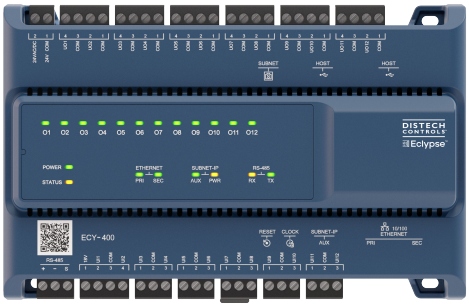
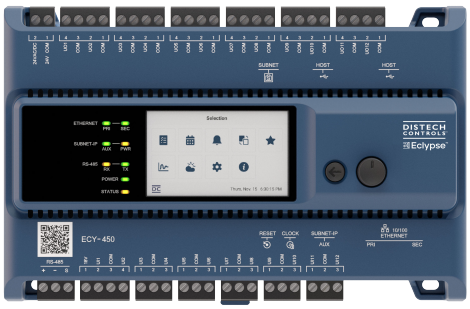
ECY-400 Series





Overview

The Eclypse™ 400 (ECY-400) Series controllers are designed to control various building automation applications such as air handling units, multi-zone applications, chillers, boilers, pumps, cooling towers, and roof top units. They support BACnet/IP communications and are listed BACnet Building Controllers (B-BC).

These programmable controllers are powered by Eclypse Facilities and include two years of Atrius Facilities - Organize. They feature an embedded visualization interface and web server, which enables web-based application configuration, scheduling, alarming, and logging. Control logic and graphic user interface can be customized as required for the application.

General Installation Requirements

For proper installation and subsequent operation of each controller, pay special attention to the following recommendations:

- Upon unpacking the product, inspect the contents of the carton for shipping damages. **Do not install damaged modules.**
- Avoid areas where corroding, deteriorating or explosive vapors, fumes or gases may be present.
- Ensure the mounting surface can support the controller, DIN rail, and any user-supplied enclosure.
- Allow for proper clearance around the controller's enclosure, wiring terminals, and HOA switches to provide easy access for hardware configuration and maintenance, and to ventilate heat generated by the controller.
- The preferred mounting orientation is horizontal, but the controller can be installed in any orientation as long as the internal temperature is within the recommended range. Orient the controller with the ventilation slots and power supply input terminal block connectors towards the top to permit proper heat dissipation. When installed in an enclosure, select one that provides sufficient surface area to dissipate the heat generated by the controller and by any other devices installed in the enclosure. A metal enclosure is preferred. If necessary, provide active cooling for the enclosure.
- The controller's spec sheet specifies the power consumption (amount of heat generated), the operating temperature range, and other environmental conditions the controller is designed to operate under.
- Ensure that all equipment is installed according to local, regional, and national regulations.
- If the controller is used and/or installed in a manner not specified by Distech Controls, the functionality and the protection provided by the controller may be impaired.
- SELV (Separated Extra Low Voltage) inputs/outputs must be connected to other SELV equipment inputs/outputs.
- Keep this product at room temperature for at least 24 hours before installation to allow any condensation that may have accumulated due to low temperature during shipping/storage to evaporate.
- Do not drop the product or subject it to physical shock.

Any type of modification to any Distech Controls product will void the product's warranty

Take reasonable precautions to prevent electrostatic discharges to the product when installing, servicing or operating the product. Discharge accumulated static electricity by touching one's hand to a well-grounded object before working with the product.

Device Markings

Certain markings (symbols) can be found on the controller and are defined as follows:

Symbol	Description
CE	CE marking: the device conforms to the requirements of applicable EC directives.
UK CA	UKCA marking: the device conforms to the requirements of applicable Great Britain regulations.
	Double Insulation marking: These controllers are built using double insulation.
	Products must be disposed of at the end of their useful life according to local regulations.
	Read the Hardware Installation Guide for more information.
	For indoor use only.
c UL us LISTED	UL marking: conforms to the requirements of the UL certification.
FC	FCC marking: This device complies with FCC rules part 15, subpart B, class B.
	Warning Symbol: Significant information required. Refer to the Hardware Installation Guide
	HIGH VOLTAGE Symbol: Direct contact will cause electrical shock or burn.
~	Alternating Current
⎓	Direct Current
L	Line
N	Neutral

General Wiring Recommendations

Risk of Electric Shock: Turn off power before any kind of servicing to avoid electric shock.

- All wiring must comply with electrical wiring diagrams as well as national and local electrical codes.
- To connect the wiring to a device, use the terminal connectors. Use a small flat screwdriver to tighten the terminal connector screws once the wires have been inserted (strip length: 0.25'' (6 mm), maximum tightening torque 0,4 Nm (3.45 in-lb)).
- Comply with all network and power supply guidelines outlined in the Network Guide.
- Always use unshielded cabling with a minimum Category 5 (CAT5) cable for ethernet communications.
- Keep wiring separate according to their function and purpose to avoid any ambient noise transmission to other wires. Use strapping to keep these wires separated. For example, keep power, hazardous voltage, SELV, PELV, network, and input wiring separate from each other.
- Power Wiring: When connecting one wire to a controller's terminal block clamping cage (pole), the wire must be between 18 and 14 gauge (0.82 and 2.1mm^2 cross-sectional area). When connecting two wires to a controller's terminal block clamping cage, both wires must be the same thickness, must be between 18 and 16 gauge (0.82 and 1.3mm^2 cross-sectional area), and must be the same type (solid or stranded).
  Twist the wires together and insert then into the controller's terminal block clamping cage. For any other wiring combination (mixed wire thickness, mixed solid and stranded conductors, more than three wires, wire thickness is out of range), twist the wires together and use a wire nut and a pig tail to connect to the controller's terminal block connector as show below.

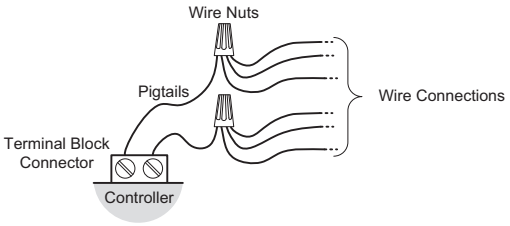
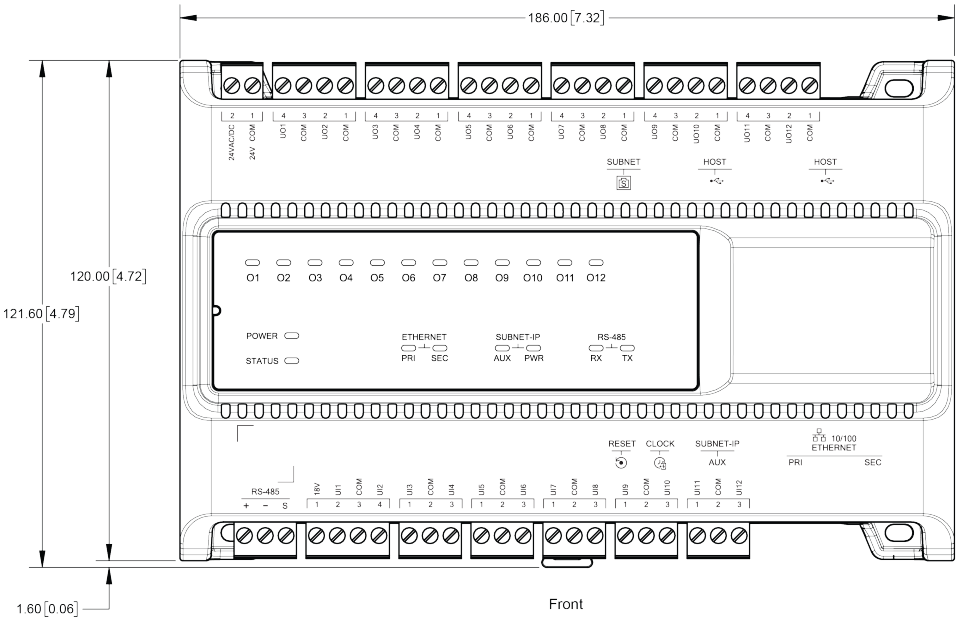
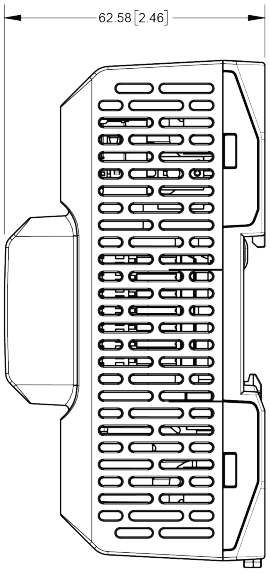


Figure 1. Using a Wire Nut and Pigtail to Wire the Controller

- Do not connect the universal inputs, analog/digital outputs or common terminals to earth or chassis ground (unless stated otherwise).
- Keep input and output wiring in conduits, trays or close to the building frame if possible.

