

EasyIO Neo Series CW-1612 Installation Guide

CW-1612

Building Technologies & Solutions

www.johnsoncontrols.com

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Overview

The CW-1612 is an input/output controller with IP network, Ethernet, and Wi-Fi connectivity. Use this guide to complete the following tasks:

- Understand the controller components
- Mount the controller on a DIN rail or enclosure base plate
- Install the antennas
- View a wiring diagram of the controller in a system
- Connect to the controller with a LAN or Wi-Fi connection
- Connect to the controller with the Edge Controller Programming Tools (EP) application.
- Connect to the controller's web server dashboard with EP Graphics.

Figure 1: CW-1612 front view

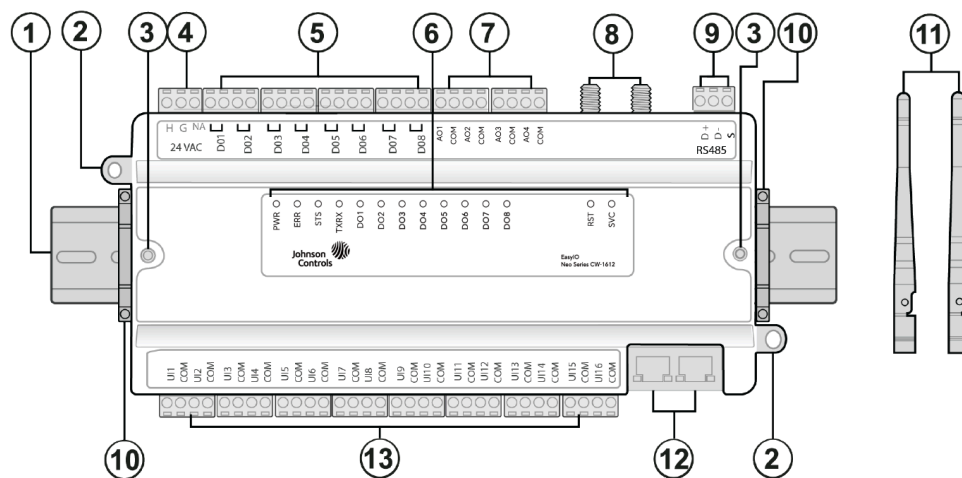
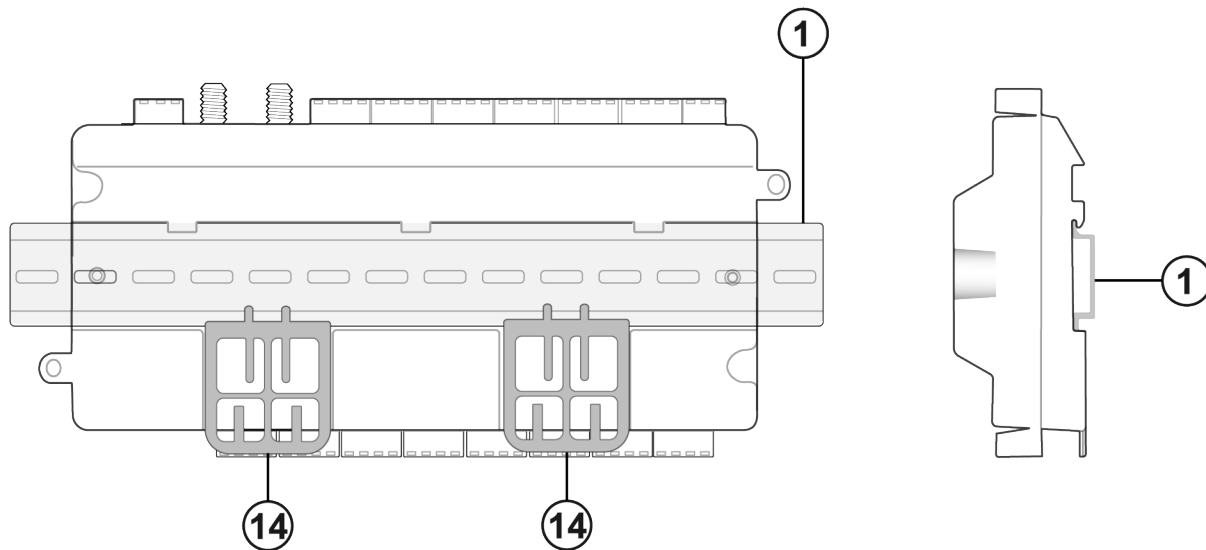


