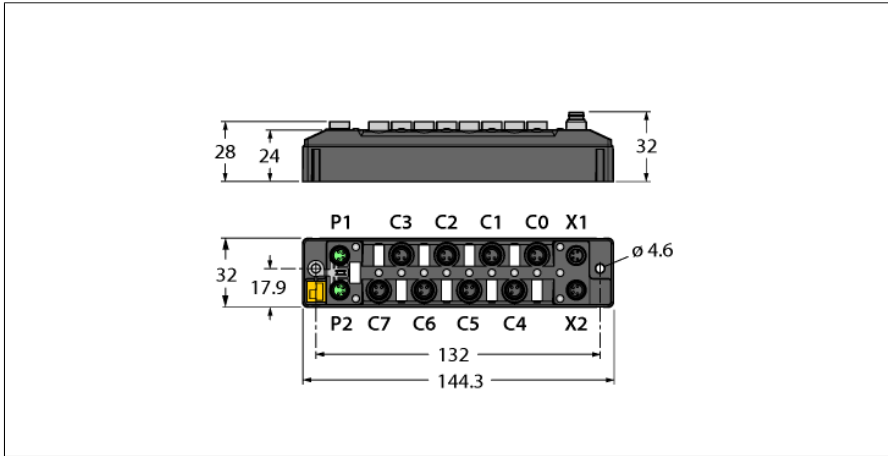


Compact Multiprotocol I/O Module for Ethernet
8 Digital PNP Outputs 0.5 A
TBEN-S1-8DOP



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

| | |
|--|--|
| Type designation | TBEN-S1-8DOP |
| Ident-No. | 6814022 |
| 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 |
| Operating current | V1: max. 150 mA |
| Sensor/Actuator supply V _{AUX2} | 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 |
| System data | |
| 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 |
| Field Logic Controller (FLC) | |
| Supported from firmware version | 3.1.4.0 |
| Released from ARGEE 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) | < 500 ms |
| Device Level Ring (DLR) | supported |
| Class 3 connections | 3 |
| Class 1 connections | 10 |
| Input Assembly Instance | 103 |
| Output Assembly Instance | 104 |
| Configuration Assembly Instance | 106 |

Compact Multiprotocol I/O Module for Ethernet

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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 |

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 proof |
| Load type | EN 60947-5-1: DC-13 |
| Short-circuit protection | yes |
| Electrical isolation | galvanic isolation to P1/P2 , voltages up to 500 VDC |

Standard/Directive conformity

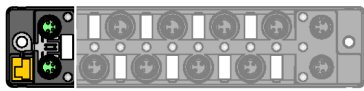
| | |
|-------------------------------|--|
| Vibration test | acceleration to 20 g acc. to EN 60068-2-6 |
| Shock test | acc. to EN 60068-2-27 |
| Drop and topple | acc. to EN 60068-2-31/IEC 60068-2-32 |
| Electromagnetic compatibility | acc. to EN 61131-2 |
| Approvals and certificates | CE, FCC |
| 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 |
| Operating temperature | -40...+70 °C |
| Storage temperature | -40...+85 °C |
| Altitude | max. 5000 m |
| Protection class | IP65 IP67 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.

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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

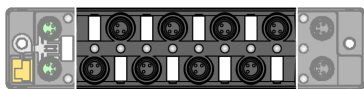
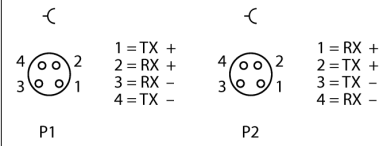
Ident. no.: U-55725

M8-M12:

RSSD-PSGS4M-4413-1M

Ident. no.: U-58840

M8 x 1 Ethernet



Accessories

Actuator and sensor cable/PUR cable (example):

M8 - open end

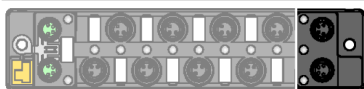
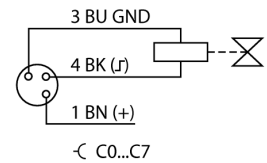
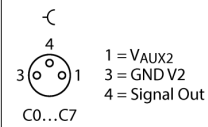
ID No. 6625562 PSG3M-2/TXL

M8-M8

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

ID No. 6627137 PKG3M-3-PSG3M/TXL

M8 x 1 I/O Port



Accessories

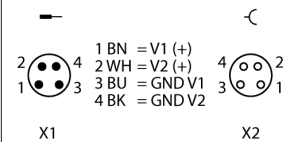
Power supply cable (example):

M8-M8 2 m

PKG 4M-2-PSG 4M

Ident. no. U99-10815

M8 x 1 Voltage Supply



Compact Multiprotocol I/O Module for Ethernet

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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_2 undervoltage diagnosis is parameter-dependent |
| PWR | Green | ON | V_1 and V_2 power on |
| | Red | ON | V_2 power off or below defined tolerance of 18 V |
| | | OFF | V_1 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/ 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. 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/ 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 V2 | VERR V2 | | | | | | | | |
| PWM Diagnos- tics Ch3 | 0x0001 | 0x0002 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | PWM OUT ERR | | | | | | | | |
| PWM Diagnos- tics Ch7 | 0x0002 | 0x0004 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | PWM OUT ERR | | | | | | | | |
| Module Status | 0x0003 | 0x0006 | - | 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 | 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

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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 |