energyplus

EPL-I/O-40

Wiring and Mounting Reference

Terminals, power, field wiring and mechanical layout at a glance

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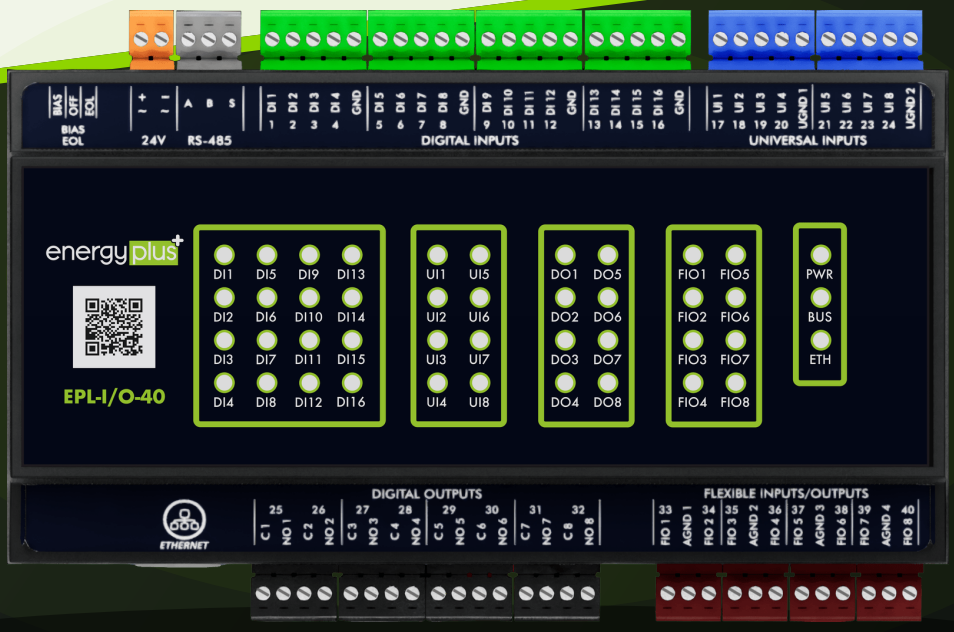

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Used to verify panel mounting, power supply, communication and I/O wiring of the EPL-I/O-40 on site.

1. Scope

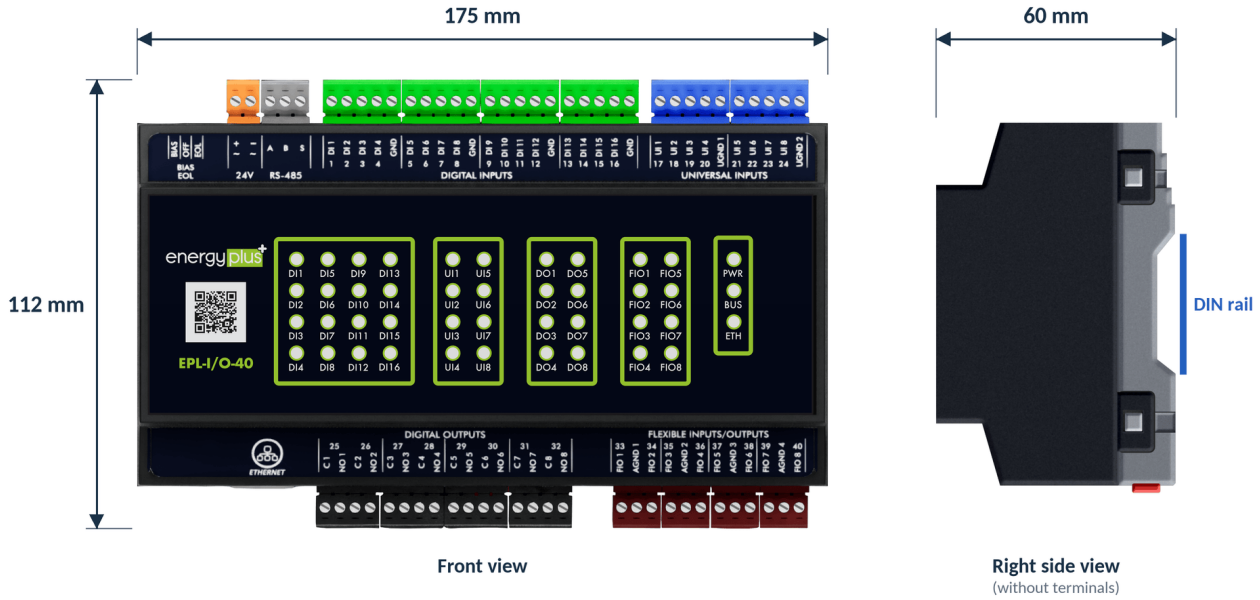
This reference collects the cabinet mounting, main terminal groups, power supply, communication and field I/O wiring of the EPL-I/O-40 device in a single document. The project electrical diagram and local standards always take precedence.

2. Technical Specifications

Specification	Value
Local I/O capacity	16 DI (DI1..DI4 counter inputs), 8 UI, 8 DO relay outputs, 8 FIO (flexible input/output)
UI measurement resolution	22 bit
Communication interfaces	1 × Ethernet RJ45 (10/100 Mbit/s), 1 × RS-485, Bluetooth LE (service and commissioning)
BACnet vendor ID	1600 (registered with ASHRAE)
Supply voltage	24 Vac ±20% or 21..30 Vdc
Nominal power consumption	5 VA
Supply class	Class 2
Protection and temperature class	IP20 enclosure protection, T50 operating class
Operating environment	0..50 °C, 5..95% relative humidity (non-condensing)
Storage environment	-20..70 °C, 5..95% relative humidity (non-condensing)
DO relay output rating	5 A @ 277 Vac or 3 A @ 30 Vdc, resistive load
FIO analog output range	0..10 V or 2..10 V selectable; maximum load current 20 mA per channel
Mounting	DIN rail (EN 60715, 35 mm), cabinet mounting
Enclosure dimensions (width × height × depth)	175 mm × 112 mm × 60 mm

3. Mounting

Item	Application
Mounting type	DIN rail, cabinet mounting.
Housing dimensions	175 mm x 112 mm x 60 mm.
Cabinet location	Place the device so that service access and terminal readability are preserved.
Heat	Observe the T50 operating class and do not obstruct air circulation inside the cabinet.
Protection	The IP20 housing protection is intended for cabinet installation; outdoor use requires additional enclosure protection.



Overall dimensions (W x H x D): 175 x 112 x 60 mm, plugged terminals included. DIN rail, in-cabinet mounting; IP20.

