LN Series LN-VSTAT and LN-PSTAT Sensors

Installation Instructions

LN-VSTAT-1, LN-PSTAT-1

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Applications

The LN Series LN-VSTAT and LN-PSTAT sensors are specifically designed to connect to the SMRT ports of the Johnson Controls' LN Series controllers. The LN-VSTAT-1 works with the LN-VAVFLFS-1 and LN-VVTLFS-1 controllers. The LN PSTAT-1 works with the LN-PFCU-1 and LN-PFCUA-1 controllers. The SMRT ports supply power and serial communications to the LN-VSTAT and LN-PSTAT sensors. The device provides precision local temperature sensing and it allows occupants to adjust the local setpoint and view the occupancy status, local space temperature, and outside air temperature.

North American Emissions Compliance

United States

Compliance Statement (Part 15.19)

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.

Warning (Part 15.21)

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

To comply with FCC RF exposure requirements for mobile transmitting devices, this transmitter should only be used or installed at locations where there is at least 20cm separation distance between the antenna and all persons.

Canada

Industry Canada Statement

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

Le terme «IC» précédant le numéro de d'accréditation/ inscription signifie simplement que le produit est conforme aux spécifications techniques d'Industry Canada.

Installation

For proper installation and subsequent operation of the LN-VSTAT and LN-PSTAT sensors, follow these recommendations:

- Allow for proper clearance of device casing and wiring terminals for easy access, hardware configuration, and maintenance.
- The sensor is designed to operate under the following conditions:
  - Ambient temperature between 32º to 158ºF (Oº to 70ºC)
  - Relative humidity from 0% to 95%, non-condensing
- Ensure proper ventilation of devices and avoid areas where corroding, deteriorating, or explosive vapors, fumes, or gasses may be present.

IMPORTANT: Work in a static-free area. Discharge static electricity by touching a known, securely grounded object. Do not handle the controller without proper protection against static discharge. Use a wrist strap when handling the controller. Secure the wrist strap clamp to earth ground.