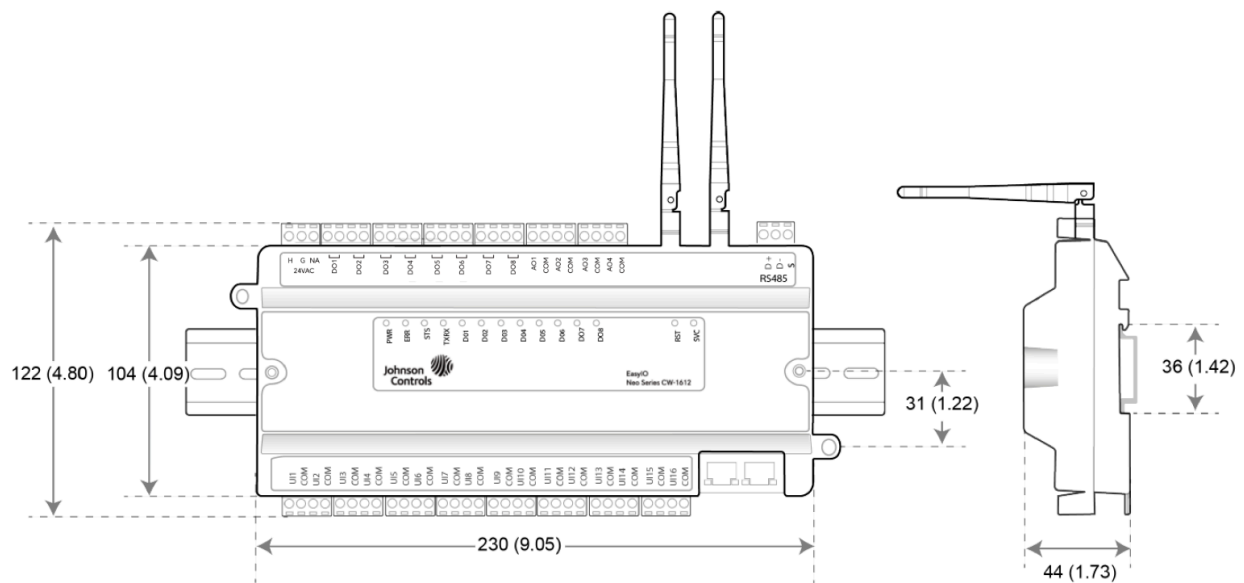
Figure 2: CW-1612 back and side view



Callout	Description	
1	35 mm (1.38 in.) DIN rail	
2	Enclosure mounting holes	
3	Cover screw	
4	Hot (H) and Ground (G) terminals	
5	Digital Output (DO) terminals	
6	PWR	Power LED
	ERR	Error LED
	STS	Status LED
	TXRX	Transmitting or receiving communication LED
	DO1 to DO8	DO communication LED
	RST	Reset button.
	SVC	Service button
7	Analog Output (AO) and COM (Common) terminals	
8	RP-SMA female antenna jacks	
9	RS-485 bus terminals	
10	DIN rail end clips	
11	Antennas	
12	Ethernet ports	
13	Universal Input (UI) and COM terminals	
14	Mounting clips	

Physical dimensions

Figure 3: CW-1612 dimensions, mm (in.)



Parts included

- One CW-1612 controller with removable terminal blocks
- Two Wi-Fi 2.4 Ghz, 2.2dBi antennas
- 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 controller on a DIN rail and mounting the controller on an enclosure base plate.

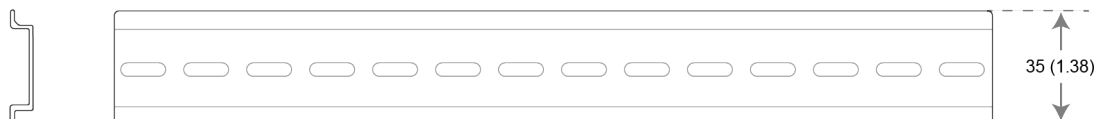
Mounting locations to avoid

- 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 controller on a 35 mm DIN rail

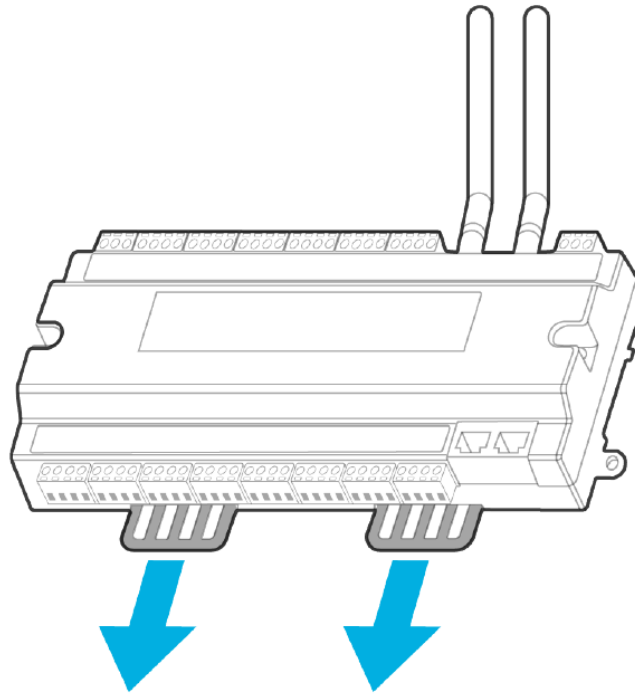
1. Mount a section of 35 mm (1.38 in.) DIN rail horizontally on the enclosure base plate.

Figure 4: 35 mm DIN rail



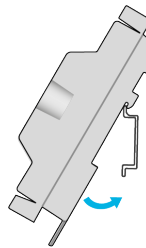
2. Pull the two bottom mounting clips outward from the controller to the extended position.