Figure 1. Mechanical dimensions

4. Terminal Groups

Group	Terminal / channel	Description
Power supply	+ / -, 24 V	Device power supply; use a Class 2 power supply.
RS-485	A, B, S	Modbus RTU or BACnet MS/TP field line; S is the line shield/reference.
BIAS / EOL	3-position switch: BIAS, OFF, EOL	Each position has a separate function. EOL is line termination only; select it on the devices at both ends of the line. BIAS is line biasing only; on long lines, select it on a single intermediate device. OFF disables both; leave the other intermediate devices in this position.
Ethernet	RJ45	Web, service, OTA, Modbus TCP or BACnet/IP access.
DI	1..16 (DI1..DI16), one GND per four channels	Digital input; DI1..DI4 can be used for pulse/counter.
UI	17..24 (UI1..UI8), UGND1, UGND2	Universal inputs.
DO	25..32 (DO1..DO8), C / NO on each channel	Relay outputs; dry contact.
FIO	33..40 (FIO1..FIO8), AGND1..AGND4	Flexible input/output (UO): analog output, digital output or digital input.

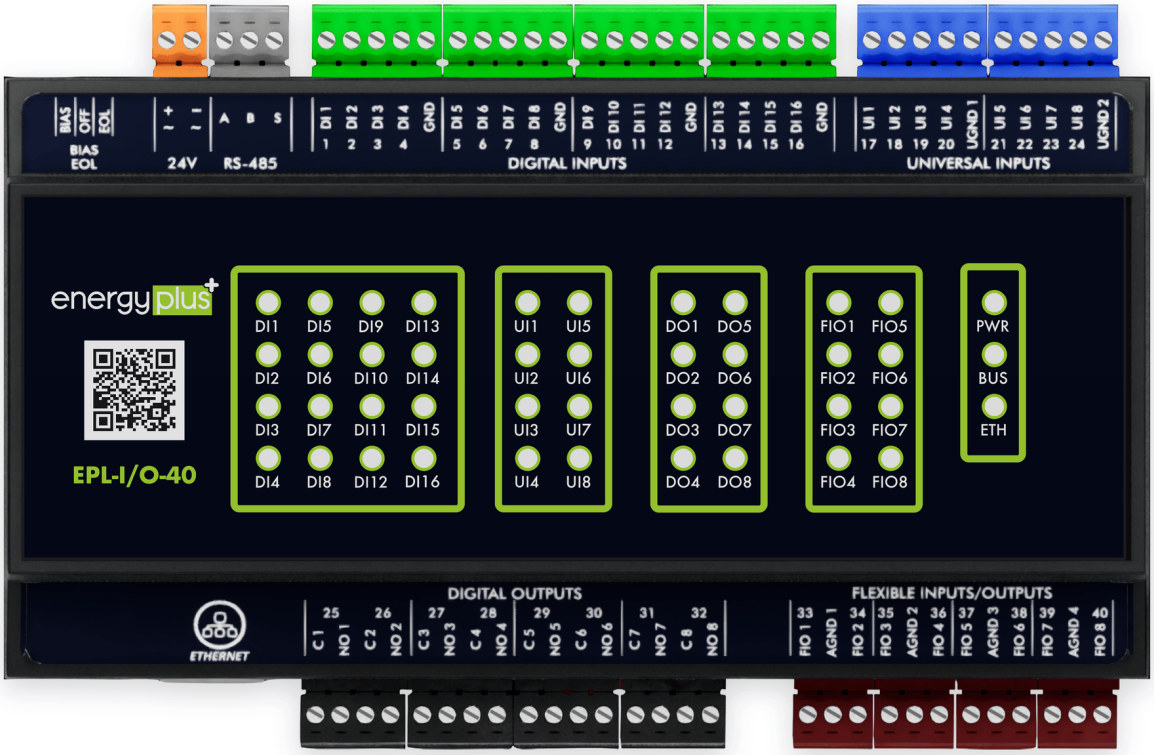


Figure 2. Front panel and terminal layout

5. Power Supply Connection

Item	Value
Voltage	24 Vac ±20% or 21..30 Vdc.
Power	5 VA.
Class	Class 2.
Check	After power-up, check the PWR LED and the system status summary in the web interface.

6. Communication Connection

Interface	Application
Ethernet	Connects to the same field network as the service computer and BMS/SCADA.
RS-485	Line topology, shielding, polarity and termination follow the project standard.
BLE	Provides a short-range service connection with a mobile device for field access.