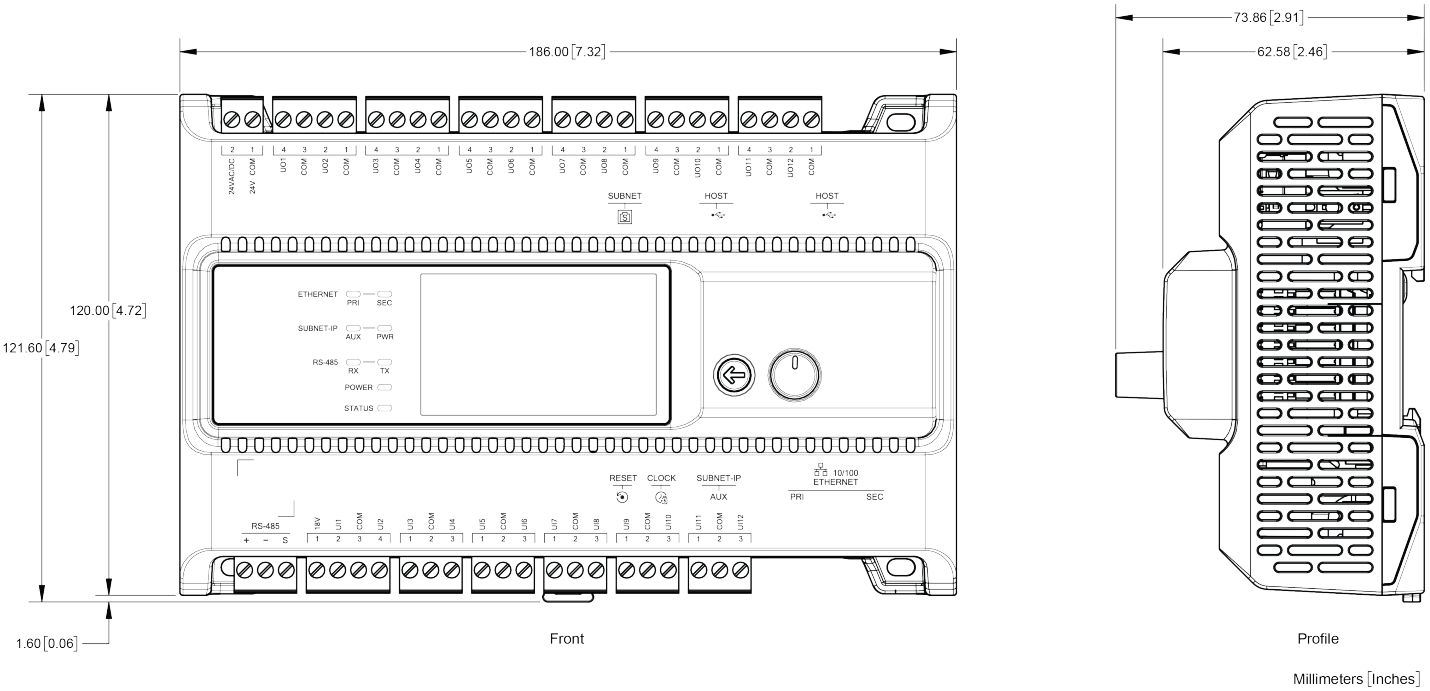
Dimensions





Millimeters [Inches]

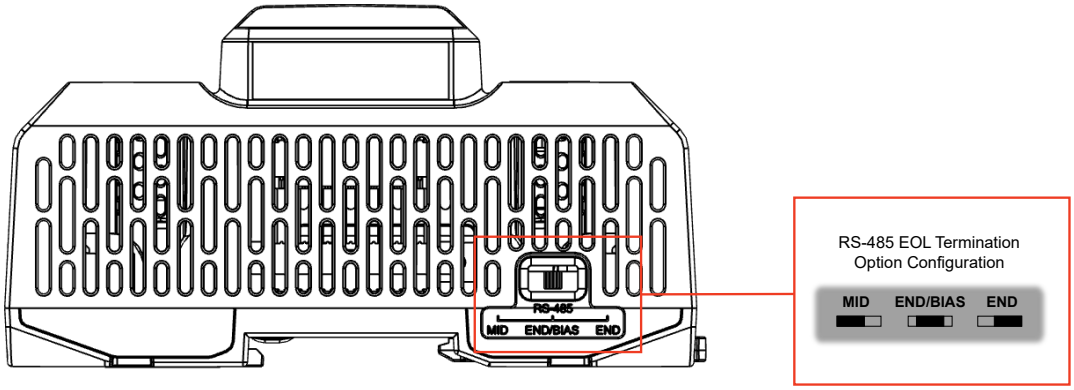
Controllers not equipped with an operator interface



Controllers equipped with an operator interface

End-of-line (EOL) Switch

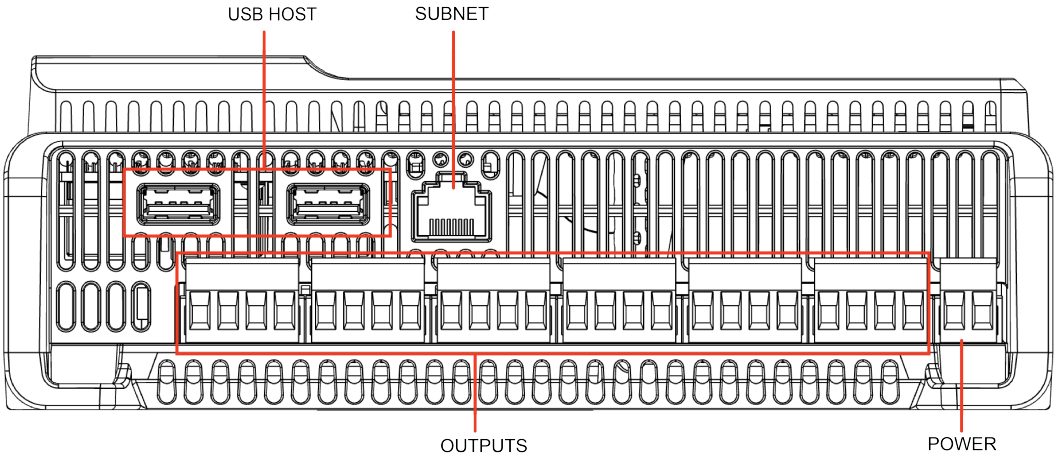
Controllers have an integrated EOL switch located on the side, as shown in the figure below.



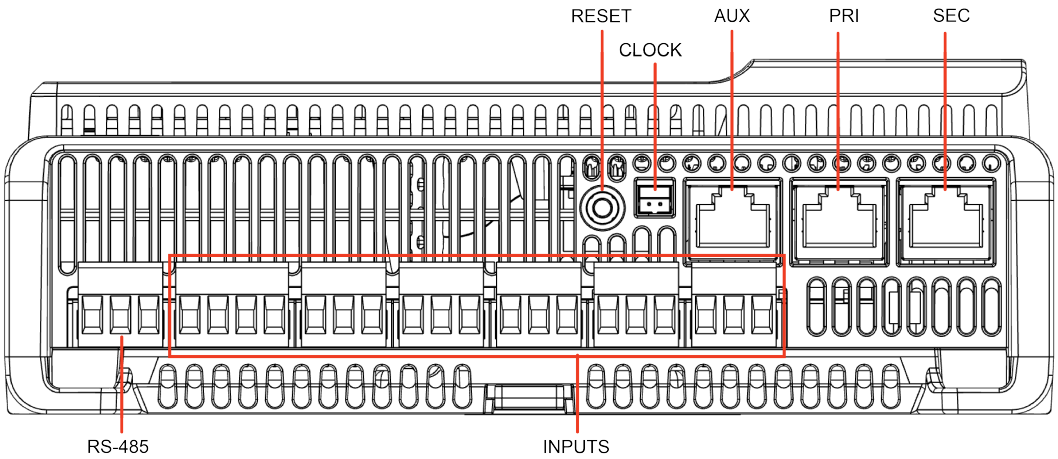
RS-485 EOL Termination Option Configuration Switch Location

Ports and Reset Button

Controllers have a Reset button and the following ports as shown in the figures below:



Port locations - top view



Port locations - bottom view

Using the Reset Button

Depending on the amount of time the reset button is held down, different actions are taken by the controller. The **STATUS** LED will turn off after each time interval.

Hold Reset For	To
5 seconds	Restart / reboot the controller.
10 seconds	Reset both Ethernet and Wi-Fi IP addresses back to factory default settings.
20 seconds	Reset the controller to its factory default settings. User accounts (user names and passwords) will also be reset to the factory default settings and the controller license will be cleared.

Always backup the controller's license through the controller's Web interface before you hold the controller's reset button for 20 seconds. Once the controller reboots, you will have to install the license through the controller's Web interface.