Dimensions

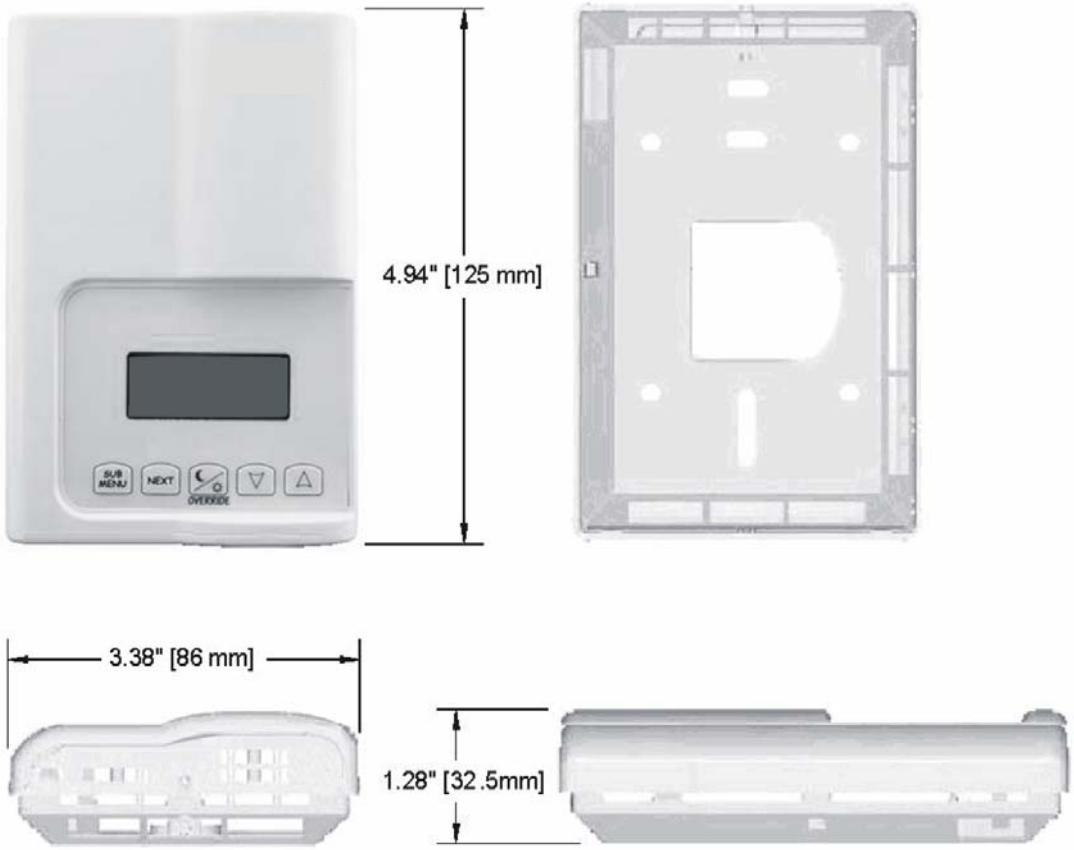

Figure 1: LN-VAVLF, LN-VAVCF, and LN-VVTLF Controller Dimensions

Mounting

Location Considerations

The LN-VAV/VVT controllers are designed for easy installation. However, certain conditions apply when choosing a location for the device:

- The LN-VSTAT and LN-PSTAT sensors should not be installed on an outside wall
- Install the sensor away from any heat source
- Install the sensor away from discharge air grills
- Install the sensor away from areas where it can be affected by the sun
- Install the sensor in an area that provides proper device ventilation. Ensure nothing restrains air circulation to the sensor.

Note: The LN-VSTAT and LN-PSTAT sensors are not designed for outdoor use.

Installation

1. Unscrew the security screw on the bottom of the casing (Figure 2).

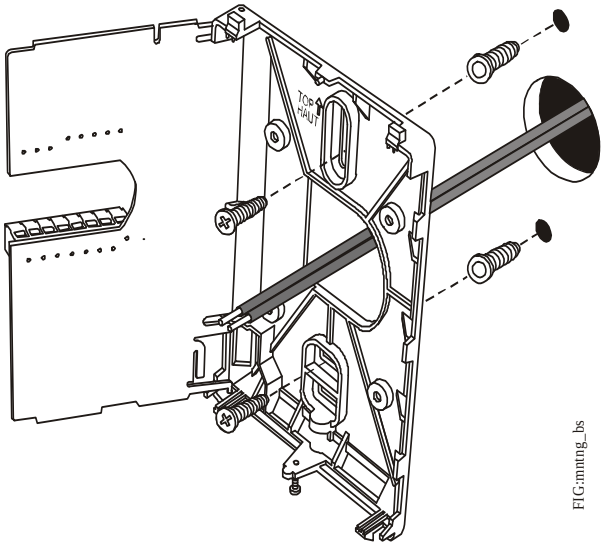

Figure 2: Mounting the LN-VSTAT and LN-PSTAT sensors

2. Open the cover by pulling the bottom side of the casing outwards. Flip printed circuit board to access mounting hole.
3. Pull cables 6 in. out of the wall and insert them in the central hole of the base.
4. Align the base and mark the location of the two mounting holes on the wall. Ensure the correct side of the base is facing upwards.
5. Remove the device and drill holes, if necessary.
6. Install anchors into the wall, if necessary.
7. Ensure the mounting surface is flat and clean.
8. Insert screws in mounting holes of the base. Do not overtighten the screws.
9. Strip each wire 1/4 in.
10. Gently push excess wiring back into the wall.
11. Flip the printed circuit board back into place.
12. .Flip down the front cover verify it clips tightly into place.
13. Install the security screw (Figure 3).

