

EasyIO Neo Series IO-1006 Installation Guide

IO-1006

Building Technologies & Solutions

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IO-1006 overview

The EasyIO IO-1006 is an input and output module. Use this guide to complete the following tasks:

- Mount and install the module
- Understand the module components
- Mount the module on a DIN rail or enclosure base plate
- View a wiring diagram of the module in a system

Figure 1: IO-1006 front view

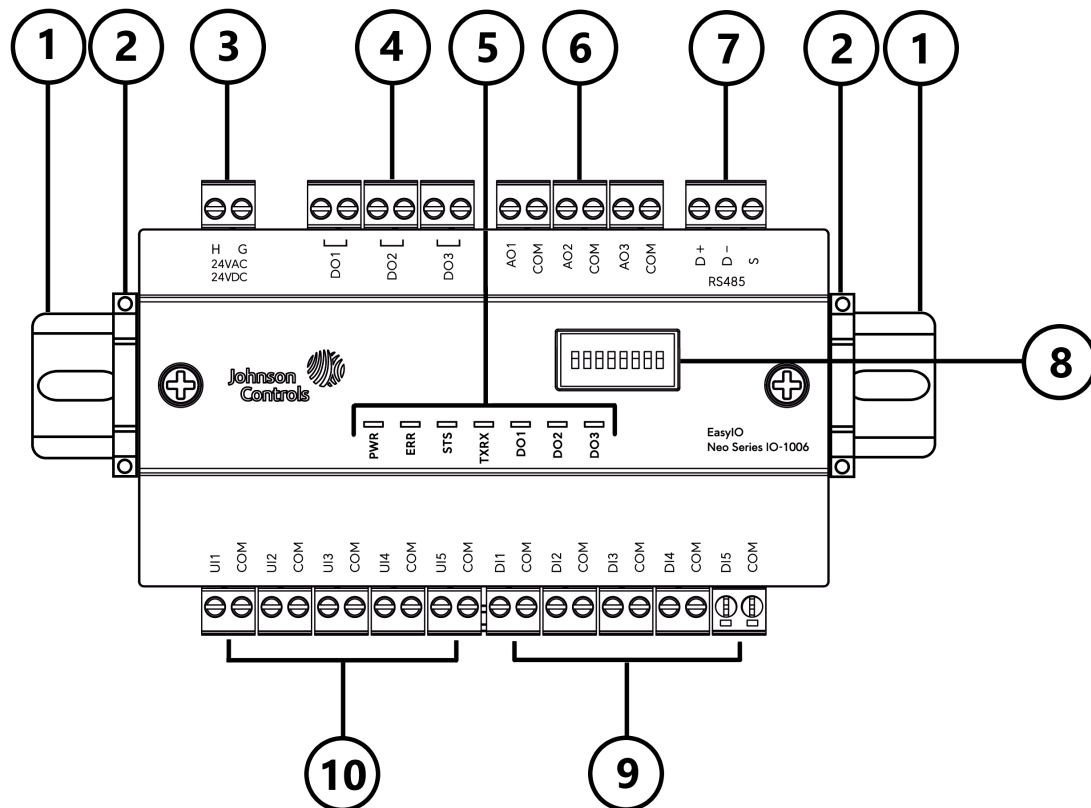
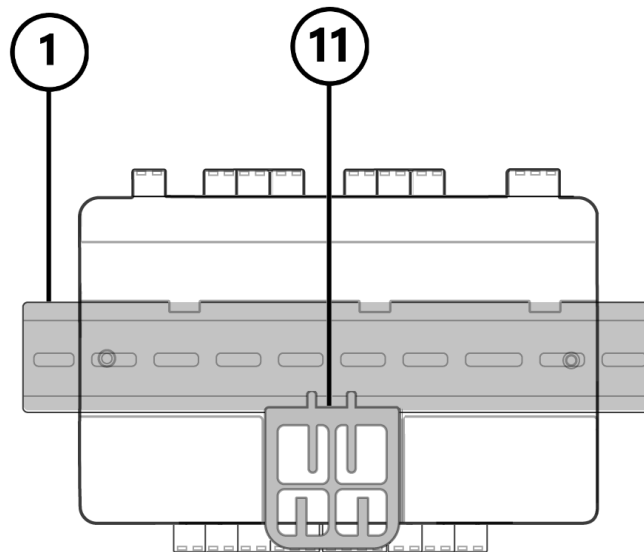


