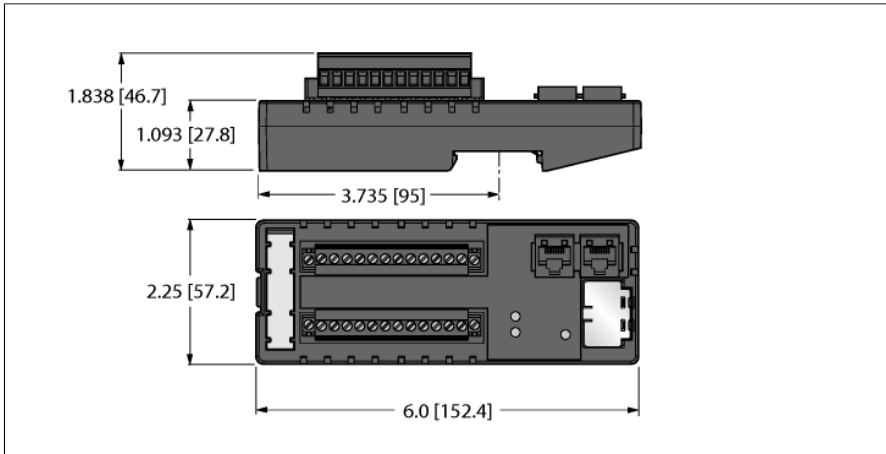# Compact IP20 Multiprotocol Ethernet I/O Station
# 16 Configurable Digital PNP Channels
# FEN20-16DXP



■ FLC/ARGEE programmable

| Type | FEN20-16DXP |
|---|---|
| ID | 6931089 |

| | |
|---|---|
| Number of channels | 16 |
| Operating / load voltage | 12...30 VDC |
| Operating current | 100 mA |
| Electrical isolation | 500V Galvanic Zone-Zone and Zone-Ethernet |
| Supply voltage | 24 VDC |
| System power supply | Supply from V1 |
| Admissible range | 12...30 VDC |
| Power dissipation, typical | ≤ 2.4 W |
| Voltage supply connection | Screw terminals |

| Inputs | |
|---|---|
| Number of channels | 16 |
| Input voltage | 24 VDC |
| Supply current | 700 mA |
| Switching threshold | 10V / 2mA |
| Low level signal voltage | < 9 VDC |
| High level signal voltage | 11...30 VDC |
| Low level signal current | < 1.5 mA |
| High level signal current | > 2.5 mA |
| Input delay | 2.5 ms |
| Max. input current | 6 mA |

| Outputs | |
|---|---|
| Number of channels | 16 |
| Type of output diagnostics | Channel diagnostics |
| Output voltage | 12…30 VDC |
| Output current per channel | @70°C: 0.5A (8A Overall) or 0.75A (6A Overall) |
| | @50°C: 0.75A (12A Overall) or 1A (8A Overall) |
| Load type | Resistive, Inductive, Lamp Load |
| Short-circuit protection | yes |

| System data | |
| --- | --- |
| Transmission rate Ethernet | 10/100 Mbps, Full/Half Duplex, Auto Negotiation, Auto Cross |
| Transmission rate | 10/100 Mbps; Full/Half Duplex; Auto Negotiation; Auto Crossing |
| Fieldbus address range | 0 (192.168.1.254) |
| Addressing modes Ethernet: | via Coded Rotary Switch |
| Connection technology Ethernet | 2 × RJ45 female connector |
| Protocol detection | automatic |
| Web server | 192.168.1.254 (Default) |
| Service interface | Ethernet |
| Device Reset | via Rotary Switch |

| Modbus TCP | |
| --- | --- |
| Addressing | Static IP, BOOTP, DHCP |
| Supported function codes | FC1, FC2, FC3, FC4, FC5, FC6, FC15, FC16, FC23 |
| Number of TCP connections | 6 |
| Input Data Size | max. 1 register |
| Input register start address | 0 (0x0000 hex) |
| Output Data Size | max. 1 register |
| Output register start address | 2048 (0x0800 hex) |

| Ethernet/IP | |
| --- | --- |
| Addressing | acc. to EtherNet/IP specification |
| Quick Connect (QC) | < 150 ms |
| Device Level Ring (DLR) | supported |
| Class 1 connections (CIP) | 6 |

| 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 |

| Dimensions (W x L x H) | 57.1 x 152.2 x 46.7 mm |
| --- | --- |
| Housing material | Fiber-glass reinforced Polyamide (PA6-GF30) |
| Ambient temperature | -40…+70 °C |
| Storage temperature | -40…+85 °C |
| Protection class | IP20 |
| MTTF | 148 years acc. to SN 29500 (Ed. 99) 20 °C |
| Approvals | CE, UL, Class I Div. 2 |

**Terminal assignment**
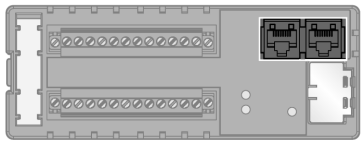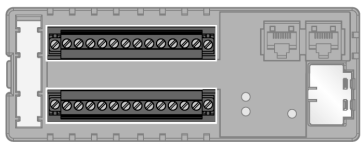
| | Ethernet | RJ45 Ethernet |
|---|---|---|
|  | **Ethernet**<br>Fieldbus cable (example): RJ45S RJ45S 441-2M (Ident no. U-06842) | 1 = TX +<br>2 = TX −<br>3 = RX +<br>4 = n.c.<br>5 = n.c.<br>6 = RX −<br>7 = n.c.<br>8 = n.c.<br><br>12345678 |
|  | **Power Supply and I/O Channels**<br>The internal module electronics and the I/O channels 0 to 7 are supplied via V1.<br>The I/O channels 8 to 13 are supplied via V2.<br>The I/O channels 14 to 15 are supplied via V3.<br>More devices can be supplied with 24 VDC, up to 0.7 A, via the terminals Vout1+ and Vout1-.<br>Recommended torque for screw terminals: 0.5 Nm (4.43 lb.in) | Terminal Connection |

