F4-SNC Installation Guide

Part No. 24-10143-02031 Rev. I

2025-06-03

Application

The Facility Explorer SNC Series (F4-SNC) are Ethernet-based, supervisory controllers that connect Building Automation System (BAS) networks to IP networks. The SNC features onboard inputs and outputs for direct control of equipment. This device monitors and controls networks of field-level building automation devices, including HVAC equipment, lighting, security, and fire safety equipment. The SNC has FIPS 140-2 Level 1 Compliance, which is a United States government cybersecurity standard that approves cryptographic modules/algorithms used for encryption.

The F4-SNC2515x-0x/x models have a total of 40 I/O points with 25 inputs and 15 outputs. The F4-SNC1612x-0x/x models have a total of 28 I/O points with 16 inputs and 12 outputs. The first two numbers of the product code number represent the number of inputs (SNC**25**15x-0x/x) and the next two numbers represent the number of outputs (SNC25**15**x-0x/x). The SNC offers various integration options.

For ordering information, refer to the *F4-SNC Product Bulletin (12013669)*.

Supported Field Bus integrations

- BACnet® MS/TP
- N2 Bus
- LonWorks® with an approved USB adapter
- Modbus® Remote Terminal Unit (RTU)
- M-Bus
- Zettler® Fire Panel

ⓘ **Note:** Use only Modern Mode for an SNC with an N2 Bus integration.

Supported Ethernet integrations

- BACnet integrations include the following:
  - Johnson Controls and third-party BACnet/IP devices
  - Simplex® Fire Alarm Control Unit (FACU)
  - Cree® SmartCast® Lighting Control
  - Molex® Lighting Control
- BACnet/SC
- MQ Telemetry Transport (MQTT)
- Tyco® C•CURE® 9000 or victor® Video Management
- Modbus TCP/IP
- M-Bus with Ethernet to M-Bus converter
- KNX
- OPC Unified Architecture (UA)

SNC device diagram

The following figures display the physical features of the SNC2515x-0x/x and SNC1612x-0x/x with display models. The accompanying table provides a description of the physical features and a reference to further information where relevant.

(barcode for factory use only)

F4-SNC2515x-0xx, F4-SNC1612x-0xx

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Figure 1: F4-SNC2515x-0x/x

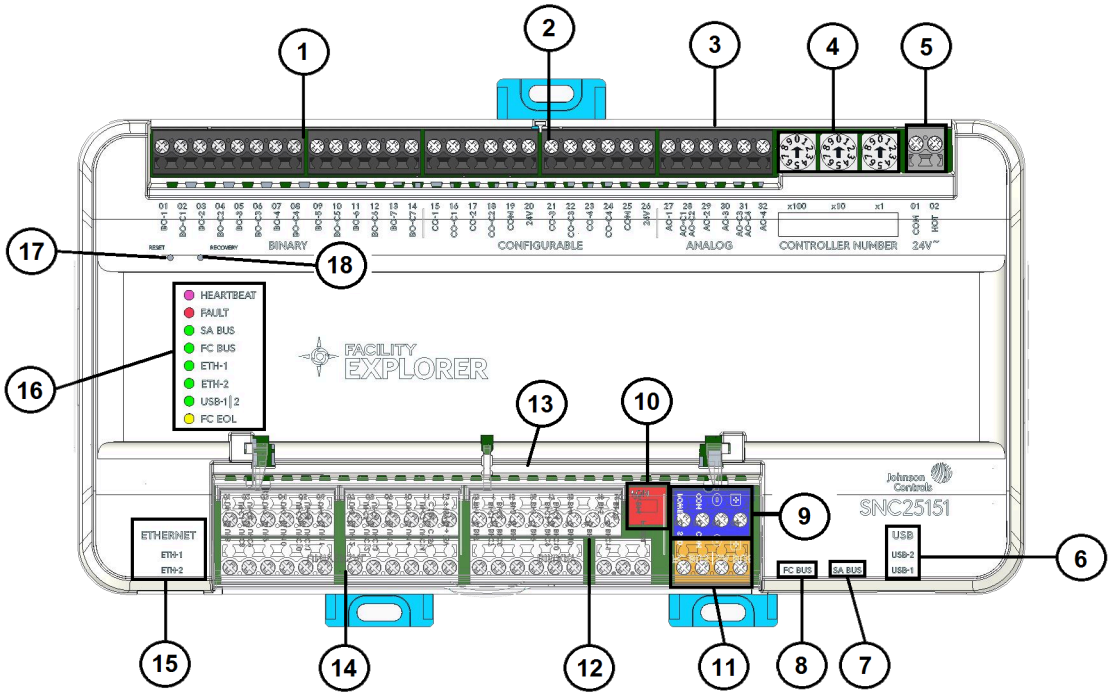

Figure 2: F4-SNC1612x-0x/x

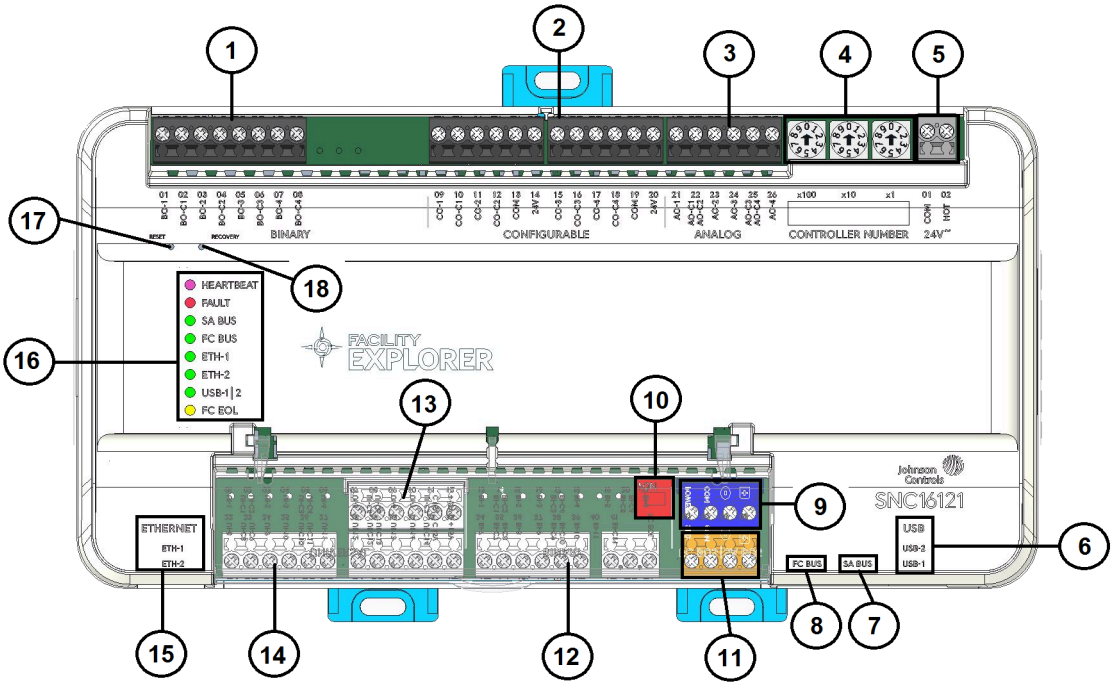

Table 1: Physical features of the SNC2515x-0x/x and SNC1612x-0x/x

Callout	Physical features
1	Binary Outputs (BO) removable terminal blocks. See Connecting input and output terminals for more information.
2	Configurable Outputs (CO) removable terminal blocks. See Connecting input and output terminals for more information.

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Table 1: Physical features of the SNC2515x-0x/x and SNC1612x-0x/x

Callout	Physical features	
3	Analog Output (AO) removable terminal blocks. See Connecting input and output terminals for more information.	
4	Rotary switch dials: controller number. Ships from the factory at setting 000. See Rotary switch dials for more information.	
5	Supply power removable terminal block: gray terminals; 24 VAC, Class 2.	
6	Two Universal Serial Bus (USB) 2.0 host type A ports. USB-1 (top port): Any Johnson Controls approved USB device can be connected to the top port. USB-2 (bottom port): Any non-wireless, Johnson Controls approved USB device can be connected to the bottom port. ⓘ **Note:** There is one micro-USB port that is reserved for future use.	
7	Sensor/Actuator (SA) Bus port: RJ-12 6-pin modular jack.	
8	Field Controller (FC) Bus port: RJ-12 6-pin modular jack.	
9	Field Controller (FC) Bus removable terminal block: blue terminal. See FC Bus terminal block for more information.	
10	End-of-Line (EOL) switch.	
11	Sensor Actuator (SA) Bus removable terminal block: brown terminal. See SA Bus terminal block for more information.	
12	Binary Input (BI) removable terminal blocks. See Connecting input and output terminals for more information.	
13	SNC input terminal blocks cover.	
14	Universal Inputs (UI) removable terminal blocks. See Connecting input and output terminals for more information.	
15	• SNC25151-0x/x • SNC16121-0x	Two active Ethernet ports, 1000/100/10 Mbps; 8-pin RJ-45 connector, labeled **ETH-1** (top) and **ETH-2** (bottom).
	• SNC25152-0x/x • SNC16122-0x/x	One active Ethernet port, 100/10 Mbps; 8-pin RJ-45 connector, labeled **ETH-2** (bottom).
16	Multi-color LED status indicators. See LED status indicators for more information.	
17	Reset button. See Reset button for more information.	
18	Recovery button. See Recovery button for more information.	