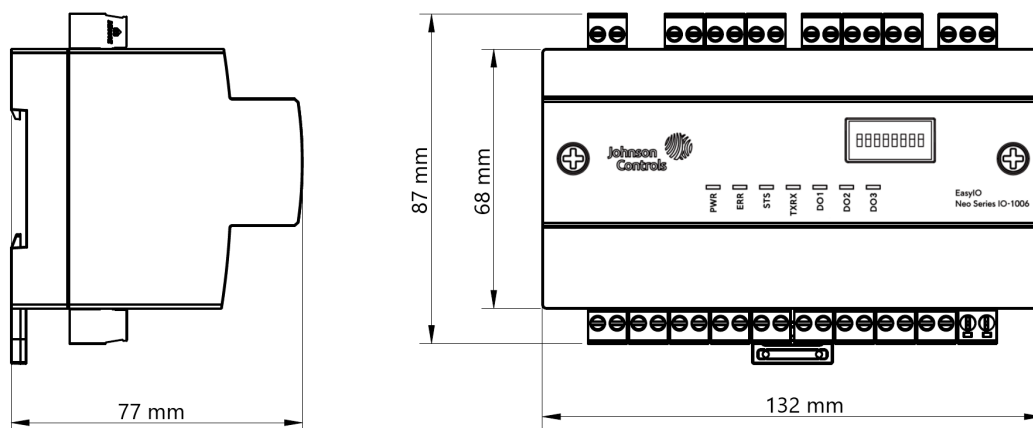
Figure 2: IO-1006 back views



Callout	Description
1	DIN rail
2	DIN rail end clips
3	Hot (H) and ground (G) terminals
4	Digital output (DO) terminals
5	LED indicators
6	Analog output (AO) and COM terminals
7	RS-485 serial port terminals
8	DIP switch
9	Digital input (DI) and COM terminals
10	Universal input (UI) and COM terminals
11	Mounting clips

IO-1006 dimensions

Figure 3: IO-1006 dimensions, mm



Parts included

- One IO-1006 module with removable terminal blocks
- One Pack Sheet

Required tools and parts

One small flathead screwdriver to secure wires to terminal blocks.

Mounting guidelines

The following section lists location considerations, mounting the module on a DIN rail and mounting the module on an enclosure base plate.

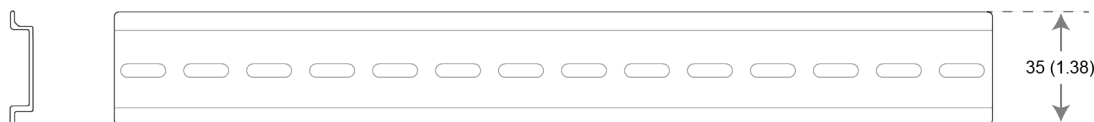
Mounting locations to avoid

- Areas with excessive moisture, corrosive fumes, or explosive vapors
- Locations where excessive vibration or shock occurs
- Locations with excessive electrical noise, such as large magnetic interference or variable speed drive modules

Mounting the module on a 35mm DIN rail

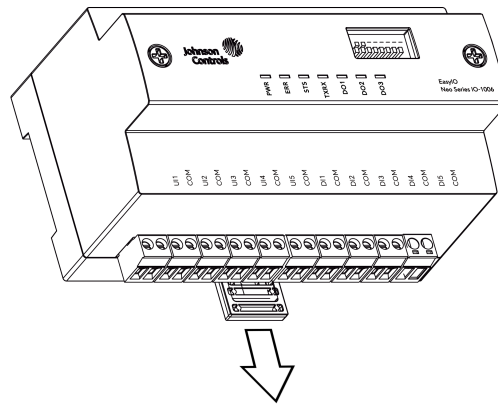
1. Mount a section of 35 mm (1.38 in.) DIN rail horizontally on the enclosure base plate.

