ECL Series LonWorks Controllers

Figure 1: From left to right: large enclosure with HOA switches, large enclosure without HOA, and small enclosure with operator interface.

Product Description

This document describes the hardware installation procedures for the ECL Series LonWorks controllers.

The Distech Controls ECL Series controllers are designed to control and monitor various HVAC equipment such as roof top units, air handling units as well as chillers, boilers, and central plant applications. Moreover, these controllers are suitable for any lighting control and power measurement applications. This product line includes the following controllers: ECL-203, ECL-300, ECL-400 Series, ECL-600 Series.

For controllers equipped with an operator interface (ECL-x50 models), refer to the ECL-x50 and ECB-x50 Series Controller User Guide for how to use the this interface.

The ECL-600 Series are compatible with the IO Extension Module product line, which includes the following modules: ECx-400, ECx-410, and ECx-420 (refer to the ECx-400 series IO Extension Module Hardware Installation Guide).

Each controller uses the LonWorks TP/FT-10 communication protocol.

This document describes the hardware installation procedures for the following controllers: ECL-203, ECL-300, ECL-400 Series, and ECL-600 Series controllers only.

- ☐ These controllers are all built on a similar platform, but have different numbers of inputs and outputs. Moreover, each individual model has different amounts of digital and/or universal outputs. For more information on the specific layout and functionality of each controller, please refer to their individual datasheets.
- ☐ The following controllers are housed in small enclosures: ECL-203 Series and ECL-300 Series.
- ☐ The following controllers are housed in large enclosures: ECL-400 Series and ECL-600 Series.

General Installation Requirements

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

- ☐ It is recommended that the controller(s) be kept 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.
- ☐ Upon unpacking, inspect the contents of the carton for shipping damages. **Do not install a damaged device.**
- ☐ The device is designed to operate under environmental conditions that are specified in its datasheet.
- ☐ Ensure proper ventilation of the device and avoid areas where corroding, deteriorating or explosive vapors, fumes or gases may be present.
- ☐ Record the 12-character Neuron® ID located on either end of the device (shown on a sticker below the barcode), for later commissioning.
- ☐ Allow for proper clearance around the device's enclosure and wiring terminals to provide easy access for hardware configuration and maintenance.
- ☐ When installing in an enclosure, select one that provides sufficient surface area to dissipate any heat generated by the device and by any other devices installed in the enclosure. A metal enclosure is preferred. If necessary, provide active cooling for the enclosure.
- ☐ Orient the controller with the ventilation slots and power supply/output terminal block connectors towards the top to permit proper heat dissipation.
- ☐ The device's plastic enclosure has a back plate that is separable from the front plate allowing the back plates (with the connectors) to be shipped directly to the installation site while all the engineering is done in the office.
- ☐ The device's datasheet specifies the power consumption (amount of heat generated), the operating temperature range, and other environmental conditions the device is designed to operate under.
- ☐ Ensure that all equipment is installed according to local, regional, and national regulations.
- ☐ Do not drop the device or subject it to physical shock.
- ☐ If the device is used and/or installed in a manner not specified by Distech Controls, the functionality and the protection provided by the device may be impaired.

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

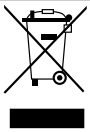
Take special care to keep the front and back plate aligned when separating and joining them.

Before installation of the Wireless Receiver, verify that local communication regulations allow the installation of wireless devices and available frequencies to be supported in your area. Refer to the Open-to-Wireless™ Application Guide for more information.

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

Device Markings (Symbols)

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

Symbol	Description
	CE marking: the device conforms to the requirements of applicable EC directives.
	Products must be disposed of at the end of their useful life according to local regulations.
	Read the Hardware Installation Guide for more information.
	UL marking: conforms to the requirements of the UL certification.
	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.
	Alternating Current
	Direct Current

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 0.5 Nm).
- ☐ 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.
- ☐ The board connectors accept wires or flat cables ranging from 22 to 14AWG (0.644 to 1.630mm diameter) per pole. However, power cables must be between 18 and 14AWG (1.024 to 1.630mm diameter).
- ☐ Keep all wires away from high speed data transmission cables (for example, Ethernet, etc.).
- ☐ 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.