Installation

Use the following guidelines when you transport and use the SNC:

- Transport the SNC in the original container to minimize vibration and shock damage to the SNC.
- Verify that all the parts shipped with the SNC are present.
- Do not drop the SNC or subject it to physical shock.
- Do not use non-qualified USB adapters in the two USB ports. The USB ports only function with the USB adapters that are tested and qualified for use on the SNC. Non-qualified adapters do not function in the USB ports of the SNC.

  For the list of qualified and supported USB adapters, refer to the ordering information in *F4-SNC Product Bulletin (LIT-12013669)*.

➤ **Important:** Do not open the housing for any reason. The supervisory controller has no user-serviceable parts inside. Tamper-evident labels on the device caution installers, service technicians, building owners, and our RMA inspectors from unauthorized opening or tampering of the device.

Parts included

- One F4-SNC Supervisory Controller
- One F4-SNC Pack Sheet (Part No. A163816VBP)

Materials and special tools needed

You can mount the SNC with the fasteners option or the DIN rail option.

- Fasteners option - Three fasteners appropriate for the mounting surface:
  - #8 screws - North America
  - M4 screws - Europe

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- DIN rail option - 20.3 cm (8 in.) DIN rail for DIN rail mount applications only.

SNC mounting

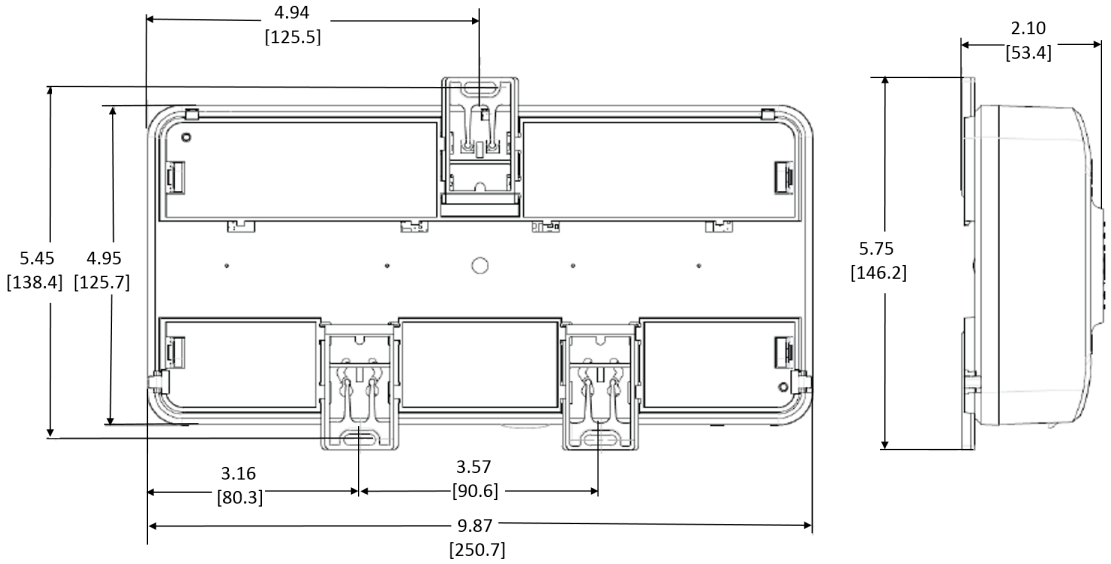
Location considerations

Use the following guidelines when you mount an SNC:

- Ensure that the mounting surface can support the SNC and any user-supplied enclosure.
- Mount the SNC in the correct orientation. Horizontal orientation is preferred, vertical orientation is acceptable.
- Mount the SNC on an even surface in wall mount applications whenever possible.
- Mount the SNC in areas free of corrosive vapors and observe the environmental limitations listed in the SNC technical specifications section.
- Do not mount the SNC on surfaces that are prone to vibration, such as duct work, or in areas where electromagnetic emissions from other devices or wiring can interfere with SNC communication.
- Allow sufficient space for cable and wire runs and terminal connections.
- Mount the power supply above the SNC to ensure adequate heat dissipation and to position close to the power wiring conduit.
- Do not install the SNC in an airtight enclosure. Make sure the enclosure offers sufficient ventilation to ensure the temperature in the enclosure does not exceed 50°C (122°F).
- Mount the SNC so that the enclosure wall or the transformer does not obstruct ventilation of the SNC housing.

Dimensions

Figure 3: SNC mounting dimensions, in. (mm)



Mounting the SNC for wall mount applications

Use the holes in the three mounting clips for wall mount applications. To mount the SNC on a vertical surface, complete the following steps:

1. Pull the top mounting clip upwards to the extended position.
2. Mark mounting hole locations on the wall using the dimensions shown in Figure 3, or hold the bracket against the wall and mark the hole locations through the mounting clips. The screw holes on the SNC accommodates M4 and #8 screws.
3. Drill holes in the wall based on the locations marked in Step 2. Insert wall anchors for each hole if necessary.
4. Hold the device in place, insert the screws through the mounting clips and into the screw holes, and then carefully tighten all screws.

   Important: Do not over tighten the mounting screws. If you over tighten the screws, you can crack the mounting clips.

Mounting the SNC for DIN rail mount applications

To mount the DIN rail and the SNC, complete the following steps:

1. Securely mount a 20.3 cm (8 in.) DIN rail in the required space.
2. On the SNC, extend the two bottom mounting clips.

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3. Hang the SNC on the DIN rail hooks on the back of the SNC.
4. Press the DIN clips back into position to secure the unit on the DIN rail.

Mounting the SNC in a panel

To mount the SNC in a panel, follow these requirements:

- Mount the panel in accordance with the manufacturer's instructions.
- Mount the SNC in the panel following the guidelines in Location considerations and the SNC mounting sections of this document.

SNC wiring overview

Power supply, network, and communication connections

See Figure 1 and Figure 2 for the location of the power supply terminal, FC Bus and SA Bus terminals, Ethernet ports, and USB ports. All terminal blocks are removable terminal blocks.

Power supply

Power the SNC with a 24 VAC power transformer. In North America, use a Class 2, 24 VAC power supply with a 50 VA minimum output. Outside North America, use a 24 VAC SELV (safety extra-low voltage) transformer at the appropriate rating. The minimum input voltage for the SNC to operate correctly is 20 VAC.

Use a dedicated power supply to the SNC only. Do not connect any other loads to the power supply. Additional loads may cause noise interference. Outputs must be powered from a separate source when not using internal power.

Ethernet port

The Ethernet port is an 8-pin RJ-45 network port that you can use to connect the SNC to Ethernet IP networks. You can connect the SNC to Ethernet networks at 100 or 10 Mbps. The maximum acceptable cable length is 100 m (328 ft).

Important: There are two active Ethernet ports on the SNC25151-0x/x and SNC16121-0x/x models that you can use to daisy-chain BACnet/IP devices. There is one active Ethernet port on the SNC25152-0x/x and SNC16122-0x/x models. It is not possible to daisy-chain BACnet/IP devices on these models.

You can connect the following devices to an active Ethernet port on an SNC:

- BACnet/IP
  - Johnson Controls and third-party BACnet/IP devices
  - Simplex FACU
  - Cree SmartCast Lighting Control
  - Molex Lighting Control
- BACnet/SC
- Modbus TCP/IP
- KNX
- Tyco C•CURE 9000
- Tyco victor Video Management
- OPC UA servers
- MQTT

FC Bus terminal block

The SNC has one Field Controller (FC) Bus terminal connection. The connection uses the blue 4-pin removable terminal block that is labeled **FC BUS**.

The FC Bus connection is an isolated RS-485 port with 4-pin terminal blocks that can communicate at 76,800, 38,400, 19,200, 9600, or 1200 baud. Use the FC Bus port to integrate BACnet MS/TP controller networks into the Facility Explorer system.

Note: The FC Bus is not enabled by default when shipped from the factory.

The SHD (shield) connection on the FC terminal block is not connected to any earth ground connection.

SA Bus terminal block

The SNC features one SA Bus terminal block connection. The connection uses the orange 4-pin SA Bus removable terminal block that is labeled **SA BUS**. Connect the 4-wire SA Bus cable to the **SA BUS** terminal block.

USB ports

The SNC features two USB 2.0 host (type A) ports that are disabled by default. You must activate the USB ports in the FX SNC UI. The two USB ports labeled **USB-1** and **USB-2** are both configured as hosts and are independent of each other. Use the USB ports to connect an integration adapter.

For accessories ordering information, refer to the *F4-SNC Product Bulletin (12013669)*.

Important: Do not connect any other loads to the USB ports. For example, do not power cell phones from the USB ports.

Wiring the SNC

Mount the SNC securely before you wire it. For details, see SNC mounting.

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CAUTION

Risk of Property Damage.

Do not apply power to the system before checking all wiring connections. Short circuited or improperly connected wires may result in permanent damage to the equipment.

ATTENTION

Risque de dégâts matériels.

Ne pas mettre le système sous tension avant d'avoir vérifié tous les raccords de câblage. Des fils formant un court-circuit ou connectés de façon incorrecte risquent d'endommager irrémédiablement l'équipement.

WARNING

Risk of Electric Shock.

Disconnect or isolate all power supplies before making electrical connections. More than one disconnection or isolation may be required to completely de-energize equipment. Contact with components carrying hazardous voltage can cause electric shock and may result in severe personal injury or death.

AVERTISSEMENT

Risque de décharge électrique.

Débrancher ou isoler toute alimentation avant de réaliser un branchement électrique. Plusieurs isolations et débranchements sont peut-être nécessaires pour couper entièrement l'alimentation de l'équipement. Tout contact avec des composants conducteurs de tensions dangereuses risque d'entraîner une décharge électrique et de provoquer des blessures graves, voire mortelles.

