ECLYPSE™ Connected Equipment Controller
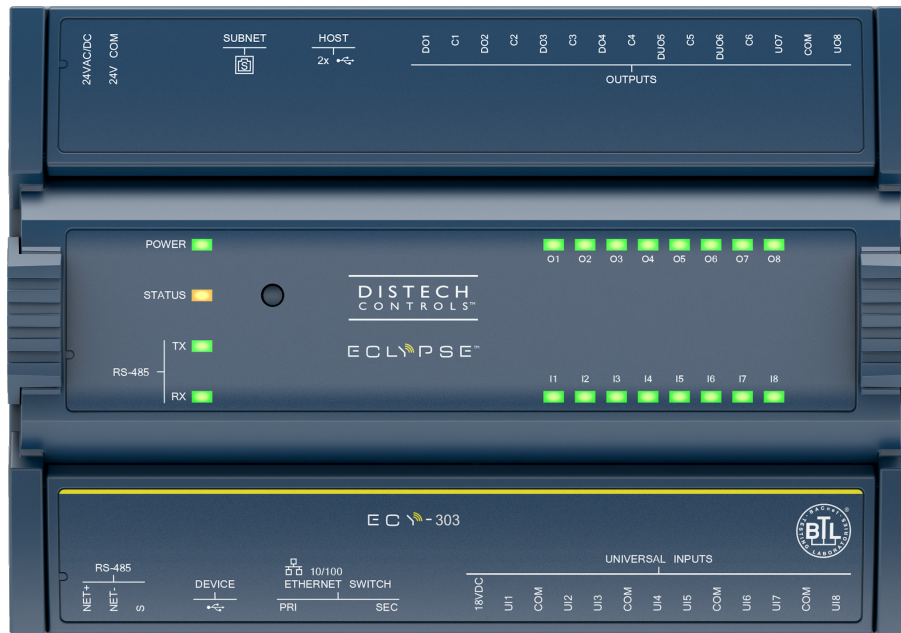

Figure 1:   ECLYPSE ECY-303 Controller (front view)

Product Description

This document describes the hardware installation procedures for the ECLYPSE Connected Equipment Controller. The ECLYPSE Connected Equipment Controller is designed to satisfy the needs of a wide range of HVAC applications such as rooftop unit, fancoil unit, heat pump, and chilled beam. It integrates a control, automation and connectivity server, power supply, and I/O set in one convenient package. It supports multi-protocol communications including BACnet/IP and is a listed BACnet Building Controller (B-BC). This programmable controller comes with an embedded web server that enables web-based application configuration and a visualization interface. It also features embedded 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, and wiring terminals to provide easy access for hardware configuration and maintenance, and to ventilate heat generated by the controller.

☐   The controller's mounting orientation must be horizontal with the controller's back attached to a vertical wall surface. Orient the controller with the 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 datasheet 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.

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

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

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Device Markings (Symbols)

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.
(crossed-out wheelie bin)	Products must be disposed of at the end of their useful life according to local regulations.
(book with i)	Read the Hardware Installation Guide for more information.
(house)	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 triangle)	Warning Symbol: Significant information required. Refer to the Hardware Installation Guide.
∼	Alternating Current
⎓	Direct Current

General Wiring Recommendations

☐ 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), tightening torque 0.5 Nm).

☐ Comply with all network and power supply guidelines outlined in the Network Guide.

☐ It is strongly recommended to use unshielded CAT5e cables 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.