Controller Dimensions & Components

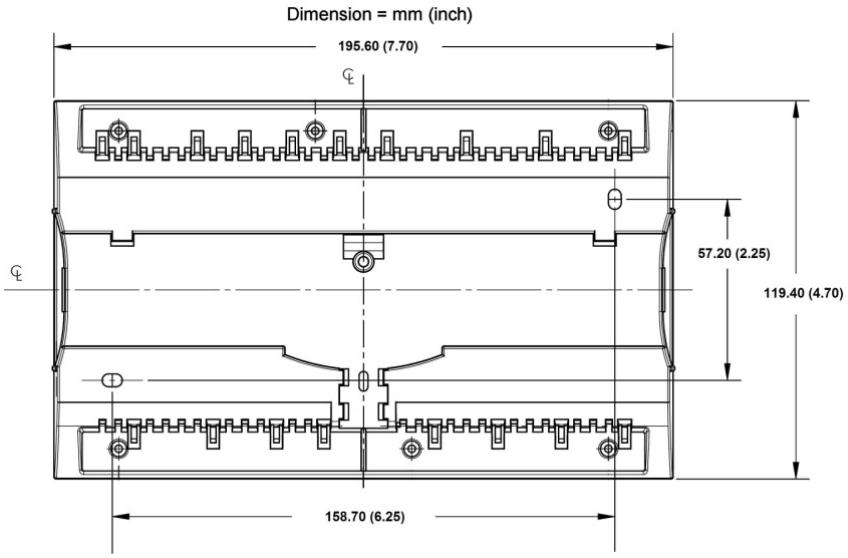


Figure 2: Rear view of large enclosure

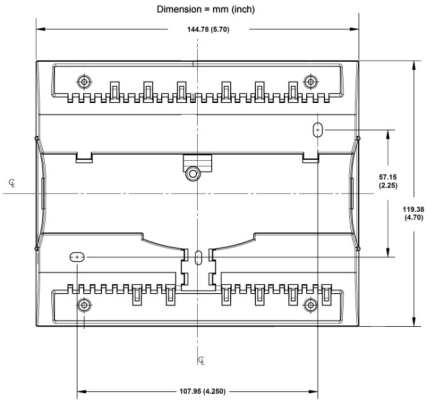


Figure 3: Rear view of small enclosure

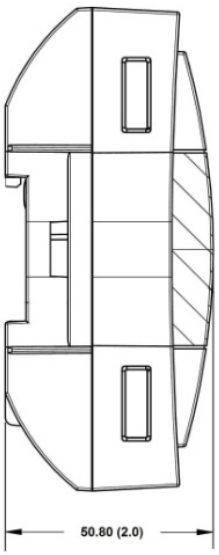
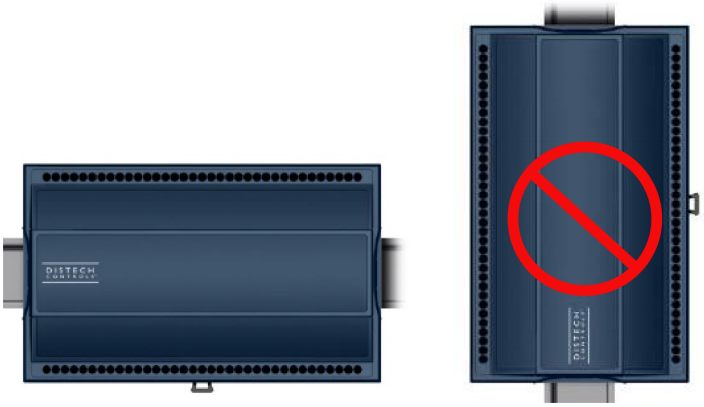


Figure 4: Side view of large and small enclosure

Mounting Instructions

The controllers can be mounted on a DIN rail to speed up the installation procedure. They are also equipped with two mounting holes 0.25” x 0.165” (6.35mm x 4.191mm). The controllers can be mounted in a panel or on a wall by using appropriate screw types (use sheet metal, thread forming, or self-tapping screws accordingly).

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



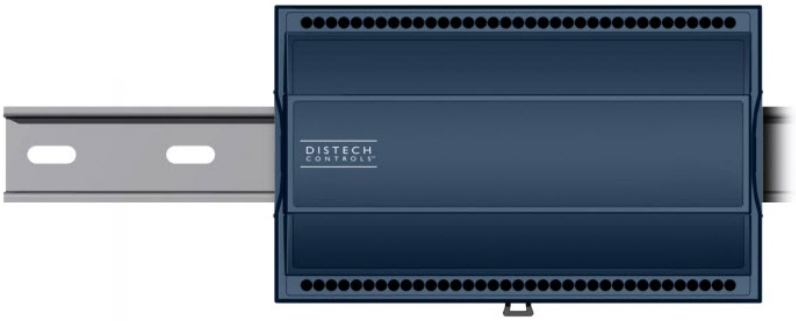
Horizontal Mounting Position:
Required for DIN rail mounting
Required for wall mounting

Vertical Mounting Position:
Is Forbidden

Figure 5: Permitted Mounting Positions

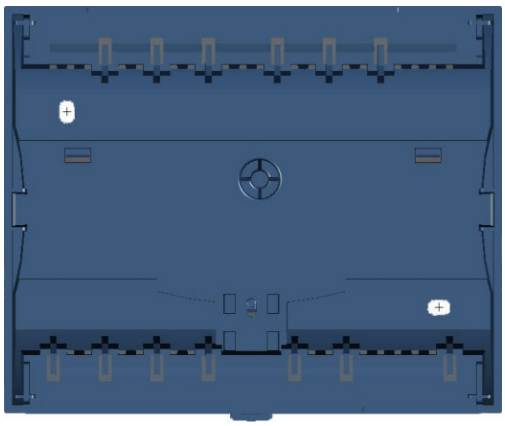
DIN Rail-Mounted Installation

1. Ensure the DIN rail is properly mounted on the wall.
2. Simply clip controller onto the DIN rail.



Wall-Mounted Installation

3. Open the enclosure by separating the front and back plate while pressing on the side clips.
4. Use the back plate’s mounting holes to mark the location of any holes that need to be drilled.
5. Drill the holes.
6. Clean the surface and mount the controller using the appropriate screw types.



Power Wiring

Voltage: 24VAC/DC; ± 15%, Class 2

This is a Class 2 Product. Use a Class 2 transformer only (rated at 100VA or less at 24VAC) to power the controller(s).

The Network Guide provides extensive information and requirements for powering a controller that uses a LonWorks network for communications. It can be downloaded from our website.

It is recommended to wire only one controller per 24VAC transformer.

If only one 24VAC transformer is available, determine the maximum number of controllers that can be supplied using the following method to determine the required power transformer capacity:

- ☐ Add up the maximum power consumption of all controllers including external loads and multiply this sum by 1.3.
- ☐ If the resulting number is higher than 100VA, use multiple transformers.

Use an external fuse on the 24VAC side (secondary side) of the transformer, as shown below, to protect all controllers against power line spikes.

Maintain consistent polarity when connecting controllers and devices to the transformer. That is, the COM terminal of each controller and each peripheral should be connected to the same terminal on the secondary side of the transformer.

Connecting the power source to Electrical System Ground is not a requirement for proper system operation. However it is good installation practice to do so in order to maintain the same potential between all controllers and Protective Earth.

Always use a separate transformer for each ECL-600 series controller and for each of its associated IO Extension Module (ECx-400s).
One terminal on the secondary side of each of these transformers must be connected to the building's ground and to the respective controller's or IO Extension Modules' 24V COM terminal.

Failure to maintain consistent polarity throughout the entire network will result in a short circuit and/or damage to the controller!
The COM terminals of the controller are internally wired to the 24V COM terminal of the power supply. Connecting a peripheral or another controller to the same transformer without maintaining polarity between these devices will cause a short circuit.

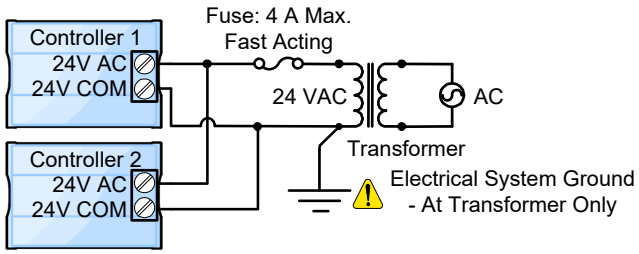


Figure 6: Power wiring – AC

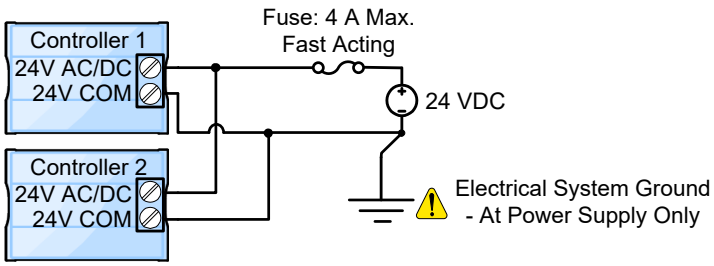


Figure 7: Power wiring – DC

Jumper Identification and Configuration

Controllers have the following onsite configurable jumpers.