Figure 4: 35 mm DIN rail



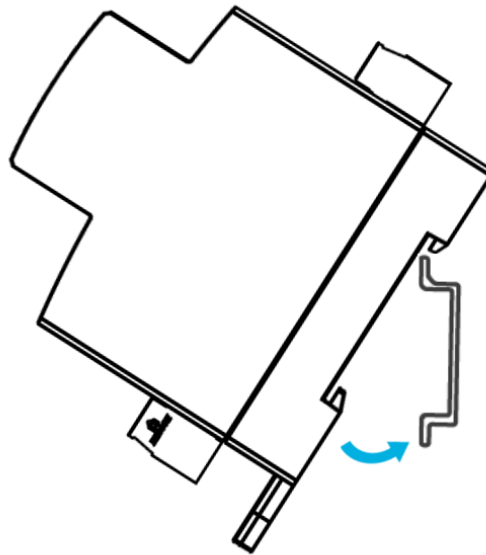
2. On the back of the module, pull down the mounting clips.

Figure 5: Pulling down the mounting clips



3. Hang the module on the DIN rail by the hooks at the top of the DIN rail channel on the back of the module and position the module firmly against the DIN rail.

Figure 6: Placing the module on the DIN rail



4. To secure the module to the DIN rail, push the mounting clip up.
5. **Optional:** For added security, use DIN rail end clips.

Removing the module cover

1. Use a Philips screwdriver to unscrew both of the cover screws.
2. Hold both ends of the cover and remove it. If the cover is stuck, separate the cover from the base with a flathead screwdriver.

Input, output, and 24 VAC Class 2 transformer power input wiring diagrams

WARNING

Risk of Electric Shock

Disconnect the power supply before you make electrical connections. Contact with components carrying hazardous voltage can cause electric shock and may result in severe personal injury or death.

NOTICE

Risk of Property Damage.

Do not apply power to the module before checking all wiring connections. Short circuited or improperly connected wires may result in permanent damage to the equipment.

Important

Do not exceed module electrical ratings, this can result in permanent damage to the module and void warranties.

Important

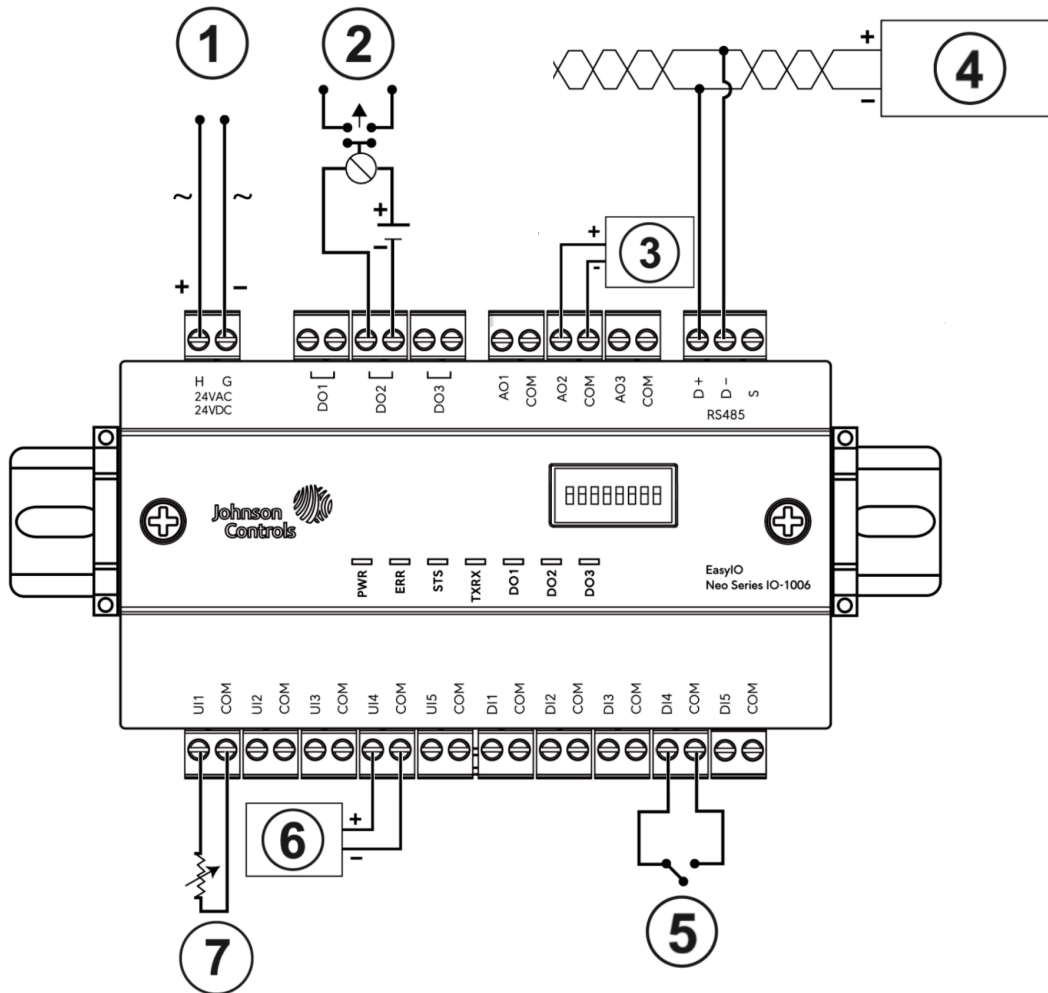
Only use copper conductors. Wire the module in accordance with local, national, and regional regulations