☐ When connecting one wire to a controller's terminal block clamping cage (pole), the wire must be between 22 and 16 gauge (0.33 and 1.3mm^2 cross-sectional area). When connecting two wires to a controller's terminal block clamping cage, both wires must be the same thickness, both wires must be between 22 and 18 gauge (0.33 and 0.82mm^2 cross-sectional area), and both wires 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.
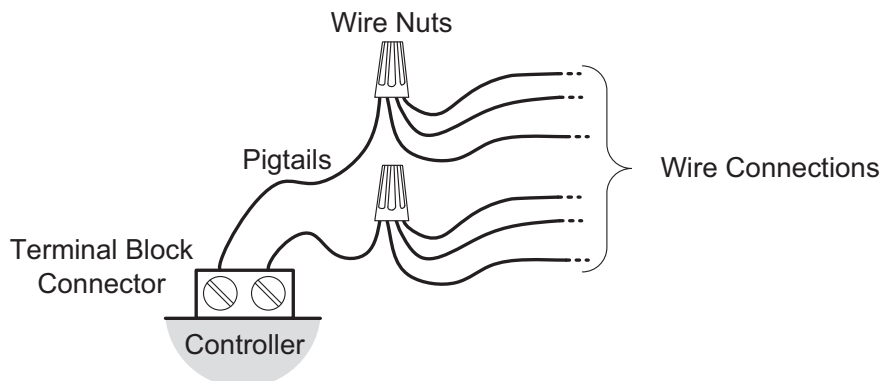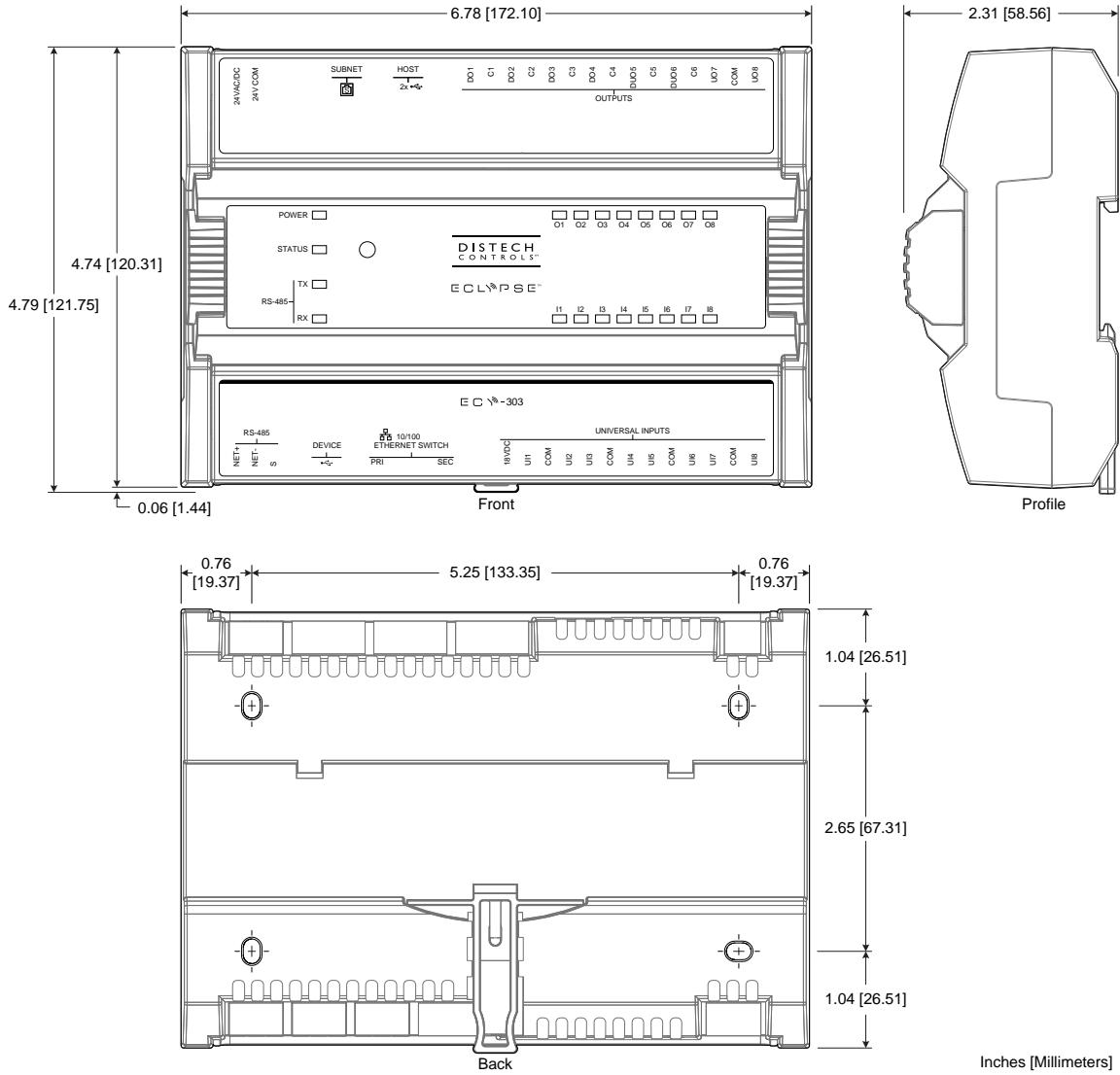

Figure 2:   Using a Wire Nut and Pigtail to Wire the Controller

☐ 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.

