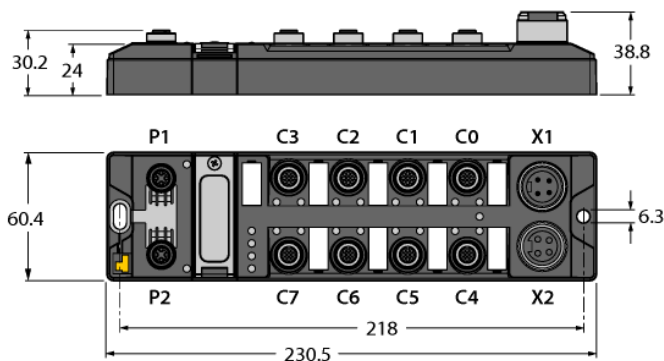


## Ethernet Spanner

### Master to master data exchange, NAT router, 16 digital PNP inputs TBEN-L4-EN1



- Two separate, electrically isolated Ethernet interfaces
- Bi-directional data exchange between two networks
- Protocol conversion between EtherNet/IP™, Modbus® TCP and Profinet®
- PROFINET® is supported on P2 Ethernet port
- 1:1 NAT router
- 10 Mbps/100 Mbps supported
- 2x M12, 4-pin, D-coded, Ethernet fieldbus connection
- Glass fiber reinforced housing
- Shock and vibration tested
- Fully potted module electronics
- Protection classes IP65, IP67, IP69K
- 7/8" connector for power supply, 4-pin
- Input diagnostics per port

|                                          |                                                                            |
|------------------------------------------|----------------------------------------------------------------------------|
| <b>Type designation</b>                  | TBEN-L4-EN1                                                                |
| Ident-No.                                | 6814037                                                                    |
| <b>Supply</b>                            |                                                                            |
| Supply voltage                           | 24 VDC                                                                     |
| Admissible range                         | 18...30 VDC                                                                |
|                                          | Total current max. 9 A per voltage group V1                                |
| Voltage supply connection                | 4-pin male 7/8" connector X1                                               |
| Sensor/Actuator supply V <sub>AUX1</sub> | supply of ports C0-C7 from V1                                              |
|                                          | short-circuit proof, 120 mA per port                                       |
| 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 x M12, 4-pin, D-coded                                                    |
| Web server                               | default: 192.168.1.254                                                     |
| Service interface                        | Ethernet via P1                                                            |
| <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                                                                          |
| <b>EtherNet/IP™</b>                      |                                                                            |
| Addressing                               | acc. to EtherNet/IP™ specification                                         |
| Class 1 connections (CIP)                | 3                                                                          |
| <b>Digital inputs</b>                    |                                                                            |
| Number of channels                       | 16                                                                         |
| Connectivity inputs                      | M12, 5-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                              | 2.5 ms                                                                     |
| Electrical isolation                     | Galvanically isolated to the fieldbus                                      |
|                                          | Voltage proof up 500 VDC                                                   |

## Ethernet Spanner

### Master to master data exchange, NAT router, 16 digital PNP inputs

#### TBEN-L4-EN1

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##### 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>FM Class I, Zone 2,<br>UV-resistant in accordance with DIN EN ISO 4892-2A (2013) |
| UL Certificate                | cULus LISTED 21 W2, Encl.type 1 IND.CONT.EQ.                                                    |

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##### General Information

|                        |                                           |
|------------------------|-------------------------------------------|
| Dimensions (W x L x H) | 60.4 x 230.4 x 39mm                       |
| Operating temperature  | -40...+70 °C                              |
| Storage temperature    | -40 °C ... +85 °C                         |
| Altitude               | max. 5000 m                               |
| Protection class       | IP65<br>IP67<br>IP69K                     |
| MTTF                   | 205 years acc. to SN 29500 (Ed. 99) 20 °C |
| Housing material       | PA6-GF30                                  |
| Housing color          | Black                                     |
| Window material        | Lexan                                     |
| Material screw         | 303 stainless steel                       |
| Material label         | Polycarbonate                             |
| Halogen-free           | yes                                       |
| Mounting               | 2 mounting holes □ 6.3 mm                 |

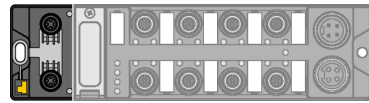
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Note the numbering of the IO range:  
From firmware version 3.0.11.0 and higher, ports C0 to C7 and channels CH0 to CH7 are counted. For more details on the corresponding change see manual.