After you perform a factory reset, the controller's HTTPS security certificates will be regenerated. If you use HTTPS to connect to the controller, you will no longer be able to connect to the controller from any PC that was used in the past to connect to the controller unless you delete the old HTTPS security certificate from these PCs.

Once the factory reset procedure is started, it cannot be cancelled.

Connecting an RTC Adapter to the Clock Port

For installations where long-term power outages are expected (e.g., schools during summer break), where there is no internet connection, or where controllers are operated at temperatures higher than 50°C (122°F), an adapter (sold separately as an accessory) can be used to add a CR2032 pill battery to provide additional power to the controller's Real Time Clock.

Connect the RTC adapter to the Clock port located on the bottom of the controller (see Figure 8, above) and make sure the switch is set to ON.

> Make sure that you select a battery that can support the operating temperatures of your installation.

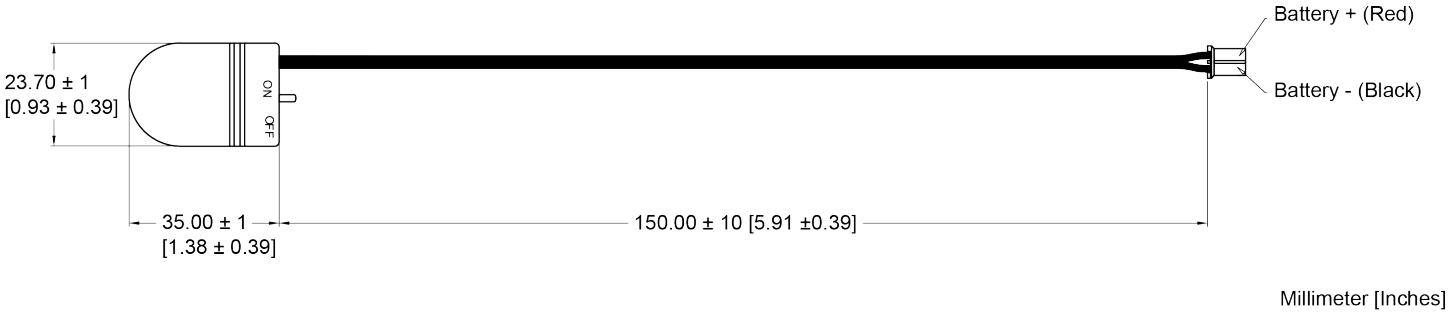


Figure 2. Dimensions of the Distech Controls RTC battery adapter (sold separately)

Mounting Instructions

The Eclypse Equipment Series controllers are specifically designed to be installed in DIN rail enclosures with an internal cover panel. Each controller or module can be mounted on a DIN rail for fast installation and easier maintenance.

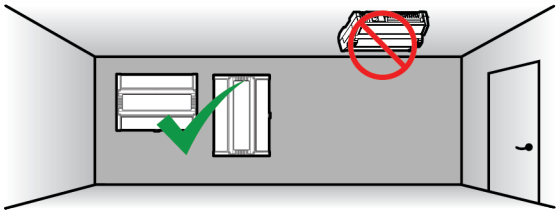
Each controller or module also has four pre-molded mounting holes allowing the module to be mounted in a panel or on a wall.

> Ensure that the mounting surface can support the controller, DIN rail, and any site-supplied enclosure.

Mounting Positions

The controller can be mounted horizontally or vertically to a vertical wall surface.

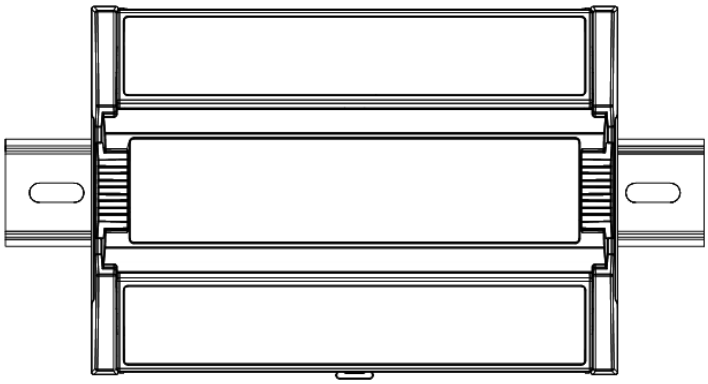
There is no restriction on the orientation of the controller as long as the internal temperature does not exceed the maximum operating temperature. However, the horizontal orientation provides the best heat dissipation.



Permitted mounting positions

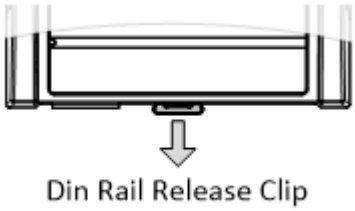
DIN Rail-Mounted Installation

1. Securely mount the DIN rail horizontally on the wall.
2. Clip the controller onto the DIN rail.



DIN rail-mounted controller onto the DIN rail

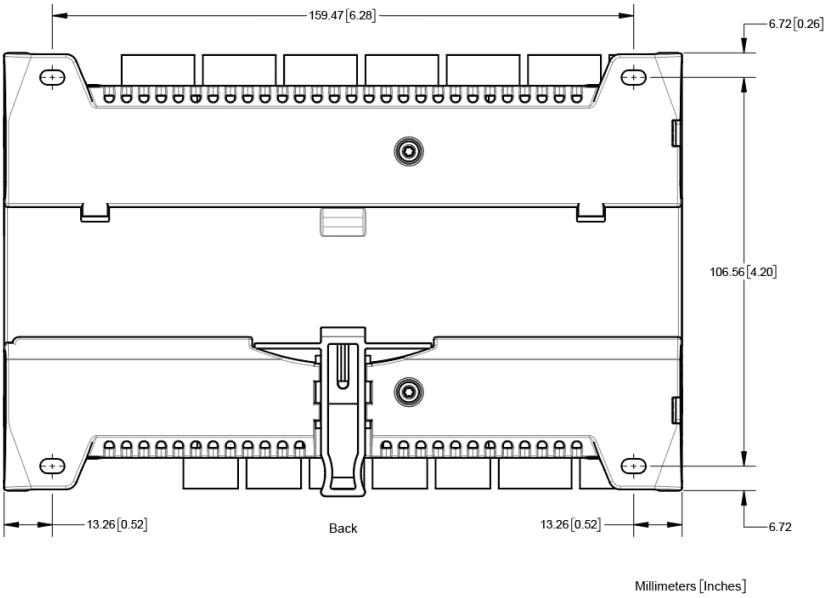
3. To detach the module from the DIN rail, separate the module from any other module located on either side. Use a flat screwdriver to pull down on the release clip located at the bottom center of the module and pull it off the DIN rail, bottom first.



Typical DIN rail-mounting release clip

Wall-Mounted Installation

1. Use the mounting holes to mark the location of any holes that need to be drilled. You may need to remove terminal block connectors to access some of the mounting holes.



Mounting hole locations

2. Drill the holes and clean the surface.
3. Mount the module using a No. 8 slotted hex, size: 1/4" (0.6cm) or equivalent mounting hardware appropriate to the wall material type.

Power Wiring

Voltage: 24VAC/DC; ± 15%, Class 2

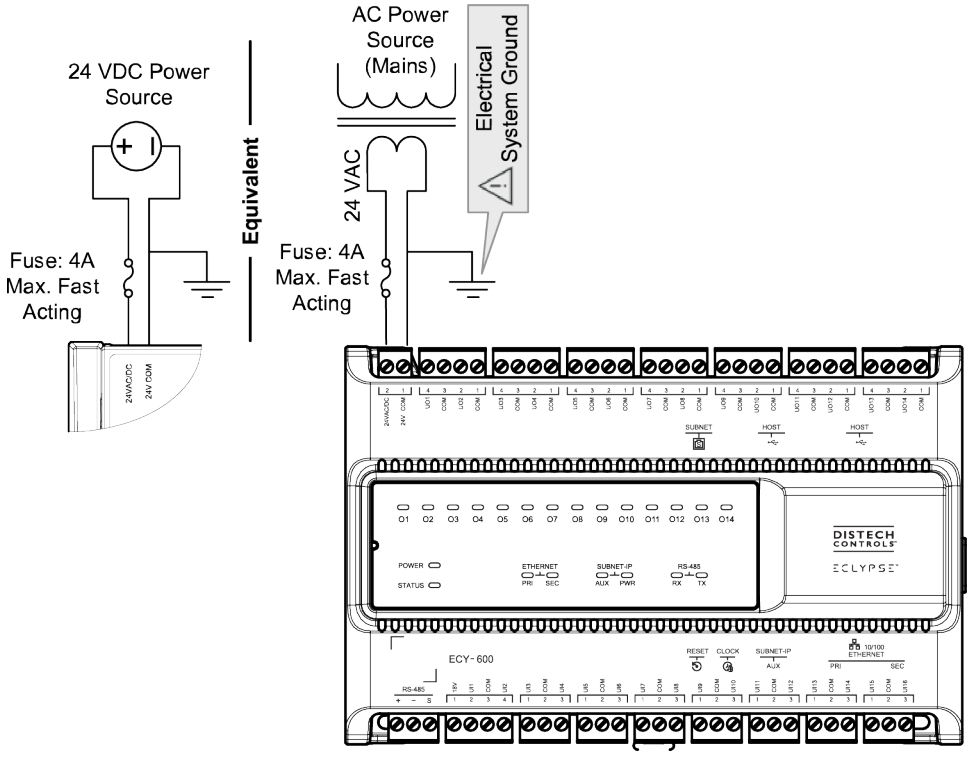
For terminal block connector wiring best practices, see General Wiring Recommendations.