Important: Use this SNC only as an operating control. Where failure or malfunction of the SNC could lead to personal injury or property damage to the controlled equipment or other property, additional precautions must be designed into the control system. Incorporate and maintain other devices, such as supervisory or alarm systems or safety or limit controls, intended to warn of or protect against failure or malfunction of the SNC.

Important: Utiliser ce SNC uniquement en tant que dispositif de contrôle de fonctionnement. Lorsqu'une défaillance ou un dysfonctionnement du SNC risque de provoquer des blessures ou d'endommager l'équipement contrôlé ou un autre équipement, la conception du système de contrôle doit intégrer des dispositifs de protection supplémentaires. Veiller dans ce cas à intégrer de façon permanente d'autres dispositifs, tels que des systèmes de supervision ou d'alarme, ou des dispositifs de sécurité ou de limitation, ayant une fonction d'avertissement ou de protection en cas de défaillance ou de dysfonctionnement du SNC.

Important:

- Do not apply power to the SNC before you complete and check connections. Short circuits or improperly connected wires may result in permanent damage to the equipment.
- Use copper conductors only. Make all wiring in accordance with local, national, and regional regulations.
- The SNC is a low-voltage device. Do not exceed the SNC electrical ratings. Applying high voltage to the SNC will void any warranties and may result in permanent damage.
- Prevent any electrostatic discharge (ESD) to the SNC. Static electric discharge can damage the SNC and void any warranties.

Follow these guidelines when you wire the SNC:

- Route the supply power wires and communication cables at least 50 mm (2 in.) away from the vent slots in the sides of the SNC housing.
- Provide slack in the wires and cables. Keep cables routed neatly around the SNC to promote good ventilation, LED visibility, and ease of service.
- Ensure that the building automation network wiring meets the specifications, rules, and guidelines in Wiring considerations and guidelines.
- Follow the transformer manufacturer's instructions and the project installation drawings. Power supply wire colors may be different on transformers not manufactured by Johnson Controls.
- Verify that transformer phasing is uniform across the devices. Power network devices with uniform 24 VAC supply power phasing to reduce noise, interference, and ground loop problems.

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- Do not connect the SNC to an earth ground connection.

Method for tightening terminal blocks

Important: Remove power from the controller before beginning this procedure. Failure to de-energize the controller can result in equipment damage.

Important: It is best practice to remove the terminal block from the pin headers on the unit before wiring the terminal blocks. See .

Do not use more force than is necessary when tightening the terminal block screws. To prevent applying excessive force when tightening the screws, apply the following steps:

1. Tighten the terminal screws until the screw is snug on the wire, and then tighten the screw an additional quarter (90°) to half (180°) turn.
2. Only use enough downward force necessary to keep the screwdriver bit engaged with the screw. Too much downward force while tightening the terminal screws can damage the terminal.

   If a terminal block exhibits any symptoms of damage, replace the terminal block. For detailed information about replacing terminal blocks, refer to the *Terminal Block Retrofit Installation Guide (LIT-12014622).* See the following table for replacement terminal block kits:

Table 2: Terminal block replacement part numbers

Product code number	Description
ACC-TBKPWFCSA-1	Power, FC Bus, and SA Bus terminal block replacement kit for SNE, CG series, CV series, CC series, and XPM products. Kit includes 5 of each terminal block type. 15 terminal blocks in total. Power is grey, SA Bus is orange, FC Bus is blue, and all are unnumbered.
ACC-TBKIO234-1	Input and Output terminal block replacement kit for SNC, CG series, CV series, CC series, and XPM products. Kit includes 10 of each 2, 3, and 4 position Input and Output terminal blocks. 30 terminal blocks in total. All black and unnumbered.
ACC-TBKIO678-1	Input and Output terminal block replacement kit for SNC, CG series, CV series, CC series, and XPM products. Kit includes 5 of each 6, 7, and 8 position Input and Output terminal blocks. 15 terminal blocks in total. All black and unnumbered.

Removing the terminal block

To remove a terminal block from the circuit board, complete the following steps:

Note: You need a flat blade screwdriver to remove the terminal block.

1. To prevent any possibility of damage from an accidental short, **remove power from the controller**.
2. Underneath the terminal block, in the small gap between the bottom of the terminal block and the circuit board, insert the flat blade of the screwdriver.
3. To detach the left-hand side of the terminal block, position the flat blade underneath the terminal block to the left, and push down the screwdriver handle. When you do this, you are using the screwdriver as a lever to pry up the terminal block.

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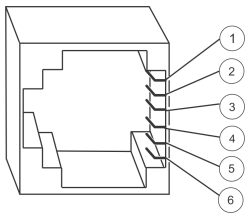
4. To detach the right-hand side of the terminal block, position the flat blade underneath the terminal block to the right, and push down the screwdriver handle.
5. If necessary, repeat steps 3 and 4 until the terminal block is removed.

Connecting to the FC Bus port

The FC Bus port is an RJ-12, 6-position modular jack that provides a connection for the Connected Workflow Wireless MS/TP Converter (CWCVT). The FC Bus port connects internally to the FC Bus terminal block and so they share only one communication protocol. See Communications Bus and supply terminal blocks, functions, ratings, requirements, and cables for more information. The FC Bus port pin assignment is shown in Figure 4.

Figure 4: Pin number assignments for FC Bus port or SA Bus port (RJ-12 modular jack)



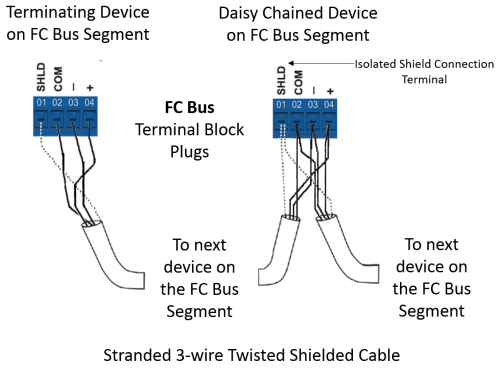
Callout	Signal
1	FC Bus or SA Bus (+)
2	FC Bus or SA Bus (-)
3	Bus and Power Common
4	Power (15 VDC)
5	Bus and Power Common
6	Power (15 VDC)

Connecting to the FC Bus terminal

To connect devices to the FC Bus, complete the following steps:

1. Connect the 3-wire bus cable to the removable blue 4-pin terminal block labeled **FC BUS** as shown in Figure 5.

Figure 5: FC Bus terminal block and wiring connections



2. Set the **FC EOL** switch to the proper position. See the note in Setting the EOL switch.
3. Go to Connecting the power source.

Connecting to the SA Bus port

The SA Bus port is an RJ-12, 6-position modular jack that provides a connection for the CWCVT, or other SA Bus devices with RJ-12 plugs.

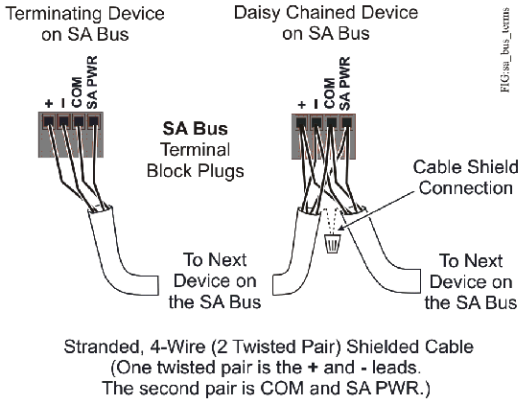
The Sensor port connects internally to the SA Bus terminal block. See Communications Bus and supply terminal blocks, functions, ratings, requirements, and cables for more information. The SA Bus port pin assignment is shown in Figure 4.

Connecting to the SA Bus terminal

1. Connect the 4-wire bus cable to the removable orange 4-pin terminal block Sensor/Actuator (SA) Bus, labeled **SA BUS**.

   Note: Only connect terminal devices to either the SA Bus port or to the SA Bus 4-pin terminal block, not both.

Figure 6: SA Bus terminal block wiring



2. Go to Connecting the power source.

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Connecting the LonWorks integration

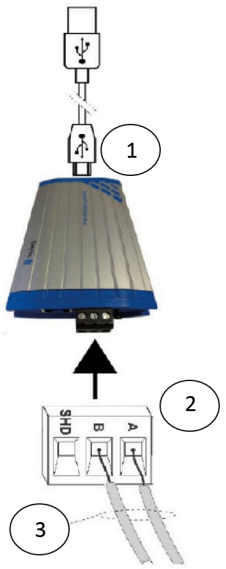
To connect LonWorks devices, complete the following steps:

1. Connect the 2-wire cable from the LonWorks network trunk to the removable 3-pin terminal block on the USB-to-LON adapter, code number ACC-USBLON-0 as shown in Figure 7. The SHD connection is not used. Connect the USB cable from the USB adapter to the **USB-1** or **USB-2** port on the SNC. You can use either port.

   Important: Only the USB adapters that were tested and qualified for use on the SNC function with the SNC. Other non-qualified adapters do not function in the USB ports of the SNC. See USB ports for more information.

2. Go to Connecting the power source.

Figure 7: LonWorks network terminal block and wiring connections



Callout	Description
1	USB connection to USB-1 or USB-2
2	LonWorks terminal block; wires are not polarity sensitive
3	Optional shield; connect shields together and insulate with tape

Connecting Modbus RTU devices

The SNC connects to Modbus RTU devices in three different ways:

- **Option 1:** Modbus connected to the FC Bus terminals.
- **Option 2:** Modbus connected to USB through the USB-to-RS-485 adapter, if the FC Bus is unavailable. The SNx engines include built-in RS-485 ports which are primarily intended for legacy N2 or BACnet MS/TP protocols. If these protocols are in use and you do not have an RS-485 port available for other third-party integration devices, use a USB-to-RS-485 adapter to connect third-party integration devices.
- **Option 3:** Modbus connected to USB through the USB-to-RS-232 adapter. Use this option if a single third-party device is connected and requires RS-232 connection.