## Ethernet Spanner

Master to master data exchange, NAT router, 16 digital PNP inputs

TBEN-L4-EN1



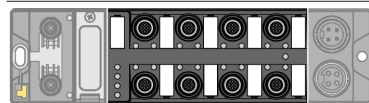
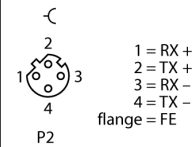
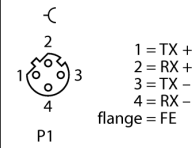
### Accessories

Ethernet cable (example):

RSSD RSSD 441-2M

Ident no. U-02482

M12 x 1 Ethernet



### Accessories

Accessories:

Connection cable , 2-channel (example):

RK 4.4T-2-RS 4.4T

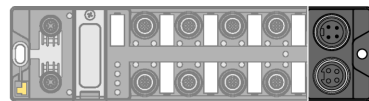
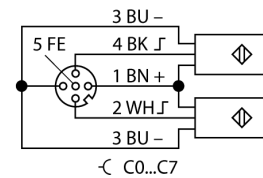
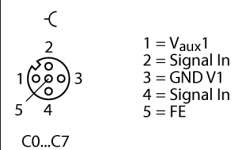
Ident no. U2445

Splitter, 1-channel (example):

YB2-FSM 4.5-2FKM 4.5

Ident no. U0875-78

M12 x 1 Input



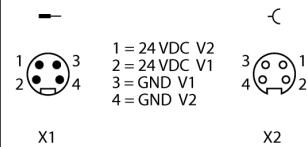
### Accessories

Power supply cable (example):

RSM RKM 40-2M

Ident no. U2280-0

7/8" Power Supply



## Ethernet Spanner

Master to master data exchange, NAT router, 16 digital PNP inputs

TBEN-L4-EN1

### 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 | Ready                                                                               |
|             | Red    | ON       | Network error or Restore Mode or Modbus timeout                                     |
|             |        | flashing | Blink/Wink command active                                                           |
|             |        | OFF      | Power off                                                                           |
| ERR         | Green  | ON       | Diagnostics disabled                                                                |
|             | Red    | ON       | Diagnostics enabled<br>V <sub>2</sub> undervoltage diagnosis is parameter-dependent |
| PWR         | Green  | ON       | Power supply V <sub>1</sub> OK                                                      |
|             |        | OFF      | V <sub>1</sub> power off or below defined tolerance of 18 V                         |

### LED Status I/O

| LED          | Color | Status   | Description                                                            |
|--------------|-------|----------|------------------------------------------------------------------------|
| LED 0 ... 15 | Green | ON       | Input active                                                           |
|              | Red   | flashing | Power overload at the corresponding port. Both port LEDs are flashing. |
|              |       | OFF      | Input inactive                                                         |

## Ethernet Spanner

### Master to master data exchange, NAT router, 16 digital PNP inputs

#### TBEN-L4-EN1

##### Process Data Mapping of the Single Protocols

For more details on the corresponding protocols see manual.

##### Modbus TCP Register Mapping

The address ranges are valid for both networks.

|                             | 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        |
|-----------------------------|--------------------|--------------|--------------|--------------|--------------|--------------|--------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|
| Inputs (RO)                 | 0x0000             | DI15<br>C7P2 | DI14<br>C7P4 | DI13<br>C6P2 | DI12<br>C6P4 | DI11<br>C5P2 | DI10<br>C5P4 | DI9<br>C4P2 | DI8<br>C4P4 | DI7<br>C3P2 | DI6<br>C3P4 | DI5<br>C2P2 | DI4<br>C2P4 | DI3<br>C1P2 | DI2<br>C1P4 | DI1<br>C0P2 | DI0<br>C0P4  |
| Status (RO)                 | 0x0001             | -            | FCE          | SPE1         | SPE2         | CFG          | COM          | V1          | -           | V2          | -           | -           | -           | -           | -           | -           | Diag<br>Warn |
| Diag (RO)                   | 0x0002             | -            | -            | -            | -            | -            | -            | -           | -           | -           | -           | -           | -           | -           | -           | -           | I/O<br>Diag  |
| Spanner Input<br>Data (RO)  | 0x3000 -<br>0x30EF | 580 Bytes    |              |              |              |              |              |             |             |             |             |             |             |             |             |             |              |
| Spanner Output<br>Data (WR) | 0x3400 -<br>0x34EF | 580 Bytes    |              |              |              |              |              |             |             |             |             |             |             |             |             |             |              |
| I/O Diag (RO)               | 0xA000             |              |              |              |              |              |              |             |             |             | SCS7        | SCS6        | SCS5        | SCS4        | SCS3        | SCS2        | SCS1<br>SCS0 |