This is a Class 2 Product. Use a Class 2 transformer only (rated at 60VA minimum at 24VAC) to power the controller(s).

A separate transformer rated at 60 VA minimum must be used for each Eclypse Equipment Series controller. Choose a transformer that can supply both the needs of the controller and any other 24VAC loads such as connected sensors and actuators: add up the maximum power consumption of all 24VAC loads and multiply this sum by 1.3 to allow room for voltage and load variations. If the resulting total (75VA plus 1.3 × 24VAC loads) is higher than 100VA, use multiple transformers.

Use an external fuse on the 24VAC side (secondary side) of the transformer, as shown in the figure below, to protect against power line spikes and mis-wiring.

Maintain consistent polarity when connecting controllers and devices to the transformer. One terminal on the secondary side of the transformer must be connected to the building's ground. Ensure that the 24V COM terminals of all power supplies are connected to the grounded transformer secondary connection.



Eclypse Equipment series controller power wiring

Input Wiring

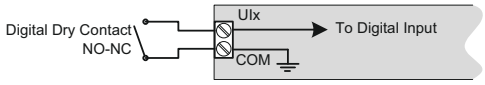
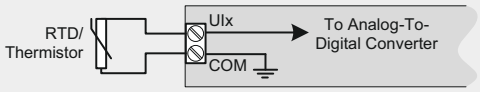
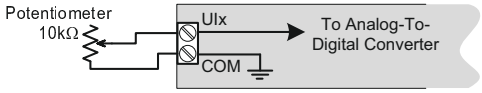
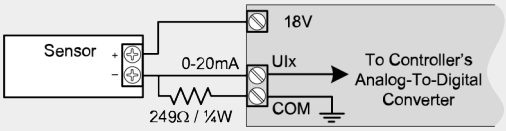
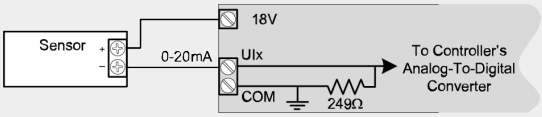
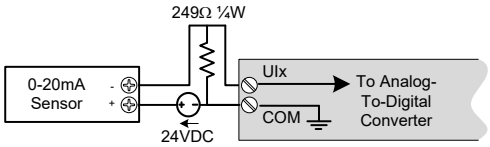
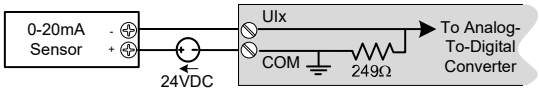
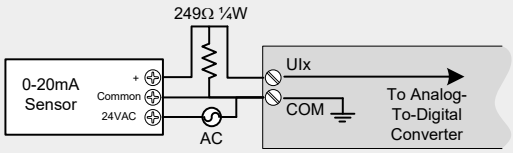
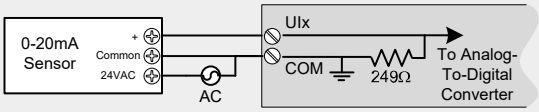
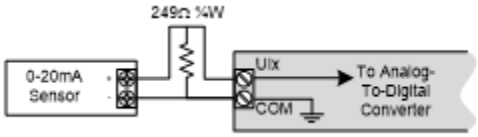
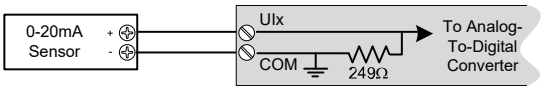
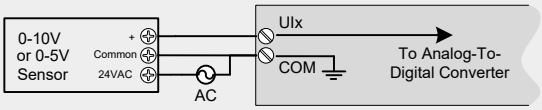
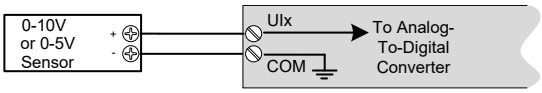
Input options must be properly configured in EC-*gfx*Program to ensure correct input readings. The table below shows the controller's available universal input (UIx) wiring methods. For terminal block connector wiring best practices, see General Wiring Recommendations [2]. Inputs can be connected as follows.

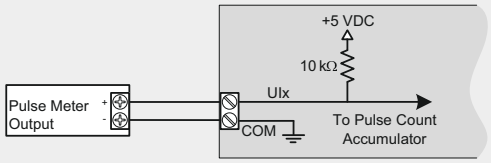
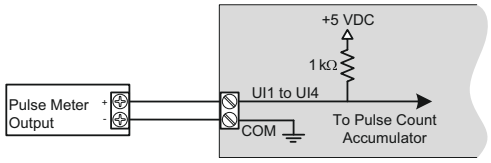
Before connecting a sensor to the controller, refer to the installation guide of the equipment manufacturer.

For a wire length less than 75' (23m), either a shielded or unshielded 18AWG wire may be used.

For a wire up to 200' (61m) long, a shielded 18AWG wire is recommended.

The shield of the wire should be grounded on the controller side only and the shield length should be kept as short as possible

Sensor Input Type	Input Designation	Input Connection Diagram
• Dry Contact input. • Pulsed input.	• UIx	
• RTD input (for example, 1000Ω). • Thermistor Input (for example, 10kΩ type II and III).	• UIx	
• Resistive input, maximum 350kΩ (for example, use with 10kΩ and 100kΩ potentiometers).	• UIx	
• 0 to 20mA input used with a 2-wire, 0 to 20mA sensor powered by the controller's internal 18VDC power supply. • Can be used with an external resistor or with the controller's internal 249Ω resistor.	• UIx	 
• 0 to 20mA input used with a 2-wire, 0 to 20mA sensor powered by an external 24 AC/DC power supply. • Can be used with an external resistor or with the controller's internal 249Ω resistor.	• UIx	 
• 0 to 20mA input used with a 3-wire, 0 to 20mA sensor powered by an external 24 AC/DC power supply. • Can be used with an external resistor or with the controller's internal 249Ω resistor.	• UIx	 
• 0 to 20mA input used with a sensor powered by its own power source. • Can be used with an external resistor or with the controller's internal 249Ω resistor.	• UIx	 
• Voltage input used with a 3-wire 0 to 10VDC or 0 to 5VDC sensor powered by an external 24 AC/DC power supply.	• UIx	
• Voltage input used with a 0 to 10VDC or 0 to 5VDC sensor powered by its own power source.	• UIx	

Sensor Input Type	Input Designation	Input Connection Diagram
• **Slow Pulse –** 2-wire sensor powered by its own power source • This input supports a maximum input frequency of 1Hz (500ms minimum ON/OFF). • Connect the pulse input according to the figure for a pulse meter that can pull-down a +5VDC supply with a 10KΩ pull-up resistor (Internal supply type).	• UIx	
• **Fast Pulse –** 2-wire sensor powered by its own power source • This input supports a maximum input frequency of 100Hz (5ms minimum ON/OFF). • Connect the pulse input according to the figure for a pulse meter that can pull-down a +5VDC supply with a 1KΩ pull-up resistor (Internal supply type).	• UIx	

Output Wiring

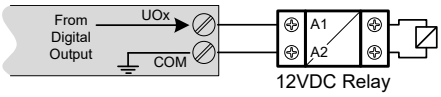
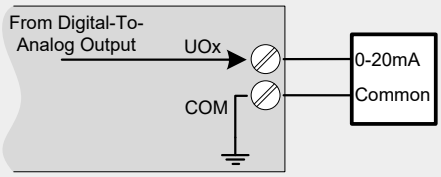
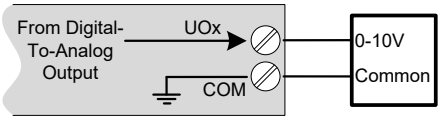
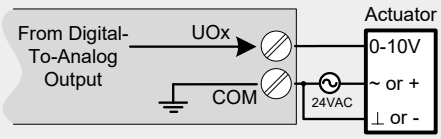
Output options must be properly configured in EC-*gfx*Program to ensure correct output values. The table below shows the controller's available output wiring methods. For terminal block connector wiring best practices, see General Wiring Recommendations [2]. Outputs can be connected as follows.

