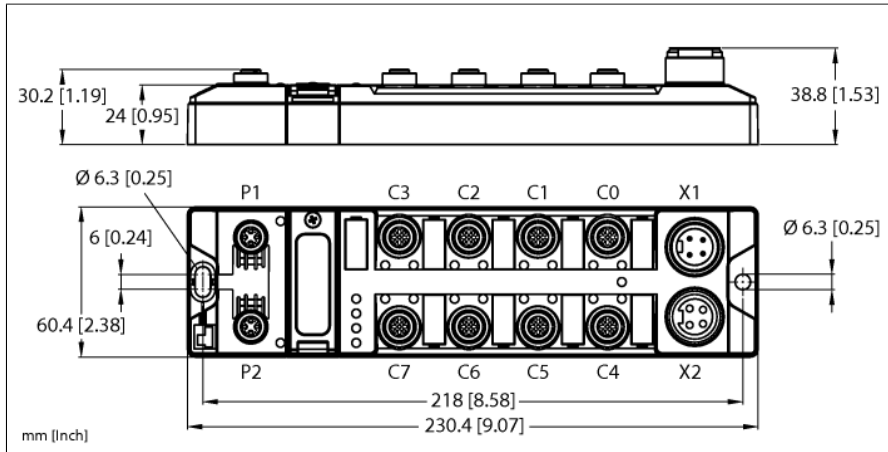


# Compact Multiprotocol I/O Module for Ethernet

## 8 IO-Link Master Channels

### 4 Universal Digital PNP Channels, 2 A, Channel Diagnostics

#### TBEN-LH-8IOL



|                                |                                                                                                                       |
|--------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| Type                           | TBEN-LH-8IOL                                                                                                          |
| ID                             | 100002195                                                                                                             |
| <b>Supply</b>                  |                                                                                                                       |
| Supply voltage                 | 24 VDC                                                                                                                |
| Admissible range               | 18...30 VDC<br>Total current max. 9 A per voltage group<br>Total current V1 + V2 max. 11 A<br>IO-Link 20.4...28.8 VDC |
| Voltage supply connection      | 4-pin male 7/8" connector X1                                                                                          |
| Operating current              | V1: max. 180 mA, min. 120 mA<br>V2: min. 40 mA, max. 90 mA                                                            |
| Sensor/actuator supply         | Supply from V1<br>Short-circuit proof, max. 4 A per slot C0 and C4,<br>max. 2 A per slot C1–C3, C5–C7                 |
| Sensor/actuator supply         | Class B supply from V2<br>Short-circuit proof, max. 4 A per slot C4 and C5,<br>max. 2 A per slot C6 and C7            |
| Electrical isolation           | galvanic isolation of the voltage groups V1 and V2,<br>voltages up to 500 VAC                                         |
| Fault exclusion                | Yes, acc. to EN ISO 13849-2, appendix D.2                                                                             |
| <b>System data</b>             |                                                                                                                       |
| Fieldbus transmission rate     | 10/100 Mbps                                                                                                           |
| Fieldbus connection technology | 2 × M12, 4-pin, D-coded                                                                                               |
| Protocol detection             | automatic                                                                                                             |
| Web server                     | Default: 192.168.xxx.xxx                                                                                              |
| Service interface              | Ethernet via P1 or P2                                                                                                 |
| <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)                                                                                                     |

- PROFINET device, EtherNet/IP device or Modbus TCP slave
- Integrated Ethernet switch
- Supports 10 Mbps / 100 Mbps
- 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" male connector for power supply, 4-pin
- Galvanically isolated voltage groups support passive safety
- M12 ports for IO-Link master, 5-pin
- IO-Link master port class A and port class B
- IO-Link Protocol 1.1
- Dieser Artikel darf nur für Honda-Projekte verwendet werden!