1. Choose the applicable option from the following table and complete the associated procedure.

Option	Procedure
Option 1	For a Modbus RTU protocol that requires an RS-485 serial connection, connect the 2-wire bus cable to the removable 4-terminal plug labeled **FC BUS-1** as shown in Figure 8. The RS-485 bus is a two-wire network. **Note:** When the FC BUS-1 connection is used for Modbus integration, it is not available for BACnet Field Controllers or the CWCVT.
Option 2	Connect the USB adapter, ACC-USBRS485-0, to the USB-1 or USB-2 port and connect the RS-485 based third-party integration to the USB adapter.
Option 3	For a Modbus RTU that requires a RS-232 connection, use the USB-to-RS232 adapter, code number ACC-USBRS232-0. Connect the adapter to the USB-1 or USB-2 port and connect the three wires to the Sub D9 interface on the USB-to-RS-232 adapter as follows: Rx to pin 2, Tx to pin 3, and GND to pin 5. **Note:** The maximum cable length between devices connected though an RS-232 line depends on the baud rate used. For example, if the device communicates at 9600 baud, do not exceed a cable length of 49.21 ft (15 m).

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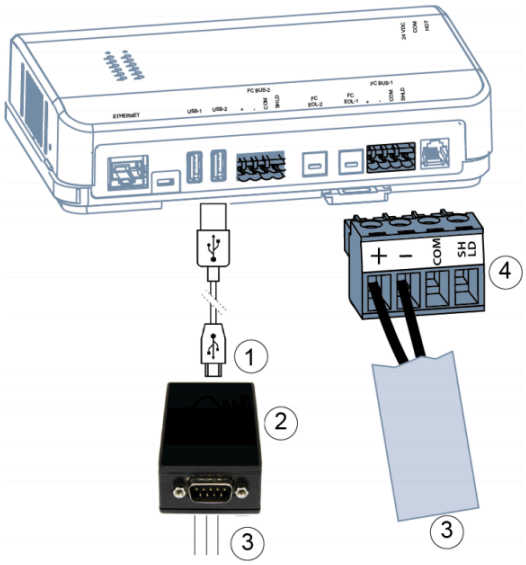
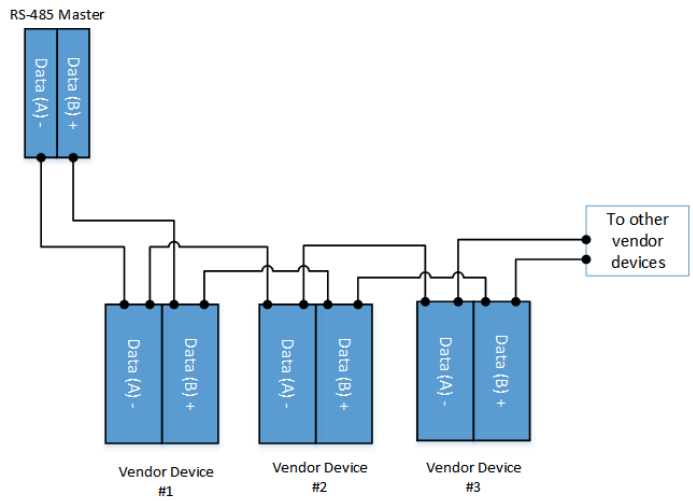
Figure 8: FC Bus terminal connection for Modbus devices (Modbus connection Option 1 and Option 3 shown)



Callout	Description
1	USB connection: Connect USB cable from SNC to RS-232 converter
2	USB-to-RS-232 adapter
3	To Modbus devices
4	FC Bus terminal connection

2. When you use a RS-485 connection, you can add additional vendor devices. To add additional vendor devices, wire from one device to the next as shown below. Do not connect more than two wires to each terminal to ensure that a daisy chain configuration is used. For general Modbus protocol rules, see Wiring considerations and guidelines. For a RS-232 connection, you can connect only one vendor device.

Figure 9: Modbus RTU wiring detail: daisy chained devices

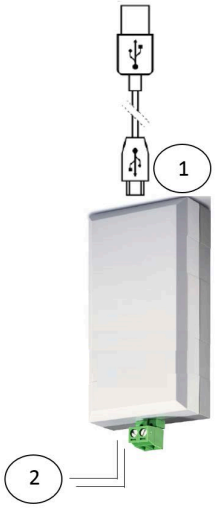


3. Go to Connecting the power source.

Connecting M-Bus devices using the USB-to-M-Bus adapter

1. Connect the 2-wire cable from the M-Bus device to the USB-to-M-Bus adapter, either the M-Bus Mikro-Master USB device, or the ACC-USBMBUS-0 (Figure 10).
2. Connect the USB cable from the USB adapter to the **USB-1** or **USB-2** port on the SNC. You can use either port.

Figure 10: USB-to-M-Bus connection



Callout	Description
1	USB connection: Connect USB cable from SNC to USB-to-M-Bus adapter
2	M-Bus connection: 1: M- 2: M+

Important: Only the USB adapters that were tested and qualified for use on the SNC function with the SNC. Other non-qualified adapters do not function in the USB ports of the SNC. See USB ports for more information.

3. Go to Connecting the power source.

Connecting M-Bus devices using the USB-to-RS-232 adapter

The SNC connects to the M-Bus network devices by using the M-Bus Level Converter (Figure 11).

1. Connect the USB cable from the SNC to the USB-to-RS-232 adapter. You can use either USB-1 or USB-2 port on the SNC.

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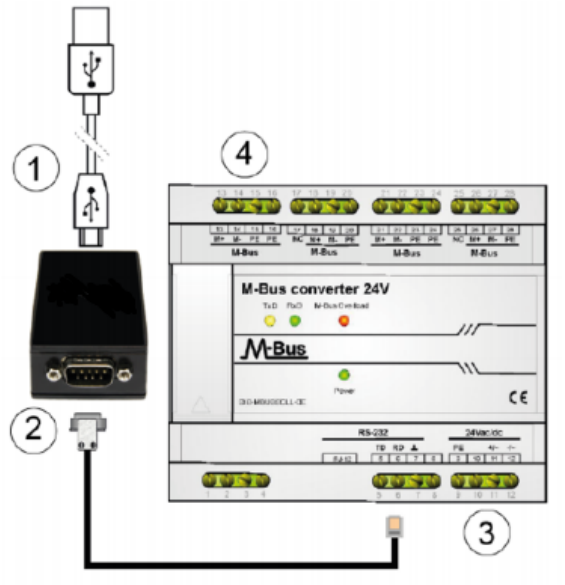
2. Use cable INT-DX-KAB01 to connect the USB-to-RS-232 adapter to the RS-232 connection on the M-Bus Level Converter. Wire to terminals GND, RxD, and TxD.

Figure 11: Connecting SNC to M-Bus Network using M-Bus Level Converter



Callout	Description
1	USB connection: Connect USB cable from SNC to USB-to-RS-232 adapter
2	RS-232 wire connection (serial cable INT-DX-KAB01): 5: TxD (transmit data); PIN 2 on RJ-12 6: RxD (receive data); PIN 3 on RJ-12 7: GND (ground); PIN 5 on RJ-12
3	Power connections (24 VAC/DC): 9: PE 11: 24+ V/~ 12: 24- V/~
4	M-Bus connections: 13: M+ 14: M- 18: M+ 19: M- 21: M+ 22: M- 26: M+ 27: M-

3. Wire from the M+ and M- terminals on the level converter to the M-Bus meters using a free topology (star, tree, or line). Specific cabling can vary depending on the topology and site. See Wiring considerations and guidelines for network integrations.

Note: If the number of M-Bus unit loads or distances exceeds the specifications of a level converter, attach an M-Bus repeater to the M-Bus to increase the number of unit loads and distances. The converter shown in the previous figure is capable of handling up to 100 unit loads.

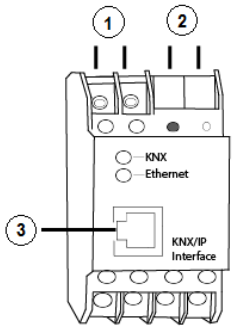
4. Connect the 24 VAC supply power wires from the transformer to the -/~ and +/~ terminals, but do not supply power to the unit until after you supply power to the network engine.
5. Go to Connecting the power source.

Connecting the KNX devices

1. Connect the Ethernet cable to the SNC Ethernet port and connect the Ethernet cable to the port on the front of the KNX gateway as shown in Figure 12.

Note: Depending on the size of your network, you can use either a KNX interface or router as a gateway. The interface connects the SNC to a single KNX line. The router acts as both an interface and a line coupler over Ethernet to connect the SNC to the network, not to a single device.

Figure 12: KNXnet/IP Interface/Router



Callout	Description
1	To power supply
2	To KNX devices
3	To Ethernet network

2. For a single KNX line, wire from the red and black terminals on the gateway to the devices. For multiple KNX lines, wire from the red and black terminals on each gateway to the devices on the according KNX line.

Note: Specific cabling can vary depending on the topology and site. See Wiring considerations and guidelines for network integrations.