Important

Use the correct electrostatic discharge precautions throughout installation, setup, and service to avoid damage to the module and module components.

IO-1006 basic input, output, power, and serial device wiring setup

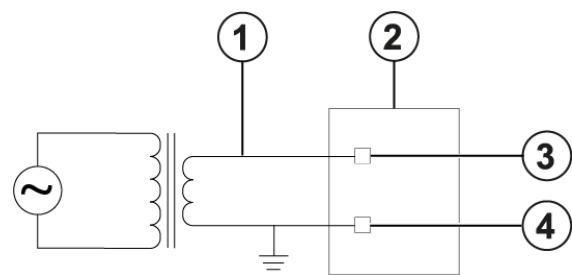
Figure 7: IO-1006 wiring guide



Callout	Description
1	Power input, 24 VAC or 24 VDC
2	Digital output wiring
3	Voltage-controlled actuator
4	Supervisory device
5	Dry contact input
6	Voltage transmitter, 0 V to 10 V or 0 V to 5 V
7	Thermistor, resistance temperature director, or potentiometer

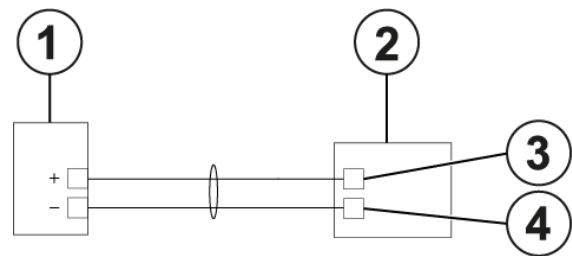
Note: If you configure the module as a subordinate device and it is at the end of a daisy chain, install a 120 ohm resistor in parallel with the RS-485 terminal.

Figure 8: 24 VAC Class 2 transformer power input



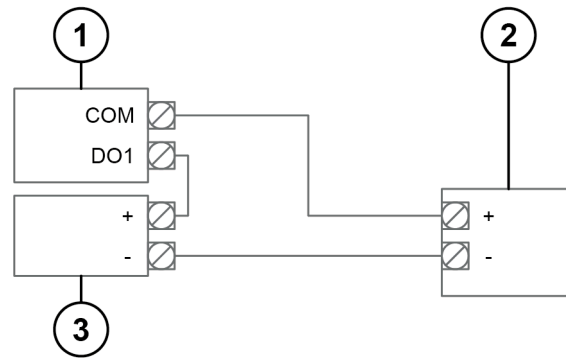
Callout	Description
1	20 AWG copper stranded wire
2	Controller
3	H terminal
4	G terminal