Module Enclosure Dimensions

Inches [Millimeters]

Mounting Instructions

The controller can be mounted on a DIN rail for fast installation and easier maintenance. The controller 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.

The controller must be mounted in a horizontal position as indicated in this guide to ensure proper airflow and heat dissipation. Any other position may cause excess heat accumulation and may result in a damaged controller.

Mounting Positions

The controller's mounting orientation must be horizontal with controller's back attached to a vertical wall surface.

DIN Rail-Mounted Installation

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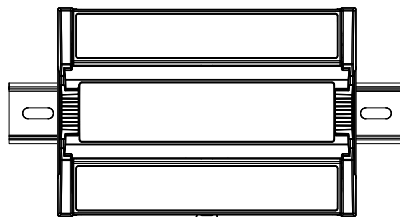2. Clip the controller onto the DIN rail.

Figure 3:   DIN rail-mounted controller

3. To detach the controller from the DIN rail, use a flat screw driver to pull down on the release clip located at the bottom center of the controller and pull it off the DIN rail, bottom first.
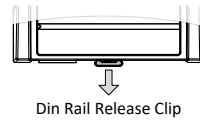

Din Rail Release Clip

Figure 4:   Typical DIN Rail-Mounting Release Clip

Wall-Mounted Installation

4. Before mounting the controller, separate the front assembly from the back plate: push the two latches up to unlock the front assembly as shown below and then open and pull on the hinged gull-wing connector covers to separate the two halves.
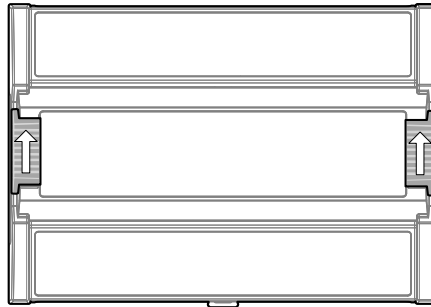

Figure 5:   Latches to Unlock the Controller's Front Assembly

5. Once the front assembly has been removed, use the back plate's mounting holes to mark the location of any holes that need to be drilled.
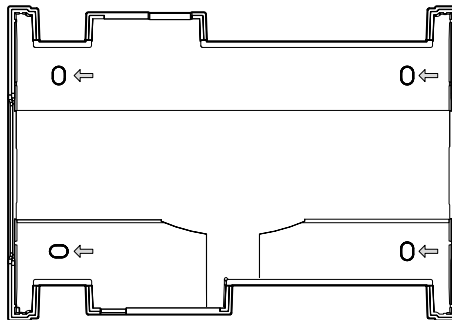

Figure 6:   Typical Mounting Holes

6. Use the mounting holes to mark the location of any holes that need to be drilled.
7. Drill the holes.
8. Clean the surface
9. Mount the module using a No. 8 slotted hex, size: 1/4" or equivalent mounting hardware appropriate to the wall material type.

Figure 7:   Appropriate Mounting Hardware (Field Supplied)

10. To lock a module's front assembly in place, attach the front assembly to the module's back base by closing any gull-wing front assemblies (if applicable) and pushing the two latches down.