3. Wire each KNX interface to its own dedicated power supply on the KNX line.
4. Go to Connecting the power source.

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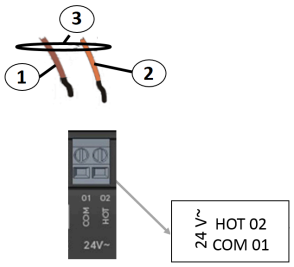
Connecting the power source

1. Connect power to the SNC through a 24 VAC power transformer, connect the 24 VAC supply power wires from the transformer to the gray 2-pin terminal block labeled 24 V~ on the SNC (Figure 13). The connections are **HOT** and **COM** (common).

   Note: Power supply wire colors may be different on transformers that are not manufactured by Johnson Controls. Follow the transformer manufacturer's instructions and the project installation drawings.

Figure 13: Supply power wiring (24 VAC transformer)



Callout	Description
1	Brown wire (COM)
2	Orange wire (24 VAC)
3	Wires from Johnson Controls 24 VAC, Class Power Transformer

Connecting input and output terminals

The SNC2515x-0x/x supports up to 40 hard-wired onboard I/O points, 25 inputs and 15 outputs. The SNC1612x supports up to 28 hard-wired onboard I/O points, 16 inputs and 12 outputs.

Table 3: Onboard I/O points

SNC	Total I/O	Universal Inputs (UI)	Binary Inputs (BI)	Configurable Outputs (CO)	Analog Outputs (AO)	Binary Outputs (BO)
SNC2515x-0x/x	40	14	11	4	4	7
SNC1612x-0x/x	28	10	6	4	4	4

Figure 14: SNC inputs

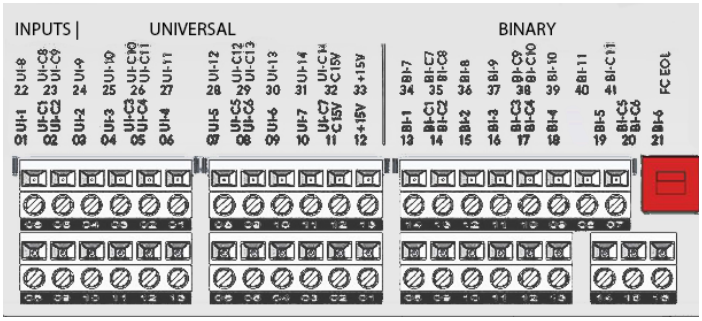
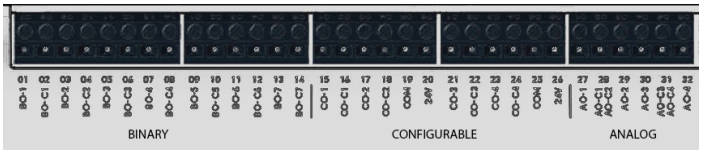


Figure 15: SNC outputs



Note: The SNC has two sets of 24+ and common terminal block connections among the output pins (Label numbers 19, 20 and 25, 26). The 24 V connection (Label numbers 20 and 26) is the same as the 24V~ HOT connection (Label number 02) and the COM connections (Label numbers 19 and 25) are the same as the 24VAC~ COM connection (Label number 01). You can use these extra power connections to jumper power for switched high (externally sourced) or switched low (externally sourced) Triac loads.

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Table 4: Input and output terminals

Type of point	Options
Universal inputs	• Voltage analog inputs (0 VDC to 10 VDC) • Current analog inputs (4 mA to 20 mA) • Resistive analog inputs (0k ohm to 2k ohm) - RTD: 1k Nickel, 1k Platinum, or A99B SI - NTC: 10k Type L or 2.225k Type 2 • Dry contact binary inputs
Binary inputs	• Dry contact maintained • Pulse counter mode (100 Hz)
Configurable outputs	• Voltage analog outputs (0 VDC to 10 VDC) • Binary outputs (24 VAC Rated Triac)
Analog outputs	• Voltage analog outputs (0 VDC to 10 VDC) • Current analog outputs (4 mA to 20 mA)
Binary outputs	24 VAC Rated Triac

Terminal functions, ratings, requirements, and wiring guidelines

Input and output wiring guidelines

The following table provides information and guidelines about the functions, ratings, and requirements for the SNC input and output terminals and references to guidelines for determining proper wire sizes and cable lengths.

In addition to the wiring guidelines in the following table, observe these guidelines when wiring inputs and outputs:

- Run all low-voltage wiring and cables separate from high-voltage wiring.
- Ensure all input and output cables, regardless of wire size or number of wires, consist of stranded, insulated, and twisted copper wires.
- Shielded cable is recommended but not required for input or output cables.
- Shielded cable is recommended for input and output cables that are exposed to high electromagnetic or radio frequency noise.
- Inputs and outputs with cables less than 30 m (100 ft) do not require an offset in the software setup. Cable runs over 30 m (100 ft) may require an offset in the input and output software setup.

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Terminal wiring and cable length guidelines

Table 5: Terminal wiring

Terminal block label	Terminal labels	Function, ratings, and requirements	Determine wire size and maximum cable length
UNIVERSAL (Inputs)	+15 V	15 VDC Power Source for active (3-wire) input devices connected to the Universal UI-# terminals. Provides 100 mA total current.	Same as Universal inputs UI-# ⓘ **Note:** Use a 3-wire cable for devices that source power from the +15 V terminal.
	UI-#	**Analog Input - Voltage Mode (0–10 VDC)** 10 VDC maximum input voltage Internal 110k Ohms pull down.	See Guideline A in Table 6.
		Analog Input - Current Mode (4–20 mA) Internal 100 Ohms load impedance.	See Guideline B in Table 6.
		Analog Input - Resistive Mode Internal 12 V, 15k Ohms pull up. Qualified Sensors: 0–2k potentiometer, RTD (1k Nickel [Johnson Controls sensor], 1k Platinum, and A99B Silicon Temperature Sensor) NTC Sensor (10k Type L, 10k JCI Type II, 2.252k Type II).	See Guideline A in Table 6.
		Binary Input - Dry Contact Maintained Mode 1 second minimum pulse width Internal 12 V, 15k Ohms pull up.	See Guideline A in Table 6.
	UI-C#	**Universal Input Common** for all Universal input terminals ⓘ **Note:** All Universal UI-C# terminals share a common that is isolated from all other commons.	Same as (Universal) UI-#.
BINARY (Inputs)	BI-#	**Binary Input - Dry Contact Maintained Mode** 0.01 second min. pulse width. Internal 17 V, 3k Ohms pull up.	See Guideline A in Table 6.
		Binary Input - Pulse Counter/ Accumulator Mode 0.01 second min. pulse width. (50 Hz at 50% duty cycle). Internal 17 V, 3k Ohms pull up.	
	BI-C#	**Binary Input Common** for all Binary Input terminals	

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Table 5: Terminal wiring

Terminal block label	Terminal labels	Function, ratings, and requirements	Determine wire size and maximum cable length
ANALOG (Outputs)	AO-#	**Analog Output - Voltage Mode (0–10 VDC)** 10 VDC maximum output voltage. 10 mA maximum output current. Requires an external load of 1,000 Ohms or more. ⓘ **Note:** The AO operates in Voltage Mode when connected to devices with impedances greater than 1,000 Ohms. Devices that drop below 1,000 Ohms may not operate as intended for Voltage Mode applications.	See Guideline C in Table 6.
		Analog Output - Current Mode (4–20 mA) Requires an external load between 0–300 Ohms. ⓘ **Note:** The AO operates in Current Mode when connected to devices with impedances less than 300 Ohms. Devices that exceed Ohm may not operate as intended for Current Mode applications.	See Guideline B in Table 6.
	AO-C#	**Analog Output Signal Common** for all Analog OUT terminals ⓘ **Note:** All Analog AO-C# terminals share a common that is isolated from all other commons.	Same as (Analog) AO-#.
BINARY (outputs)	BO-#	**Binary Output - 24 VAC Triac (External Power)** Connects BO-# to BO-C# when activated. External Power Source: 30 VAC maximum output voltage. 0.5 A maximum output current. 1.3 A at 25% duty cycle. Maximum 6 cycles/hour with M9220-BGx-3. 40 mA minimum load current.	See Guideline C in Table 6.
	BO-C#	**Binary Output Common** (for BO-# terminal) ⓘ **Note:** Each Binary Output common terminal is isolated from all other commons, including other Binary Output commons.	

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Table 5: Terminal wiring

Terminal block label	Terminal labels	Function, ratings, and requirements	Determine wire size and maximum cable length
CONFIGURABLE (Outputs)	CO-#	**Analog Output - Voltage Mode (0–10 VDC)** 10 VDC maximum output voltage. 10 mA maximum output current. Requires an external load of 1000 Ohms or more.	See Guideline A in Table 6.
		Binary Output 24 VAC Triac (External Power Source only) Connects CO-# to CO-C# when activated. External Power Source: 30 VAC maximum voltage to load. 0.5 A maximum output current. 1.3 A at 25% duty cycle. Maximum 6 cycles/hour with M9220-BGx-3. 40 mA minimum load current.	See Guideline C in Table 6.
	CO-C#	**Analog Output Signal Common**: All Configurable Outputs defined as Analog Outputs share a common that is isolated from all other commons, except the Binary Input common. **Binary Output Signal Common**: All Configurable Outputs defined as Binary Outputs are isolated from all other commons, including other Configurable Output commons.	Same as (Configurable) CO-#.

The following table defines cable length guidelines for the various wire sizes that can be used for input and output wiring.