Figure 9: Analog output wiring



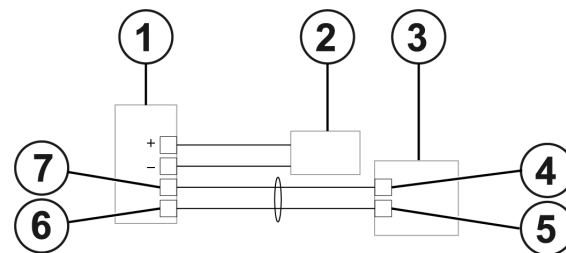
Callout	Description
1	Field device
2	Controller
3	Analog output (AO) terminal
4	COM terminal

Figure 10: DO wiring



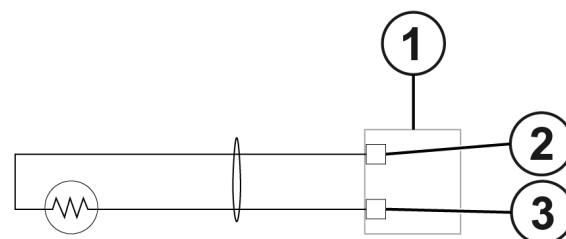
Callout	Description
1	Controller
2	Field device
3	24 VDC power supply

Figure 11: UI voltage mode wiring



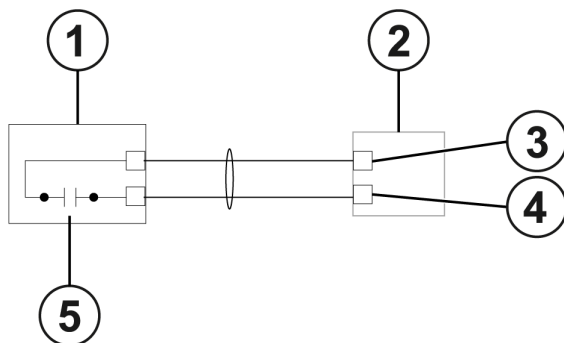
Callout	Description
1	Field device
2	Power supply
3	Controller
4	UI terminal
5	COM terminal
6	COM terminal
7	OUT terminal

Figure 12: UI resistance mode



Callout	Description
1	Controller
2	UI terminal
3	COM terminal

Figure 13: UI dry contact input



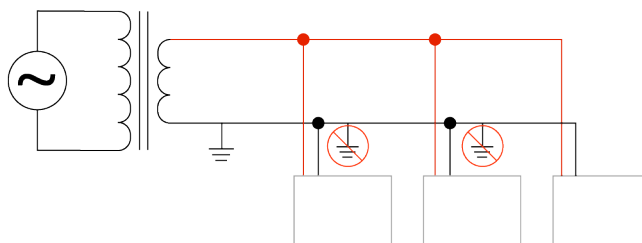
Callout	Description
1	Field device
2	Controller
3	UI terminal
4	COM terminal
5	Normally open or normally closed as required

Power supply terminal wiring

Connect the 24 VAC supply power wires from the transformer to the H and G power terminals as shown in [Figure 14](#).

- ❗ **Note:** The supply power wire colors may differ on transformers from other manufacturers. Refer to the transformer manufacturer's instructions and the project installation drawings for wiring details.
- **Important:** To reduce noise, interference, and ground loop problems, connect a 24 VAC supply power to the module and to all other network devices so that transformer phasing is uniform across network devices. The module does not require an earth ground connection. However, when you need to ground the secondary of the 24 VAC transformer, make only one ground connection near the transformer. For more information, see the following figure.

Figure 14: Transformer grounding



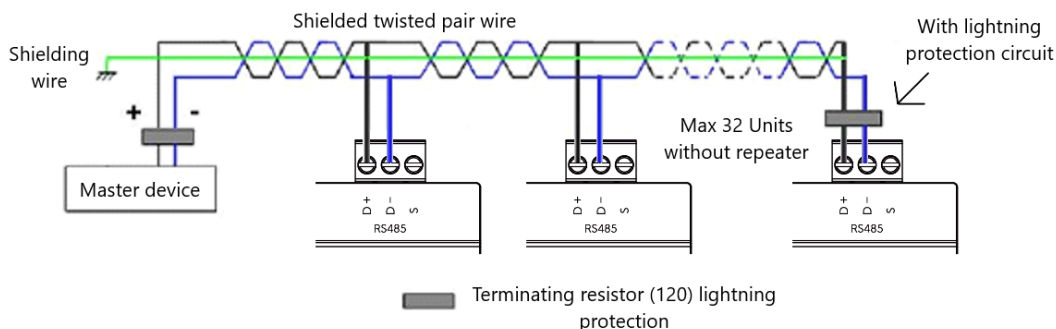
⚠ CAUTION

To avoid property damage, check all wiring connections before you apply power to the system. If you wire this terminal incorrectly, a short circuit can occur across the 24 VAC power supply on the module. A short circuit can cause a tripped circuit breaker or a blown fuse. If you use a transformer with a built-in fuse, you may need to replace the transformer.