Figure 5: Extending the mounting clips



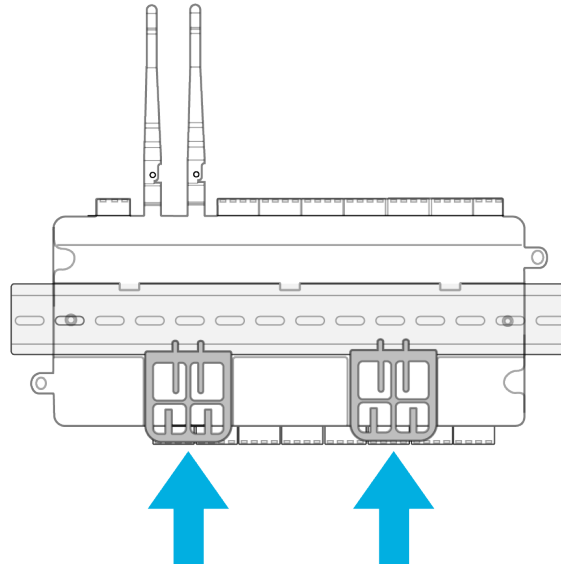
3. Hang the controller on the DIN rail by the hooks at the top of the DIN rail channel on the back of the controller and position the controller firmly against the DIN rail.

Figure 6: Placing the controller on the DIN rail



4. To secure the controller to the DIN rail, push the mounting clips up.

Figure 7: Closing the mounting clips (rear view)



5. **Optional:** For added security, use DIN rail end clips. For the DIN rail end clips locations see [Figure 1](#).

Mounting the controller to an enclosure base plate

About this task:

If a DIN rail mount is not practical, the controller features two mounting holes to screw mount the controller to an enclosure base plate.

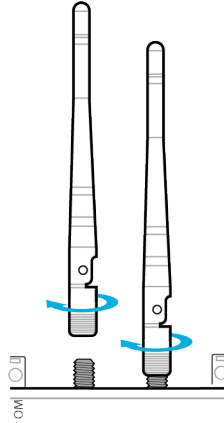
1. Place the controller on the enclosure surface and mark the enclosure mounting holes on the surface. For the enclosure mounting hole locations see [Figure 1](#).
2. Drill both holes in the enclosure base plate.
3. Screw the controller to the enclosure base plate.

Installing the antennas

1. Locate the two RP-SMA female jacks. See [Figure 1](#).
2. To connect the male antenna connectors to the female RP-SMA jacks, screw on the antennas in a clockwise direction.

❗ **Note:** For a secure connection hold the metal part of the RP-SMA male connector. A poor connection reduces reception when you tighten the antennas to the female RP-SMA jack.

Figure 8: Screwing on the antennas



3. Adjust the direction of the antennas to find the best reception.

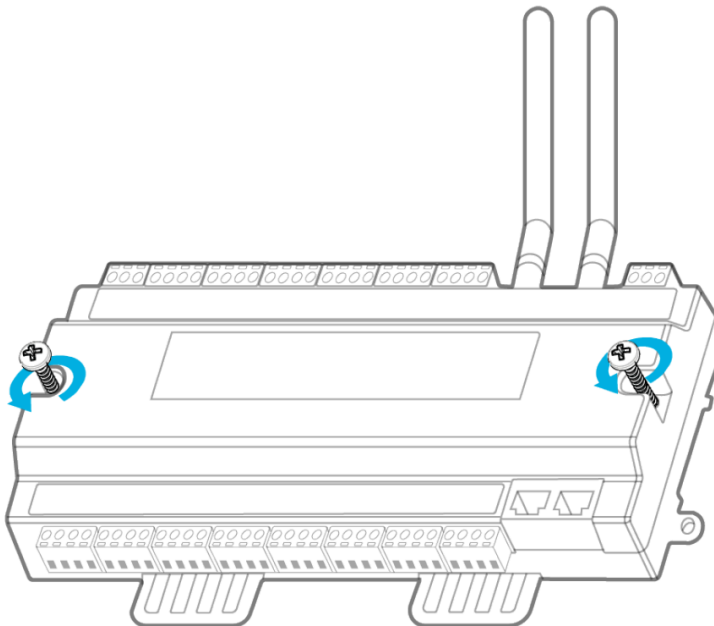
Removing the controller cover

About this task:

Remove the controller cover to access the circuitry, jumpers, and to better access the reset and service buttons.

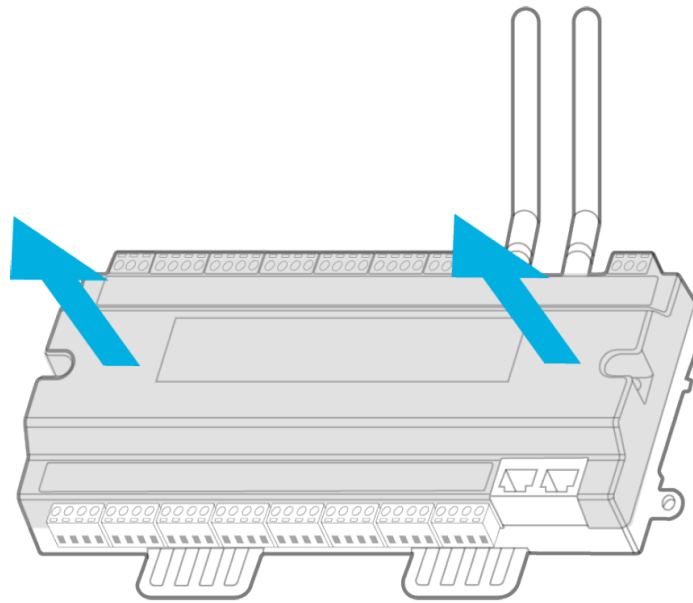
1. Use a Philips screwdriver to unscrew both of the top cover screws.