Table 6: Cable length guidelines for recommended wire sizes

Guideline	Wire size/gauge and type	Maximum cable length and type	Assumptions
A	1.0 mm (18 AWG) stranded copper	457 m (1,500 ft) twisted wire	100 mV maximum voltage drop Depending on the cable length and the connected input or output device, you may have to define an offset in the setup software for the input or output point.
	0.8 mm (20 AWG) stranded copper	297 m (975 ft) twisted wire	
	0.6 mm (22 AWG) stranded copper	183 m (600 ft) twisted wire	
	0.5 mm (24 AWG) stranded copper	107 m (350 ft) twisted wire	
B	1.0 mm (18 AWG) stranded copper	229 m (750 ft) twisted wire	100 mV maximum voltage drop Depending on the cable length and the connected input or output device, you may have to define an offset in the setup software for the input or output point.
	0.8 mm (20 AWG) stranded copper	137 m (450 ft) twisted wire	
	0.6 mm (22 AWG) stranded copper	91 m (300 ft) twisted wire	
	0.5 mm (24 AWG) stranded copper	61 m (200 ft) twisted wire	
C	See Figure 16 to select wire size/gauge. Use stranded copper wire.	See Figure 16 to determine cable length. Use twisted wire cable.	N/A

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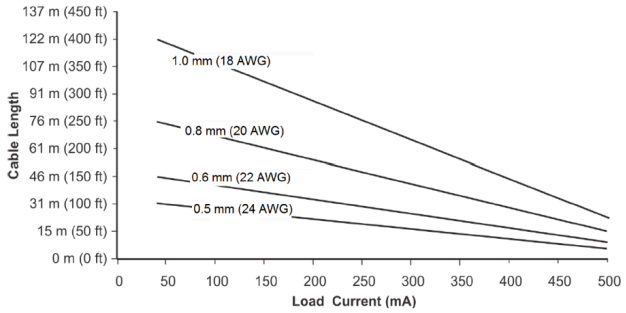
Maximum cable length versus load current

In most cases inputs/outputs with cables less than 30 m (100 ft) do not require an offset in the software setup. Cable runs over 30 m (100 ft) may require an offset in the input/output software setup. Use Figure 16 to estimate the maximum cable length relative to the wire size and the load current (in mA) when wiring inputs and outputs.

Figure 16: Maximum wire length by current and wire size



Communications Bus and supply terminal blocks, functions, ratings, requirements, and cables

Table 7: Communications Bus and supply terminal blocks, functions, ratings, requirements, and cables

Terminal block/ port label	Terminal labels	Function, electrical ratings/requirements	Recommended cable type
FC BUS	- (03) + (04)	FC Bus Communications	0.6 mm (22 AWG) stranded, 3-wire twisted, shielded cable recommended
	COM (02)	Signal Reference (Common) for bus communications	
	SHLD (01)	Isolated terminal (optional shield drain connection)	
FC BUS (port)	FC Bus	RJ-12 6-Position Modular Connector provides: • FC Bus Communications • FC Bus Signal References and 15 VDC Common • 15 VDC Power for Wireless Commissioning • Converter or ZFR1811 Wireless Router	Wireless Commissioning Converter retractable cable or 24 AWG 3-pair CAT 3 Cable <30.5 m (100 ft)
SA BUS	- (03) + (04)	SA Bus Communications	0.6 mm (22 AWG) stranded, 4-wire twisted, shielded cable recommended ⓘ **Note:** The + and - wires are one twisted pair and the COM and SA PWR are the second twisted pair of wires.
	COM (02)	SA Bus Signal Reference and 15 VDC Common	
	SA PWR (01)	15 VDC Supply Power for Devices on the SA Bus (Maximum total current draw for SA Bus is 240 mA.)	
SA BUS (Port)		6-Position Modular Connector provides: • SA Bus Communications • SA Bus Signal References and 15 VDC Common • 15 VDC Power for devices on the SA Bus and • Wireless Commissioning Converter	24 AWG 3-pair CAT 3 Cable <30.5 m (100 ft)
24~	HOT	**24 VAC Power Supply - Hot** Supplies 20-30 VAC (Normal 24 VAC)	0.8 mm to 1.5 mm (20 to 16 AWG) 2-wire
	COM	**24 VAC Power Supply Common** (Isolated from all other Common terminals on controller)	

ⓘ **Note:**

- See Table 6 to determine wire size and cable lengths for cables other than the recommended cables.
- The FC Bus and SA Bus wiring recommendations in this table are for MS/TP Bus communications at 38.4k baud. For more information, refer to the *MS/TP Communications Bus Technical Bulletin (LIT-12011034).*

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- Use correctly sized wire strippers for the gauge of wire you are landing on the terminal block, ensuring the terminal is not tightened on the wire's insulation.

FC Bus and SA Bus and supply power wiring guidelines

Table 7 provides information about the functions, ratings, and requirements for the SNC communication bus and supply power terminals, and guidelines for wire sizes, cable types, and cable lengths when you wire the communication buses and supply power.

In addition to the guidelines in Table 7, observe these guidelines when wiring the FC Bus and SA Bus supply power:

- Run all low-voltage wiring and cables separate from high-voltage wiring.
- Use twisted, insulated, stranded copper wire for all FC and SA Bus cables, regardless of wire size.
- Shielded cable is strongly recommended for all FC and SA Bus cables.

Termination diagrams

The Johnson Controls termination diagrams provide details for wiring inputs and outputs to the controllers. See the figures in this section for the applicable termination diagrams.

Table 8: Termination diagrams

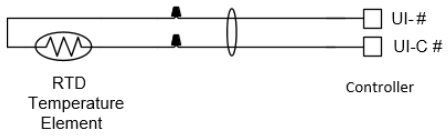
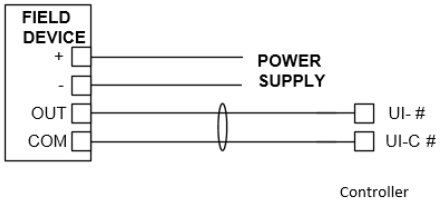
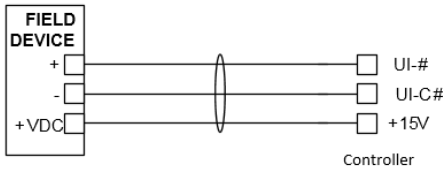
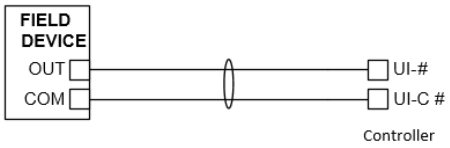
Type of field device	Type of input/ output	Termination diagrams
Temperature Sensor	UI	
Voltage Input - External Source	UI	
Voltage Input - Internal Source	UI	
Voltage Input (self-powered)	UI	

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Table 8: Termination diagrams

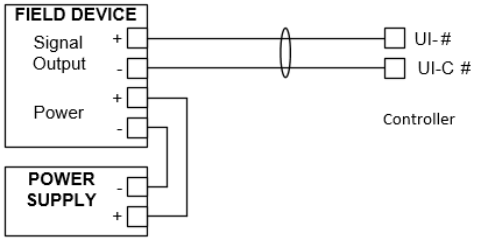
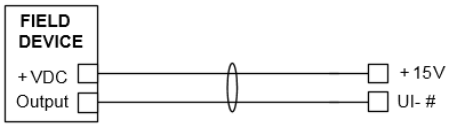
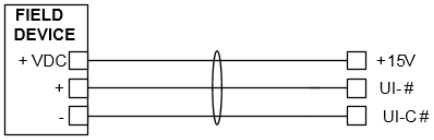
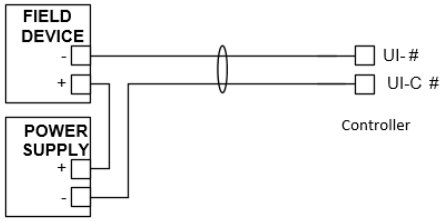
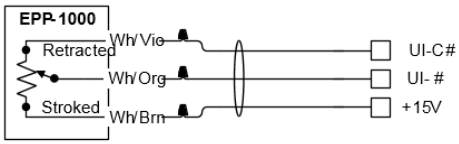
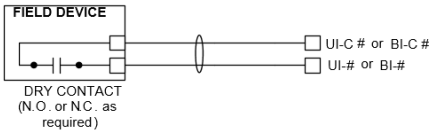
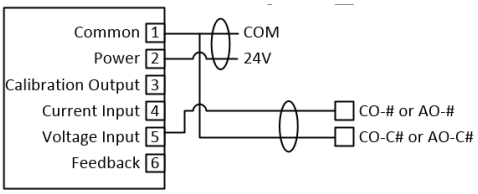
Type of field device	Type of input/ output	Termination diagrams
Current Input - External Source (isolated)	UI	
Current Input - Internal Source (2-wire)	UI	
Current Input - Internal Source (3-wire)	UI	
Current Input - External Source (in loop)	UI	
Feedback from EPP-1000	UI	
Dry Contact (binary input)	UI or BI	
0–10 VDC Output to Actuator (external source)	CO or AO	

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Table 8: Termination diagrams