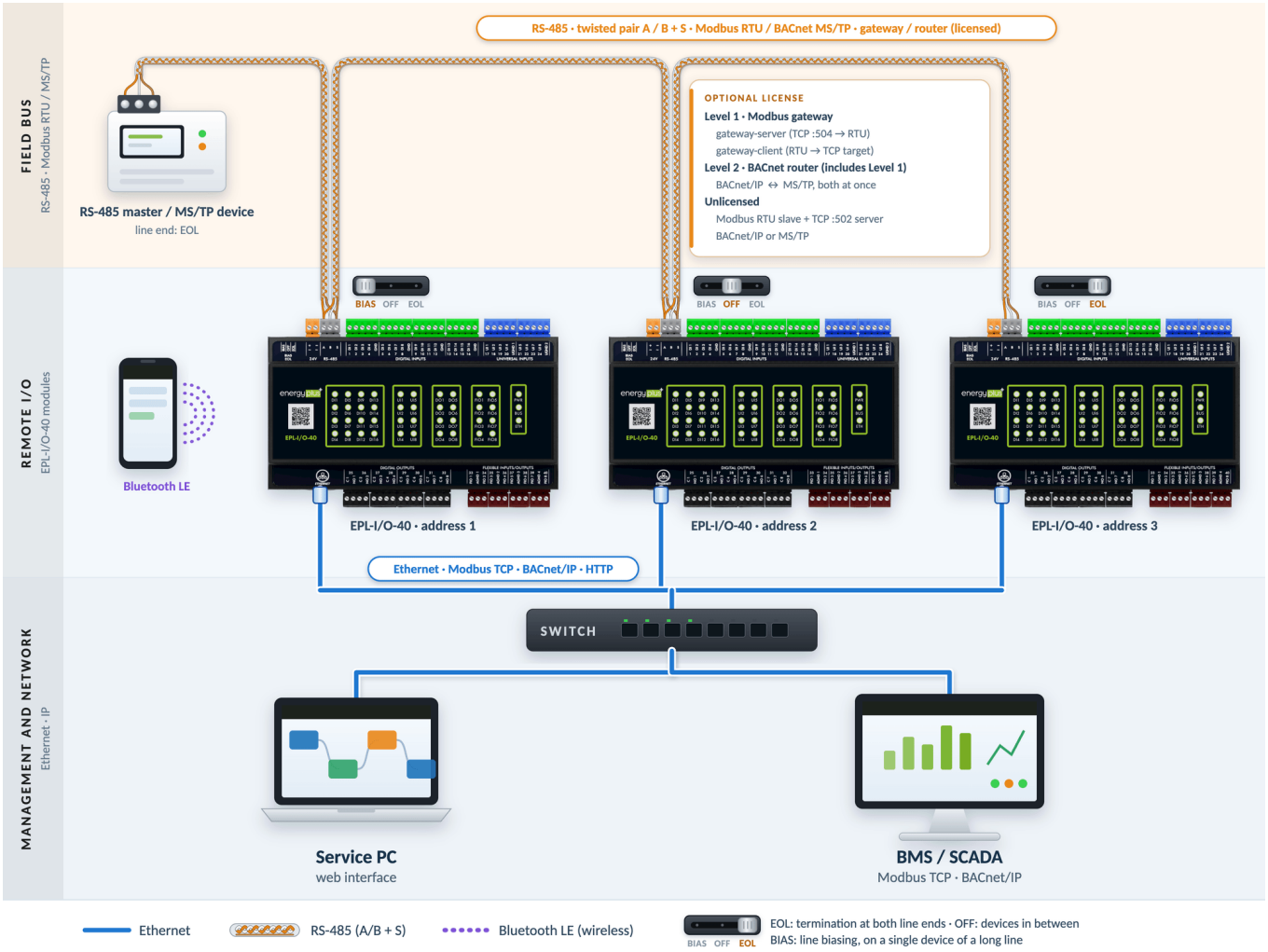


Figure 3. Communication topology

7. I/O Wiring Examples

Channel	Wiring example	Check
DI	Dry contact, auxiliary contact or pulse output	Verify live signal changes and counter behavior.
DO	Contactor coil, alarm or auxiliary relay	Verify the relay contact rating and load type.
UI	0..10 V, 2..10 V, 0..20 mA, 4..20 mA, digital contact or temperature sensor	Check the mode, min/max and offset settings.
FIO	0..10 V or 2..10 V analog output, digital output or digital input	Verify the mode, load current and field equipment compatibility.

The channels chosen in the diagrams are examples; the same wiring applies to the other channels of the same group. Common terminals:

- UGND1 for UI1..UI4, UGND2 for UI5..UI8
- the group's own GND terminal for each set of four DI channels (DI1..DI4 → first GND)
- one AGND for each FIO pair (FIO1/FIO2 → AGND1, FIO3/FIO4 → AGND2)
- the dedicated C / NO contact pair of each DO channel

After wiring, set the channel mode, min/max and offset, and compare the live value with the actual field measurement.

7.1. 0-10 V Active Sensor

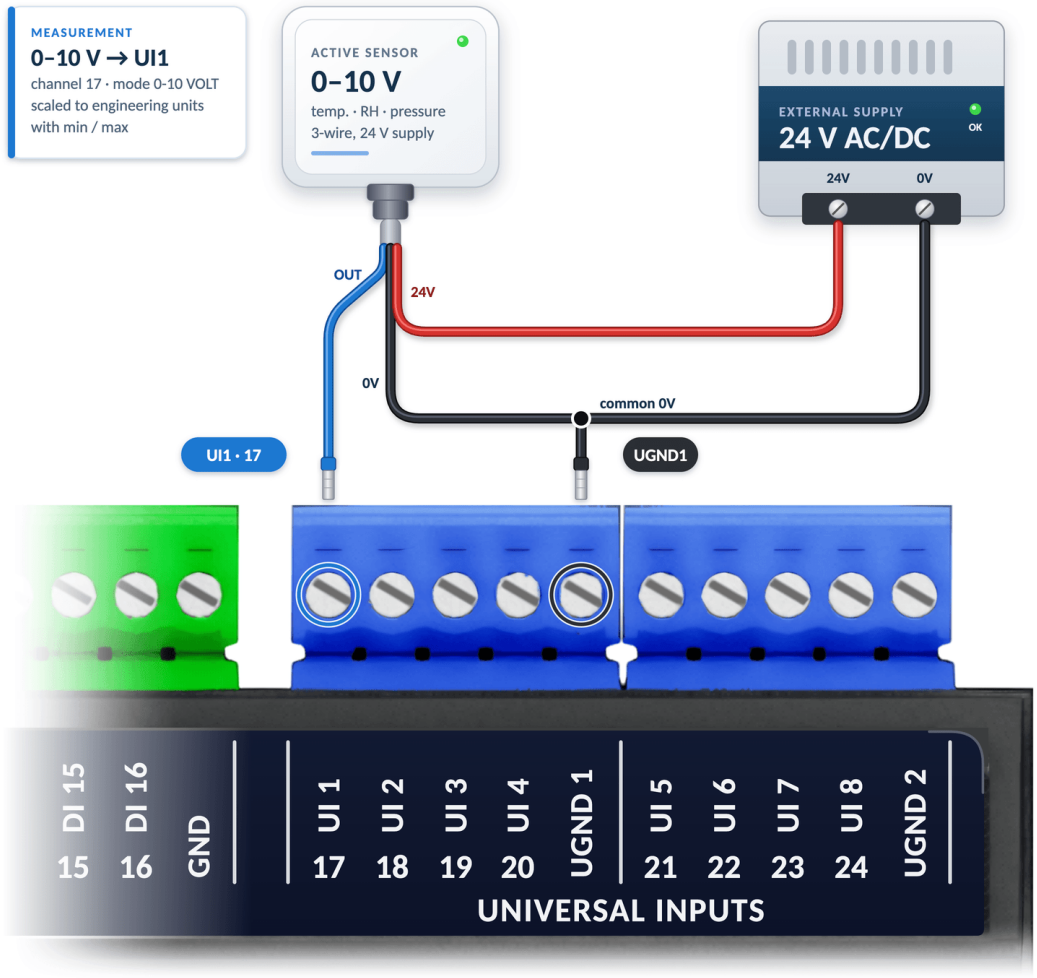


Figure 4. 0-10 V active sensor wiring (UI1)

- Connect the sensor output (OUT) to the UIx terminal and the sensor 0V lead to the corresponding UGND terminal.
- Power the sensor from an external 24 V source (AC or DC according to the sensor datasheet); connect the source 0V, the sensor 0V and UGND together.
- Mode 0-10 VOLT; select 2-10 VOLT for sensors with a 2-10 V output.
- Enter the sensor measuring range in min/max (e.g. 0 / 100 for a humidity sensor).
- A broken wire is not detected in 0-10 VOLT mode; in 2-10 VOLT mode, 2 V and below is reported as a fault.

