 x 144 x 32mm                           |
| Ambient temperature    | -40...+70 °C                              |
| Storage temperature    | -40...+85 °C                              |
| Altitude               | max. 5000 m                               |
| Protection class       | IP65<br>IP67<br>IP69K                     |
| MTTF                   | 283 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 □ 4.6 mm                 |

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

# Compact Multiprotocol I/O Module for Ethernet

## 8 Digital PNP Outputs 0.5 A

### TBEN-S1-8DOP



#### 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

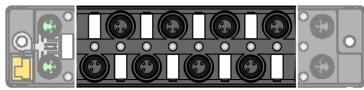
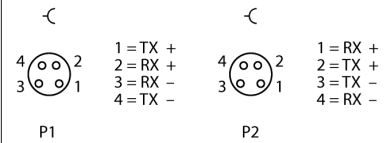
Ident. no.: U-55725

M8-M12:

RSSD-PSGS4M-4413-1M

Ident. no.: U-58840

#### M8 × 1 Ethernet



#### Accessories

Actuator and sensor cable/PUR cable (example):

M8 - open end

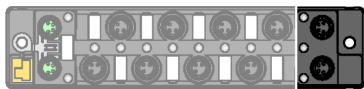
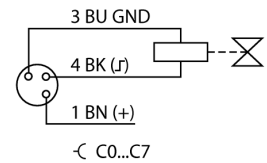
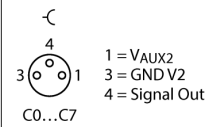
ID No. 6625562 PSG3M-2/TXL

M8-M8

ID No. 6625665 PKG3M-0,3-PSG3M/TXL

ID No. 6627137 PKG3M-3-PSG3M/TXL

#### M8 × 1 I/O port



#### Accessories

Power supply cable (example):

M8-M8 2 M (2.0 Amp)

PKG 4M-2-PSG 4M

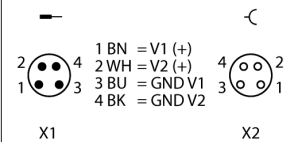
Ident. No. U99-10815

M8-M8 2 M (4.0 Amp)

PKGC 4M-2-PSGC 4M

Ident. No. U-82319

#### M8 × 1 power cable



# Compact Multiprotocol I/O Module for Ethernet

## 8 Digital PNP Outputs 0.5 A

### TBEN-S1-8DOP

#### 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<br>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/<br>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>2</sub> undervoltage diagnosis 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 <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                                                                              |
|-------------|-------|----------|------------------------------------------------------------------------------------------|
| LED 0 ... 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 C0-C3 or C4-C7 are flashing. |
|             |       | OFF      | Output inactive                                                                          |
| LED 7       | White | Flashing | Blink/Wink command active                                                                |

# Compact Multiprotocol I/O Module for Ethernet

## 8 Digital PNP Outputs 0.5 A

### TBEN-S1-8DOP

#### 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/<br>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<br>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/<br>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. Observe offset of respective protocol

Channel Assignment/Port/Pin:

| Channel |  | - | - | - | - | - | - | - | - | Ch7 | Ch6 | Ch5 | Ch4 | Ch3 | Ch2 | Ch1 | CH0 |
|---------|--|---|---|---|---|---|---|---|---|-----|-----|-----|-----|-----|-----|-----|-----|
|         |  | - | - | - | - | - | - | - | - | DO7 | DO6 | DO5 | DO4 | DO3 | DO2 | DO1 | DO0 |
| Port    |  | - | - | - | - | - | - | - | - | C7  | C6  | C5  | C4  | C3  | C2  | C1  | C0  |
| Pin     |  | - | - | - | - | - | - | - | - | P4  | P   | P4  | P4  | P4  | P4  | P4  | P4  |

#### Process Input Data:

|                             | Reg/<br>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   |       |       |       |       |       |                    |                    |
| Diagnostics                 | 0x0000       | 0x0000 | ERR7   | ERR6   | ERR5   | ERR4   | ERR3   | ERR2   | ERR1  | ERR0  | -     | -     | -     | -     | -     | -     | VERR<br>V2<br>CH47 | VERR<br>V2<br>CH03 |
| PWM Diagnos-<br>tics<br>Ch3 | 0x0001       | 0x0002 | -      | -      | -      | -      | -      | -      | -     | -     | -     | -     | -     | -     | -     | -     | -                  | PWM<br>OUT<br>ERR  |
| PWM Diagnos-<br>tics<br>Ch7 | 0x0002       | 0x0004 | -      | -      | -      | -      | -      | -      | -     | -     | -     | -     | -     | -     | -     | -     | -                  | PWM<br>OUT<br>ERR  |
| Module Status               | 0x0003       | 0x0006 | -      | FCE    | -      | -      | -      | COM    | V1    | -     | V2    | -     | -     | -     | -     | -     | -                  | DIAG               |

#### Process Output Data:

|                 | Reg/<br>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   | DO3   | DO2   | DO1   | DO0   |
| PWM Ch3         | 0x0001       | 0x0002 | -      | -      | -      | -      | -      | -      | -     | -     | Duty cycle |       |       |       |       |       |       |       |
| PWM Ch7         | 0x0002       | 0x0004 | -      | -      | -      | -      | -      | -      | -     | -     | Duty cycle |       |       |       |       |       |       |       |

Legend:

|     |                 |     |                                 |
|-----|-----------------|-----|---------------------------------|
| V1  | Undervoltage V1 | CFG | I/O configuration error         |
| V2  | Undervoltage V2 | FCE | I/O-ASSISTANT Force Mode active |
| ... | ...             | ... | ...                             |

# Compact Multiprotocol I/O Module for Ethernet

## 8 Digital PNP Outputs 0.5 A

### TBEN-S1-8DOP

| Dlx        | 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                |