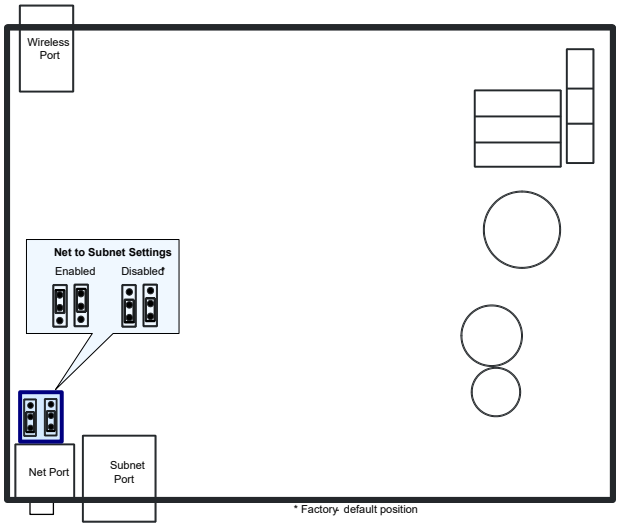


Figure 8: ECL-203 Controller Jumper Locations

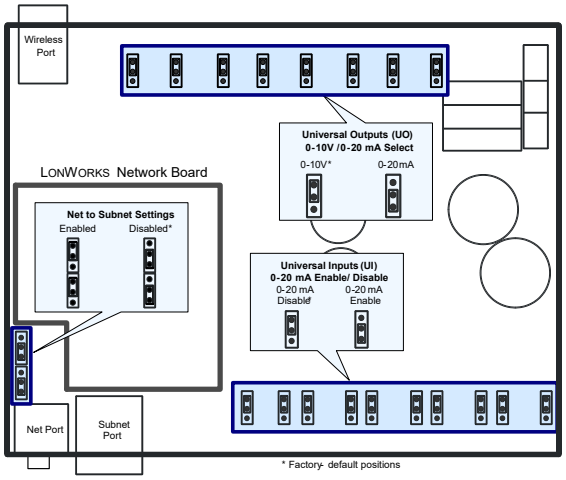


Figure 9: ECL-300 Controller Jumper Locations

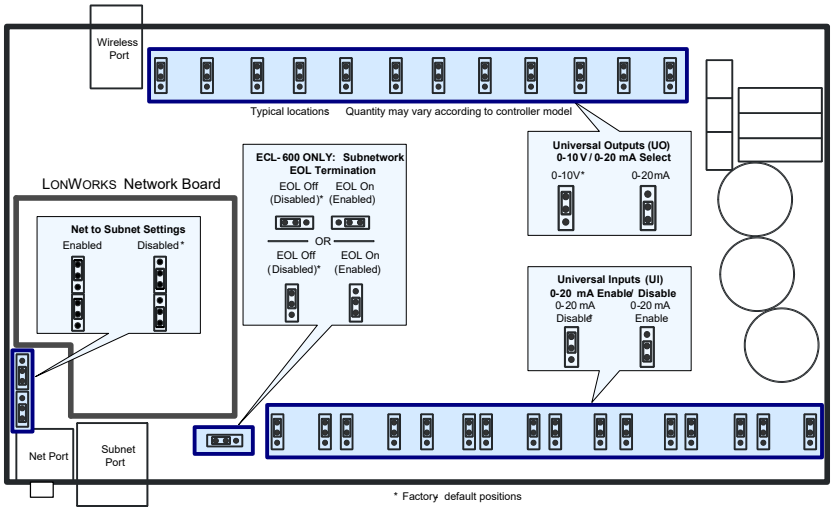


Figure 10: ECL-400 Series and ECL-600 Series Controller Jumper Locations

Input Wiring

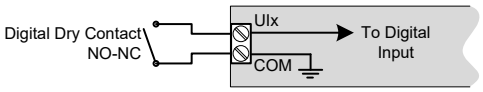
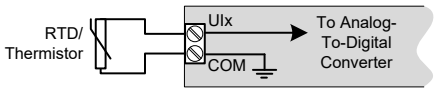
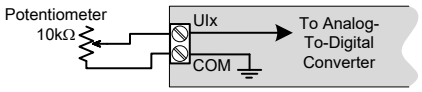
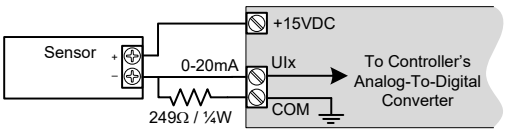
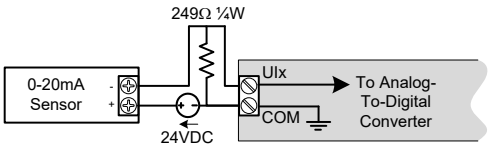
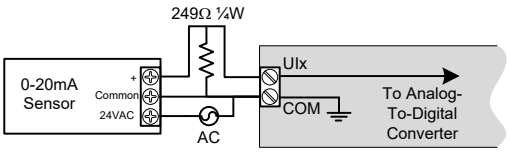
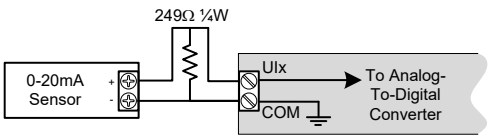
Before connecting a sensor to the controller, refer to the installation guide of the equipment manufacturer.

- ☐ 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 shield length should be kept as short as possible.

Table 1 shows the ECL-203, ECL-300, ECL-400, and ECL-600 Series controller pulse and current input jumper support. Table 2 shows the available universal input (UIx) wiring methods.