7.2. 4-20 mA Passive Transmitter (2-Wire)

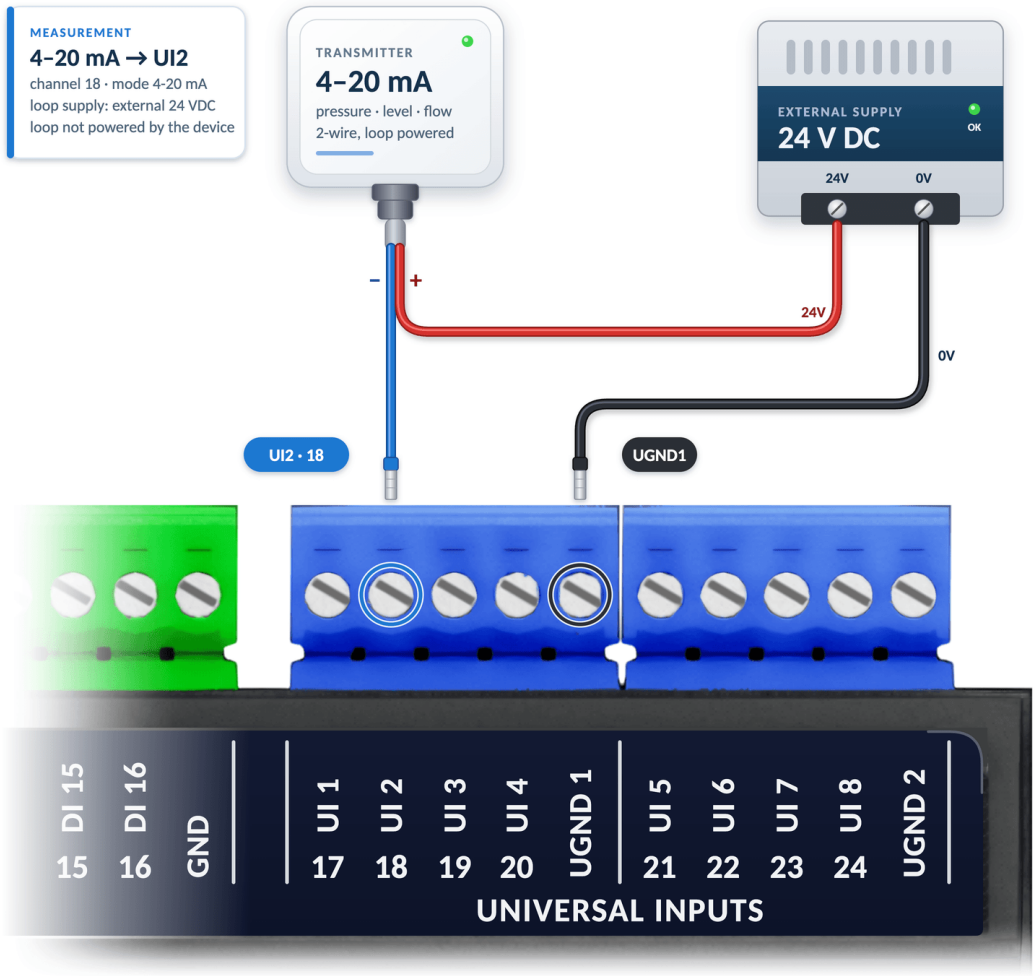


Figure 5. 4-20 mA passive transmitter wiring (UI2)

- The device does not supply loop power; power the loop from an external 24 VDC source.
- Wiring order: source + → transmitter +, transmitter – → UIx, source – → UGND.
- The current input is a load resistance of approximately 150 Ω (approximately 3 V at 20 mA). The source voltage must cover the sum of the transmitter's minimum operating voltage, this 3 V and the cable loss.
- Mode 4-20 mA; enter the transmitter measuring range in min/max.
- 4 mA and below is reported as a fault (out of range); an open loop is detected this way.

7.3. 0-20 mA Active Transmitter (4-Wire)

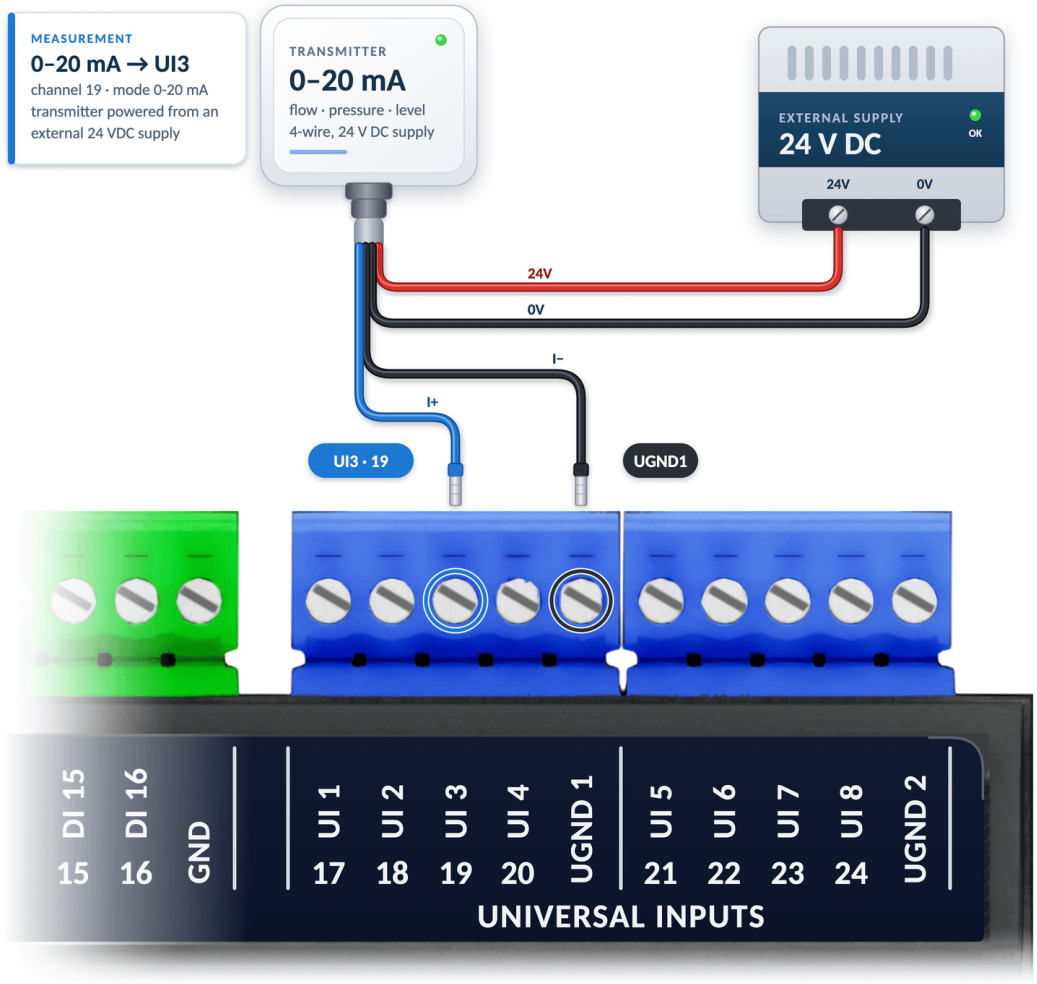


Figure 6. 0-20 mA active transmitter wiring (UI3)