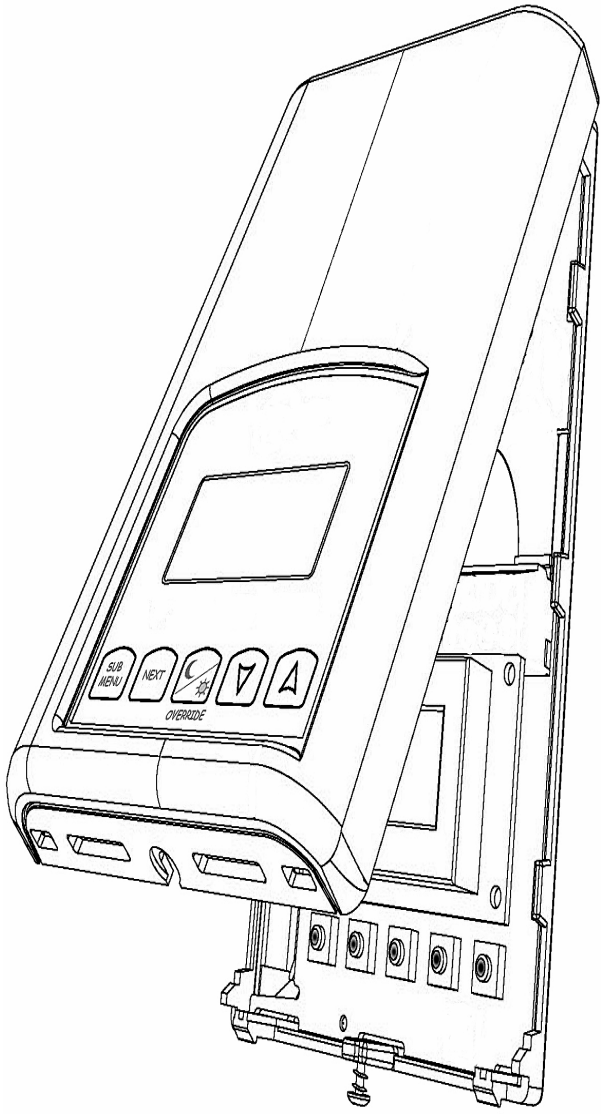

Figure 3: LN-VSTAT and LN-PSTAT Sensors Security Screw

Wiring

IMPORTANT: Make all wiring connections in accordance with the National Electrical Code and all local regulations. Use Copper conductors only. Do not exceed the control's electrical rating.

CAUTION: Risk of Electric Shock.
Disconnect power supply before making electrical connections to avoid shock.

MISE EN GARDE : Risque de décharge électrique.
Débrancher l'alimentation avant de réaliser tout raccordement électrique afin d'éviter tout risque de décharge électrique.

The LN-VSTAT and LN-PSTAT sensors draw power and communicate with the associated controller over the SMRT wiring using a serial communication protocol. Figure 4 shows the terminal wiring details.)

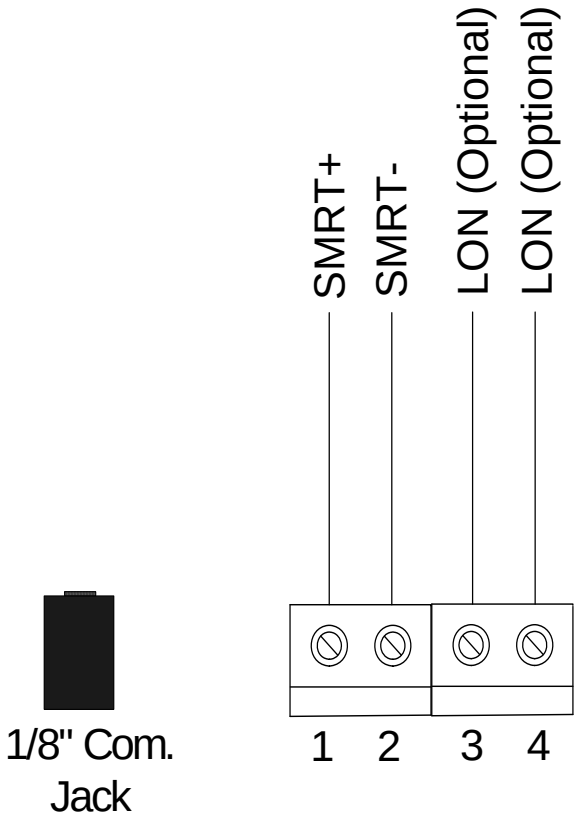

Figure 4: LN-VSTAT and LN-PSTAT Sensors Terminal Wiring Details

Wiring the LN-VSTAT and LN-PSTAT Sensors to a Controller

The LN-VSTAT and LN-PSTAT sensors use a serial communication protocol and are designed to connect to the serial inputs labelled SMRT+ and SMRT- on the LN-VAVLF and LN-VVTLF controller.

Note: The LN-VAVCF controller does not support the LN-VSTAT and LN-PSTAT sensors.