Controller	Fast and Slow Pulse Inputs support		Current Input Jumper support: 0 to 10VDC / 0 to 20mA
	50Hz: 10ms minimum ON/OFF (Fast Pulse)	1Hz: 500ms minimum ON/OFF (Slow Pulse)	
ECB-203	None	UI1 to UI6	None
ECB-300	UI1 to UI4	UI5 to UI10	Yes; see *Table 2*
ECB-400 Series	UI1 to UI4	UI5 to UI12	
ECB-600 Series	UI1 to UI4	UI5 to UI16	

Table 1: Controller Input Support

Sensor Input Type	Input Connection Diagram
☐ Dry Contact input.	
☐ RTD input (for example, 1000Ω). ☐ Thermistor Input (for example, 10kΩ type II and III).	
☐ Resistive input, (for example, use with 10kΩ and 100kΩ potentiometers).	
ECL-**203 Series:** ☐ 0 to 20mA input used with a 2-wire, 0 to 20mA sensor powered by the controller's internal 15VDC power supply.	
ECL-**203 Series:** ☐ 0 to 20mA input used with a 2-wire, 0 to 20mA sensor powered by an external 24VDC power supply.	
ECL-**203 Series:** ☐ 0 to 20mA input used with a 3-wire, 0 to 20mA sensor powered by an external 24VAC power supply.	
ECL-**203 Series:** ☐ 0 to 20mA input used with a sensor powered by its own power source.	

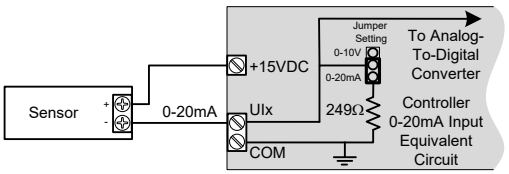
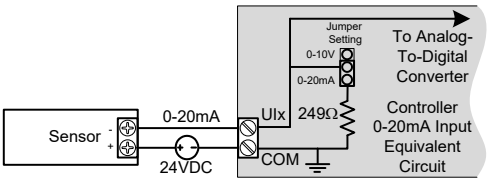
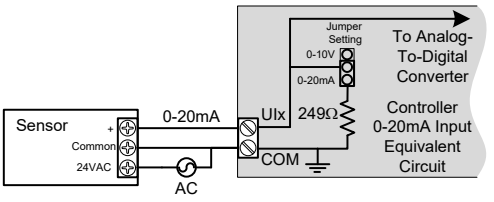
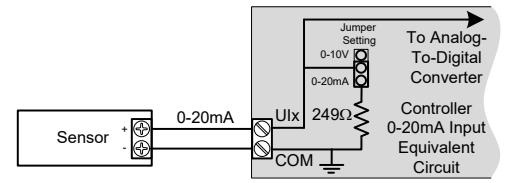
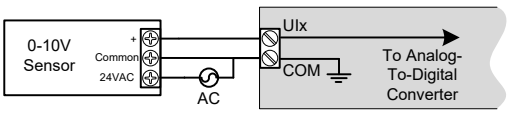
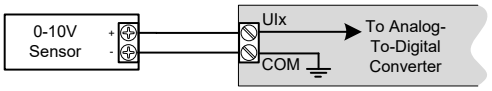
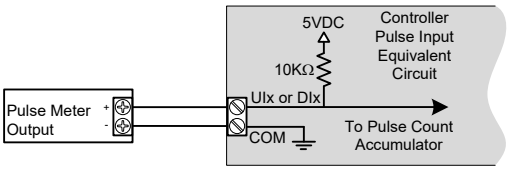
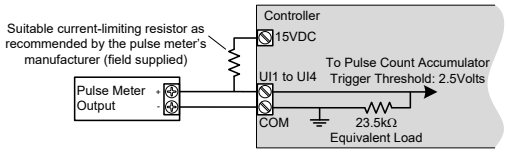
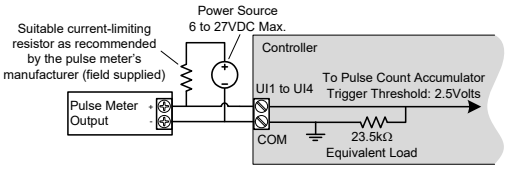
Sensor Input Type	Input Connection Diagram
ECL-**300,** ECL-**400, and** ECL-**600 Series:** ☐ 0 to 20mA input used with a 2-wire, 0 to 20mA sensor powered by the controller's internal 15VDC power supply. ☐ For jumper location, see Jumper Identification and Configuration [pg. 6].	
ECL-**300,** ECL-**400, and** ECL-**600 Series:** ☐ 0 to 20mA input used with a 2-wire, 0 to 20mA sensor powered by an external 24VDC power supply. ☐ For jumper location, see Jumper Identification and Configuration [pg. 6].	
ECL-**300,** ECL-**400, and** ECL-**600 Series:** ☐ 0 to 20mA input used with a 3-wire, 0 to 20mA sensor powered by an external 24VAC power supply. ☐ For jumper location, see Jumper Identification and Configuration [pg. 6].	
ECL-**300,** ECL-**400, and** ECL-**600 Series:** ☐ 0 to 20mA input used with a sensor powered by its own power source. ☐ For jumper location, see Jumper Identification and Configuration [pg. 6].	
☐ Voltage input used with a 3-wire 0 to 10VDC or 0 to 5VDC sensor powered by an external 24VAC power supply.	
☐ Voltage input used with a 0 to 10VDC or 0 to 5VDC sensor powered by its own power source.	
☐ **Slow Pulse – Internal supply**: 2-wire pulse meter for ECL-203, ECL-300, ECL-400, and ECL-600 Series controllers ☐ 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). ☐ Refer to Table 1 for more information on Controller Input Support	
☐ **Fast Pulse – Internal supply:** 2-wire pulse meter for ECL-300, ECL-400, and ECL-600 Series controllers ☐ Connect the pulse input according to the figure for a pulse meter that requires more than 5VDC to operate using **built in controller power source** from 6VDC to 15VDC maximum. ☐ Refer to Table 1 for more information on Controller Input Support	
☐ **Fast Pulse – External supply**: 2-wire pulse meter for ECL-300, ECL-400, and ECL-600 Series controllers ☐ Connect the pulse input according to the figure for a pulse meter that requires more than 5VDC to operate using an **external power source** from 6VDC to 27VDC maximum. ☐ Refer to Table 1 for more information on Controller Input Support	

Table 2: Input Wiring

Output Wiring

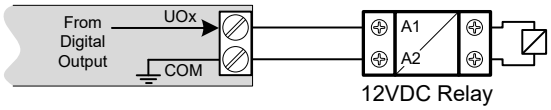
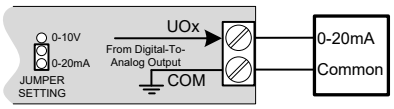
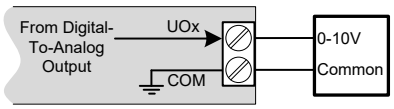
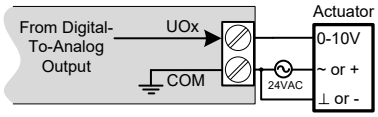
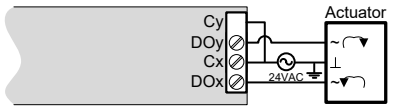
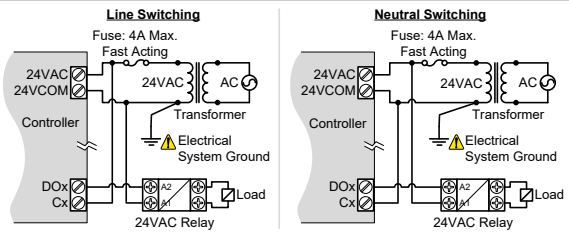
Before connecting an output device (actuator, relay, etc.) to the controller, refer to the datasheet and installation guide of the equipment manufacturer.