- The transmitter is powered with external 24 VDC through its own supply terminals.
- Connect the current output I+ → UIx and I− → UGND.
- Mode 0-20 mA. Active-output 4-20 mA transmitters are wired the same way, with 4-20 mA mode selected.
- In 0-20 mA mode, 0 mA is a valid value; a broken wire is not detected.

7.4. NTC Sensor

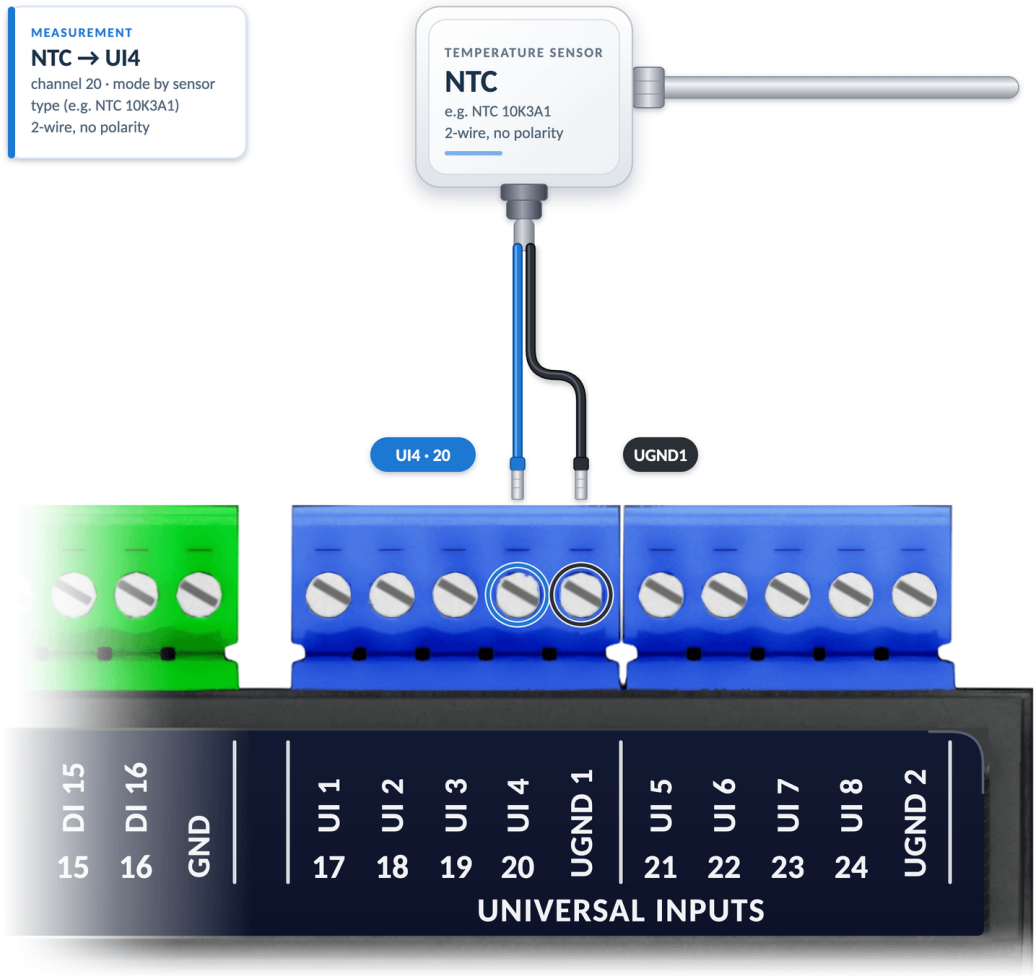


Figure 7. NTC sensor wiring (UI4)

- Connect the sensor with two wires between UIx and UGND; there is no polarity.
- Select the mode according to the sensor type: NTC 1.8K, NTC 2.2K, NTC 3.3K, NTC 10K3A1, NTC 10K4A1, NTC 10K CAREL or NTC 20K6A1.
- Measuring range -20 .. 120 °C; open and short circuits are detected.
- Correct a constant deviation caused by the sensor location or the cable with offset.