RS-485 bus terminals

The RS485 connection must be terminated at both ends with a termination resistor, typically of 120Ω. It is best practice to use shielded twisted pair wire (STP) for the wiring. For optimal performance, install a lightning protection circuit at one end of the wiring. The controller should be wired in daisy chain network topology as shown as image below. If wire branch can be avoided, keep it as short as possible, and never connect more than one device to the wire branch.

Figure 15: RS-485 wiring



RS-485 serial port settings

The IO-1006 module comes with one RS-485 port, D+ and D-. The following table outlines the serial port configuration.

Table 1: RS 485 serial port settings

Port number	Protocol communications supported	Default serial port settings
RS485 port (D+, D-)	Modbus or BACnet. Use DIP switch 1 to select a protocol. - DIP 1 off = Modbus RTU - DIP 1 on = BACnet MSTP	Modbus
		Baud rate: 19.2 K
		Parity: even
		Data bit: 8 not editable
		Stop bit: 1
		BACnet
		Baud rate: 19.2 K

Universal jumper setting

Universal input jumper configuration

The IO-1006 module supports resistance and voltage field devices. For resistance mode, position the jumper on the two left pins. For voltage mode, position the jumper on the two right pins.

① **Note:** You can configure each universal input individually.

Figure 16: Resistance mode

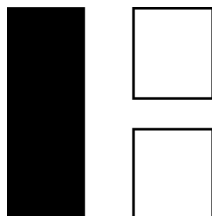
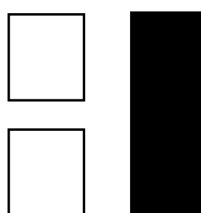


Figure 17: Voltage mode



BACnet or Modbus selection and ID setting

Use the dual in-line package (DIP) switch to select the BACnet or the Modbus protocol. By default, the Modbus protocol is selected. To switch to BACnet, toggle switch 1 upwards to the on position.

Use the switches 2 to 8 to set the BACnet MSTP ID when the switch 1 is on or the Modbus Serial ID when the switch 1 is off. Each of the switches 2 to 8 stand for a binary bit. Toggle the switches upwards to the on position to make that address digit 1 or leave it in the off position to make that address digit 0. The most significant bit (MSB) is DIP 2 and the least significant bit (LSB) is DIP 8.

Table 2:

DIP switch number	Function
1	Protocol selection
2	ID 64
3	ID 32
4	ID 16
5	ID 8
6	ID 4
7	ID 2
8	ID 1

IO-1006 LED states

The following table displays the IO-1006 LED states:

Table 3: IO-1006 LED states

LED label	LED color	Normal state	State	Description
PWR	Green	On steady	Off steady	No power
			On steady	Power is supplied by primary voltage
ERR	Red	Off steady	Constant rapid blinks	RS-485 communication error
			Off steady	No errors
STS	Green	1 Hz blinks	1 Hz blinks	Normal operation
			Off steady	Module fault
TXRX	Yellow	1 Hz to 5 Hz blinks	1 Hz to 5 Hz blinks	Normal data communication
			Off steady	No data transmission
DO1 to DO3	Green	Off steady	Off steady	DO off
			On steady	DO on