- ☐ 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.
- ☐ For relay outputs (DOx); select appropriately-sized wiring suitable to the current load.
- ☐ To measure the state of a triac output, an external load must be connected.

Table 3 shows the ECL-203, ECL-300, ECL-400, and ECL-600 Series controller Output and Jumper support. Table 4 shows the available output wiring methods.

Controller	Digital (Triac) Outputs	Universal Outputs	Jumper 0 to 10VDC/0 to 20mA
ECL-203	5	3	
ECL-300	0	8	■
ECL-4x0 Series	0	12	■
ECL-4x3 Series	8	4	■
ECL-600 Series	0	12	■

Table 3: Controller Output Support

Control Output Type	Output Designation	Output Connection Diagram
☐ Discrete 0 or 12VDC digital, Pulse, or PWM output controlling a 12VDC relay. Maximum 60 mA (minimum load resistance 200Ω).	UOx	
☐ Current 0 to 20mA universal output & jumper configuration ☐ For ECL-300, ECL-400, and ECL-600 Series only ☐ For jumper location, see Jumper Identification and Configuration [pg. 6].	UOx	
☐ Linear 0 to 10VDC digital to analog output.	UOx	
☐ 0 to 10VDC voltage output controlling an analog actuator that is powered by an external 24VAC power source.	UOx	
☐ 24VAC externally-powered triac output controlling a floating actuator[1]. ☐ Ensure that the external power supply is grounded as shown.	DOx	
☐ 24VAC **controller**-powered triac output controlling a relay[1] with line and neutral switching. ☐ Ensure that the transformer's secondary winding is grounded as shown.	DOx	

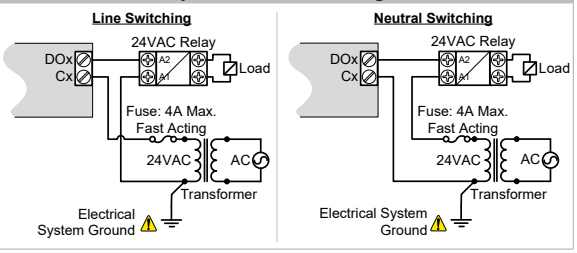
Control Output Type	Output Designation	Output Connection Diagram
☐ 24VAC **externally**-powered triac output controlling a relay[1] with line and neutral switching. ☐ Ensure that the transformer's secondary winding is grounded as shown.	DOx	

Table 4: Output Wiring

1. Maximum output current for all digital triac outputs is 0.5A continuous or 1A @ 15% duty cycle for a 10-minute period.

Subnet-Wiring

The subnet is used to connect a range of Allure Series Communicating Sensors:

- ☐ The Allure EC-Smart-Vue Series sensor is a communicating room temperature sensor with backlit display graphical menus and VAV balancing capabilities.
- ☐ The Allure EC-Smart-Comfort and Allure EC-Smart-Air Communicating Sensors are a range of communicating room temperature sensors.

Connect the Allure Series to the controller's **Subnet Port** with a standard Category 5e Ethernet patch cable fitted with RJ-45 connectors. Refer to the Network Guide for extensive information and requirements for the connection of the Allure Series. It contains information about network topology and length, cable type, setting the Subnet ID, etc. It can be downloaded from the *www.distech-controls.com* website. See also the Hardware Installation Guide supplied with the Allure Series.

If you make your own patch cable, see the Allure Series Hardware Installation Guide.

Protect the controller's connector from being pulled on when a cable to the Allure Series is connected. Create a strain-relief by looping the cable and attaching it to a solid object with a nylon tie so that a tug on the cable will not pull out the connector on the controller.

Subnet Wiring with the ECL-600 Series Controller

ECx-400 series IO Extension Modules are connected to the **SUBNET**– and **SUBNET+** terminals of the ECL-600 series controller. The Network Guide provides extensive information and requirements to implement the subnetwork for the ECx-400 series IO Extension Modules. It contains information about network length, cable type, controller addressing, etc. It can be downloaded from our website. See also the Hardware Installation Guide supplied with the ECx-400 series IO Extension Module.

Communications Wiring

The recommended cable type for LonWorks® communications is 22AWG (0.65 mm), twisted pair, unshielded. The LonWorks communication wire is polarity insensitive and can be laid out in a bus, star, loop or free topology. For loop topology, polarity is important, special care must be taken when connecting the LonWorks network to avoid short circuit.

It is recommended to use the bus topology network configuration for all LonWorks communication wiring, as it allows for easy network troubleshooting.

Connect both wires to the LON+ and LON- terminals of the controller. If inserting multiple wires in the terminals, ensure to properly twist wires together prior to inserting them in the terminal connectors.

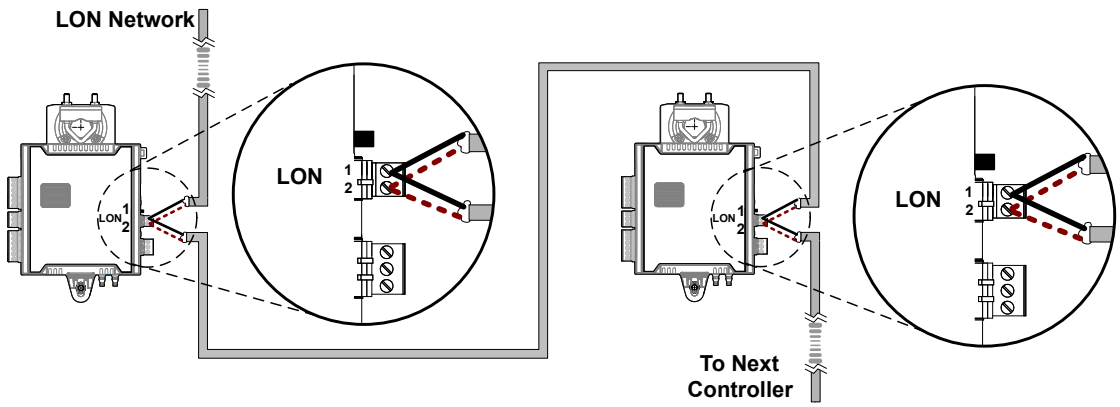


Figure 11: Communication Wiring

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

For more information and detailed explanations on network topology and wire length restrictions, refer to the Network Guide, which can be downloaded from our website.