7.5. PT1000 / NI1000 Sensor

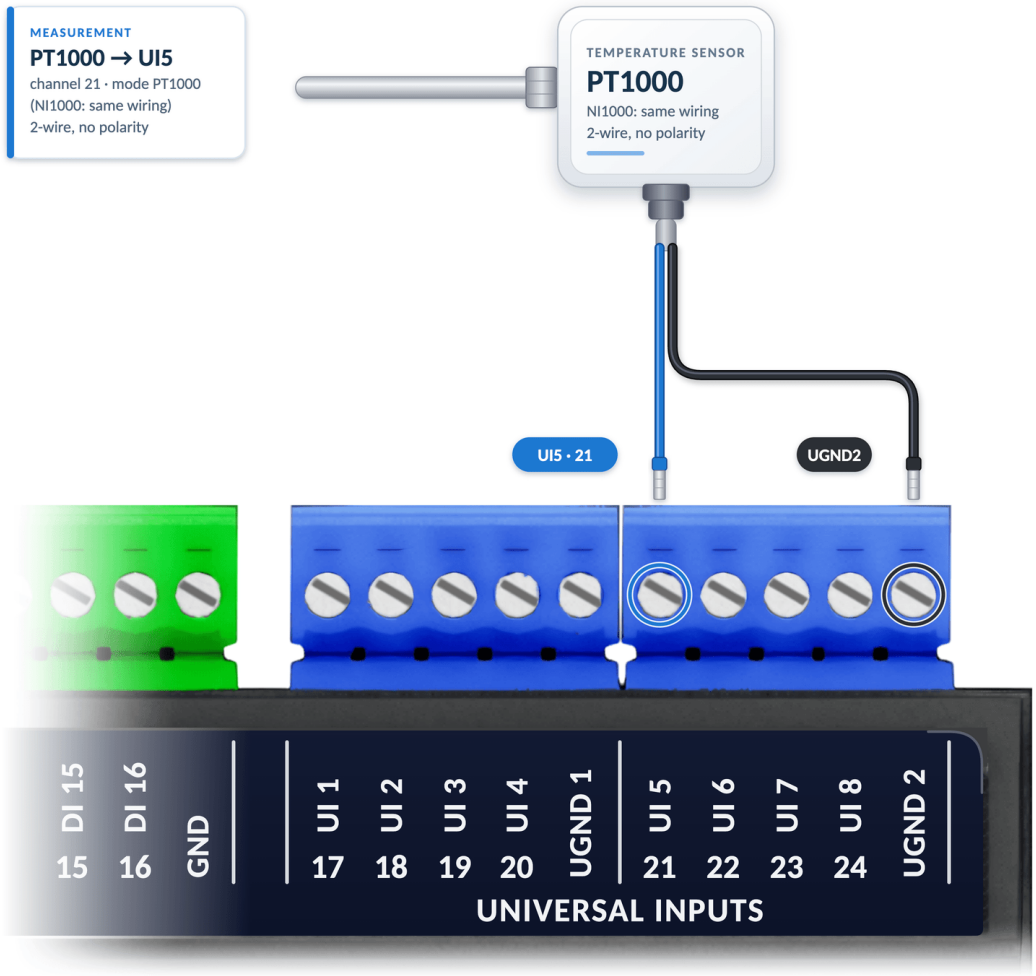


Figure 8. PT1000 sensor wiring (UI5)

- Connect the sensor with two wires between UIx and UGND; there is no polarity.
- Mode PT1000, NI1000 DIN or NI1000 LG.
- Measuring range -50 .. 150 °C; open and short circuits are detected.
- In a two-wire connection the cable resistance adds to the measurement: with PT1000, each 1 Ω of cable resistance reads approximately 0.26 °C high. On long lines, use a sufficient cross-section or correct the difference with offset.

7.6. Digital Input: Dry Contact and Pulse

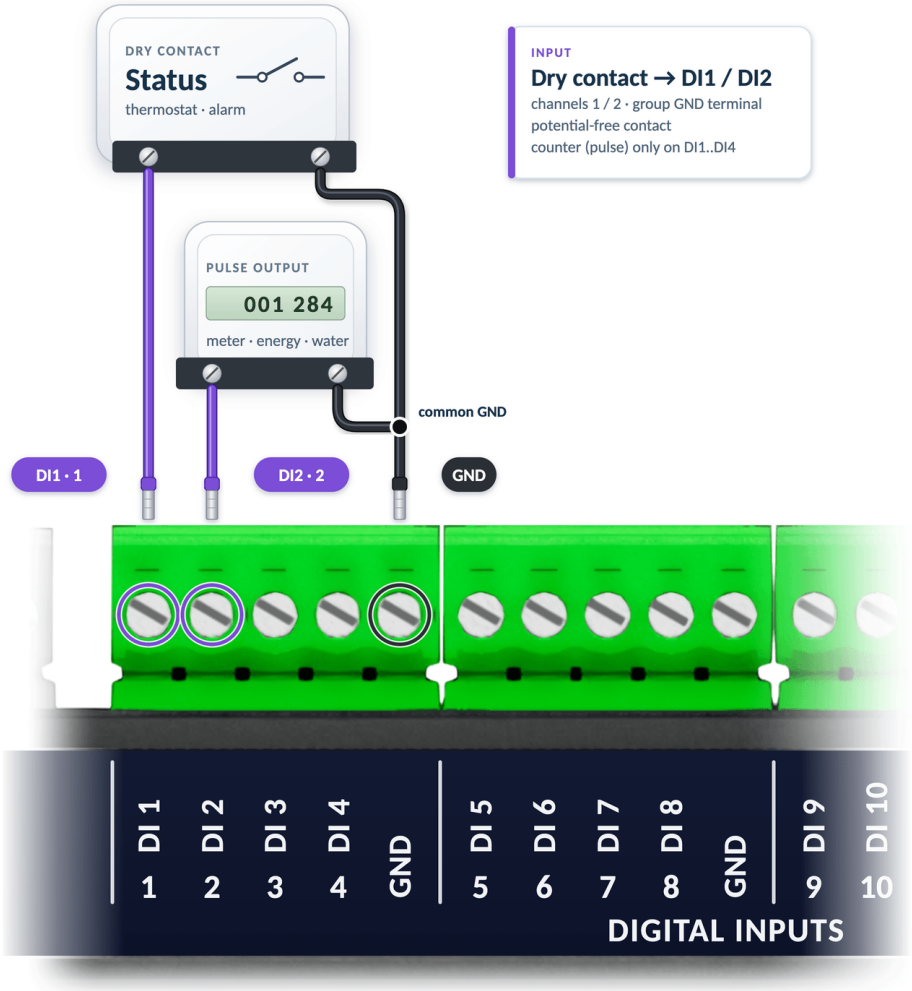


Figure 9. Dry contact and pulse contact wiring (DI1, DI2)

- Connect a potential-free (dry) contact between DIx and the group's GND terminal; do not apply external voltage to the input.
- The returns of several contacts can be joined on the same GND terminal.
- The counter (COUNTER) is available only on channels DI1..DI4. The pulse source must be free of contact bounce (an electronic or reed output is recommended).
- In digital mode (DI DIRECT / DI REVERSE), UI channels are wired the same way with a dry contact between UIx and UGND; in digital input mode, FIO channels are wired with a dry contact between FIOx and AGND.