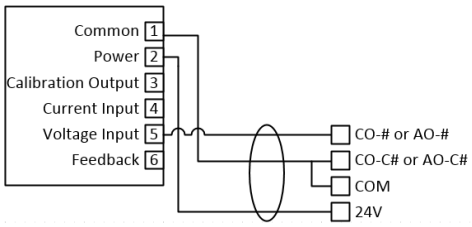
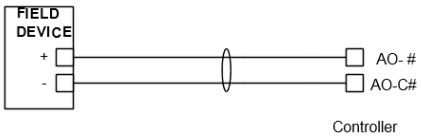
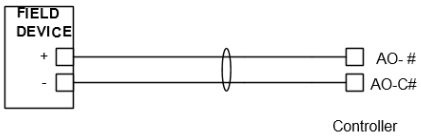
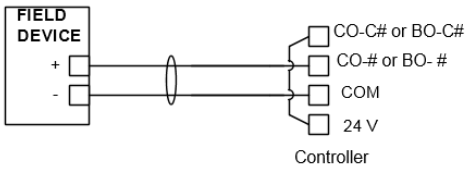
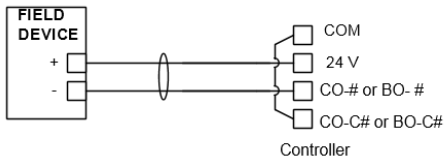
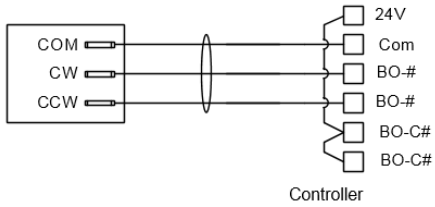
Type of field device	Type of input/ output	Termination diagrams
0–10 VDC Output to Actuator (internal source)	CO or AO	
Current Output	AO	
Analog Output (current)	AO	
24 VAC Triac output (switch high, external source, Triac)	BO or CO	
24 VAC Triac output (switch low, external source)	BO or CO	
Incremental control to actuator (switch high, external source, Triac)	BO	

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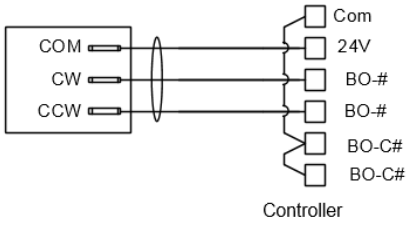
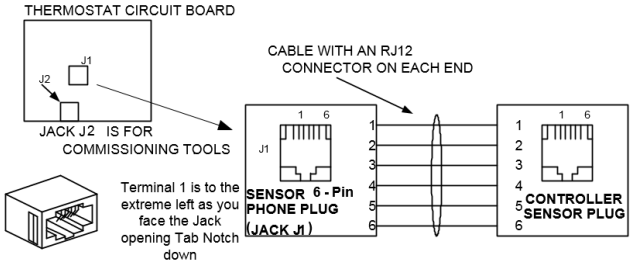
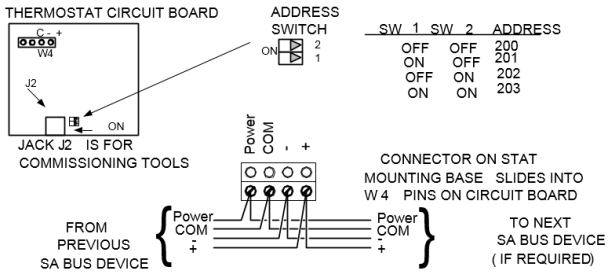
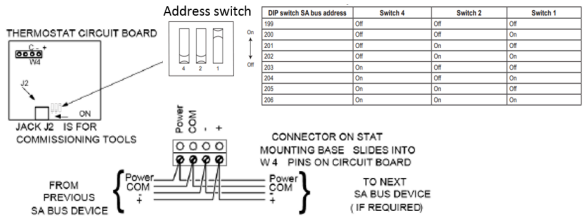
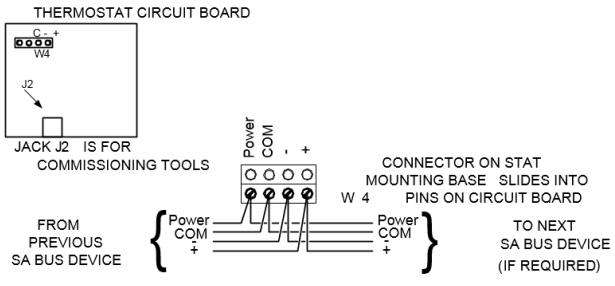
Table 8: Termination diagrams

Type of field device	Type of input/ output	Termination diagrams
Incremental control to actuator (switch low, external source, Triac)	BO	
Network Stat with Phone Jack (Fixed Address = 199)	SA Bus	
Network Stat with Terminals Addressable	SA Bus	
NS8000 series sensors	SA Bus	
Network Stat with Terminals (Fixed Address = 199)	SA Bus	

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Input/Output wiring validation

The SNC includes integral wiring validation for onboard Inputs/Outputs with a default state application. The SNC controllers ship with a default state that can assist in validating the wiring of the input and output terminals before downloading an application file. You do not need to take special actions to use this feature. Apply power to the SNC controller and connect to the device with a Site Management Portal UI to view the integral I/O points in the controller. You can view the points under the **Local Hardware** folder of the device and the points are named according to the I/O they represent, for example UI-1. It is possible to upload the default state application with the System Configuration Tool (SCT), as needed.

The default state creates I/O points for all connections on the input and output terminals. It assumes all Universal Inputs (UIs) are Nickel temperature sensors. All Configurable Outputs (COs) are treated as Binary Outputs (BOs) with an initial value of 0. The default state also takes input from a Network Sensor at address 199. If there is no connected Network Sensor, the startup of this default state is delayed by 30 seconds as the controller attempts to establish connection with the sensor. For more details about the default state workflow, refer to information on the FAN-410.

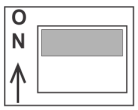
ⓘ **Note:** The SNC is not currently supported at MAP Gateway release 5.1.

Setting the EOL switch

You must set the network devices at the end of an FC Bus segment as network terminated devices. The SNC includes one red EOL switch labeled FC EOL for the FC Bus connection that sets the supervisory controller as a network terminated device on the bus.

To set a SNC as an FC Bus terminated device, position the switch on the EOL switch to the **ON** position as shown in Figure 17.

Figure 17: FC Bus EOL switch: ON (Up) position



ⓘ **Note:** The SNC is shipped with the EOL switch in the initial factory position, **ON** (up) position as shown in Figure 17. If the SNC is not a terminated device on the FC Bus, reposition the EOL switch to the Off (down) position.

Set the EOL switches appropriately for the FC Bus.

For the RS-485 connection, set the EOL termination to **ON** or install an EOL terminator for the two devices located at either end of each bus segment on an RS-485 Bus. Set the EOL switches to off or do not install an EOL terminator for all other devices on the bus segment on an RS-485 Bus.

Powering on the SNC

Apply power to the SNC. The device requires approximately three minutes to start up and become operational. See LED test sequence at startup.

Startup is complete and the SNC is operational after the HEARTBEAT LED flashes blue/purple at 1 Hz and the red FAULT LED is off.

ⓘ **Note:** The super capacitor in the SNC that backs up volatile memory during shutdown can degrade if the engine sits idle without power for over nine months. Ensure you connect an idle SNC to power for approximately 24 hours every 8 to 9 months, which sufficiently charges the super capacitor.

Disconnecting power from the SNC

Disconnect power from the SNC by removing the gray 2-pin terminal block from the 24 V~ power terminal port on the SNC.

When you disconnect or lose supply power from the SNC, the SNC becomes non-operational when the power management settings expire. The blue HEARTBEAT LED remains on, and the super capacitor continues to power the SNC for approximately 30 seconds so that volatile data can be backed up in nonvolatile memory. The HEARTBEAT LED goes off when the data backup completes.

➤ **Important:** The behavior of the super capacitor is different from backup batteries that supervisory controllers have used in the past. For example, the capacitor requires time to recharge after each power cycle. The unit is not designed for frequent power cycles over a short period of time, such as three or four power cycles in one hour. In this scenario, the capacitor can deplete enough so that it no longer functions. A fully depleted capacitor can take up to 90 minutes to recharge after the SNC is plugged into its power source.

Rotary switch dials

The SNC includes three rotary switch dials labeled Controller Number for setting the controller number that can be numbered from 000 to 999. The switches are shipped from the factory set to 000. You can use them to set a decimal number from 000 to 999 as a unique identifier for each SNC.

Setting the controller number

You can set the controller number using three rotary switches, and can number it from 000 to 999. The numbers are ordered from left to right, most significant bit (MSB) to least significant bit (LSB). In the following image, the switches are set to 1 2 3. If you change the controller number, refresh the FX SNC UI **Hardware** tab to see the change.

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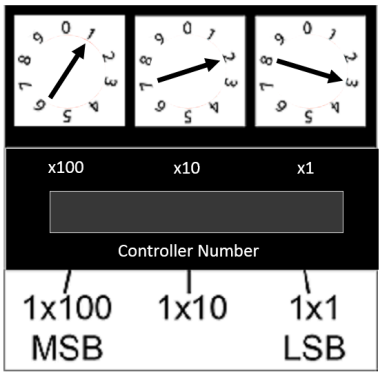
Figure 18: Rotary switch controller number



LED test sequence at startup

During startup, the SNC automatically initiates a self-test to verify correct operation of the unit. When you connect supply power, the following LED lighting sequence occurs:

- The **HEARTBEAT** LED flashes blue/purple when the SNC starts.
- The **FAULT** LED is solid red for approximately 30 seconds, then turns off.
- The **USB-1|2** LED flashes green when a supported device is connected to either of the USB ports. The LED turns solid red when you connect an unsupported device. The LED is off if no device is connected.

Troubleshooting

LED status indicators

LEDs on the front panel of the SNC indicate its functional state. For a comprehensive list of LED functional information, see Table 9.

SNC LED indication table

Table 9 describes each LED on the device. The normal states are in bold. A flicker has a fast blink rate faster than one second and a flash has a much slower blink rate of one second.