|                                 |                                   |
|---------------------------------|-----------------------------------|
| Ethernet/IP                     |                                   |
| Addressing                      | acc. to EtherNet/IP specification |
| Quick Connect (QC)              | < 150 ms                          |
| Device Level Ring (DLR)         | supported                         |
| Class 3 connections (TCP)       | 3                                 |
| Class 1 connections (CIP)       | 10                                |
| Input Assembly Instance         | 101                               |
| Output Assembly Instance        | 102                               |
| Configuration Assembly Instance | 106                               |

|                                 |                                 |
|---------------------------------|---------------------------------|
| PROFINET                        |                                 |
| Addressing                      | DCP                             |
| Conformance class               | B (RT)                          |
| MinCycleTime                    | 1 ms                            |
| Fast Start-Up (FSU)             | < 150 ms                        |
| Diagnostics                     | acc. to PROFINET alarm handling |
| Topology detection              | supported                       |
| Automatic addressing            | supported                       |
| Media Redundancy Protocol (MRP) | supported                       |

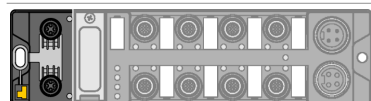
|                           |                                                          |
|---------------------------|----------------------------------------------------------|
| Digital inputs            |                                                          |
| Number of channels        | 4 DXP + 8 SIO                                            |
| Connectivity inputs       | M12, 5-pin                                               |
| Input type                | PNP                                                      |
| Type of input diagnostics | Channel diagnostics                                      |
| Switching threshold       | EN 61131-2 type 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 bus, voltages up to 500 VAC |

|                            |                                                             |
|----------------------------|-------------------------------------------------------------|
| Digital outputs            |                                                             |
| Number of channels         | 4 DXP                                                       |
| 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 | 2.0 A, short-circuit proof                                  |
| Electrical isolation       | galvanically isolated against P1/P2, voltages up to 500 VAC |

|                       |                                                         |
|-----------------------|---------------------------------------------------------|
| IO-Link               |                                                         |
| Number of channels    | 8                                                       |
| IO-Link               | Pin 4 in IOL mode                                       |
| IO-Link specification | V 1.1                                                   |
| IO-Link port type     | Class A and Class B                                     |
| Frame type            | supports all specified frame types                      |
| Supported devices     | Max. 32 bytes in/32 bytes out per port                  |
| Transmission rate     | 4.8 kbps (COM 1) / 38.4 kbps (COM 2) / 230 kbps (COM 3) |

|                                      |                                                                        |
|--------------------------------------|------------------------------------------------------------------------|
| <b>Standard/Directive conformity</b> |                                                                        |
| Vibration test                       | Acc. to EN 60068-2-6<br>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<br>FCC statement,<br>UV resistant acc. to DIN EN ISO 4892-2A (2013) |
| UL Certificate                       | cULus LISTED 21 W2, Encl.Type 1 IND.CONT.EQ.                           |

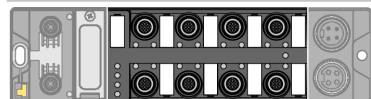
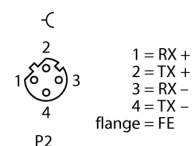
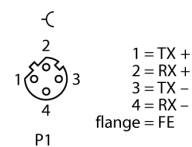
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|----------------------------|---------------------------|
| <b>General Information</b> |                           |
| Dimensions (W x L x H)     | 60.4 x 230.4 x 39 mm      |
| Ambient temperature        | -40...+70 °C              |
| Storage temperature        | -40...+85 °C              |
| Altitude                   | Max. 5000 m               |
| Protection class           | IP65<br>IP67<br>IP69K     |
| Housing material           | PA6-GF30                  |
| Housing color              | Black                     |
| Male connector material    | Nickel-plated brass       |
| Window material            | Lexan                     |
| Material screw             | 303 stainless steel       |
| Material label             | Polycarbonate             |
| Halogen-free               | yes                       |
| Mounting                   | 2 mounting holes □ 6.3 mm |



## Note

Ethernet cable (example):  
RSSD-RSSD-441-2M/S2174  
Ident. no. 6914218

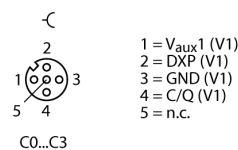
## Ethernet



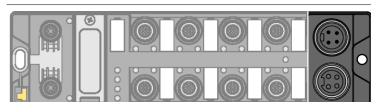
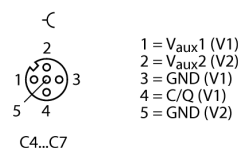
## Note