7.7. DO Relay Output

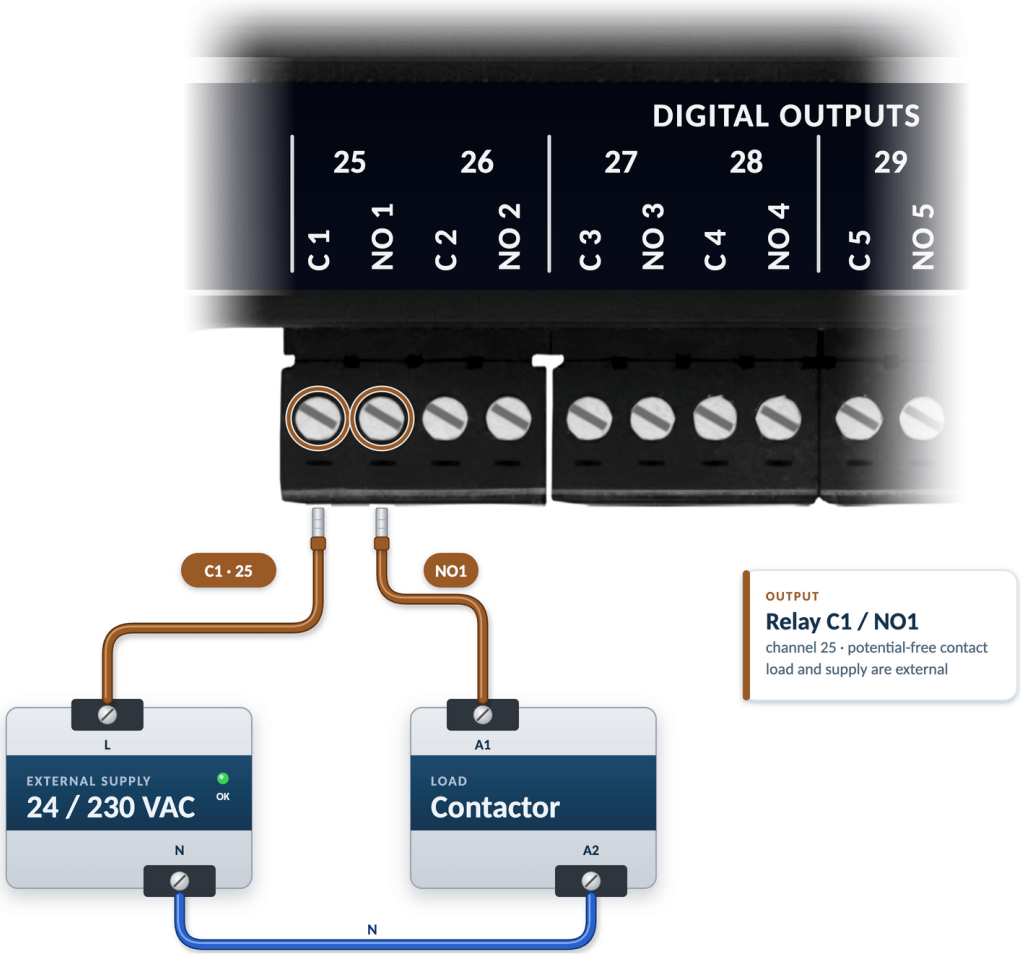


Figure 10. Driving a load with a relay output (DO1)

- Each DO channel is a potential-free C / NO contact; the load supply is external.
- Wiring: supply L → C, NO → load, load return → N.
- The contact rating with a resistive load is 5 A @ 277 Vac or 3 A @ 30 Vdc. For inductive loads such as contactor coils, a suppression element (RC or varistor for AC, diode for DC) is recommended.
- Mains voltage (230 VAC) lines must be routed separately from 24 V signal and communication lines and must be connected by authorized personnel.
- Mode DO DIRECT or DO REVERSE.

7.8. FIO 0-10 V Analog Output

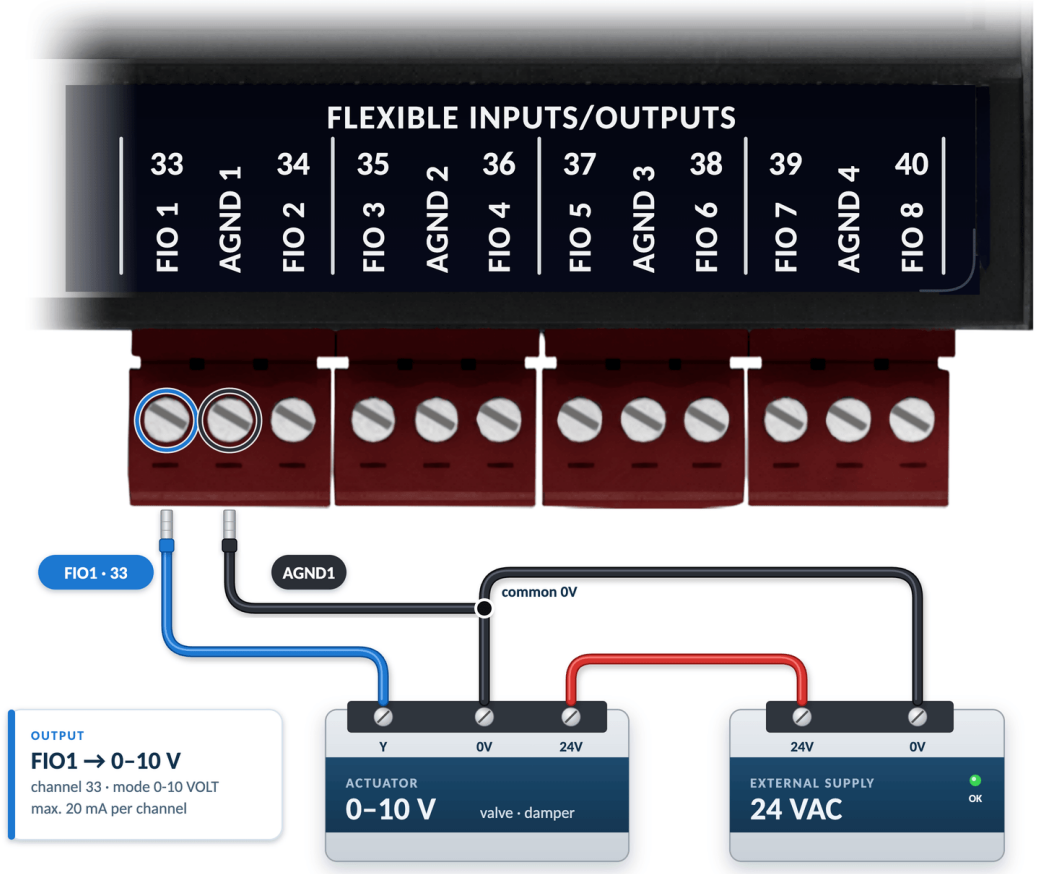


Figure 11. Driving an actuator with an FIO analog output (FIO1)

- Connect FIOx to the actuator control input (Y) and the corresponding AGND to the actuator 0V terminal.
- Power the actuator with external 24 VAC; connect the supply 0V, the actuator 0V and AGND together.
- Mode 0-10 VOLT or 2-10 VOLT; maximum load 20 mA per channel.