##### EtherNet/IP™ data mapping with activated scheduled diagnostics, default settings

The address ranges are valid for both networks.

|                                  | 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)  |       |              |              |              |              |              |              |             |             |             |             |             |             |             |             |             |             |
| GW Status                        | 0     | -            | FCE          | SPE1         | SPE2         | CFG          | COM          | V1          | -           | V2          | -           | -           | -           | -           | -           | -           | Diag Warn   |
| Inputs                           | 1     | DI15<br>C7P2 | DI14<br>C7P4 | DI13<br>C6P2 | DI12<br>C6P4 | DI11<br>C5P2 | DI10<br>C5P4 | DI9<br>C4P2 | DI8<br>C4P4 | DI7<br>C3P2 | DI6<br>C3P4 | DI5<br>C2P2 | DI4<br>C2P4 | DI3<br>C1P2 | DI2<br>C1P4 | DI1<br>C0P2 | DI0<br>C0P4 |
| Diag 1                           | 2     | -            | -            | -            | -            | -            | -            | -           | -           | -           | -           | -           | -           | -           | -           | -           | I/O<br>Diag |
| Diag 2                           | 3     |              |              |              |              |              |              |             |             | SCS7        | SCS6        | SCS5        | SCS4        | SCS3        | SCS2        | SCS1        | SCS0        |
| Spanner                          | 4-243 | 580 bytes    |              |              |              |              |              |             |             |             |             |             |             |             |             |             |             |
| Output Data (Scanner -> Station) |       |              |              |              |              |              |              |             |             |             |             |             |             |             |             |             |             |
|                                  | 0-3   | reserved     |              |              |              |              |              |             |             |             |             |             |             |             |             |             |             |
| Spanner                          | 4-243 | 580 bytes    |              |              |              |              |              |             |             |             |             |             |             |             |             |             |             |

##### PROFINET process data

|        | Byte | Bit 7       | Bit 6        | Bit 5        | Bit 4        | Bit 3        | Bit 2       | Bit 1       | Bit 0       |
|--------|------|-------------|--------------|--------------|--------------|--------------|-------------|-------------|-------------|
| Inputs | 0    | DI7<br>C3P2 | DI6<br>C3P4  | DI5<br>C2P2  | DI4<br>C2P4  | DI3<br>C1P2  | DI2<br>C1P4 | DI1<br>C0P2 | DI0<br>C0P4 |
|        | 1    | DI15<br>C72 | DI14<br>C7P4 | DI13<br>C6P2 | DI12<br>C6P4 | DI10<br>C5P2 | DI9<br>C5P4 | DI8<br>C4P2 | DI7<br>C4P4 |

Key:

|          |                                            |           |                                                         |
|----------|--------------------------------------------|-----------|---------------------------------------------------------|
| DIx      | Digital input channel x                    | CFG       | I/O configuration error                                 |
| DOx      | Digital output channel x                   | FCE       | I/O-ASSISTANT Force Mode active                         |
| Cx       | Port x                                     | I/O Diag  | I/O diagnostics connected                               |
| Px       | Pin x                                      | SchedDiag | Manufacturer-specific diagnostics configured and active |
| DiagWarn | Diagnostic at least on 1 channel           | SCSx      | Short-circuit at port x                                 |
| V1       | Undervoltage V1                            | SCG1      | Short-circuit supply ports C0-C3                        |
| V2       | Undervoltage V2                            | SCG2      | Short-circuit supply ports C4-C7                        |
| COM      | Communication error on internal module bus | SC0x      | Short-circuit output channel x                          |
| SPEx     | Spanner port active                        |           |                                                         |