To wire a wall mounted LN-VAV/VVT controller:

1. Remove the faceplate.
2. Use a screwdriver to press down the tabs located on the bottom of the sensor to remove the cover.

3. Connect the SMRT+ and SMRT- output terminals of the LN-VSTAT to the SMRT+ and SMRT- input terminals on the LN-VAV/VVT controller (Figure 6).

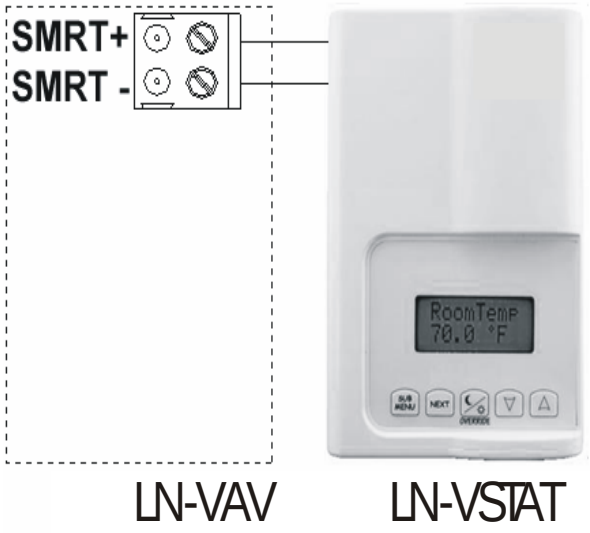

Figure 6: LN-VSTAT and LN-PSTAT Sensors - Wired to Controller

Using the LN-VSTAT as a Portable Device

You can use the LN-VSTAT sensors as a portable device to perform VAV balancing. If an LN-Sensor is already connected to the VAV that you intend to balance, directly connect the LN-VSTAT to the communication jack within the LN Series Sensor.

Note: Terminals 1 and 2 of the right most terminal block within the LN Sensor must be connected to the SMRT+ and SMRT- inputs of the VAV controller before you can use the communication jack. Typically, these connections should have been made when the VAV controller and LN Sensor were first installed.

To connect the LN-VSTAT sensors to an LN-Sensor using an 1/8 in. mono or stereo audio cable:

1. Use the taps on the bottom of the sensor to remove the sensor face plate.
2. Connect the SMRT+ and SMRT- output terminals of the LN-VSTAT sensors to two wires that terminate in the 1/8 in. audio plug (Figure 7).

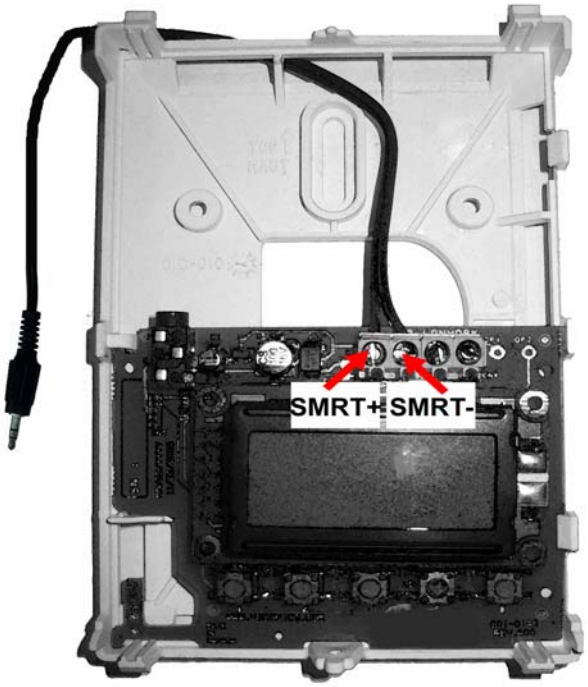

Figure 7: SMRT+ and SMRT- Output Terminals with Audio Plug

3. Remove the LN Sensor faceplate and insert the 1/8 in. audio plug into the communication jack. Ensure the two output terminals on the right side of the LN-Sensor are wired to the SMRT+ and SMRT- terminals of the LN-Sensor (Figure 8).