7.9. FIO Digital Output

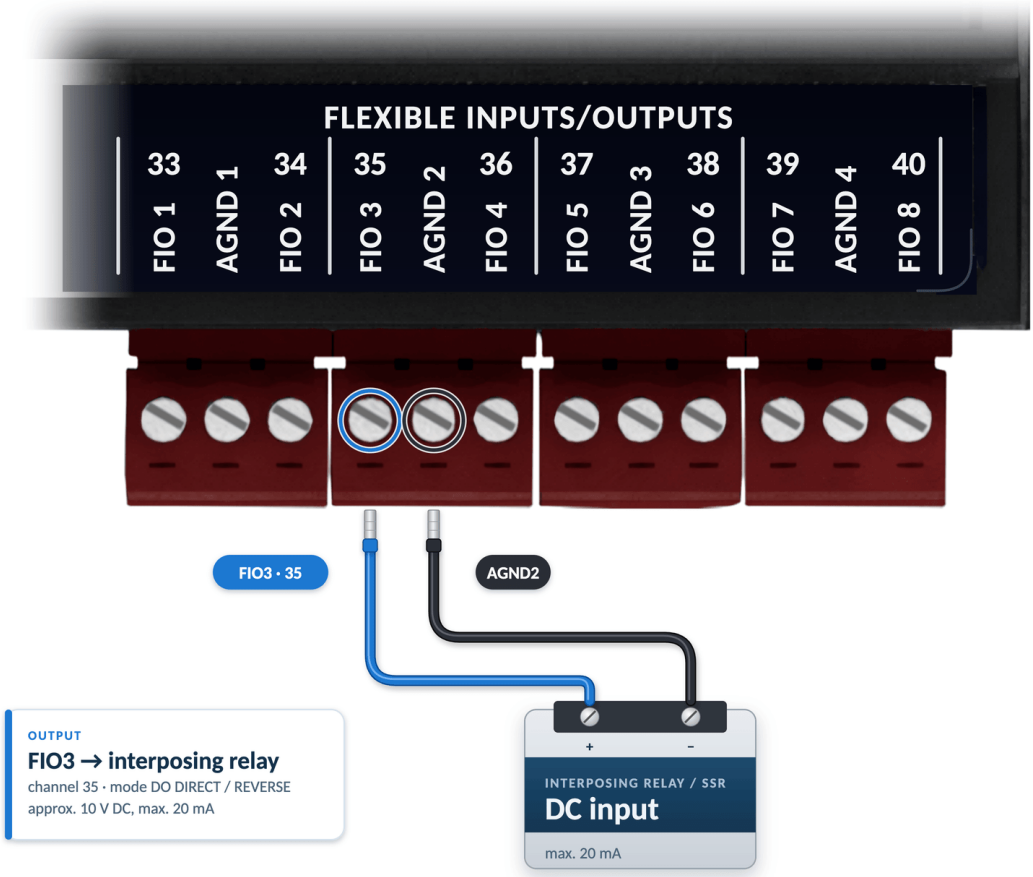


Figure 12. Driving an interposing relay / SSR with an FIO digital output (FIO3)

- Mode `DO DIRECT` or `DO REVERSE`. When the output is active, approximately `10 V` DC is present between `FIOx` and `AGND`; the output is not a relay contact.
- The channel can supply at most `20 mA`. Do not connect a contactor, valve or mains load directly; use an interposing relay module or SSR whose input suits this current and voltage.
- Connect `FIOx` → module `+` and `AGND` → module `–`; the load is driven through the module's output contact.

7.10. FIO Digital Input

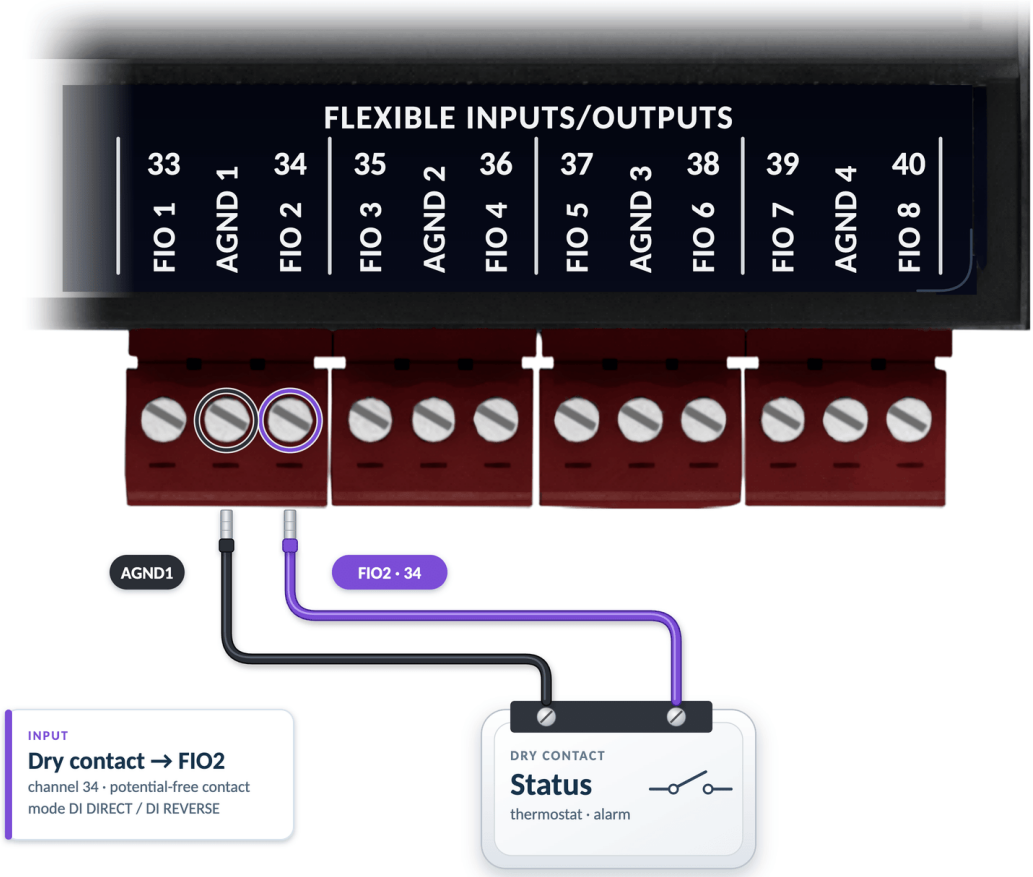


Figure 13. Dry contact on an FIO digital input (FIO2)

- Mode DI DIRECT or DI REVERSE.
- Connect a potential-free (dry) contact between FIOx and the corresponding AGND; do not apply external voltage to the input.
- The counter (COUNTER) is not available on FIO channels; use DI1..DI4 for pulse counting.

8. Label and Service Information

Item	Description
Product label	Verify the model, serial number and Ethernet MAC address on the product label.
Default IP	For initial commissioning, use the factory network information in the user manual.
Handover record	Record the final IP address, firmware version and channel modes in the project handover form.