

Modicon Premium automation platform

TBX discrete I/O IP 65 modules on Fipio bus

General

Decentralising the I/O meets the requirement of both users and machine manufacturers while maintaining performance comparable with that of a centralised structure.

In the same way as distributed I/O modules, TBX dust and damp proof modules are used to create distributed control systems, which offer increased availability of installations. They also offer the possibility of locating the I/O interfaces close to the process or machines, in harsh environments (water jets, dust, etc).

TBX modules are addressed by the application program as “In rack” I/O, with which they can coexist.

TBX dust and damp proof distributed I/O modules are connected to Premium processors via the Fipio fieldbus (maximum number of modules per Fipio bus, see page 43589/4).

TBX dust and damp proof I/O modules offer:

- Compact interface elements.
- Easy setup and connection:
 - sensors and actuators are directly connected to dust and damp proof standard connectors,
 - tools are available for local testing and diagnostics of both the interfaces and those devices which are connected to them.

TBX dust and damp proof I/O modules with IP 65 protection conform to the following test standards:

- UL, NEMA,
- CSA,
- IEC 65A,
- NFC 63850,
- to the CNOMO EO3 40 50 recommendation,
- to the NF 46 604 FIP standard.

Functions

TBX dust and damp proof distributed discrete I/O modules offer identical functions to those of the modular TBX I/O modules:

| Reference | TBX EEP 08C22 | TBX EEP 1622 | TBX ESP 08C22 | TBX ESP 1622 |
|---|---------------|--------------|---------------|--------------|
| Wiring check | | | | |
| Outputs fallback | | | | |
| Assignment of I/O channels to application tasks | | | | |

■ Function available

TBX EEP 08C22/1622 dust and damp proof distributed input modules

The TBX EEP 08C22 input module (8 channels --- 24 V) and the TBX EEP 1622 input module (16 channels --- 24 V) have the following functions:

- Wiring check providing line check via short-circuit, open circuit or earth line detection.
- Assignment of each group of 8 input channels (channels 0 to 7 or 8 to 15) to a specific application task (fast, master or auxiliary task).

TBX ESP 08C22/1622 dust and damp proof distributed output modules

The TBX ESP 08C22 output module (8 channels --- 24 V) and the TBX EEP 1622 output module (16 channels --- 24 V) have the following functions:

- Transistor output protection, detection of overloads or short-circuits which can be used by the user program (channel by channel or for all 8 or 16 module channels).
- Reactivation of transistor outputs, choice of automatic reactivation or by user program.
- Wiring check providing line check via short-circuit, open circuit or earth line detection.
- Output fallback state: on module fault, maintains the state of the outputs at their last value or at a configured value (state 0 or 1) channel by channel.
- Assignment of each group of 8 output channels (channels 0 to 7 or 8 to 15) to a specific application task (fast, master or auxiliary task).

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Description

TBX EEP/ESP 08C22 modules

Dust and damp proof distributed I/O modules are monobloc type in an IP 65 casing and comprise:

- 1 8 female M12 type fast connectors for connecting the sensors or preactuators.
- 2 8 channel status indicator lamps.
- 3 4 status indicator lamps for module operation and integrated communication.
- 4 A dust and damp proof connector for connection to the Fipio bus, and to the $\overline{\text{---}}$ 24 V power supply.
- 5 For output modules, a $\overline{\text{---}}$ 24 V preactuator power supply connector.

Connector to be ordered separately:

- TBX BLP 10 dust and damp proof connector which can also be used for coding connection points.
- For output modules, a TBX BAS 10 dust and damp proof power supply connector.

TBX EEP/ESP 1622 modules

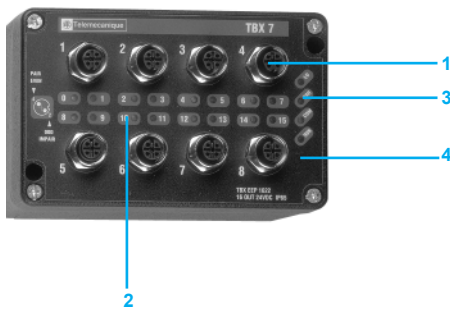
Dust and damp proof distributed I/O modules are monobloc type in an IP 65 casing and comprise:

- 1 8 female M12 type fast connectors for connecting the sensors or preactuators (1 connector for 2 channels).
- 2 16 channel status indicator lamps (yellow lamps for even channels and green lamps for odd channels).
- 3 4 status indicator lamps for module operation and integrated communication.
- 4 A dust and damp proof connector for connection to the Fipio bus, and to the $\overline{\text{---}}$ 24 V power supply.