Pin 1:  $V_{AUX1}$  can be deactivated via process data  
Pin 4: IO-Link data or digital input (SIO mode)  
C0...C3: IO-Link Master Class A  
Pin 2: digital input or output (DXP)  
C4...C7: IO-Link Master Class B  
Pin 2: switchable class B supply ( $V_{AUX2}$ )  
Accessories:  
Appropriate IO-Link cable for example:  
ID No. 6625604 2m: RKC4T-2-RSC4T/TXL  
ID No. 6625730 5 m: RKC4T-5-RSC4T/TXL  
Further lengths and variants in the product catalog or on request

## M12 × 1 I/O port



## M12 × 1 I/O port



## Note

Power supply cable (example):  
RKM43-1-RSM43  
Ident. no. 6914312

## Voltage Supply 7/8"



#### 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                                                     |
|             | Green/Red | Alternating | Autonegotiation and/or waiting for DHCP/Boot-P addressing                     |
|             |           | Off         | Power off                                                                     |
| ERR         | Green     | On          | No diagnostics available                                                      |
|             | Red       | On          | Diagnostics available                                                         |
|             |           |             | Undervoltage diagnosis response is parameter dependent                        |
| PWR         | Green     | On          | V <sub>1</sub> and V <sub>2</sub> power supply OK                             |
|             | Red       | On          | V <sub>2</sub> power supply off or V <sub>2</sub> undervoltage                |
|             |           | Off         | V <sub>1</sub> power supply off or V <sub>1</sub> undervoltage                |

#### LED Status I/O

| LED                                                               | Color | Status   | Description                                                   |
|-------------------------------------------------------------------|-------|----------|---------------------------------------------------------------|
| LED 0, 2, 4, 6, 8, 10, 12, 14<br>IO-Link Port 1-8<br>IO-Link Mode | Green | Flashing | IO-Link communication, process data valid                     |
|                                                                   |       |          |                                                               |
|                                                                   | Red   | Flashing | IO-Link communication, process data invalid                   |
|                                                                   |       | ON       | IO-Link supply OK, no IO-Link Communication                   |
| LED 0, 2, 4, 6, 8, 10, 12, 14<br>IO-Link Port 1-8<br>SIO Mode     | Green | ON       | Digital Input signal is present                               |
|                                                                   |       | OFF      | No input signal                                               |
|                                                                   | Red   | ON       | Digital input or output active                                |
|                                                                   |       | ON       | Output active with overload/short circuit                     |
| LED 1, 3, 5, 7<br>DXP                                             | Green | ON       | Digital input or output active                                |
|                                                                   |       | ON       | Output active with overload/short circuit                     |
|                                                                   | Red   | ON       | Overload supply V <sub>AUX1</sub>                             |
|                                                                   |       | OFF      | Input or output inactive                                      |
| LED 9, 11, 13, 15<br>IO-Link Class B VAUX2                        | Green | ON       | V <sub>AUX2</sub> Active on Pin 2                             |
|                                                                   |       | ON       | V <sub>AUX2</sub> Active on Pin 2 with overload/short circuit |
|                                                                   | Red   | ON       | Overload supply V <sub>AUX1</sub>                             |
|                                                                   |       | OFF      | V <sub>AUX2</sub> Inactive on Pin 2                           |

# Process Data Mapping of the Single Protocols

For more details on the corresponding protocols see manual.