Before connecting an output device (actuator, relay, etc.) to the controller, refer to the datasheet and installation guide of the equipment manufacturer.

For a wire length less than 75' (23m), either a shielded or unshielded 18AWG wire may be used.

For a wire up to 200' (61m) long, a shielded 18AWG wire is recommended.

The shield of the wire should be grounded on the controller side only and the shield length should be kept as short as possible

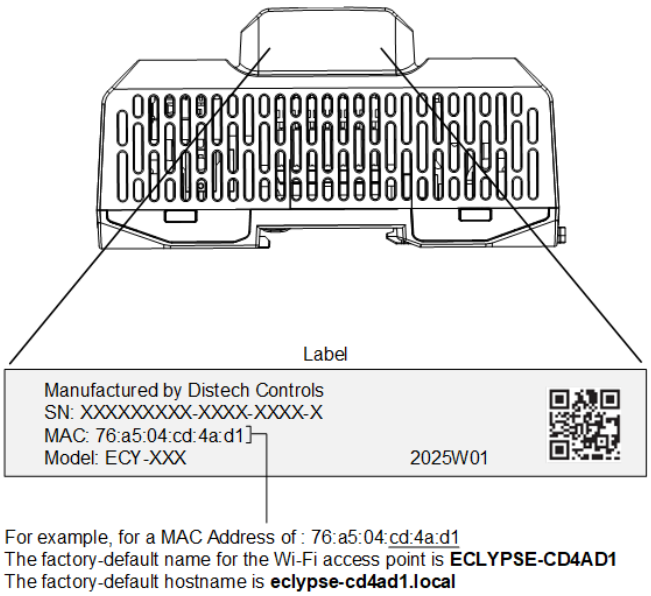
Control Output Type	Output Designation	Output Connection Diagram
• Discrete 0 or 12VDC digital or PWM output controlling a 12VDC relay.	• UOx	
• 0 to 20mA current output.	• UOx	
• 0 to 10VDC voltage output.	• UOx	
• 0 to 10VDC voltage output controlling an analog actuator that is powered by an external 24VAC power source.	• UOx	

Communications Wiring

The Eclypse User Guide provides extensive information and requirements to implement a BACnet IP network. It contains information about network topology, wire length restrictions, cable type, device IP addressing, radio path planning (when the Eclypse Wi-Fi Adapter is connected to the controller), etc. It can be downloaded from our website. For optimal performance, use Distech Controls category 5e network cable or refer to the Eclypse User Guide for cable specifications.

Controllers are uniquely identified on the network by their MAC address. This identifier is printed on a label located on the side of the controller and on its shipping box. Get a printed copy of the building's floor plan. During controller installation, peel the MAC address stickers off of the shipping box and put it

on the floor plan where the controller has been installed. This MAC address is used as part of the controller's factory-default Wi-Fi access point name and its network hostname.

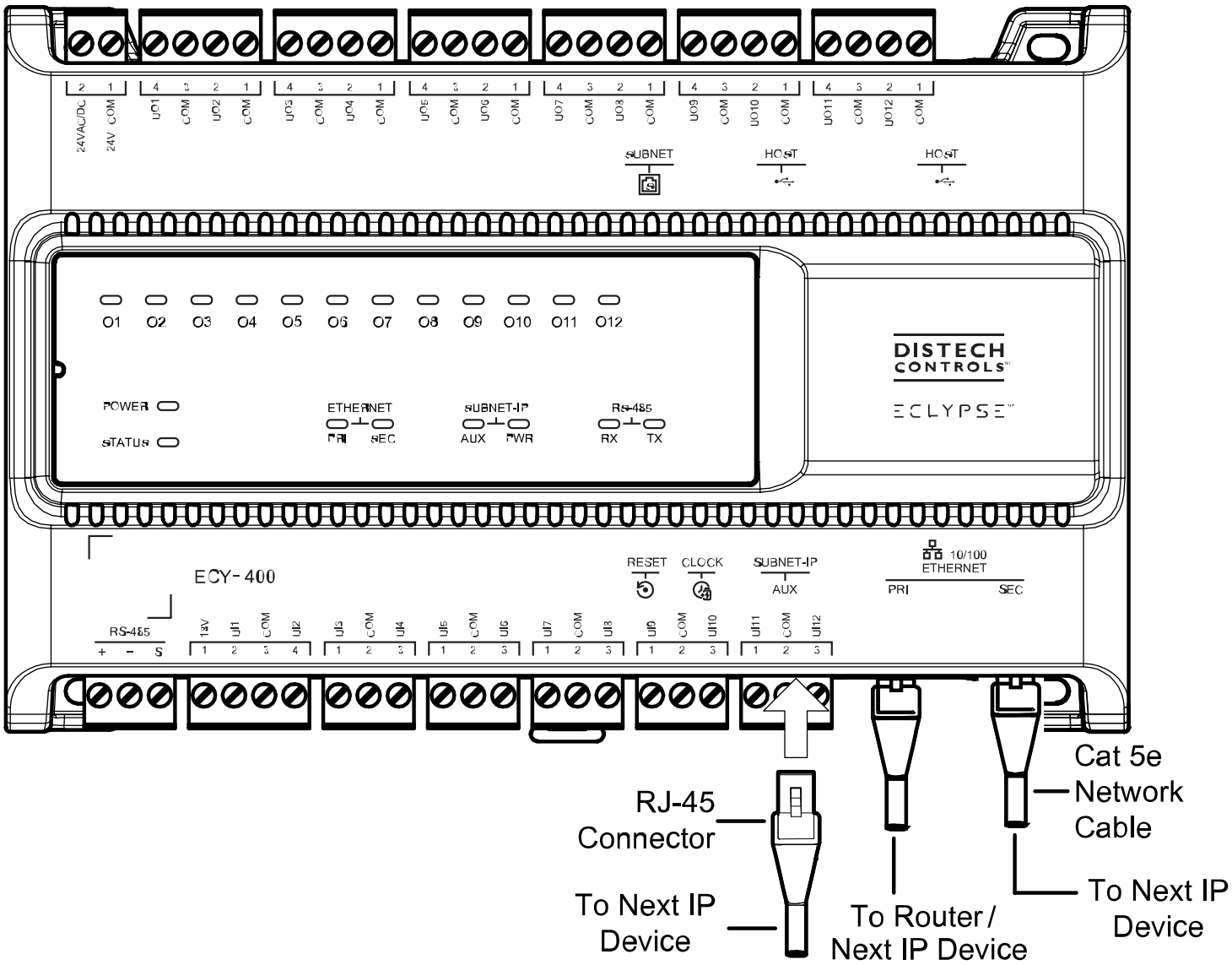


Finding the Controller's MAC Address

There are two methods to connect to the controller: wired (Ethernet connection) or wireless (with the Eclypse Wi-Fi Adapter).

Wired Connection

Network connections can be daisy-chained.


24VAC/DC
24V COM
UO1 COM UO2 COM UO3 COM UO4 COM UO5 COM UO6 COM UO7 COM UO8 COM UO9 COM UO10 COM UO11 COM UO12 COM
SUBNET
HOST
HOST
O1 O2 O3 O4 O5 O6 O7 O8 O9 O10 O11 O12
POWER
STATUS
ETHERNET
PRI SEC
SUBNET-IP
AUX PWR
RS-485
RX TX
DISTECH CONTROLS
ECLYPSE
ECY-400
RESET
CLOCK
SUBNET-IP
AUX
10/100 ETHERNET
PRI SEC
RS-485
+ - S
14V UI1 COM UI2 UI3 COM UI4 UI5 COM UI6 UI7 COM UI8 UI9 COM UI10 UI11 COM UI12
RJ-45 Connector
To Next IP Device
To Router / Next IP Device
Cat 5e Network Cable
To Next IP Device

By default, the controller's Secondary Ethernet port and Subnet-IP (Auxiliary) port are bridged with the Primary Ethernet port. When ports are bridged, the controllers connected to these ports are part of the same network, and a fail-safe relay automatically relays communication across the bridged ports in the event of power loss.

You can disable the Bridge to isolate ports and create separate networks. However, this will also disable the fail-safe relays between these ports.

You can configure the Bridge between ports in the controller's Web interface or in Xpress*Network* Utility. For more information on configuring the controller's Network settings, refer to the Eclypse Facilities and Xpress*Network* Utility User Guides.

Do not connect any equipment (such as a laptop or network switch) to the Subnet-IP (Auxiliary) port, except for PoE-powered devices (like the Resense™ Move) when PoE has been manually activated in Eclypse Facilities. Doing so may result in damage to your equipment.

Wireless Connection

To enable the controller to wirelessly communicate on a Wi-Fi network, connect an Eclypse Wi-Fi adapter (sold separately) to one of the controller's USB (Host) ports. The USB cable provided with the Eclypse Wi-Fi Adapter measures approximately 4.9ft (1.5m). If you are using another USB cable, make the cable's length does not exceed 6.6ft (2m).