Figure 9: Unscrewing the cover



2. Hold both ends of the top cover and remove it. If the top cover is stuck, separate the cover with a flathead screwdriver.

Figure 10: Removing the cover



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 controller before checking all wiring connections. Short circuited or improperly connected wires may result in permanent damage to the equipment.

Important

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

► Important

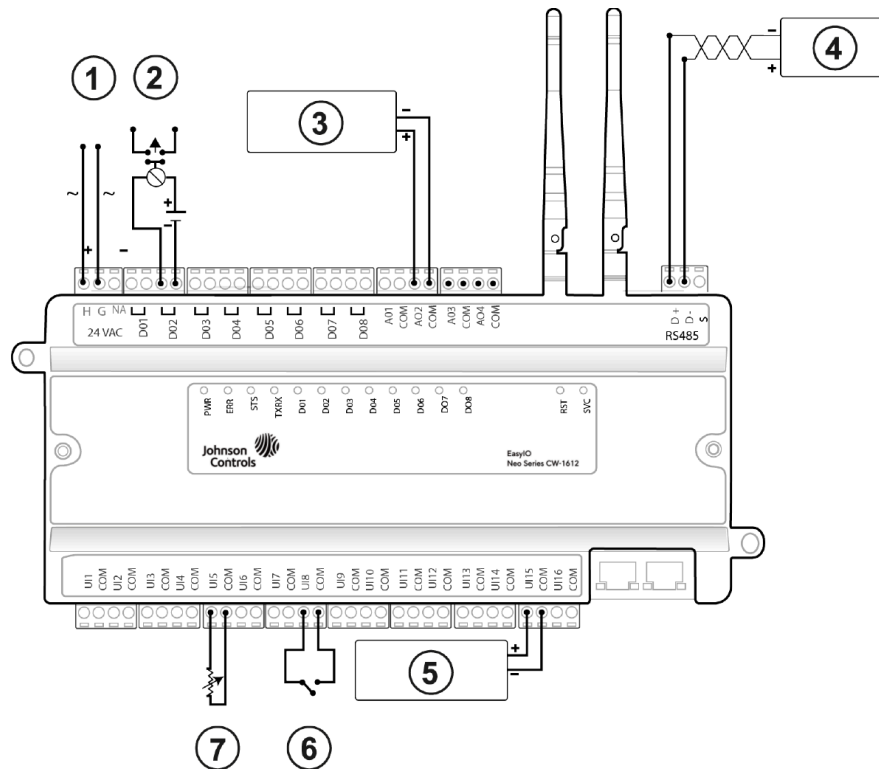
Only use copper conductors. Wire the controller in accordance with local, national, and regional regulations

► Important

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

CW-1612 basic input, output, power, and serial device wiring setup

Figure 11: CW-1612 wiring guide

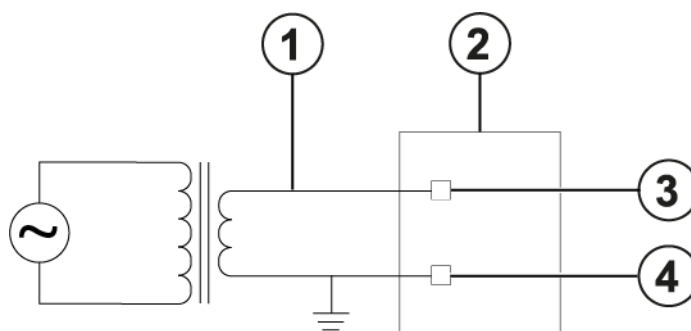


Callout	Description
1	Power input 24 VAC or 24 VDC
2	External pilot duty relay that the DO activates
3	Voltage-controlled actuator
4	BACnet® MS/TP or Modbus® RTU devices

Callout	Description
5	Voltage transmitter 0 V to 10 V
6	Dry contact
7	Thermistor, RTD, or potentiometer

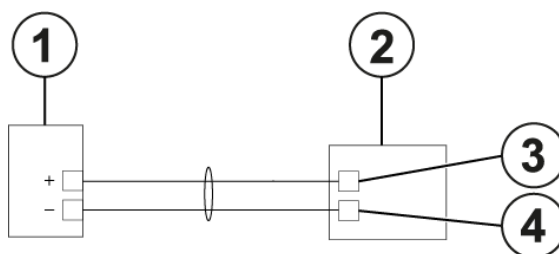
- ① **Note:** If you configure the controller as a subordinate device and it is at the end of a daisy chain, install a 120 ohm resistor in parallel with the RS-485 terminal.