For output modules, a $\overline{\text{---}}$ 24 V preactuator power supply connector on the left side.

Connector to be ordered separately:

- TBX BLP 10 dust and damp proof connector which can also be used for coding connection points.
- For output modules, a TBX BAS 10 dust and damp proof power supply connector.



Modicon Premium automation platform

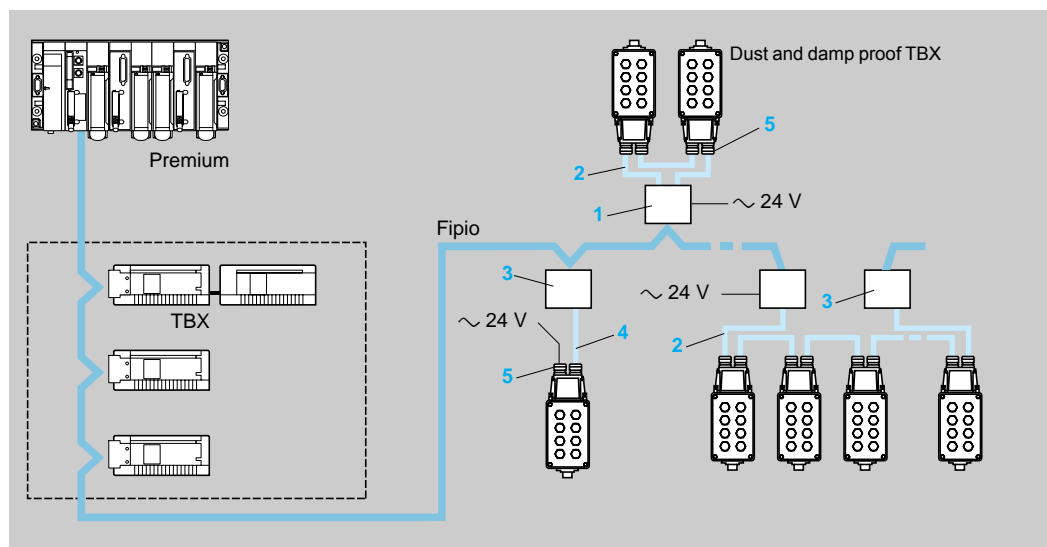
TBX discrete I/O IP 65 modules on Fipio bus

Connection principles

TBX dust and damp proof distributed I/O modules require a \sim 24 V power supply. This supply can be provided:

- Via a TBX FP ACC 10 dust and damp proof network junction box **1**. In this case, the TSX FP CF●00 tap link cable **2** is required which is a screened twisted pair 150 W with 2 conductors carrying the \sim 24 V supply for the modules. The mechanical and chemical resistance characteristics for this cable are suitable for use in harsh environments.

Directly to the TBX BLP 10 connector on the dust and damp proof TBX module **5**. In this case, a tap link off the trunk cable is made using the TSX FP ACC 4 T-junction box **3** with the TSX FP CC●00 tap link cable **4** (double twisted pair 150 Ω).



Daisy chaining dust and damp proof distributed I/O modules using a TBX FP ACC 10 T-junction box

Using a TBX FP ACC 10 junction box **1** up to 10 TBX dust and damp proof modules can be daisy chained.

Since power is carried to the TBX dust and damp proof I/O modules via the TSX FP CF●00 tap link cable **2**, the length of the tap links depends on the type of \sim 24V power supply and the number of TBX dust and damp proof modules daisy chained on the same tap link. The lengths in metres are given in the table below:

| Number of TBX dust and damp proof modules in daisy chain | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|--|-----|-----|----|----|----|----|----|----|----|----|
| \sim 24 V \pm 3% supply | 263 | 131 | 87 | 65 | 51 | 42 | 36 | 31 | 27 | 24 |
| \sim 24 V \pm 5% supply | 232 | 116 | 77 | 57 | 45 | 37 | 31 | 27 | 24 | 21 |
| \sim 24 V \pm 10% supply | 154 | 77 | 51 | 38 | 30 | 24 | 20 | 17 | 15 | 13 |