Once the Eclypse Wi-Fi Adapter has been connected to the controller, a Wi-Fi hotspot becomes available that allows you to connect to the controller's configuration Web interface with your PC.

On your PC's wireless networks, look for an access point named **ECLYPSE-XXYYZZ** where **XXYYZZ** are the last 6 hexadecimal characters of the controller's MAC address (see above). The default password for the wireless network is: **eclypse1234**

Connecting to the Configuration Interface

Use any of the following methods to connect to the configuration interface:

- Using the Xpress*Network* Utility [13]
- Using the Hostname [13]
- Using the Wireless IP Address [14]
- Using the Ethernet IP Address [14]

Using the Xpress*Network* Utility

The Xpress*Network* Utility is a software application that runs on a PC that allows you to discover all Eclypse controllers and other devices connected to an IP network's subnetwork or Wi-Fi network and to perform a range of operations on many controllers or devices at once: you can set the Hostname and IP address, launch EC-*gfx*Program, or you can access the configuration Web interface. See the Xpress*Network* Utility User Guide for more information.

The Xpress*Network* Companion mobile app can be installed on your smartphone and it works with the QR code marked on the controller's faceplate which encodes the controller's MAC address and host ID. By scanning the QR code, the app records this information to which you assign a hostname. Once the QR codes for all controllers have been read in, the app's information is transferred to the Xpress*Network* Utility where it is used to populate the relevant data fields. See the Xpress*Network* Utility User Guide for more information.

Figure 3. Typical QR Code

Using the Hostname

Devices have a factory-default hostname that you can use instead of an IP address to connect to it. The hostname can be used in a Web browser's address bar or in the EC-*gfx*Program's **Connect to** screen. When installing the latest version of EC-*gfx*Program and your PC does not have the Bonjour service installed, a link to install the Bonjour service is provided. The Bonjour service must be installed on your PC to allow your PC to discover controllers by their hostname.

If your PC is unable to resolve the device's hostname, you must connect your PC through Ethernet or Wi-Fi so that your PC only sees the device network. For example, in this case, your PC must be disconnected from all other networks such as a corporate network or the Internet. If necessary, temporarily disconnect your PC's network cable from its Ethernet port.

The factory-default hostname is **eclypse-xxxxxx.local** where **xxxxxx** is the last 6 characters of the MAC address printed on a sticker located on the device. See Communications Wiring.

For example, the sticker on the side of a controller shows that its MAC address is 76:a5:04:cd:4a:d1. Connect to the Web interface as follows:

1. Open your Web browser.
2. In the Web browser's address bar, enter **https://eclypse-cd4ad1.local**.
3. Login to the device. Then set the configuration parameters in the configuration Web interface. See Connecting to the Configuration Web Interface [13].

Using the Wireless IP Address

This procedure requires the installation of the Eclypse Wi-Fi adapter to one of the USB ports on the controller so that the controller becomes a hotspot to which you can connect (see Wireless Connection [13]). Once you are connected, you can then log in to the controller as shown below:

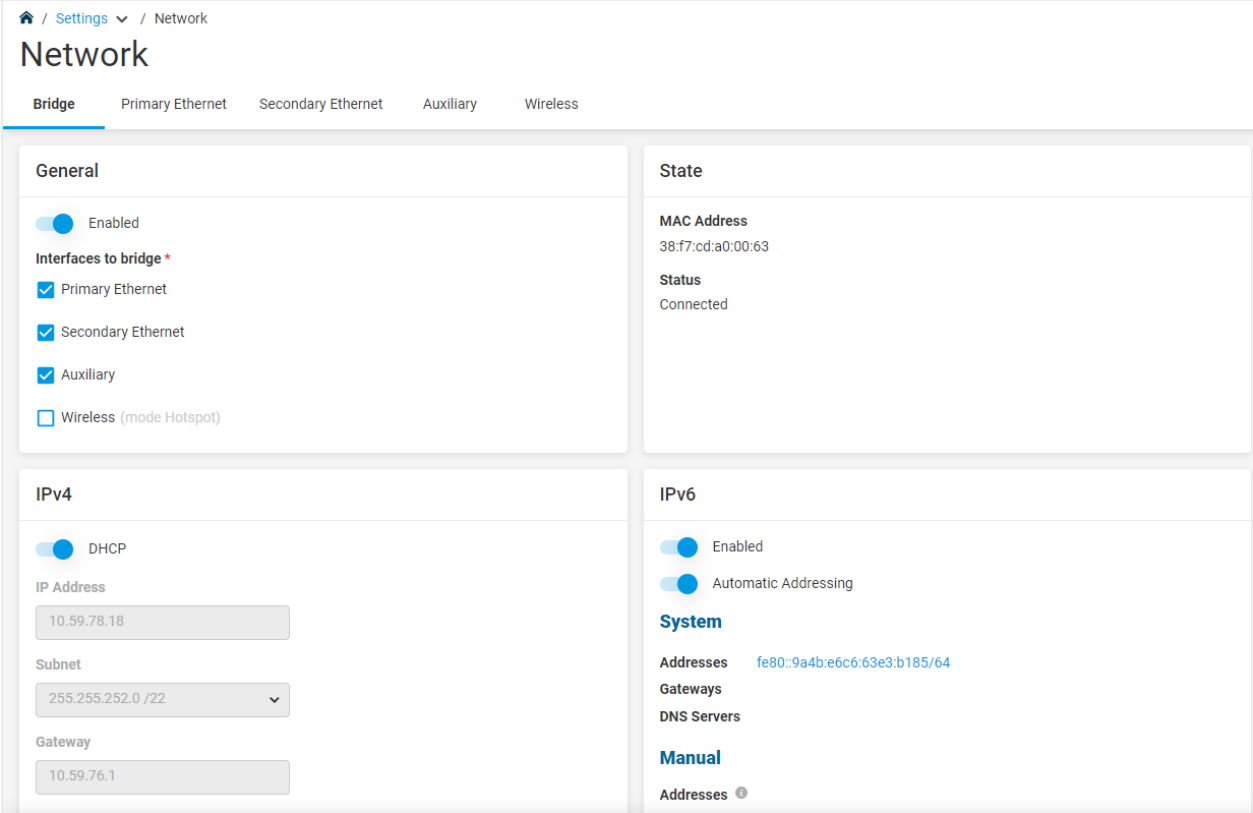
1. Open your Web browser.
2. In the Web browser's address bar, enter **https://192.168.0.1** (the factory-default wireless hotspot IP address).
3. Login to the device. Then set the configuration parameters in the configuration Web interface. See Connecting to the Configuration Web Interface [13].

Using the Ethernet IP Address

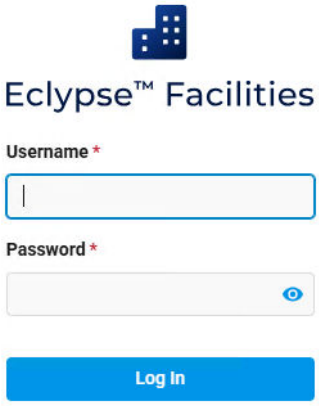
Once you have discovered the device's primary IP address (e.g., from the DHCP server or through the discovery process in Xpress*Network* Utility), you can log in as shown below:

1. Open your Web browser.
2. In the Web browser's address bar, enter the IP address.
3. Login to the device. Then set the configuration parameters in the configuration Web interface. See Connecting to the Configuration Web Interface [13].

By default, the controller's Secondary Ethernet port and Subnet-IP (Auxiliary) port are bridged with the Primary Ethernet port; all ports have the same IP address unless they are configured otherwise in the controller's Web Interface. See the Eclypse Facilities User Guide for more information.



Logging in to the Configuration Interface



When connecting to an Eclypse Controller or other IP device for the first time, you will be prompted to change the password for the admin account to a strong password to protect access to the device.

In Network Settings, configure the network parameters so that they are compatible with your network. See the Eclypse User Guide for more information about network settings and how to secure the device. It is important to create new user accounts with strong passwords to protect from unauthorized access. Remove the factory default admin account as this is a commonly known security breech (only the password for this user account needs to be compromised).

Using the Controller's Operator Interface (ECY-x50 models only)

Once some code has been created in EC-*gfx*Program and then synchronized with the controller, various objects (points, schedules, PID loops, and so on) used in the code become visible through this operator interface. Object values can be viewed and, in many cases, modified or overridden.

Configuration of this operator interface is done in EC-*gfx*Program in the **LCD Screen** block when the controller is programmed. The following items can be configured:

- The title of the main screen can be set.
- The **About** menu content can be configured.
- The passwords can be set for multiple users according to their role.
- The operator interface languages can be set.