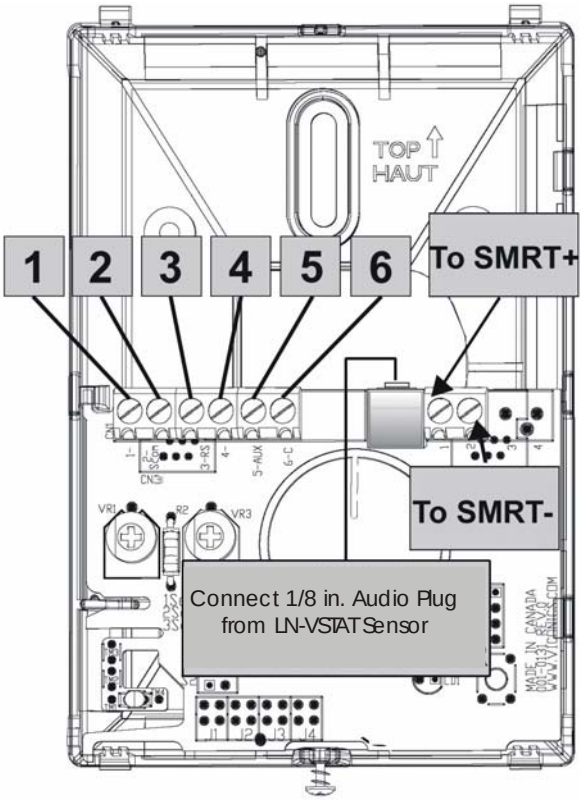

Figure 8: LN Sensor Wiring

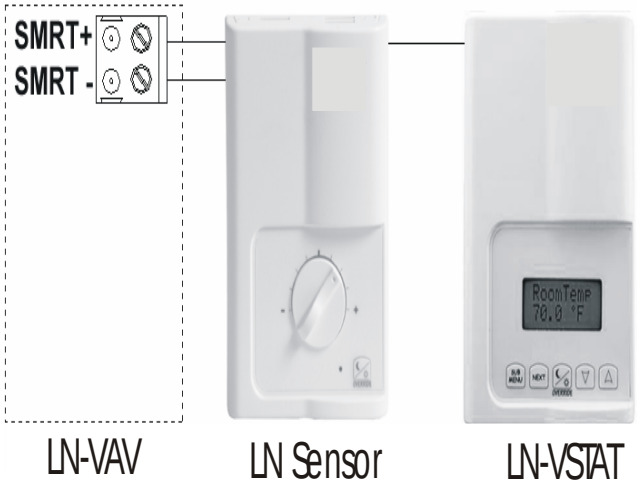

Figure 9: LN-VSTAT and LN-PSTAT sensors Wired to LN Sensor Using an Audio Plug

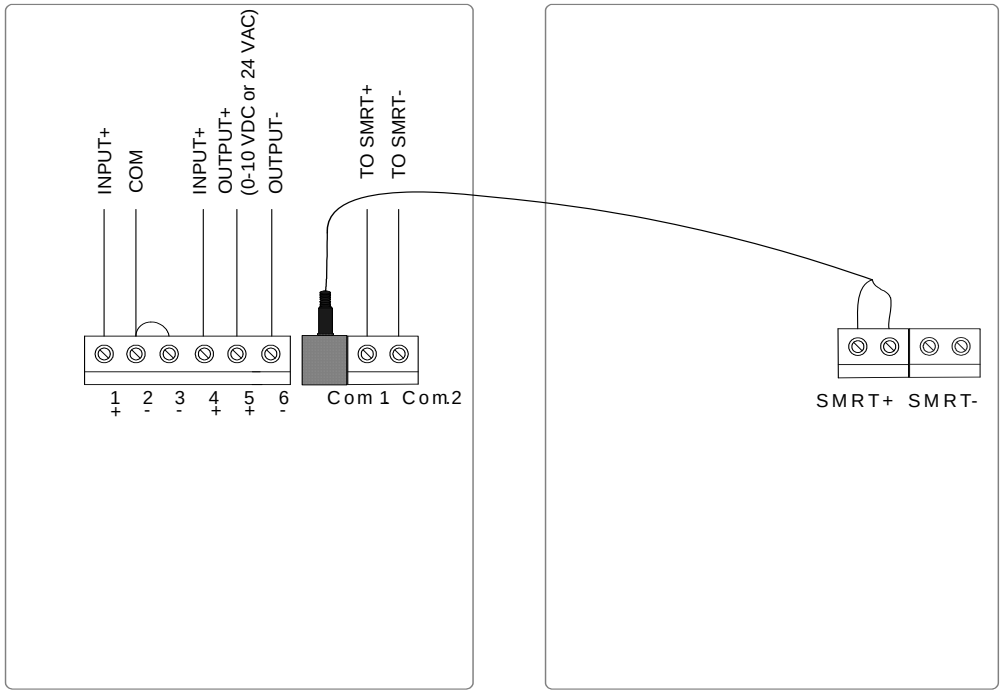

Figure 10: LN-Sensor to an LN-PSTAT Sensor Wiring Details

Communications Wiring

You can optionally wire Terminals 3 and 4 of the LN-VSTAT and LN-PSTAT sensors to the LON terminals of the controller. Before you insert multiple wires into any of the terminals on the controller, ensure you properly twist the wires together.

You can access the LON network with a laptop by plugging into the communications jack on the LN-VSTAT with a 1/8 in. audio plug.

Approved cable types for LON communication is Level IV 22 AWG (0.65 mm), UNSHIELDED. You can use both one pair and two pair wires. The LON communication wire is not polarity sensitive and can be laid out in a bus, star, loop, or free topology network configuration. For loop topology, polarity is important, take special care when connecting the LON network to avoid a short circuit.

Note: The LN-VSTAT and LN-PSTAT sensors do not have an effect on the network topology for LON networks.

Note: The Bus topology network configuration allow for easy network troubleshooting for LON communication wiring.

Topology Wiring Choices

If the distance between the sensor and the controller (stub length) is less than 3 meters a bus topology must be used (Figure 11). If the stub length is greater than 3 meters, a free topology in a daisy-chain manner must be used (Figure 12).

Note: In Figure 11 and Figure 12, the wire runs from the two communication terminals of the LN-VSTAT and LN-PSTAT sensors to the LON/NET terminals of a controller. When you insert multiple wires into the terminals, ensure you properly twist the wires together prior to inserting them into the terminal connectors.

Figure 11 shows a bus topology (wired in a daisy chain) with stub length of less than 3 meters.