It is important to use proper network terminators depending on the type of network topology used. Failure to do so may result in communication errors between controllers.

Selecting Network Terminators

For a bus topology, 2 network terminators are required (1 at each end of the bus topology channel). For a free topology, 1 network terminator is required and it can be put anywhere on the channel.

When used with anAllure EC-Smart-Vue Series Communicating Sensor, the network can be accessed at the sensor's audio plug port for commissioning and maintenance purposes, when the two **Net to Subnet Port Settings** jumpers inside the ECL Series controller are set to **Enable** (for jumper location, see Figure 9). This will connect the main LonWorks network to the subnet Cat5e cable.

Recommendation: Only a limited number of controllers on a LonWorks network segment should have their **Net to Subnet Port Settings** jumpers enabled. Enabling too many Allure EC-Smart-Vue sensors with network access may cause network communication issues. If there are any network communication problems, refer to the Troubleshooting Guide.

The Cat5e cable length is restricted by the maximum allowable subnetwork bus length (see the Allure EC-Smart-Vue Hardware Installation Guide for more information).

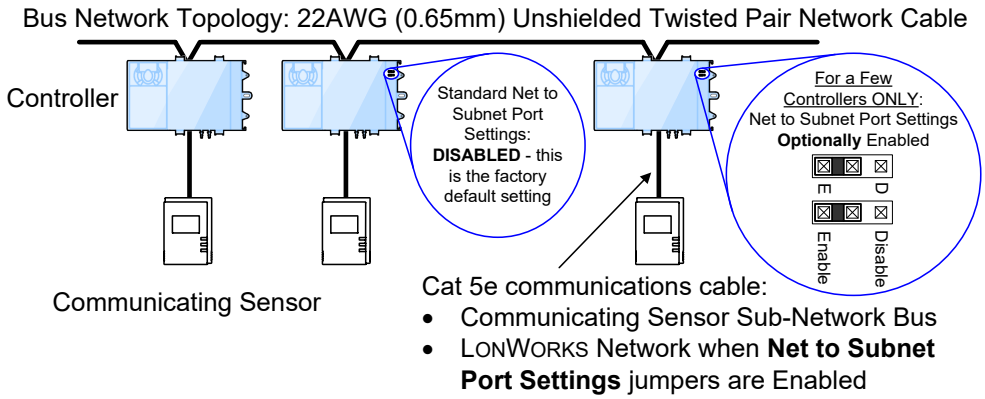


Figure 12: LonWorks Network Bus Topology

Temporary Network Access

To temporarily access the LonWorks LAN for commissioning and maintenance purposes, connect a LonWorks network interface to the NET PORT audio plug. Wire a standard ⅛" (3.5 mm) three-conductor (stereo jack) or two-conductor (mono jack) as shown below.

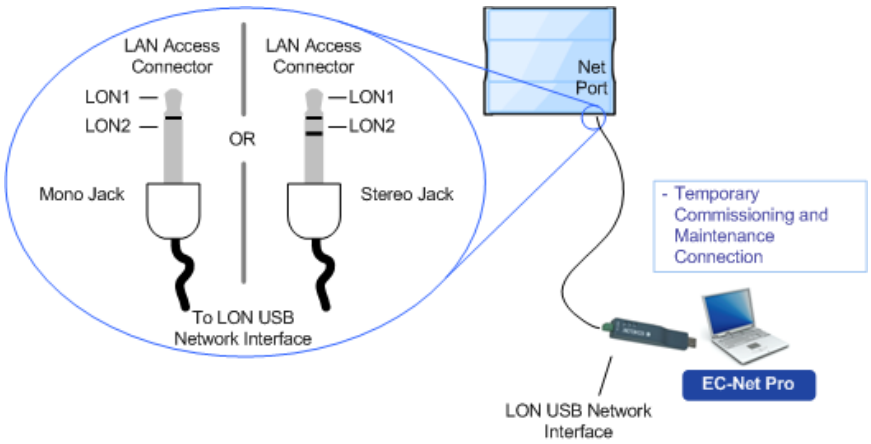


Figure 13: ⅛" (3.5 mm) Stereo or Mono Jack Connection for a LONWORKS Network Interface

Wireless Installation

When connected to a Wireless Receiver, controllers can receive input signals from a wide selection of wireless devices. Compatible wireless devices include temperature sensors, duct sensors, window/door contacts and light switches. These devices are easy to install, and can be mounted on a wide range of building materials.

Before connecting any wireless equipment to the controller, refer to the Open-to-Wireless Application Guide.

Connecting the Wireless Receiver

The Wireless Receiver is connected to the controller using a 2m (6.5ft) telephone cable with 4P4C modular connectors at both ends. Do not exceed this cable length. The Wireless Receiver's telephone socket is located inside the device. To locate it, open the Wireless Receiver by separating its front and back plates.

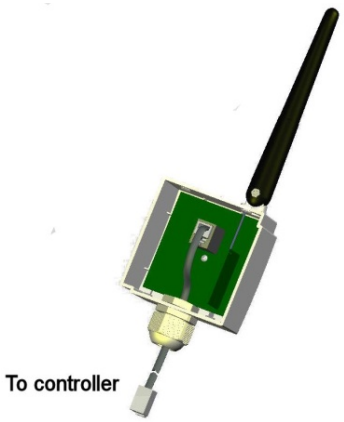


Figure 14: Location of the Wireless Receiver's telephone socket

Connecting to the Controller's Wireless Port

Each controller has a wireless port in which one end of the Wireless Receiver's telephone cable plugs in.

Strain relief and Terminal Block Cover

In certain jurisdictions, terminal block covers are required to meet local safety regulations. Strain reliefs and terminal block covers are available for controllers housed in large enclosures and are used to relieve tension on the wiring and conceal the controllers' wire terminals. Strain reliefs and terminal block covers are optional and are sold as peripherals.