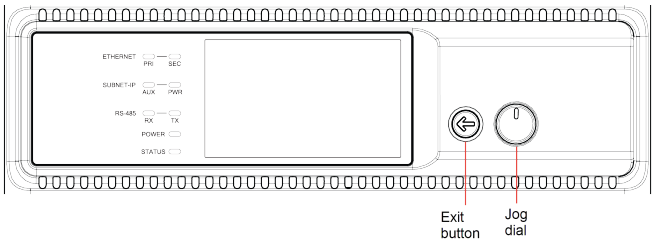
Other menus, such as Favorites and Weather, may be greyed-out (that is, inaccessible) on your operator interface screen when the corresponding objects have not previously been configured through EC-*gfx*Program for this controller.

Refer to the EC-*gfx*Program User guide and the ECx-Display And ECB & ECL 50 Series Controllers User Guide for more information.

Navigation

Navigating throughout the operator interface is done by using the *Jog Dial* and the **EXIT** button:

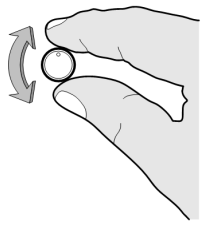
- By turning the *Jog Dial*, you can highlight screen icons, context menu options, or change a parameter's value.
- By pressing the *Jog Dial*, you can select the current icon to enter a menu, select a context menu option, or to enter the current parameter's value.
- By pressing the **EXIT** button, you can navigate back to the previous menu or item while cancelling any changes that have been made.



Using the Jog Dial

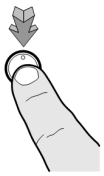
The *Jog Dial* is operated as follows:

- By turning or rotating it between your thumb and forefinger to select (or highlight) a menu item or set a value shown on the display.



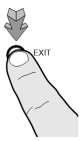
Rotate the Jog Dial to Select a Menu Item or Set a Value

- Press the *Jog Dial* to activate or accept the currently selected menu item or value shown on the display.



Press the Jog Dial to Activate or Accept the Currently Selected Menu Item or Value

- Use the **EXIT** button to cancel the current action or menu and to go back to the previous menu.

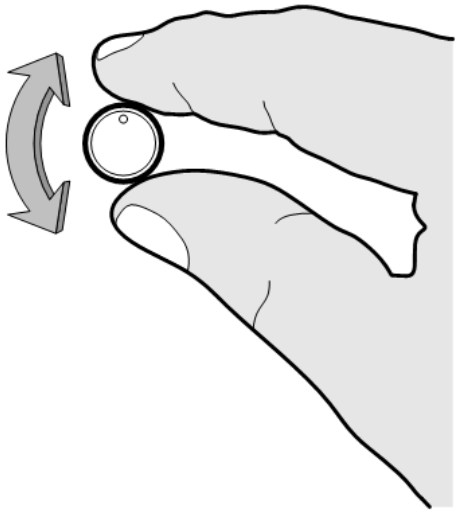


Press the EXIT Button to Cancel the Current Action or Menu and Go Back

Using the Jog Dial

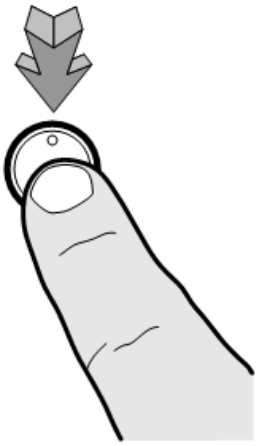
The *Jog Dial* is operated as follows:

- By turning or rotating it between your thumb and forefinger to select (or highlight) a menu item or set a value shown on the display.



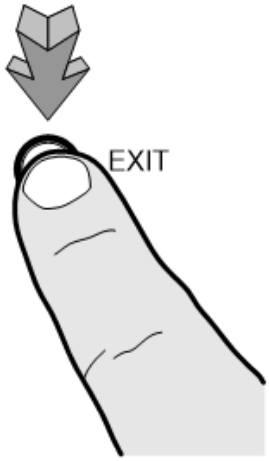
Rotate the Jog Dial to Select a Menu Item or Set a Value

- Press the *Jog Dial* to activate or accept the currently selected menu item or value shown on the display.



Press the Jog Dial to Activate or Accept the Currently Selected Menu Item or Value

- Use the **EXIT** button to cancel the current action or menu and to go back to the previous menu.



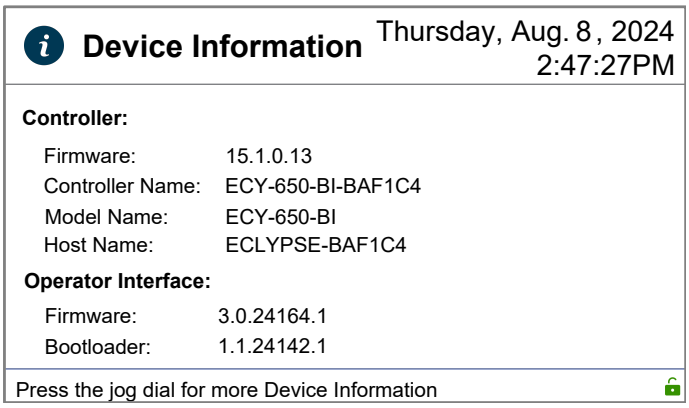
Press the EXIT Button to Cancel the Current Action or Menu and Go Back

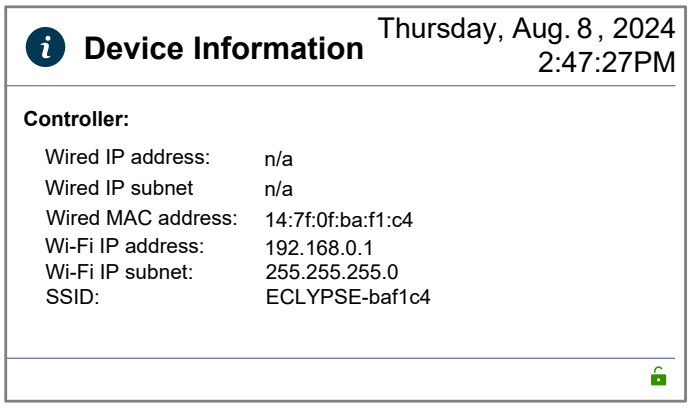
Device Information

The information displayed in the *Device Information* screens can be useful when troubleshooting connectivity issues on the controller. Access the **About** menu and press the *Jog Dial* to scroll through the controller's *Device Information* screens.

The first *Device Information* screen displays the controller's and operator interface's current firmware versions, as well as the controller's name, model, and Hostname.

The second screen displays the controller's IP address (wired or Wi-Fi), IP Subnet (wired or Wi-Fi), and SSID.





Firmware versions and controller identifiers (left); Controller connectivity information (right)

Subnet Wiring

Supported Allure Series and Resense Air Series communicating sensors are connected to the **SUBNET** port modular connector of the controller with a standard Category 5e Ethernet patch cable fitted with RJ-45 connectors.

The Eclypse User Guide provides extensive information and requirements for the connection of an Allure series communicating sensor. It contains information about network topology and length, cable type, setting the Subnet ID, etc. It can be downloaded from our website. See also the Installation Guide supplied with the sensor.

BACnet MS/TP Communications Wiring

Ensure that you have at least a C1 Connectivity Pack to enable BACnet routing, MS/TP "Client", integration, and use of the RS-485 port. See the controller's Spec Sheet for more details.

BACnet MS/TP communications are made by connecting directly to an RS-485 port.