| Type of inputs module | | | TBX EEP 08C22 | TBX EEP 1622 |
|--|--|--------------|--|---------------|
| Modularity | | | 8 | 16 |
| Nominal input values | Voltage | V | ≐ 24 | |
| | Current | mA | 7 | |
| | Sensor supply (ripple included) | V | ≐ 19.2...30 | |
| Input limit values | At state 1 | Voltage | V | ≥ 11 |
| | | Current | mA | ≥ 6 for 11 V |
| | At state 0 | Voltage | V | < 5 |
| | | Current | mA | ≤ 2 |
| Input impedance | | | kΩ | 3.4 |
| Logic | | | Positive | |
| Response time | Change from 0 at 1 | ms | 6 | 5...11 |
| | Change from 1 at 0 | ms | 6 | 5...13 |
| Protection against polarity inversion | Sensor supply | | Reverse mounted parallel diode | Series diode |
| Dissipated power | Per module (with 60 % load) | W | 2.6 | 2.7...24 V |
| Typical currents consumed | Module supply | mA | 40 | 95 (at 24 V) |
| | Sensor supply | mA | 70 | 100 (at 24 V) |
| Type of inputs | | | Current sink, conforming to IEC 1131 type 2 | |
| Sensor common | | | To "+ve" of supply | |
| Compatibility output modules | | | TBX transistor outputs of the same voltage | |
| External line | Line resistance | Ω | < 500 with volt-free contact, < 100 with 2-wire proximity sensor | |
| | Open line leakage resistance | kΩ | > 30 with volt-free contact, > 100 with 2-wire proximity sensor | |
| Isolation | Dielectric strength between inputs and earth | V eff | 1500 at 50/60 Hz for 1 min | |
| | Insulation resistance | MΩ | > 10 at ≐ 500 V | |
| Temperature | Operation | °C | 5...60 | |
| | Storage | °C | - 25...+ 70 | |

| Type of outputs module | | | TBX ESP 08C22 | TBX ESP 1622 |
|----------------------------------|--|--------------|--------------------------------|---------------|
| Modularity | | | 8 | 16 |
| Loads | Voltage | V | ≐ 24 | |
| | Nominal current | A | 0.5 | |
| | Tungsten filament lamp | W | 8 | |
| Limit values | Voltage (ripple included) | V | ≐ 19.2...30 | |
| Logic | | | Positive outgoing current | |
| Response time | Change from state 0 to 1 | ms | ≤ 1 | |
| | Change from state 1 to 0 | ms | ≤ 1 | |
| Leakage current | At state 0 | mA | < 2 | |
| Residual voltage | At state 1 | V | < 0.4 | |
| Built-in protection | Against overloads | | Yes (thermal) | |
| | Against overvoltages | | Zener Diode | |
| | Against inverse polarity | | Reverse mounted parallel diode | Series diode |
| Load common | | | To "-ve" of supply | |
| Typical currents consumed | Module supply | mA | 30 | 107 (at 24 V) |
| | Preactuator supply | mA | 45 (except actives outputs) | 51 (at 24 V) |
| Dissipated power | Per module (with 60 %load) | W | 4.3 | 3.7 (at 24 V) |
| Compatible input modules | | | Yes | |
| Load impedance | At state 1 | Ω | 50 < Z < 3000 | |
| Isolation | Dielectric strength between inputs and earth | V eff | 1500 at 50/60 Hz for 1 min | |
| | Insulation resistance | MΩ | > 10 at ≐ 500 V | |
| Temperature | Operation | °C | 0...60 | |
| | Storage | °C | - 25...+ 70 | |

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TBX EEP 08C22



TBX ESP 1622



TSX FP ACC 4



TBX BLP 10



TBX BAS 10

Dust and damp proof monobloc discrete I/O modules

| Type of module | Operating voltage | Modularity (no. of channels) | Characteristics | Reference | Weight kg |
|----------------|-------------------|------------------------------|--|----------------------|-----------|
| Input | ~ 24 V | 8 | Conforming to IEC 1131 type 2 Wiring check function | TBX EEP 08C22 | 0.510 |
| | | 16 | Conforming to IEC 1131 type 2 | TBX EEP 1622 | 0.510 |
| Output | ~ 24 V | 8 | 0.5 A protected Wiring check function | TBX ESP 08C22 | 0.580 |
| | | 16 | 0.5 A protected | TBX ESP 1622 | 0.580 |