Prior to connecting all wires, it is recommended to install the strain relief. Three screws are provided for its installation under the bottom part of the enclosure. Tie wraps can then be used to group wires together and attach them securely to the strain relief in an effort to relieve undue tension. If necessary, the terminal block cover can then be clipped on to the strain relief as shown below.

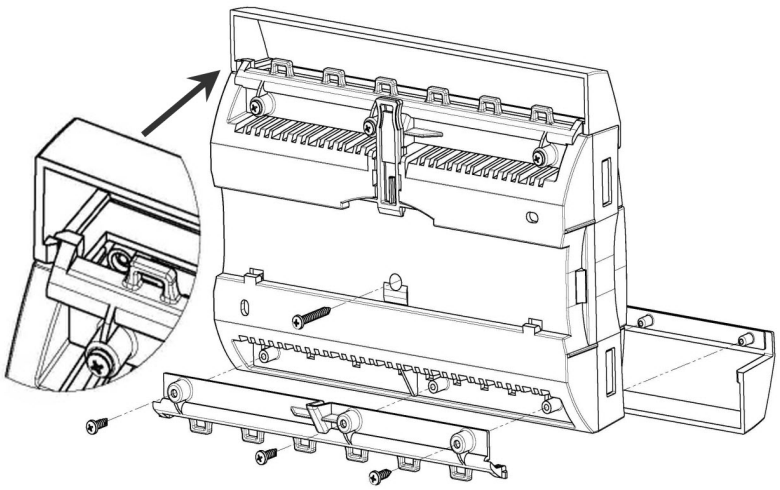


Figure 15: Large enclosure strain relief and terminal block cover installation

Maintenance

Unplug device before any kind of servicing.

The device requires minimal maintenance, but it is important to take note of the following:

- ☐ If it is necessary to clean the outside of the device, use a 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 set 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.

Typical Air Handling Unit Application Wiring Diagram

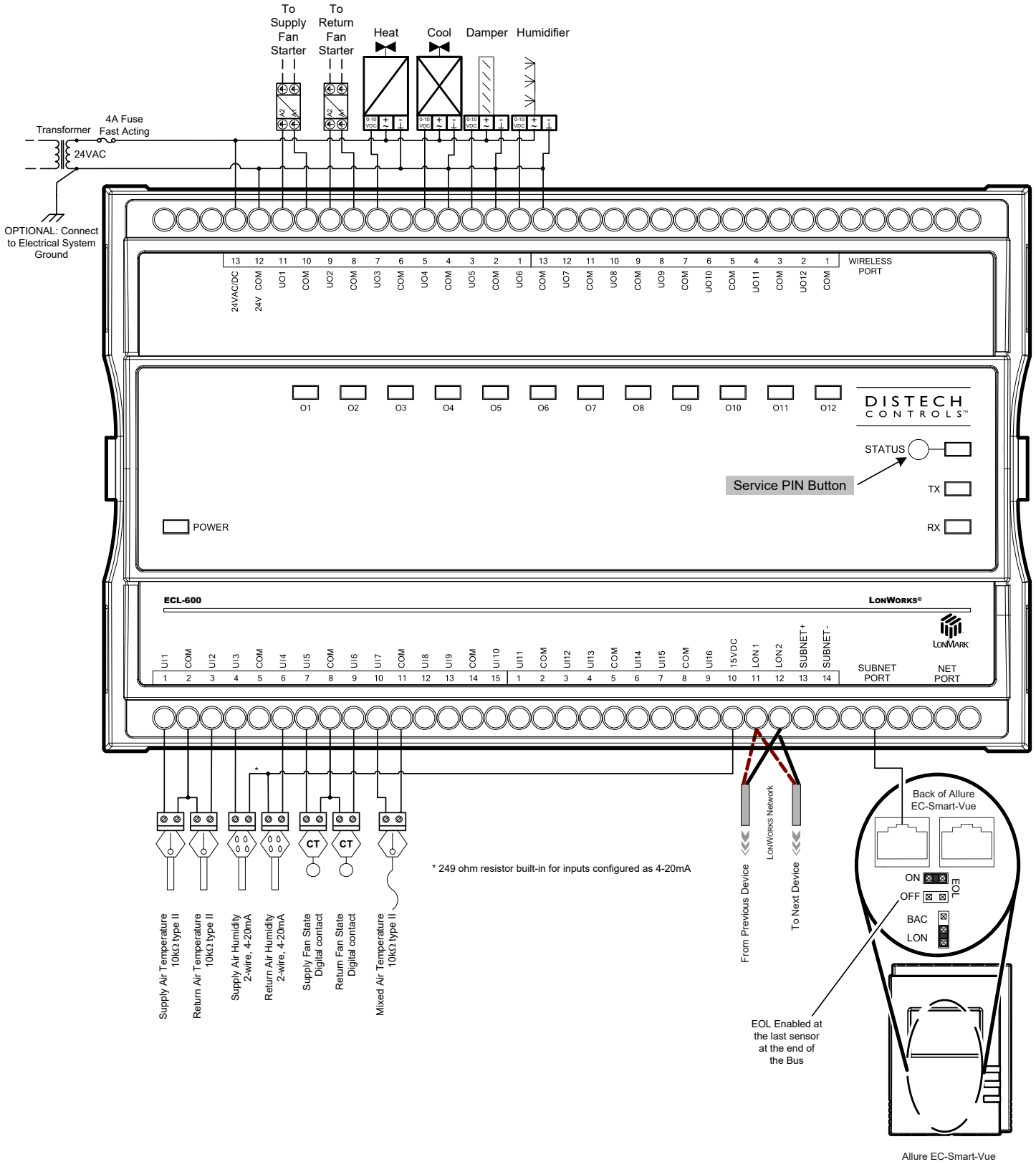


Figure 16: Typical Power and Network Connections with an Allure EC-Smart-Vue sensor

Although only the Allure EC-Smart-Vue is shown here, any other Allure Series Communicating Sensor can be connected to the subnet port in this manner. Refer to the sensor's corresponding Hardware Installation Guide for more details.