Status LED, DIP Switch, and Jumper Identification and Configuration

The controller has the following onsite configurable DIP switch located inside the cover as shown in the figure below. Orient the circuit board as shown in the figure below.
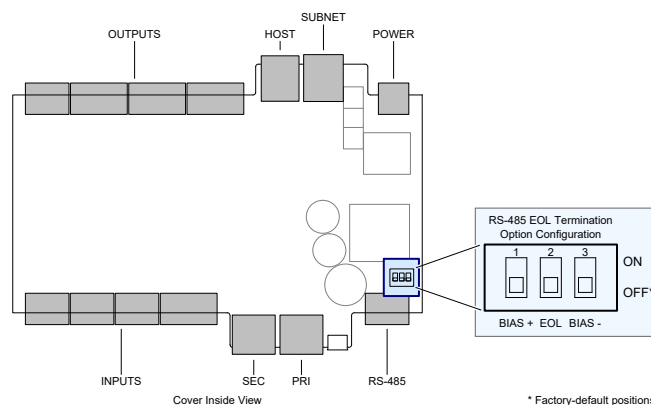

Figure 8:   RS-485 EOL Termination Option Configuration DIP Switch Location

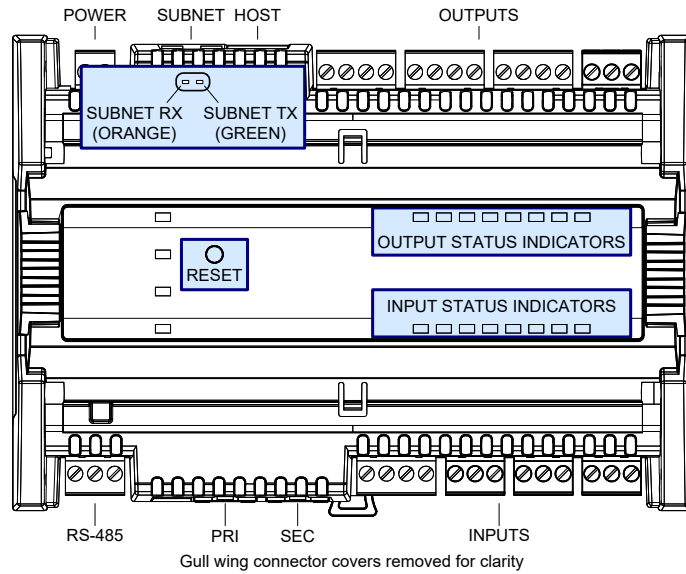The controller has a Reset button and Status indicators located on the faceplate as shown in the figure below.

Figure 9: Reset Button and Status Indicator Locations

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 between 50 and 100VA at 24VAC) for each ECY-303.

A separate transformer rated at 50 VA minimum must be used for each ECY-303 controller. Choose a transformer that can supply both the needs of the ECY-303 controller (50VA) 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. If the resulting total (50VA 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.
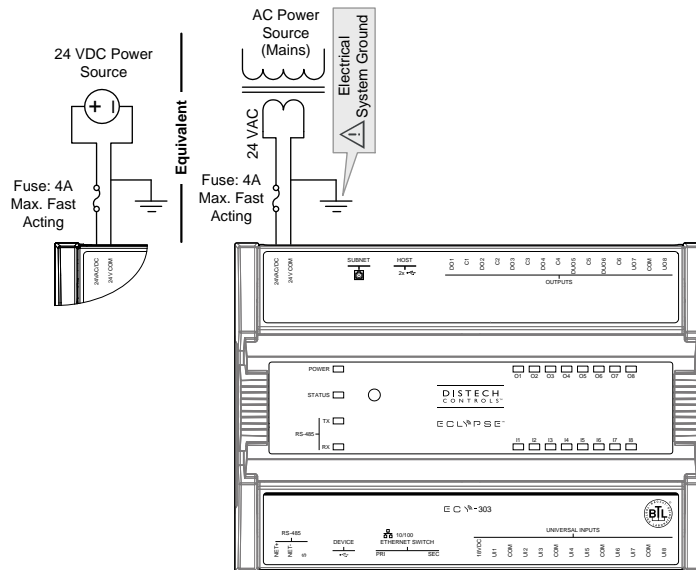