Figure 12: 24 VAC Class 2 transformer power input



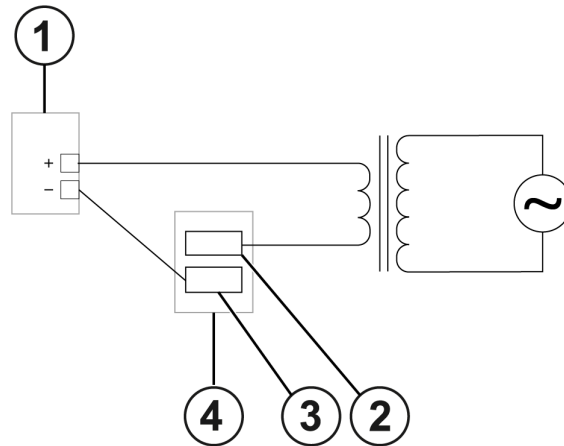
Callout	Description
1	20 AWG copper stranded wire
2	Controller
3	H terminal
4	G terminal

Figure 13: Analog output wiring



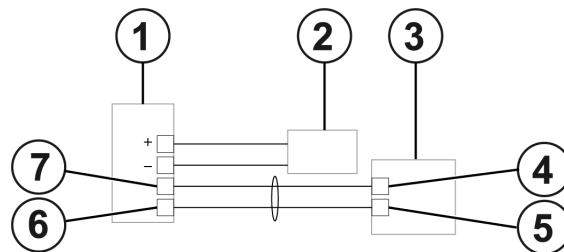
Callout	Description
1	Field device
2	Controller
3	Analog output (AO) terminal
4	COM terminal

Figure 14: DO wiring



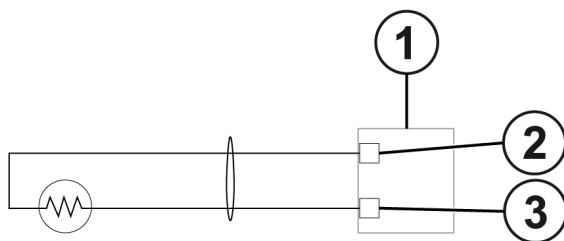
Callout	Description
1	Field device
2	DO terminal
3	COM terminal
4	Controller

Figure 15: UI voltage mode wiring



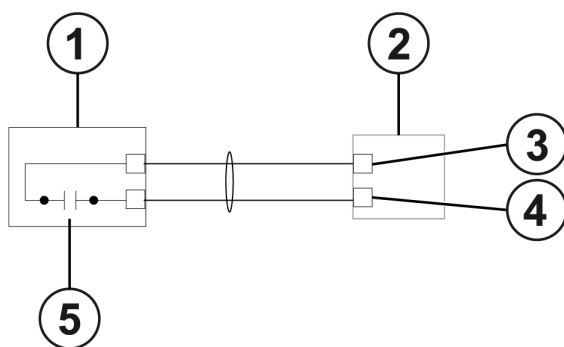
Callout	Description
1	Field device
2	Power supply
3	Controller
4	UI terminal
5	COM terminal
6	COM terminal
7	OUT terminal

Figure 16: UI resistance mode



Callout	Description
1	Controller
2	UI terminal
3	COM terminal

Figure 17: UI dry contact input



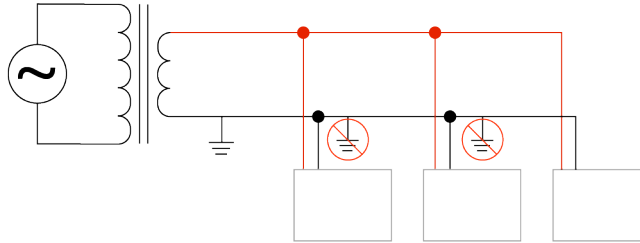
Callout	Description
1	Field device
2	Controller
3	UI terminal
4	COM terminal
5	Dry contact
	Normally open or normally closed as required

Power supply terminal wiring

Connect the 24 VAC supply power wires from the transformer to the HOT and COM power terminals as shown in [Figure 18](#).

- ❗ **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 controller and to all other network devices so that transformer phasing is uniform across network devices. The controller 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 18: 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 controller. 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.

Input and output terminal wiring considerations

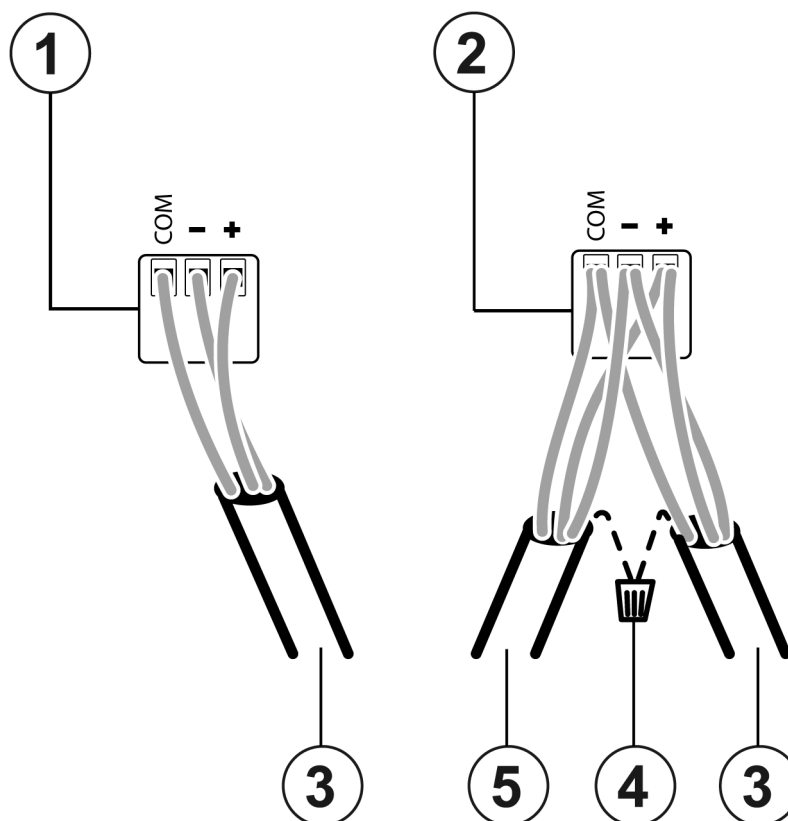
- Run all low-voltage wiring and cables separate from high-voltage wiring.
- For all input and output cables, use twisted, insulated, and stranded copper wires.
- Use shielded cables for input and output cables that are exposed to high electromagnetic or radio frequency noise.
- Cable runs over 30 m or 100 ft require an offset in the input and output software setup.