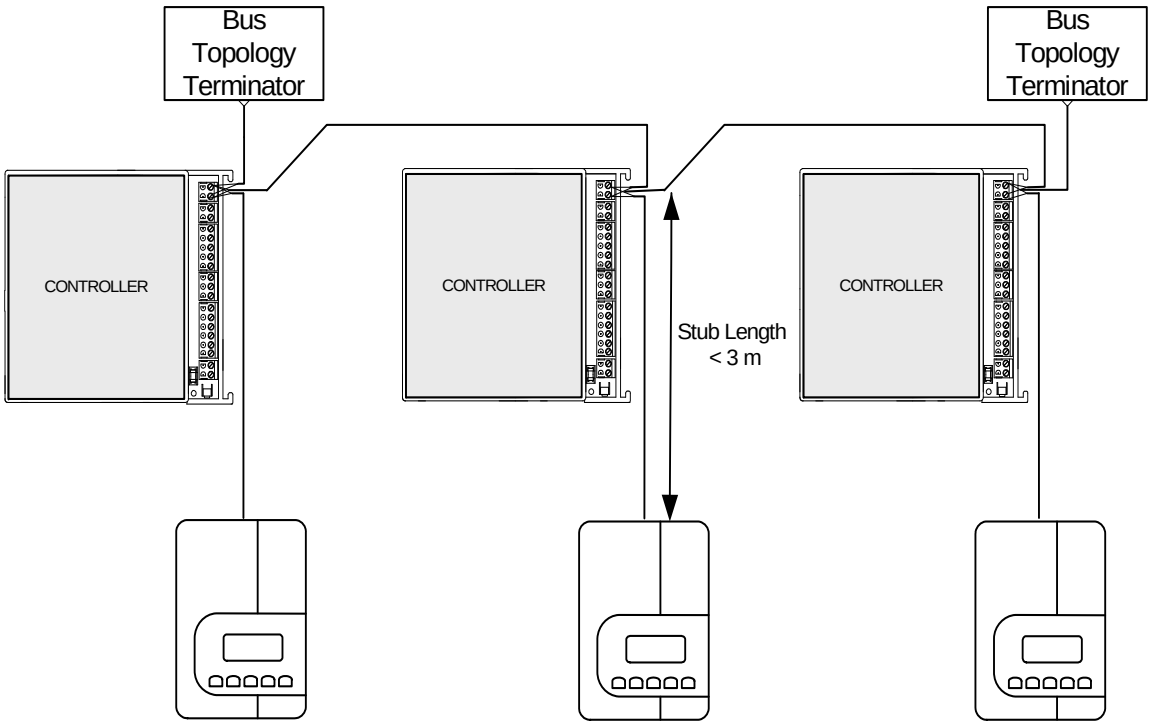

Figure 11: Bus Topology, Stub < 3m

Figure 12 shows free topology (with stub) wired in daisy chain manner.

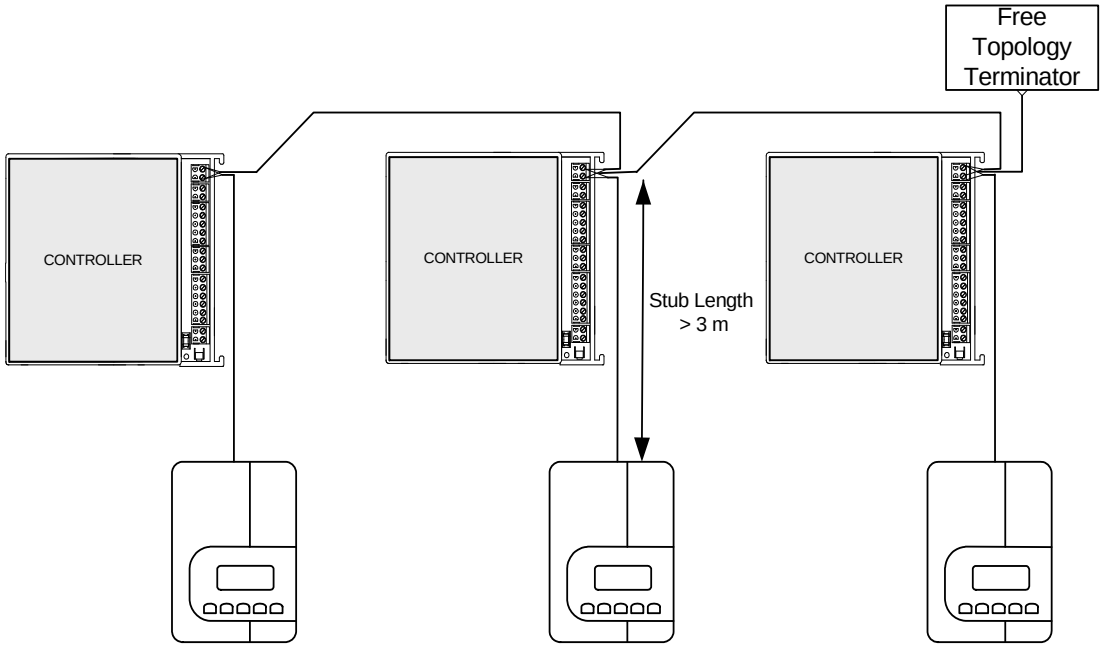

Figure 12: Free Topology, Stub > 3m

The wiring scheme in figure is almost identical to a bus topology network, but since the stub length exceeds 3 meters, it becomes a free topology network which requires a free topology terminator.

For additional information and detailed explanations on network topology and wire length restrictions, refer to Echelon Corporation's *Junction Box and Wiring Guideline for Twisted Pair LONWORKS Networks (Part # 005-0023-01).*

Note: Use proper network terminators depending on the type of network topology used. Failure to do so may result in communication errors between controllers. Do not use multiple gauges of cable on the same communication bus, as this may also result in communication errors.

Troubleshooting

Table 1: Troubleshooting

Problem	Possible Cause	Solution
Temperature is not read properly	Wrong connection	Verify that every connection is properly wired.
Temperature setpoint is not read properly	Wrong connection	Verify that every connection is properly wired.
	Software configuration	Verify that the setpoint is configured correctly according to the selected sensor model.

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