Figure 10: ECY-303 Power wiring

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 [pg. 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 Connection Diagram
☐ Dry Contact input. ☐ Pulsed input.	
☐ Pulse input used with a 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).	
☐ RTD input (for example, 1000Ω). ☐ Thermistor Input (for example, 10kΩ type II and III).	
☐ Resistive input, maximum 350kΩ (for example, use with 10kΩ and 100kΩ potentiometers).	
☐ 0 to 20mA input used with a 2-wire, 0 to 20mA sensor powered by the controller's internal 15VDC power supply.	
☐ 0 to 20mA input used with a 2-wire, 0 to 20mA sensor powered by an external 24 AC/DC power supply.	
☐ 0 to 20mA input used with a 3-wire, 0 to 20mA sensor powered by an external 24 AC/DC power supply.	
☐ 0 to 20mA input used with a sensor powered by its own power source.	
☐ Voltage input used with a 3-wire 0 to 10VDC or 0 to 5VDC sensor powered by an external 24 AC/DC power supply.	
☐ Voltage input used with a 0 to 10VDC or 0 to 5VDC sensor powered by its own power source.	

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 [pg. 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) long, either a shielded or unshielded 18AWG wire may be used.
- ☐ For a wire length up to 200' (61m) long, a shielded 18AWG wire is recommended.
- ☐ The shield of the wire should be grounded on the controller side 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	
☐ Discrete 0 or 12VDC digital or PWM output controlling a 12VDC relay[1]. ☐ In EC-*gfx*Program Hardware Output configuration, set the **Output mode** to **12VDC**. Output mode: ○ 24 VAC ● 12 VDC	☐ DUOx	
☐ 0 to 10VDC voltage output.	☐ UOx	
☐ 0 to 10VDC voltage output. ☐ In EC-*gfx*Program Hardware Output configuration, set the **Output mode** to **12VDC**. Output mode: ○ 24 VAC ● 12 VDC	☐ DUOx	
☐ 0 to 10VDC voltage output controlling an analog actuator that is powered by an external 24VAC power source.	☐ UOx	
☐ 0 to 10VDC voltage output controlling an analog actuator that is powered by an external 24VAC power source. ☐ In EC-*gfx*Program Hardware Output configuration, set the **Output mode** to **12VDC**. Output mode: ○ 24 VAC ● 12 VDC	☐ DUOx	
☐ 24VAC externally-powered triac output controlling a relay[2].	☐ DOx	
☐ 24VAC externally-powered triac output controlling a relay[2][3]. ☐ In EC-*gfx*Program Hardware Output configuration, set the **Output mode** to **24VAC**. Output mode: ● 24 VAC ○ 12 VDC	☐ DUOx	
☐ 24VAC externally-powered triac output controlling a floating actuator[2].	☐ DOx	
☐ 24VAC externally-powered triac output controlling a floating actuator[2][3]. ☐ In EC-*gfx*Program Hardware Output configuration, set the **Output mode** to **24VAC**. Output mode: ● 24 VAC ○ 12 VDC	☐ DUOx	

1. NOTE: Do not connect a 24VAC relay to this output configuration. A 24VAC relay used with this output configuration and the output nears 100% can result in the relay going into oscillation which may damage connected equipment or cause unexpected operation.
2. Maximum output current for all digital triac outputs is 0.5A continuous or 1A @ 15% duty cycle for a 10-minute period.
3. Use a 1 amp fast-acting fuse in series with the power source to protect the output from potential damages caused by mis-wiring.

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.

For example, for a MAC Address of : 76:a5:04:cd:4a:d1
The factory-default name for the Wi-Fi access point is **ECLYPSE-CD4AD1**
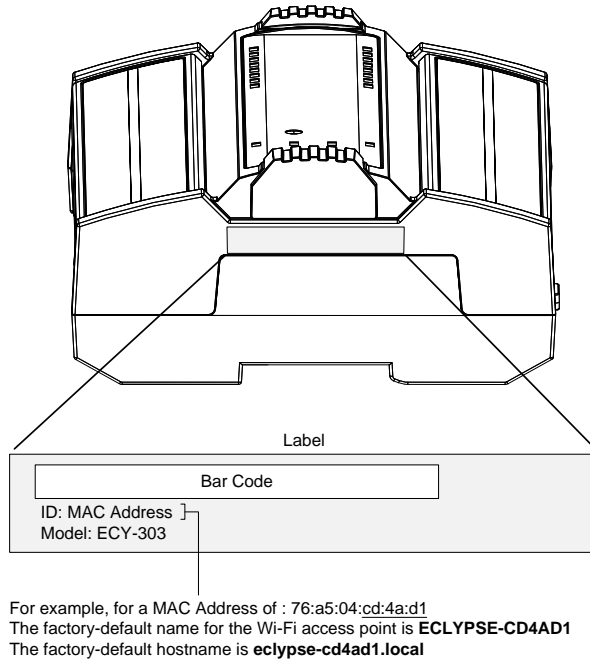The factory-default hostname is **eclypse-cd4ad1.local**

Figure 11:   Finding the Controller's MAC Address

There are two methods to connect to the controller: wired (Ethernet connection) or wireless (when the ECLYPSE Wi-Fi Adapter is connected to the controller).