| INPUT       | WORD                                          | Bit 7/15                         | Bit 6/14                   | Bit 5/13                   | Bit 4/12                   | Bit 3/11                     | Bit 2/10                     | Bit 1/9                      | Bit 0/8                      |
|-------------|-----------------------------------------------|----------------------------------|----------------------------|----------------------------|----------------------------|------------------------------|------------------------------|------------------------------|------------------------------|
| Input Word  | 0                                             | Reserved                         | Reserved                   | Reserved                   | Reserved                   | C3 DXP Input Active          | C2 DXP Input Active          | C1 DXP Input Active          | C0 DXP Input Active          |
|             |                                               | C7 PIN4 DI                       | C6 PIN4 DI                 | C5 PIN4 DI                 | C4 PIN4 DI                 | C3 PIN4 DI                   | C2 PIN4 DI                   | C1 PIN4 DI                   | C0 PIN4 DI                   |
|             | 1                                             | Reserved                         | Reserved                   | Reserved                   | FCE                        | COM                          | V2                           | V1                           | Diag                         |
|             |                                               | C7 IOL Port 8 Data Valid         | C6 IOL Port 7 Data Valid   | C5 IOL Port 6 Data Valid   | C4 IOL Port 5 Data Valid   | C3 IOL Port 4 Data Valid     | C2 IOL Port 3 Data Valid     | C1 IOL Port 2 Data Valid     | C0 IOL Port 1 Data Valid     |
|             | IO-Link process input data                    |                                  |                            |                            |                            |                              |                              |                              |                              |
|             | 2                                             | C0 IOL Port 1 Input Data Word 0  |                            |                            |                            |                              |                              |                              |                              |
|             | 3                                             | C0 IOL Port 1 Input Data Word 1  |                            |                            |                            |                              |                              |                              |                              |
|             | 4                                             | C1 IOL Port 2 Input Data Word 0  |                            |                            |                            |                              |                              |                              |                              |
|             | 5                                             | C1 IOL Port 2 Input Data Word 1  |                            |                            |                            |                              |                              |                              |                              |
|             | 6                                             | C2 IOL Port 3 Input Data Word 0  |                            |                            |                            |                              |                              |                              |                              |
|             | 7                                             | C2 IOL Port 3 Input Data Word 1  |                            |                            |                            |                              |                              |                              |                              |
|             | 8                                             | C3 IOL Port 4 Input Data Word 0  |                            |                            |                            |                              |                              |                              |                              |
|             | 9                                             | C3 IOL Port 4 Input Data Word 0  |                            |                            |                            |                              |                              |                              |                              |
|             | 10                                            | C4 IOL Port 5 Input Data Word 0  |                            |                            |                            |                              |                              |                              |                              |
|             | 11                                            | C4 IOL Port 5 Input Data Word 1  |                            |                            |                            |                              |                              |                              |                              |
|             | 12                                            | C5 IOL Port 6 Input Data Word 0  |                            |                            |                            |                              |                              |                              |                              |
|             | 13                                            | C5 IOL Port 6 Input Data Word 1  |                            |                            |                            |                              |                              |                              |                              |
|             | 14                                            | C6 IOL Port 7 Input Data Word 0  |                            |                            |                            |                              |                              |                              |                              |
|             | 15                                            | C6 IOL Port 7 Input Data Word 1  |                            |                            |                            |                              |                              |                              |                              |
|             | 16                                            | C7 IOL Port 8 Input Data Word 0  |                            |                            |                            |                              |                              |                              |                              |
|             | 17                                            | C7 IOL Port 8 Input Data Word 1  |                            |                            |                            |                              |                              |                              |                              |
|             | structure depends on channel parameterization |                                  |                            |                            |                            |                              |                              |                              |                              |
|             | 18                                            | C0 IOL Port 1 Input Data Word 0  |                            |                            |                            |                              |                              |                              |                              |
|             | 34                                            | C1 IOL Port 2 Input Data Word 0  |                            |                            |                            |                              |                              |                              |                              |
|             | 50                                            | C2 IOL Port 3 Input Data Word 0  |                            |                            |                            |                              |                              |                              |                              |
|             | 66                                            | C3 IOL Port 4 Input Data Word 0  |                            |                            |                            |                              |                              |                              |                              |
|             | 82                                            | C4 IOL Port 5 Input Data Word 0  |                            |                            |                            |                              |                              |                              |                              |