Terminal Connection:

| Terminal | | Terminal | | Assignment | Assignment |
|---|---|---|---|---|---|
| 1 | | 13 | | 1 = $V_{OUT}1$ + | 13 = V2 + |
| 2 | | 14 | | 2 = $V_{OUT}1$ − | 14 = V2 − |
| 3 | | 15 | | 3 = V1 + | 15 = I/O 8 |
| 4 | | 16 | | 4 = V1 − | 16 = I/O 9 |
| 5 | | 17 | | 5 = I/O 0 | 17 = I/O 10 |
| 6 | | 18 | | 6 = I/O 1 | 18 = I/O 11 |
| 7 | | 19 | | 7 = I/O 2 | 19 = I/O 12 |
| 8 | | 20 | | 8 = I/O 3 | 20 = I/O 13 |
| 9 | | 21 | | 9 = I/O 4 | 21 = V3 + |
| 10 | | 22 | | 10 = I/O 5 | 22 = V3 − |
| 11 | | 23 | | 11 = I/O 6 | 23 = I/O 14 |
| 12 | | 24 | | 12 = I/O 7 | 24 = I/O 15 |

**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 | Ready |
| | Red | ON | IP address conflict or status word is active |
| | | Flashing | Blink/Wink command active |
| | | OFF | Power off |
| **ERR** | Green | ON | Diagnostics disabled |
| | Red | ON | Short-circuit |
| **I/O 0 – I/O 15** | Green | ON | Input/Output: Active |
| | | OFF | Input/Output: Inactive |

**Process Data Mapping**

**Modbus TCP Register Mapping**

| | 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 | DI14 | DI13 | DI12 | DI11 | DI10 | DI9 | DI8 | DI7 | DI6 | DI5 | DI4 | DI3 | DI2 | DI1 | DI0 |
| Status (RO) | 0x0001 | - | FCE | - | - | CFG | COM | V1 low | - | - | - | - | - | - | - | - | Diag Warn |
| Diag (RO) | 0x0002 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | I/O Diag |
| Outputs (RW) | 0x0800 | DO15 | DO14 | DO13 | DO12 | DO11 | DO10 | DO9 | DO8 | DO7 | DO6 | DO5 | DO4 | DO3 | DO2 | DO1 | DO0 |
| I/O Diag (RO) | 0xA000 | SCO7 | SCO6 | SCO5 | SCO4 | SCO3 | SCO2 | SCO1 | SCO0 | - | - | - | - | - | - | - | IGS |
| I/O Diag (RO) | 0xA001 | - | - | - | - | - | - | - | - | SCO15 | SCO14 | SCO13 | SCO12 | SCO11 | SCO10 | SCO9 | SCO8 |

**EtherNet/IP™ Data Mapping**

| INPUT | 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 | - | FCE | - | - | CFG | COM | V1 low | - | - | - | - | - | - | - | - | Diag Warn |
| | 1 | DI15 | DI14 | DI13 | DI12 | DI11 | DI10 | DI9 | DI8 | DI7 | DI6 | DI5 | DI4 | DI3 | DI2 | DI1 | DI0 |
| | 2 | - | - | Sched Diag | - | - | - | - | - | - | - | - | - | - | - | - | I/O Diag |
| | 3 | SCO7 | SCO6 | SCO5 | SCO4 | SCO3 | SCO2 | SCO1 | SCO0 | - | - | - | - | - | - | - | IGS |
| | 4 | - | - | - | - | - | - | - | - | SCO15 | SCO14 | SCO13 | SCO12 | SCO11 | SCO10 | SCO9 | SCO8 |
| **OUTPUT** | **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** |
| | 0 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | 1 | DO15 | DO14 | DO13 | DO12 | DO11 | DO10 | DO9 | DO8 | DO7 | DO6 | DO5 | DO4 | DO3 | DO2 | DO1 | DO0 |

**PROFINET Process Data**

| | Byte | Bit 7 | Bit 6 | Bit 5 | Bit 4 | Bit3 | Bit 2 | Bit 1 | Bit 0 |
|---|---|---|---|---|---|---|---|---|---|
| Inputs | 0 | DI7 | DI6 | DI5 | DI4 | DI3 | DI2 | DI1 | DI0 |
| | 1 | DI15 | DI14 | DI13 | DI12 | DI11 | DI10 | DI9 | DI8 |
| Outputs | 0 | DO7 | DO6 | DO5 | DO4 | DO3 | DO2 | DO1 | DO0 |
| | 1 | DO15 | DO14 | DO13 | DO12 | DO11 | DO10 | DO9 | DO8 |

Key:

| | | | |
|---|---|---|---|
| DIx | Digital input x | COM | Communication error on internal module bus |
| DOx | Digital output x | CFG | I/O configuration error |
| IGS | Input group short-circuit | FCE | I/O-ASSISTANT Force Mode active |
| SCOx | Short-circuit output x | I/O Diag | I/O diagnostic detected |
| Diag Warn | Diagnostic at least on 1 channel | Sched Diag | Manufacturer-specific diagnostics configured and active |
| V1 low | Undervoltage V1 | - | - |