Wired Connection

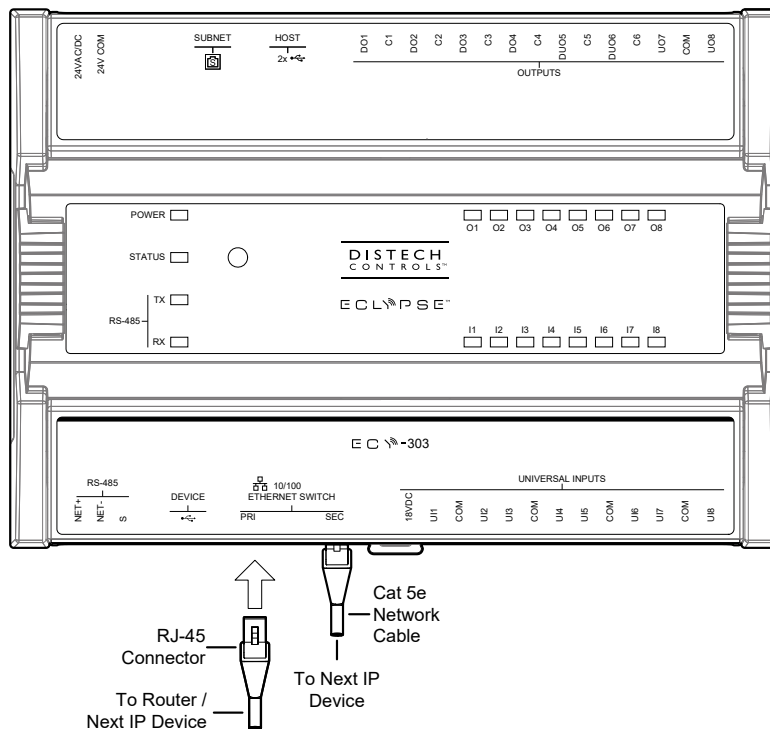Network connections can be daisy-chained.

Figure 12:   Communications Wiring

Wireless Connection

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**

Configuring the Controller

Any of the following methods can be used to connect to the controller's interface in order to configure it:

☐   Using the Xpress*Network* Utility

☐   Using the controller's factory-default Hostname in the Web browser

☐   Using the controller's IP address in the Web browser

Using the Xpress*Network* Utility

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

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 13:   Typical QR Code

Using the Controller's Factory-default Hostname in a Web Browser

Controllers 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 controller's hostname, you must connect your PC to the controller through Ethernet or Wi-Fi so that your PC only sees the controller 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 controller's 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 side of the controller. See above.

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 controller's Web interface as follows:

1. Open your Web browser.

2. In the Web browser's address bar, type **https://eclypse-cd4ad1.local** and click go.

3. Login to the controller. Then set the controller's configuration parameters in the controller's configuration Web interface. See Connecting to the Controller's Configuration Web Interface.

Using the Controller's IP Address in a Web Browser

Connect to a controller through its IP address as follows:

☐   For a Wi-Fi Network Connection:

1. Open your Web browser.

2. In the Web browser's address bar, type **https://192.168.0.1** (the controller's factory-default wireless hotspot IP address) and click go.

3. Login to the controller. Then set the controller's configuration parameters in the controller's configuration Web interface. See Connecting to the Controller's Configuration Web Interface.

☐   **For an Ethernet Network Connection**: You must know the controller's current IP address (from the DHCP server for example).

1. Open your Web browser.

2. In the Web browser's address bar, enter the controller's IP address and click go.

3. Login to the controller. Then set the controller's configuration parameters in the controller's configuration Web interface. See Connecting to the Controller's Configuration Web Interface.