RS-485 bus terminals

Wire the RS-485 terminals in a daisy-chain configuration. Use a stranded three-wire twisted and shielded cable as shown in [Figure 19](#). The three different wires are the positive bus, the negative bus, and the COM.

You can use the RS-485 positive and negative wires as sensor actuator (SA) bus + and SA bus -.

Figure 19: RS-485 wiring

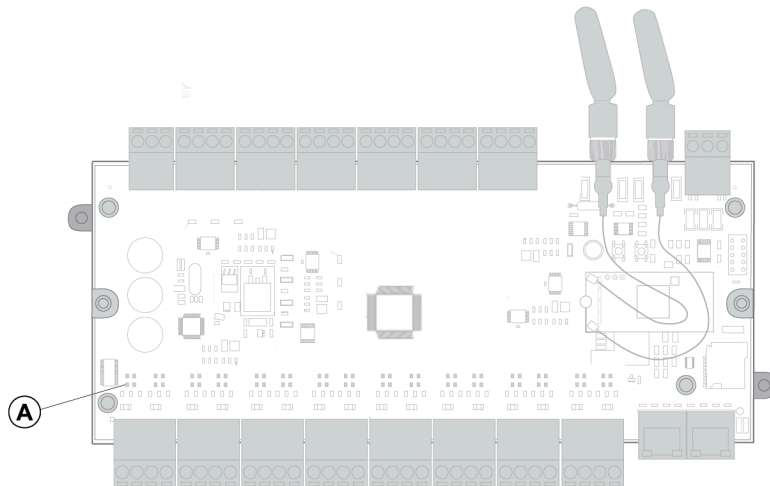


Callout	Description
1	Terminal on the first device
2	Terminal on the daisy-chained device
3	Connection to another device on the RS-485 bus
4	Cable shield connection. You do not need to ground the cable shield.
5	Connection from another device on the RS-485 bus

UI jumper setting

The CW-1612 UI jumper includes 16 sets of UI and supports both resistance and voltage field devices.

Figure 20: CW-1612 front uncovered



Callout	Component
A	Universal input

Universal input jumper configuration

The CW-1612 controller 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.

Note: You can configure each UI individually.

Figure 21: Resistance mode

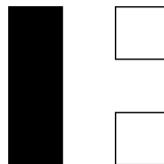
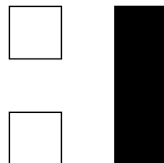


Figure 22: Voltage mode



Controller interfacing

To interface with a controller and its inputs and outputs with EP and the controller's web server, establish a connection from your device. You can connect to your controller with a device through Ethernet or through Wi-Fi.

- ① **Note:** Use the following procedures to set up a controller on a primary network. For more information about a secondary network setup, refer to the product's *User Reference Guide*.
- To connect to your controller with a computer or laptop by using an Ethernet LAN cable, see [Connecting a controller with an Ethernet cable](#).
- To connect to your controller with a mobile device, computer, or laptop with Wi-Fi, see [Connecting to a controller with Wi-Fi](#).

Interface with your controller with the following user interfaces:

- Access the controller dashboard and make network, DateTime, and service configuration changes on the controller's web server. For more information, see [Interfacing with a controller's web server](#).
- Program controller object logic with EP. For more information, see [Interfacing with controller objects using EP](#).

Connecting a controller with an Ethernet cable

1. Connect your computer to the controller with an Ethernet cable.
2. Set up your network adapter in the same range as the controller. To change your IP address, subnet mask, and gateway, complete the steps as outlined in one of the following options, depending on your operating system:
 - ① **Note:** Use the same subnet mask and gateway as the controller. For the IP address, enter the same IP address as the controller, but change the last octet to a unique number. Use a high number that is less than 255 to avoid using an IP address that is already in use. For more information about your controller's IP address, subnet mask, and gateway, see [Primary network default IP address, subnet mask, and gateway](#).

Connecting to a controller with an Ethernet cable for Windows

About this task:

Complete one of the following two methods to connect the controller.