Troubleshooting Guide

Controller is powered but does not turn on

Fuse has blown	Disconnect the power. Check the fuse integrity. Reconnect the power.
Power supply polarity	Verify that consistent polarity is maintained between all controllers and the transformer. Ensure that the 24VCOM terminal of each controller is connected to the same terminal on the secondary side of the transformer. See *Power Wiring.*

Controller cannot communicate on the LonWorks network

Absent or incorrect supply voltage	1. Check power supply voltage between 24VAC ±15% and 24VCOM pins and ensure that it is within acceptable limits. 2. Check for tripped fuse or circuit breaker.
Overloaded power transformer	Verify that the transformer used is powerful enough to supply all controllers.
Network not wired properly	Double check that the wire connections are correct.
Absent or incorrect network termination	Check the network termination(s).
Too many Allure EC-Smart-Vue Sensors are providing network access	Disable the Net to Subnet Port Settings jumpers on all controllers (for jumper location, see Figure 9). If communications are re-established, re-enable only a few Allure EC-Smart-Vue sensors to have network access.

Controller communicates well over a short network, but does not communicate on large network

Network length	Check that the total wire length does not exceed the specifications of the *Junction Box and Wiring Guideline for Twisted Pair LonWorks Networks.*
Wire type	Check that the wire type agrees with the specification of the *Junction Box and Wiring Guideline for Twisted Pair LonWorks Networks.*
Network wiring problem	Double check that the wire connections are correct.
Absent or incorrect network termination	Check the network termination(s). Incorrect or broken termination(s) will make the communication integrity dependent upon a controller's position on the network.
Extra capacitance	Make sure that no extra capacitance is being connected to the network other than the standard FTT circuit and a maximum of a 3 meter stub (in bus topology).
Number of controllers on network segment exceeded	The number of controllers on a channel should never exceed 64. Use a router or a repeater in accordance to the *Junction Box and Wiring Guideline for Twisted Pair LonWorks Networks.*
Network traffic	Query node statistics to check for errors. Use a LonWorks protocol analyzer to check network traffic.

I/O Extension Module cannot communicate on the subnetwork

Absent or incorrect supply voltage	1. Check power supply voltage between 24VAC ±15% and 24VCOM pins and ensure that it is within acceptable limits. 2. Check for tripped fuse or circuit breaker.
Overloaded power transformer	Verify that the transformer used is powerful enough to supply all controllers. See *Power Wiring.*
Network not wired properly	Double check that the wire connections are correct.
There is another controller with the same Subnet ID on the subnetwork	Each I/O Extension Module on the subnetwork must have a unique Subnet ID. Look at the Subnet ID DIP switch on the faceplate of each I/O Extension Module.
Network length	Check that the total wire length does not exceed the specifications in the *Network Guide.*
Wire type	Check that the wire type agrees with the specification of the *Network Guide.*
Absent or incorrect network termination	Check the network termination(s). Only the last ECx-400 I/O Extension Module must have its EOL termination set to ON. When one or more Allure EC-Smart-Vue sensors are connected to the controller, only the last sensor must have its EOL termination set to ON. See the *Network Guide* for more information.

Hardware input is not reading the correct value

Input wiring problem	Check that the wiring is correct according to this manual and according to the peripheral device's manufacturer.
Configuration problem	Using EC-gfxProgram, check the configuration of the input. Refer to the EC-gfxProgram user guide for more information.
Over-voltage or over-current at an input	An over-voltage or over-current at one input can affect the reading of other inputs. Respect the allowed voltage / current range limits of all inputs. Consult the appropriate datasheet for the input range limits of this controller.
Open circuit or short circuit	Using a voltmeter, check the voltage on the input terminal. For example, for a digital input, a short circuit shows approximately 0V DC and an open circuit shows approximately 5V DC.

Hardware output is not operating correctly

Fuse has blown (Auto reset fuse)	Disconnect the power and outputs terminals. Then wait a few seconds to allow the auto-reset fuse to cool down. Check the power supply and the output wiring. Reconnect the power.
Output wiring problem	Check that the wiring is correct according to this manual and according to the peripheral device's manufacturer.
Configuration problem	Using EC-gfxProgram, check the configuration of the input. Refer to the EC-gfxProgram user guide for more information.
0 to 10V output, 24VAC powered actuator is not moving.	Check the polarity of the 24VAC power supply connected to the actuator while connected to the controller. Reverse the 24VAC wire if necessary.

Wireless devices not working correctly

Device not associated to controller	Using EC-*gfx*Program, check the configuration of the input. Refer to the *EC-gfxProgram user guide* for more information.
Power discharge	1. Recharge device with light (if solar-powered) or replace battery (if battery-powered), 2. Ensure sufficient light intensity (200lx for 4 hours/day).

Device too far from the Wireless Receiver	Reposition the device to be within the range of the Wireless Receiver. For information on typical transmission ranges, refer to the *Open-to-Wireless Application Guide.*
Configuration problem	Using the device configuration plug-in or wizard, check the configuration of the input. Refer to the Wireless Battery-less *Sensors and Switches Solutions Guide* for more information.

Rx/Tx LEDs

RX LED not blinking	Data is not being received from the LONWORKS data bus.
TX LED not blinking	Data is not being transmitted onto the LONWORKS data bus.

Status LED– Normal Operation

One fast blink ●	Initialization: The device is starting up.
Fast blink continuous: ● ● ● ● ● (150ms On, 150ms Off, continuous)	Firmware upgrade in progress. Controller operation is temporarily unavailable. The new firmware is being loaded into memory. This takes a few seconds. Do not interrupt power to the device during this time.
The Status LED is always OFF	The controller is operating normally.

Status LED blink patterns – Repeats every 2 seconds (highest priority shown first)

Long blink continuous: ▬ ▬ ▬ ▬ ▬ ... (1s On, 1s Off, continuous)	The controller is not commissioned. Appropriate action: Commission the controller.
Long Long Long blink ▬ ▬ ▬ (800ms On, 300ms Off, 800ms On, 300ms Off, 800ms On)	The controller is offline. Appropriate action: Set the controller Online
Long Short Short Short blink ▬●●● (800ms On, 300ms Off, 150ms On, 300ms Off, 150ms On, 300ms Off, 150ms On)	The controller is in bypass mode. Appropriate action: Set the controller Online
Short Short Long blink ● ● ▬ (150ms On, 300ms Off, 150ms On, 300ms Off, 800 ms On)	Poor-quality power; The device has browned-out: The voltage at the 24VAC and 24VCOM terminals has gone below the device's acceptable limit during power up.
Fast blink 12x: ●●●●●●●●●●●● (80ms On, 80ms Off, 12x)	Wink. The wink function is used to identify a device.

For issues with the Allure EC-Smart-Vue Series Communicating Sensor, refer to the Allure EC-Smart-Vue Series Communicating Sensor Hardware Installation Guide.