Troubleshooting

Table 4: Troubleshooting

Problem	Cause	Solution
The module does not turn on due to one of the following problems: - The transformer trips. Power is available at the transformer primary and there is no voltage at the secondary. - The breaker or fuse trips. Power is available at the transformer primary. You find 24 V at the secondary and 0 V at the breaker or fuse.	- The transformer shorted. - The 24 VAC powered sensor is not wired with the same polarity as the module. - The RS-485 bus device is not wired with the same polarity as the module.	- Ensure that the polarity of ~24 V COM on the module, auxiliary devices, and input and output devices is the same. - Verify that the short circuit is resolved with an ohm-meter. - Reset the breaker or fuse, or replace the transformer. ① Note: If you replace the transformer, replace it with a model that uses a resettable circuit breaker. A circuit breaker makes it easier to solve wiring problems. - To verify the connection, complete the following steps: - Disconnect the secondary of the 24 VAC transformer. - Use an ohm-meter to measure between ~24 V H and G at the module. Ensure that no short circuit occurs. ① Note: If your installation requires that you earth ground the transformer secondary, verify that the earth ground connection is valid and not shared between multiple pieces of equipment.
Analog output mode is invalid. 0 V to 10 V output is set to 100%, but output terminals are less than 10 V.	Load impedance is lower than 2,000 ohms.	- Ensure that the voltage control device load impedance is higher than 2,000 ohms. For more information, refer to the voltage device manufacturer specification. - Disconnect the connected device and verify that the value you require is present.
Analog mode for a configurable output is invalid. For example, 0 V to 10 V output results in an unwanted offset of up to 1 V.	The COM terminal is not connected.	- Connect the COM terminal of the configurable output to the common of the connected end device. - Measure the output and verify that it matches the command. - Disconnect the connected device and verify that the commanded value is present.
The Common Reference is incorrect.		

Technical specifications

Table 5: IO-1006 UL certified input, output, and communication ratings

Description	Specification	Terminal
Power supply	24 VAC, plus or minus 5% 24 VDC, plus 20% or minus 15%	H and G
	12 VA, Class 2	

Table 5: IO-1006 UL certified input, output, and communication ratings

Description	Specification			Terminal
Universal inputs	Voltage	0 VDC to 10 VDC, Class 2	3% accuracy	UI1 and COM to UI5 and COM
	Resistance	400 Ω to 300,000 Ω		
	Digital	Dry contact maintained		
Digital inputs	Dry contact maintained			DI1 and COM to DI5 and COM
Digital outputs	24 VAC, 0.5 A pilot duty, Class 2, dry contact relay output			DO1 to DO3
	24 VDC, 2 A pilot duty, Class 2, dry contact relay output			
Analog outputs	Voltage	0 VDC to 10 VDC, Class 2	3% accuracy	AO1 and COM to AO3 and COM
	Minimum load impedance	2,000 Ω		
	Maximum current draw	5 mA		
EIA/RS-485	Class 2			D+
				D-
				S

Table 6: IO-1006 Technical specifications

Description	Specification
Module processor and memory specifications	
Main processor	48Mhz ARM Cortex M0
Flash memory	256 KB
RAM	144 KB
Product temperature and humidity specifications	
Operating temperature	0°C to 65°C (32°F to 149°F)
Storage temperature	-20°C to 85°C (-4°F to 185°F)
Operating humidity	10% to 90% relative humidity, non-condensing
Physical specifications	
Dimensions (W x H x D)	132 mm x 87 mm x 77 mm (5.1 in. x 3.4 in. x 3.0 in.) including terminals
Material	UL certified

Compliance

Table 7: IO-1006 Compliance

North America: UL 916 Energy Management Equipment; FCC Class B, Part 15, Subpart C 15.247
FCC This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause interference. (2) This device must accept any interference, including interference that may cause undesired operation of the device. L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : 1) L'appareil ne doit pas produire de brouillage; 2) L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.
CE Compliant
UKCA Directive Electromagnetic Compatibility Regulations 2016: BS EN 55032:2015+A11:2020, BS EN IEC 61000-3-2:2019+A1:2021, BS EN 61000-3-3:2013+A1:2019+A2:2021, BS EN 55035:2017+A11:2020

Product warranty

This product is covered by a limited warranty, details of which can be found at www.johnsoncontrols.com/buildingswarranty.

Software terms

Use of the software that is in (or constitutes) this product, or access to the cloud, or hosted services applicable to this product, if any, is subject to applicable end-user license, open-source software information, and other terms set forth at www.johnsoncontrols.com/techterms. Your use of this product constitutes an agreement to such terms.

Contact information

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Patents

Patents: <https://icpat.com>

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