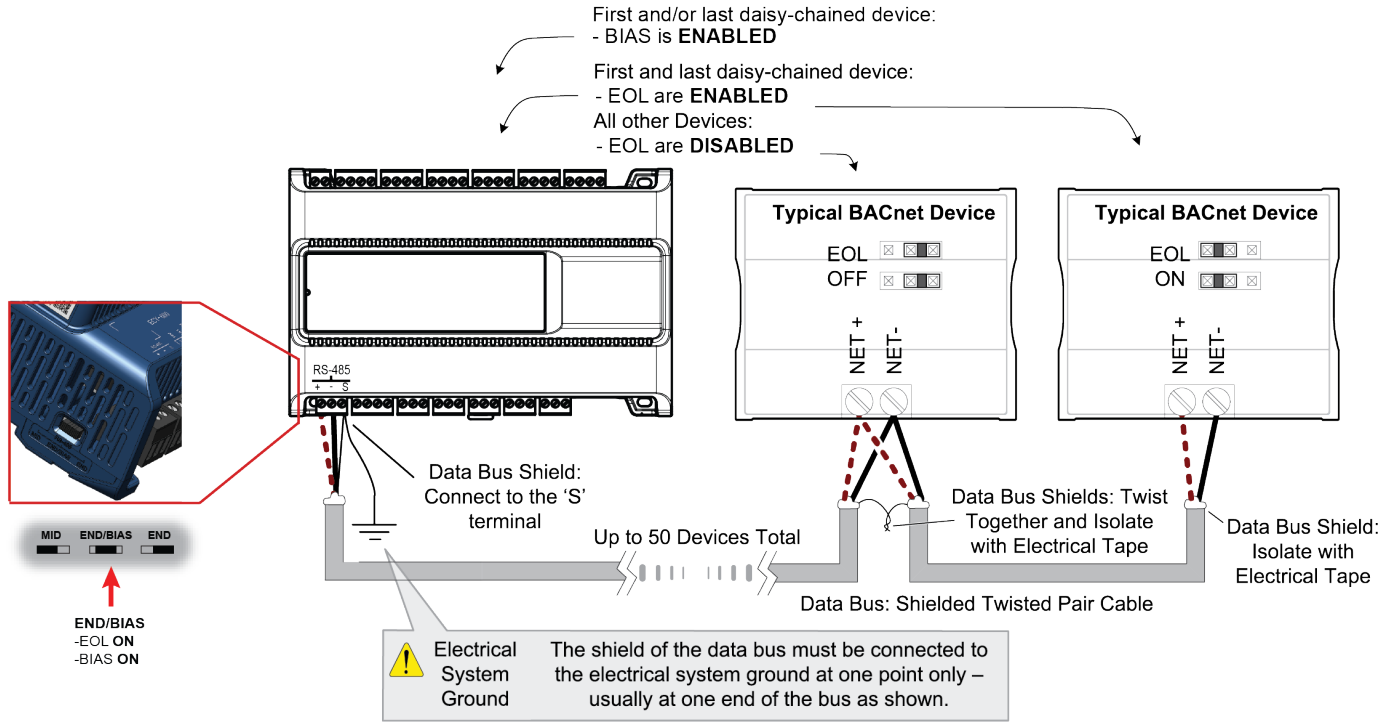
The Eclypse User Guide provides extensive information and requirements to implement a BACnet MS/TP network. It contains information about network topology, network and sub network wire length restrictions, cable type, device addressing, etc. It can be downloaded from our website. For optimal performance, use Distech Controls 24 AWG (0.65 mm) stranded, twisted pair shielded cable or refer to the Eclypse User Guide for cable specification. The BACnet MS/TP communication wire is polarity sensitive and the only acceptable topology is to daisy-chain the cable from one controller to the next. The Eclypse Facilities Guide is available on the Distech Controls Documentation Portal.

As shown in the figure below:

- The first and last daisy-chained BACnet MS/TP devices must have their EOL resistors enabled / installed. All other devices must have their EOL resistor disabled (default factory setting). See the figure below.
- The first and/or last daisy-chained BACnet MS/TP devices must have their BIAS enabled. All other devices must have their BIAS disabled (default factory setting). See the figure below. Note that the BIAS settings for BACnet MS/TP controllers that do not have a specific setting to enable / disable BIAS usually means that the BIAS is enabled when the EOL resistors are enabled.
- When the BACnet MS/TP data bus is connected to a following device, twist data bus shields together.
- Isolate all shields with electrical tape so there is no exposed metal that can touch ground or other conductors.
- The shield of the data bus must be connected to the electrical system ground at only one point – usually at one end of the bus as shown below.

Connect no more than 50 devices to a BACnet MS/TP data bus.

Use the RS-485 port to connect to a trunk of BACnet MS/TP devices. RS-485 port terminal connectors are labeled such that **NET+** is the same as **+** and **NET-** is the same as **-**. This port must be configured in the controller's Web interface prior to use.



BACnet MS/TP Communications Wiring

When inserting multiple wires into a terminal-block connector, ensure to properly twist wires together prior to insertion.

Modbus RTU Communications Wiring

Ensure that you have at least a C1 Connectivity Pack to enable the Modbus functionality and use of RS-485 port. See the controller's Spec Sheet for more details.

Modbus RTU communications are made by connecting directly to an RS-485 port.

Furthermore, Modbus TCP devices can be integrated by connecting them to the controller's IP network.

The Eclypse User Guide provides extensive information and requirements to implement a Modbus RTU network. It contains information about network topology, network and sub network wire length restrictions, cable type, device addressing, etc. It can be downloaded from our website. For optimal performance, use Distech Controls 24 AWG (0.65 mm) stranded, twisted pair shielded cable or refer to the Eclypse User Guide for cable specification. The Modbus RTU communication wire is polarity sensitive and the only acceptable topology is to daisy-chain the cable from one controller to the next. The Eclypse Guide is available on the Distech Controls Documentation Portal.

As shown in the figure below:

- The first and last daisy-chained Modbus RTU devices must have their EOL resistors enabled / installed. All other devices must have their EOL resistor disabled (default factory setting).
- The first and/or last daisy-chained Modbus RTU device must have their BIAS enabled. All other devices must have their BIAS disabled (default factory setting). See the figure below. Note that the BIAS settings for Modbus RTU devices that do not have a specific setting to enable / disable BIAS usually means that the BIAS is enabled when the EOL resistors are enabled.
- When the Modbus RTU data bus is connected to a following device, twist data bus shields together.
- Isolate all shields with electrical tape so there is no exposed metal that can touch ground or other conductors.
- The shield of the data bus must be connected to the electrical system ground at only one point – usually at one end of the bus as shown below.

Connect no more than 50 devices to a Modbus RTU data bus.

Use the RS-485 port to connect to a trunk of Modbus RTU devices. RS-485 port terminal connectors are labeled such that NET+ is the same as + and NET- is the same as -.

If inserting multiple wires in the terminals, ensure to properly twist wires together prior to inserting them into the terminal connectors.

The RS-485 port must be configured in EC-*gfx*Program prior to use. Modbus devices are integrated into EC-*gfx*Program using the EC-*gfx*Program Modbus device block.

Modbus TCP Communications Wiring

Ensure that you have at least a C1 Connectivity Pack to enable the Modbus functionality and use of RS-485 port. See the controller's Spec Sheet for more details.

Connect Modbus TCP devices to the same IP subnet the controller is using. This connection can be made by connecting the Modbus TCP device to an Ethernet port on the controller with a Cat5e network cable for example (see Wired Connection [11]). For more connection options, refer to the Eclypse User Guide.

The RS-485 port must be configured in EC-gfxProgram prior to use. Modbus devices are integrated into EC-*gfx*Program using the EC-*gfx*Program Modbus device block.

M-Bus Communications Wiring

Ensure that you have at least a C1 Connectivity Pack to enable the M-Bus functionality and use of M-Bus ports. See the controller's Spec Sheet for more details.

M-Bus communications are made by connecting meters directly in an M-Bus port.

The controller provides an M-Bus port when connected to an ECY-MBUS extension module via a USB connection.

The M-Bus port must be configured in EC-*gfx*Program prior to use. M-Bus meters are integrated into EC-*gfx*Program using the M-Bus device block.

Maximum M-Bus Device Wiring Length

The following information provides wiring limitations for M-Bus devices. The wiring length provided below was tested as a worst-case scenario with all meters being located at the end of the bus. If meters are more evenly spaced along the bus, then the maximum wiring length can possibly be increased.

Testing Conditions:

Current per slave/meter	1.5 mA
Max ΔV accepted on the bus	2 V
Cable capacity	110 nf/km

USB Connections:

Table 1. Maximum Wiring Length from the Controller to the Last M-Bus Meter on USB connection

M-Bus Meters	AWG 15			AWG 22		
	300 Bps	2400 Bps	9600 Bps	300 Bps	2400 Bps	9600 Bps
3	12000 m (39370 ft)	4500 m (14763 ft)	2400 m (7874 ft)	4000 m (13123 ft)	2200 m (7217 ft)	1150 m (3773 ft)

Maintenance

Turn off power before any kind of servicing.

Regular Maintenance

Each controller requires minimal maintenance, but it is important to take note of the following:

- Clean the outside of the controller by polishing it with a soft dry cloth.
- Using a torque limited screw driver set to 0.4 Nm (3.54 in-lb), retighten terminal connector screws annually to ensure the wires remain securely attached.

Disposal

The Waste Electrical and Electronic Equipment (WEEE) Directive sets out regulations for the recycling and disposal of products. The WEEE2002/96/EG Directive applies to standalone products, for example, products that can function entirely on their own and are not a part of another system or piece of equipment.

For this reason Distech Controls products are exempt from the WEEE Directive. Nevertheless, Distech Controls products are marked with the WEEE symbol indicating devices are not to be thrown away in municipal waste.

Products must be disposed of at the end of their useful life according to local regulations and the WEEE Directive.

North American Emissions Compliance

Changes or modifications not expressly approved by Distech Controls could void the user's authority to operate the equipment.

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 installation. 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 interference 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 (if applicable).
- 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.

This device complies with Part 15 of the FCC rules and with Industry Canada’s license exempt RSS. Operation is subject to the following two conditions:

- This device may not cause harmful interference, and
- This device must accept any interference received, including interference that may cause undesired operation of the device

Specifications subject to change without notice.

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ECY-400-Series_IG_14_EN