1. From the user interface, complete the following steps:
 - a. Navigate to **Control Panel > Network and Internet > Network and Sharing Center > Change Adapter settings**.
 - b. Right-click your Ethernet connection, then click **Properties**.
 - c. On the **Networking** tab, select the **Internet Protocol Version 4 (TCP/IPv4)** check box, then click **Properties**.
 - d. On the **General** tab, click **Use the following IP address**. In the **IP address**, **Subnet mask**, **Default gateway** fields, set the IP address, subnet mask, default gateway you want.
2. From the command prompt, complete the following steps:
 - a. Enter the following command with the IP address, subnet mask, default gateway you want:

```
netsh interface ipv4 set address
name="Ethernet" static <IP address> <subnet mask>
<gateway>
```
 - b. Enter the `ping` command followed by the controller's IP address to confirm the connection.

Connecting to a controller with an Ethernet cable for MacOS

About this task:

Complete one of the following two methods to connect the controller.

1. From the user interface, complete the following steps:
 - a. Click the Apple menu icon, then **System Preferences > Network**.
 - b. Click the network connection you want, then click **Advanced**.
 - c. On the **TCP/IP** tab, from the **Configure IPv4** list, select **Manually**.
 - d. In the **IPv4 address**, **Subnet Mask**, and **Router** fields, set the IP address, subnet mask, default gateway, then click **OK**.
2. From the terminal, complete the following steps:
 - a. Enter the following command with the IP address, subnet mask, default gateway you want:

```
networksetup -setmanual "Ethernet" <new IP address> <subnet mask> <gateway>
```

- b. Enter the `ping` command, followed by the controller's IP address to confirm the connection.

Connecting to a controller with an Ethernet cable for Linux

About this task:

Complete one of the following two methods to connect the controller.

1. From the user interface, complete the following steps:
 - a. From the toolbar, click **System > Preferences > Network Connections**.
 - b. Find the network connection you want, then click the configure icon.
 - c. On the **IPv4** tab, click **Manual**.
 - d. In the **IPv4 address**, **Netmask**, and **Gateway** fields, set the IP address, subnet mask and default gateway you want, then click **Apply**.
2. From terminal, complete the following steps:
 - a. Enter the following command with the IP address, subnet mask, default gateway you want:

```
networksetup -setmanual "Ethernet" <new IP address> <subnet mask> <gateway>
```

- b. Enter the `ping` command, followed by the controller's IP address to confirm the connection.

Connecting to a controller with Wi-Fi

1. From the desktop toolbar on your computer, click your Wi-Fi network icon.
2. Find the controller's SSID, then connect to the controller.
 - ❶ **Note:** Your controller's default SSID is a combination of the controller's series letters and the last four characters of the controller's MAC address. You can find the MAC address on the label on the back of the controller.
3. Enter the default password. For more information, contact your supplier.
4. At the command line, enter `ping` followed by the controller's IP address to ping the controller.
 - ❶ **Note:** For more information about your controller's default IP address, see [Primary network default IP address, subnet mask, and gateway](#).

Primary network default IP address, subnet mask, and gateway

Table 1: Default IP address, subnet mask, and gateway for a primary network setup

Item	Address
IP address	192.168.10.30
Subnet mask	255.255.255.0
Gateway	192.168.10.1

Interfacing with a controller's web server

About this task:

To interface with a controller's web server, complete the following steps:

1. Launch a HTML5 web browser, such as Chrome™, Firefox®, Microsoft Edge®, or Safari®.
2. In the web browser's address bar, enter your controller's IP address, for example `http://192.168.10.30`, and then press the Enter key or Return key.
 - ❗ **Note:** The default connection is HTTP. Some browsers may automatically change the connection from HTTP to HTTPS or block the connection.

Interfacing with controller objects using EP

Use EP to program EasyIO Neo Series controller logic with the Sedona framework.

1. To download the EP application, contact Support for the latest release.
2. Unzip the folder and double-click the `ep.exe` file.
 - **Important:** If the EP application is already installed on your computer and you want to update it to a new release, do not click and launch the `ep.exe` file to avoid personal settings data loss. Unzip the package and drop all the files into the existing EP folder to merge and overwrite outdated files.
3. To connect to a controller, click **File**, then click **Open App**.
4. In the **Project Management** window, on the **Recent** tab, click **New**.
5. In the **App Desc** field, enter a name for the controller.
6. In the **Host** field, enter the controller's IP address.
 - ❗ **Note:** The default IP address is `192.168.10.30`
 - ❗ **Note:** For more information about your controller's IP address, refer to the *Controller series IP address, subnet mask, and data folder* section of the *EasyIO EP User Guide* (LIT-12014485).
7. From the **Data Folder** list, select the folder for your controller type.
 - ❗ **Note:** For more information about your controller's data folder, refer to the *Controller series IP address, subnet mask, and data folder* section of the *EasyIO EP User Guide* (LIT-12014485).
8. Click **Save**.
9. Click **Open**.
10. In the **Authentication** dialog, enter your password in the **Password** field.
 - ❗ **Note:** By default, there is no password. To increase security, when you log on, create a new EP admin password.