Accessories (1)

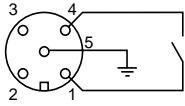
| Type of module | Characteristics | Reference | Weight kg |
|---|--|----------------------|-----------|
| Dust and damp proof junction box | Tap link off trunk cable Holds 1 female 9-way SUB-D connector Zamac casing | TSX FP ACC 4 | 0.660 |
| | Tap link off trunk cable including wires for ~ 24 V supply. Holds 1 female 9-way SUB-D connector Zamac casing | TBX FP ACC 10 | 0.680 |
| Dust and damp proof connector for TBX modules | Tap link or daisy chaining with adress coding | TBX BLP 10 | 0.320 |
| Dust and damp proof supply connector for TBX output modules | ~ 24 V preactuator power supply for TBX ESP 08C22/1622 output modules | TBX BAS 10 | 0.120 |

(1) For other Fipio accessories and connection cables, see pages 43597/4 et 43597/5.

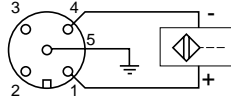
Connections

TBX EEP 08C22 inputs

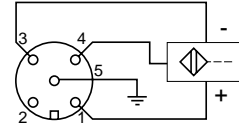
Mechanical contacts



2-wire prox.sen.

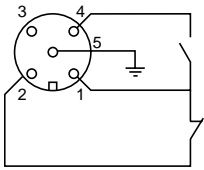


3-wire prox.sen.

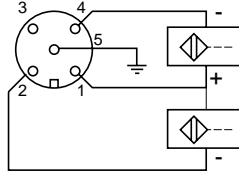


TBX EEP 1622 inputs

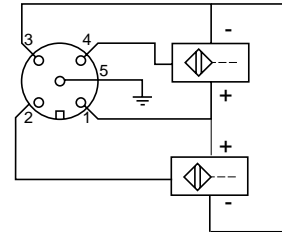
Mechanical contacts



2-wire prox.sen.

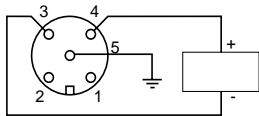


3-wire prox.sen.

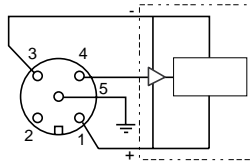


TBX ESP 08C22 outputs

Direct wiring

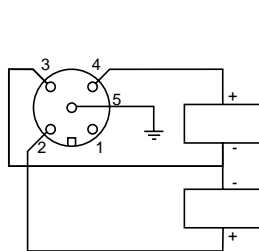


Wiring with amplification

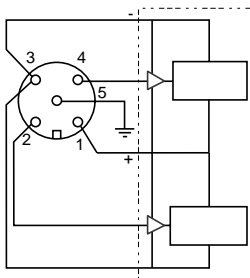


Outputs TBX ESP 1622

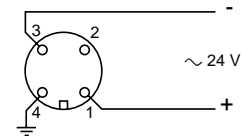
Direct wiring



Wiring with amplification

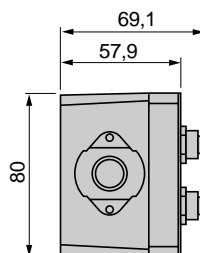
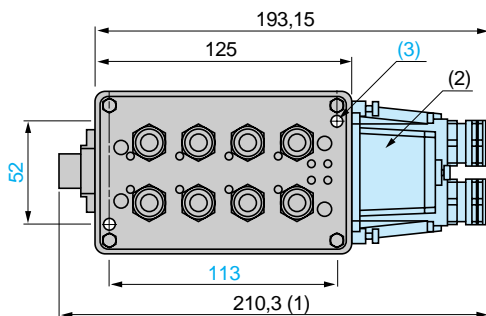


Pneuator supply via
TBX BAS 10 connector



Dimensions, mounting

TBX E●P ●●22 inputs/outputs



(1) For TBX ESP 08C22/1622

(2) TBX BLP 10 connector

(3) 2 holes \varnothing 4.4