|             | 98                                            | C5 IOL Port 6 Input Data Word 0  |                            |                            |                            |                              |                              |                              |                              |
|             | 114                                           | C6 IOL Port 7 Input Data Word 0  |                            |                            |                            |                              |                              |                              |                              |
|             | 130                                           | C7 IOL Port 8 Input Data Word 0  |                            |                            |                            |                              |                              |                              |                              |
| OUTPUT      | BYTE                                          | Bit 7                            | Bit 6                      | Bit 5                      | Bit 4                      | Bit 3                        | Bit 2                        | Bit 1                        | Bit 0                        |
| Output Word | 0                                             | Disable C7 IOL                   | Disable C6 IOL             | Disable C5 IOL             | Disable C4 IOL             | Disable C3 IOL               | Disable C2 IOL               | Disable C1 IOL               | Disable C0 IOL               |
|             |                                               | Activate C3 DXP                  | Activate C2 DXP            | Activate C1 DXP            | Activate C0 DXP            | Enable C3 DXP                | Enable C2 DXP                | Enable C1 DXP                | Enable C0 DXP                |
|             | 1                                             | -                                | C3 IOL Map B0              | -                          | C2 IOL Map B0              | -                            | C1 IOL Map B0                | -                            | C0 IOL Map B0                |
|             |                                               | -                                | C7 IOL Map B0              | -                          | C6 IOL Map B0              | -                            | C5 IOL Map B0                | -                            | C4 IOL Map B0                |
|             | 2                                             | Turn off VAUX1Pin1 C7 Ch14       | Turn off VAUX1Pin1 C6 Ch12 | Turn off VAUX1Pin1 C5 Ch10 | Turn off VAUX1 Pin1 C4 Ch8 | Turn off VAUX1Pin1 C3 Ch6, 7 | Turn off VAUX1Pin1 C2 Ch4, 5 | Turn off VAUX1Pin1 C1 Ch2, 3 | Turn off VAUX1Pin1 C0 Ch0, 1 |
|             |                                               | Turn off VAUX2Pin2 C7 Ch15       | Turn off VAUX2Pin2 C6 Ch13 | Turn off VAUX2Pin2 C5 Ch11 | Turn off VAUX2Pin2 C4 Ch9  | Reserved                     | Reserved                     | Reserved                     | Reserved                     |
|             | 3                                             | C7 16 Word Transfer              | C6 16 Word Transfer        | C5 16 Word Transfer        | C4 16 Word Transfer        | C3 16 Word Transfer          | C2 16 Word Transfer          | C1 16 Word Transfer          | C0 16 Word Transfer          |
|             |                                               | Reserved                         | Reserved                   | Reserved                   | Reserved                   | Reserved                     | Reserved                     | Reserved                     | Reserved                     |
|             | IO-Link process output data                   |                                  |                            |                            |                            |                              |                              |                              |                              |
|             | 4                                             | C0 IOL Port 1 Output Data Word 0 |                            |                            |                            |                              |                              |                              |                              |
|             | 5                                             | C0 IOL Port 1 Output Data Word 1 |                            |                            |                            |                              |                              |                              |                              |
|             | 6                                             | C1 IOL Port 2 Output Data Word 0 |                            |                            |                            |                              |                              |                              |                              |
|             | 7                                             | C1 IOL Port 2 Output Data Word 1 |                            |                            |                            |                              |                              |                              |                              |
|             | 8                                             | C2 IOL Port 3 Output Data Word 0 |                            |                            |                            |                              |                              |                              |                              |
|             | 9                                             | C2 IOL Port 3 Output Data Word 1 |                            |                            |                            |                              |                              |                              |                              |
|             | 10                                            | C3 IOL Port 4 Output Data Word 0 |                            |                            |                            |                              |                              |                              |                              |
|             | 11                                            | C3 IOL Port 4 Output Data Word 1 |                            |                            |                            |                              |                              |                              |                              |
|             | 12                                            | C4 IOL Port 5 Output Data Word 0 |                            |                            |                            |                              |                              |                              |                              |
|             | 13                                            | C4 IOL Port 5 Output Data Word 1 |                            |                            |                            |                              |                              |                              |                              |
|             | 14                                            | C5 IOL Port 6 Output Data Word 0 |                            |                            |                            |                              |                              |                              |                              |

|                                               |                                                  |
|-----------------------------------------------|--------------------------------------------------|
| 15                                            | C5 IOL Port 6 Output Data Word 1                 |
| 16                                            | C6 IOL Port 7 Output Data Word 0                 |
| 17                                            | C6 IOL Port 7 Output Data Word 1                 |
| 18                                            | C7 IOL Port 8 Output Data Word 0                 |
| 19                                            | C7 IOL Port 8 Output Data Word 1                 |
| structure depends on channel parameterization |                                                  |
| 20                                            | C0 IOL Port 1 Output Data Word 0 — 16WD Enabled  |
| 35                                            | C0 IOL Port 1 Output Data Word 15 — 16WD Enabled |
| :::                                           |                                                  |
| 132                                           | C7 IOL Port 8 Output Data Word 0 — 16WD Enabled  |
| 147                                           | C7 IOL Port 8 Output Data Word 15 — 16WD Enabled |