Connecting to the Controller's Configuration Web Interface

At the first connection to an ECLYPSE Controller you will be forced to change the password to a strong password for the admin account to protect access to the controller.

In Network Settings, configure the controller's 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 controller. It is important to create new user accounts with strong passwords to protect the controller from unauthorized access. Remove the factory default admin account as this is a commonly known security breach (only the password for this user account needs to be compromized).

Subnet Wiring

Supported Allure 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 Hardware Installation Guide supplied with the Allure series communicating sensor.

Modbus RTU Communications Wiring

Modbus RTU communication is made by connecting directly to the onboard 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 User Guide can be downloaded from our website.

Certain controller models are Modbus masters and support up to three Modbus devices.

As shown in the figure below:

☐ The first and last daisy-chained RS-485 linked devices must have their EOL resistors enabled / installed. All other devices must have their EOL resistor disabled (default factory setting).

☐ At least one RS-485 linked device must have both BIAS switches (+ and -) toggled to the ON position as shown in the figure below.

☐ When the RS-485 linked 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.

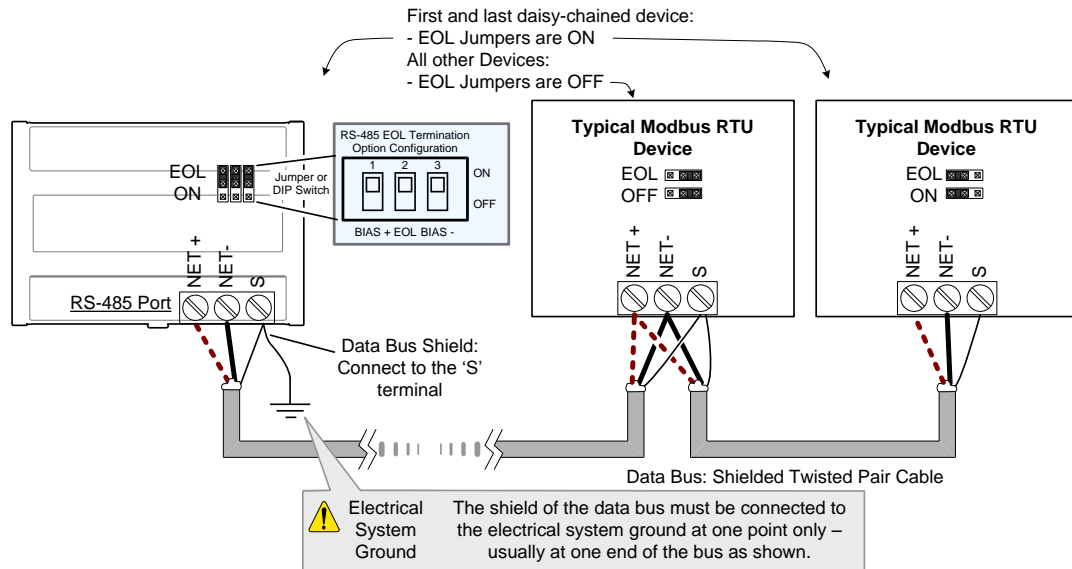Use the RS-485 port to connect to a trunk of Modbus RTU devices.

First and last daisy-chained device:
- EOL Jumpers are ON
All other Devices:
- EOL Jumpers are OFF

Figure 14: Modbus RTU Communications Wiring

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

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 ECY-303 with a Cat5e network cable for example (see Communications Wiring [pg. 8]). For more connection options, refer to the ECLYPSE User Guide.

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.

M-Bus Communications Wiring

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

The ECY-303 integrates one 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 ∆V accepted on the bus	2 V
Cable capacity	110 nf/km

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)

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

Using the Reset Button

See the Status LED, DIP Switch, and Jumper Identification and Configuration [pg. 4] for the location of 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. If FIPS has been enabled on the controller, this will turn FIPS off.

⚠️ 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 hold the controller's reset button for 20 seconds, 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.

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.
☐ Retighten terminal block 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

United States

⚠️ 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 and commercial 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.

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.

Canada

This Class (B) digital apparatus meets all the requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la Classe (B) respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.