LED states

The following table displays the LED's blink rate descriptions:

Table 2: LED states

LED label	LED color	Normal state	State	Description
ERR	Red	Off steady	Constant rapid blinks	Communication error between the FM-06 module and the base board
			On steady	Firmware upgrade in process. Ensure no power loss occurs during this period.
			Off steady	No errors
STS	Green	1 Hz blinks	1 Hz blinks	Normal operation
			Off steady	Controller fault
TXRX	Yellow	1 Hz to 5 Hz blinks	1 Hz to 5 Hz blinks	Normal data communication
			Off steady	No data transmission

Troubleshooting

Table 3: Troubleshooting

Problem	Cause	Solution
The controller does not turn on due to one of the following problems: - The transformer trips. Power is at the transformer primary and there is no voltage at the secondary. - The breaker or fuse trips. Power is at transformer primary. You find 24 V at secondary and 0 V at breaker or fuse.	The transformer shorted.	- Ensure that the polarity of ~24 V COM, +15 V, and COM on the controller, 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. 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 controller. Ensure that no short circuit occurs. 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.
	The 24 VAC powered sensor is not wired with the same polarity as the controller.	
	The RS-485 bus device is not wired with the same polarity as the controller.	
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 2K ohms.	- Ensure that the voltage control device load impedance is higher than 2,000 ohms. For more information, refer to voltage device manufacturer specification. - Disconnect the connected device and verify that the value you require is present.

Table 3: Troubleshooting

Problem	Cause	Solution
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.	1. Connect the COM terminal of the configurable output to the common of the connected end device. 2. Measure the output and verify that it matches the command. 3. Disconnect the connected device and verify the commanded value is present.
The Common Reference is incorrect.		

Technical specifications

Table 4: CW-1612 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			
Universal inputs	Voltage	0 VDC to 10 VDC, Class 2	3% accuracy	UI1 and COM to UI16 and COM
	Resistance	500 ohm to 500,000 ohm		
	Pulse count mode (max)	20 Pulse per sec at 50% duty cycle (20Hz): Voltage free contact (DI)		
Digital outputs	24 VAC, 0.5 A pilot duty, Class 2, dry-contact relay output			DO1 to DO8
	24 VDC, 0.5 A pilot duty, Class 2, dry-contact relay output			
Analog outputs	Voltage	0 V to 10 V, Class 2	3% accuracy	AO1 and COM to AO4 and COM
	Minimum load impedance	2,000 ohm		
	Maximum current draw	5 mA		
EIA/RS-485	Class 2			D+
				D-
				S
Ethernet ports	Class 2			ENET0
				ENET1

Table 5: CW-1612 technical specifications

Description	Specification
Controller processor and memory specifications	
Main processor	Qualcomm 560 Mhz
Processor	ARM Cortex 48 Mhz
Flash memory	32 MB
RAM	128 MB
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)

Table 5: CW-1612 technical specifications

Description	Specification
Operating humidity	10% to 90% relative humidity, non-condensing
Physical specifications	
Dimensions	230 mm x 104 mm x 44 mm (9.1 in. x 4.1 in. x 1.7 in)
Material	UL certified
Weight	500 g (17.6 oz)
Wireless ratings	
Standard	IEEE 802.11
Band	b/g/n
Frequency range	2412 MHz to 2462 MHz
Antenna	2.2 dBi Dipole
Transmission power	19.18 dBm EIRP

Compliance

Table 6: CW-1612 Compliance

North America: UL 916 Energy Management Equipment; FCC Class B, Part 15, Subpart B 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 follow-ing 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. NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential instal-lation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interfer-ence will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures: — Reorient or relocate the receiving antenna. — Increase the separation between the equipment and receiver. — Connect the equipment into an outlet on a circuit different from that to which the receiver is connected. — Consult the dealer or an experienced radio/TV technician for help. Limited by local law regulations, version for North America does not have region selection option. This radio transmitter IC: 279A-FW28 has been approved by Innovation, Science and Economic Development Canada to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device. Gain of antenna: 2.2 dBi max Type of antenna: 50 Ohm Dipole Le présent émetteur radio IC: 279A-FW28 a été approuvé par Innovation, Sciences et Développement économique Canada pour fonctionner avec les types d'antenne énumérés ci-dessous et ayant un gain admissible maximal. Les types d'antenne non inclus dans cette liste, et dont le gain est supérieur au gain maximal indiqué pour tout type figurant sur la liste, sont strictement interdits pour l'exploitation de l'émetteur. Gain d'antenne: 2.2 dBi maximal Type d'antenne: 50 Ohm Dipole To satisfy FCC & IC RF exposure requirements, a separation distance of 20 cm or more should be maintained between the antenna of this device and persons during device operation. To ensure compliance, operations at closer than this distance is not recommended. Les antennes installées doivent être situées de façon à ce que la population ne puisse y être exposée à une distance de moin de 20 cm. Installer les antennes de façon à ce que le personnel ne puisse approcher à 20 cm ou moins de la position centrale de l' antenne.
CE Compliant

Table 6: CW-1612 Compliance

RED directive
The Equipment named above is confirmed to comply with the requirements set out in the European Council Directive on the Approximation of the Laws of the Member States relating to 2014/53/EU (RED). The equipment passed the following test which was performed according to the following European standards:
ETSI EN 300 328 V2.2.2 (2019-07), EN 62311:2008, ETSI EN 301 489-1 V2.2.3 (2019-11), ETSI EN 301 489-17 V3.2.4 (2020-09)
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.

Patents

Patents: <https://jciapat.com>

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