Table 9: SNC LED designations, normal statuses, descriptions, and other conditions

LED name	Color	State	Description
HEARTBEAT	Multi-color: blue or purple	**Flashing blue and purple**	1 blink per second (1 Hz) = Normal operating system and all monitored processes start and the device is running
		On blue	Power is supplied by 24 VAC, but controller is non-operational
		Medium flicker, purple and blue	2 blinks per second (2 Hz) = SNC starting up
		Fast flicker, purple and blue	5 blinks per second (5 Hz) = SNC shutting down
		Off	No power
FAULT	Red	**Off**	No faults and normal operation
		On	Device fault or no application loaded. Diagnostics are running or fault conditions are detected. For example, excessive memory or flash usage, or a high CPU/PWB temperature.
SA BUS	Green	**Flashing**	1 blink per second (1 Hz) = indicates communication activity
		On	Devices have been defined but none are communicating (supervisory controller transmitting only). This behavior also applies when there are no devices defined in the CAF file.
FC BUS	Green	**Flashing**	1 blink per second (1 Hz) = indicates communication activity
		Off	No devices are communicating or no controllers have been configured to work with this bus
		On	Controllers have been defined but none are communicating (supervisory controller transmitting only)
ETH-1 and ETH-2	Green	**Flickering**	Data is transferring on the Ethernet connection
		Off	No communications

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Table 9: SNC LED designations, normal statuses, descriptions, and other conditions

LED name	Color	State	Description
USB-1|2	Green or Red	**Flashing**	Flash green = 1 blink per second (1 Hz), an approved device or devices are connected and communicating correctly to either USB-1 or USB-2
		On	Solid red = an unapproved device is connected to USB-1 or USB-2. In this case, sequentially remove each device until the LED flashes green or the LED is turned off. **Note:** Only approved USB adapters that have been tested and qualified function with the SNC. Non-qualified adapters do not function with the SNC.
		Off	No USB device is connected
FC EOL	Yellow	**On**	On Steady = end-of-line termination is enabled for the Field Bus connection
		Off	Off Steady = indicates the end of line termination network is disabled

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Reset button

The SNC features a recessed Reset button that is located directly above the LEDs and to the left of the Recovery button. If you need to reset the SNC but retain the archive and stored historical data, you can either press and immediately release the reset button, or issue a Reset Device command from the user interface. This type of reset is known as a soft reset. If you need to force an immediate restart of the SNC supervisory controller and a reset of the processor, press and hold down the Reset button for at least four seconds with an extended paper clip or mini screwdriver. This action is otherwise known as a hard reset or processor reset.

Important: During a hard reset, the SNC's archive database and any data the SNC has collected are lost. The data includes all historical information, including alarm, trend, and audit trail data.

Note: Press the reset button only if the SNC fails to respond and users cannot access it. Do not press the reset button unless you have tried other means to fix the problem.

Note: The supervisory controller has a super capacitor that, when charged, keeps the unit powered up for 30 seconds after power is removed.

Recovery button

Use the **Recovery** button to recover device functionality and to reset a supervisory controller to a known state if its operation becomes unreliable and cannot be fixed with standard procedures.

Use this button to resolve the following types of conditions:

- Forgotten password
- Device restarts continuously
- Device is unresponsive
- Device is unable to successfully download code from SCT

  Note: The firmware version on the inactive partition may be older than the version on the active partition and may lack the security enhancements of the newer, active partition. If the **Recovery** button is pressed to change partitions it is possible that the older firmware may revert to the older recovery button behavior. To check which release is installed on the active partition, press the **Recovery** button and release after **1 second**. If this has no effect, the newer firmware version is active and behaves as described below. If this initiates the recovery sequence, the older version is active and will exhibit older recovery button behavior.

Recovery to same partition

Press and hold the **Recovery** button continuously for **5-10 seconds**. After **5 seconds**, the fault LED starts blinking once every second, which indicates that you can release the **Recovery** button to invoke the same partition recovery. When you release the **Recovery** button, the Heartbeat LED is solid **ON**. To apply same partition recovery, release the button before **10 seconds**. The following sequence occurs:

1. Reverts to factory default archive.
2. Defaults the supervisory controller's hostname to SNx and MAC address.
3. Defaults the IP address to DHCP.
4. Reverts to the factory default security database.
   Recovery is complete when the Heartbeat LED starts to blink at **1 second** intervals.

Recovery to inactive partition

Press and hold the **Recovery** button continuously for at least **10 seconds** to invoke inactive partition recovery. Do **NOT** release the button before **10 seconds**, or the inactive partition recovery process will not begin. After **10 seconds**, the fault LED blinks 5 times a second, which indicates that you can release the **Recovery** button to invoke inactive partition recovery. When you release the **Recovery** button, the Heartbeat LED is solid **ON**. The following sequence occurs:

1. Reverts to factory default archive.
2. Defaults the supervisory controller's hostname to SNx and MAC address.
3. Defaults the IP address to DHCP.
4. Reverts to the factory default security database.
5. Runs on the opposite partition, possible with a different installed release.
   Recovery is complete when the Heartbeat LED starts to blink at **1 second**.

   Note: To determine which partition is currently active, open the FX SNC UI and locate the Update object of the F4-SNC Supervisory Controller under the network tree. The Active System Partition attribute is visible from the detail window of the Update object. Partition 0 is A and partition 1 is B.

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Wiring considerations and guidelines

Table 10: Ethernet network rules

Category	Allowed maximums and rules
General	Star topology with network switches
Line length and type	2,000 m (6,600 ft) for plastic or glass fiber optic with external adapter
	1000 BaseT: 100 m (330 ft) CAT5E cable 100 BaseT: 100 m (330 ft) CAT5 cable 10 BaseT: 100 m (330 ft) CAT5 cable
Terminations	For 1000/100/10 BaseT, no line terminators allowed.

Table 11: FC Bus rules for MS/TP devices

Category	Allowed maximums and rules
General	One FC Bus with up to 50 MS/TP devices for SNC2515x-0 and SNC1612x-0 and up to 4 MS/TP devices for the SNC2515x-04x and SNC1612x-04x. ⓘ **Note:** An FC port on a SNC can connect to only one bus segment on an FC Bus. Only use a daisy-chain topology. Do not use Star or T topology configurations.
Number of devices	One FC Bus Supports up to 50 MS/TP controllers on a single FC Bus segment for the SNC2515x-0 or SNC1612x-0.
	One FC Bus Supports up to 4 MS/TP controllers on a single FC Bus segment for the SNC2515x-04x or SNC1612x-04x.
Cable length for FC Bus	FC Bus can be up to 1,520 m (4,987 ft) using 0.6 mm (22 AWG) 3-wire twisted, shielded cable.
	When using fiber-optic connections: 2,010 m (6,594 ft) between two fiber-optic modems.
Cable	Stranded 0.6 mm (22 AWG) 3-wire twisted, shielded cable is recommended. Stranded 0.6 mm (22 AWG) 4-wire (two twisted-pairs) shielded cable is acceptable. ⓘ **Note:** Ensure the + and - bus leads are a twisted pair. On applications using 4-wire two twisted-pairs cable, isolate and insulate unused conductor.
EOL termination on the FC Bus	Set the EOL switch to on, or install an EOL terminator on the two devices located at either end of each bus segment on an FC Bus. Set the EOL switches to off, or disable the EOL termination for all other devices on the bus segment on an FC Bus.

Table 12: SA Bus rules

Category	Allowed maximums and rules
General	Each bus supervisor supports one SA Bus.
Number of SA devices	SA Bus applications are limited to a power load of 240 mA. The best practice when configuring an SA bus is to limit the total available operating power consumption to 100 mA or less. ⓘ **Note:** Refer to the technical specifications on the type of sensors you are using as this limits the amount of devices on the SA Bus.
Cable length for SA Bus	365 m (1,198 ft) maximum bus length.
	152 m (500 ft) maximum between an NS network sensor and the bus supervisor SNC supplying power to the sensor) using bus cable connected to the SA Bus screw terminal blocks.
	30 m (98 ft) maximum length for network sensors using bus cables connected to the 6-pin modular jack (6-Pin SA Bus port).
	366 m (1,198 ft) maximum Bus Length.

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Table 12: SA Bus rules

Category	Allowed maximums and rules
Recommended bus cable type	**Screw Terminal Connections**: 0.6 mm (22 AWG) Stranded 4-wire, 2-Twisted Pairs, Shielded Cable for screw terminals. **Modular Jack Connections**: 6-Pin Modular Connectors with 24 or 26 AWG 6-Wire, 3 Twisted-Pairs.
EOL termination on the SA Bus	Each SA Bus supervisor has integral (fixed ON) EOL termination, which provides sufficient EOL termination on a SA Bus. Long SA Bus runs or persistent communication problems on a SA Bus may require EOL termination at the last device on the SA Bus in addition to the integral EOL termination at the SA Bus supervisor) All SNC models are SA Bus supervisors.

SNC capabilities

Table 13: SNC capabilities

	SNC2515x-0x	SNC2515x-04x	SNC1612x-0x	SNC1612x-04x
Onboard I/O	25 inputs/15 outputs	25 inputs/15 outputs	16 inputs/12 outputs	16 inputs/12 outputs
Maximum objects in device	2500	2500	2500	2500
Number of site devices including self	1	1	1	1
Maximum allowed devices across all integrations. For example, MS/TP+IP. Includes VND integrations and devices brought in via routers.	96	4	60	4
Ethernet	2	2	2	2
BACnet/IP maximum trunks ⓘ **Note:** Two Ethernet device connections include one integral Ethernet port and the USB to Ethernet dongle, ACC-UBSETH-0, as the second Ethernet port. The second BACnet/IP trunk is supported only at release 13.0 and later.	2	2	2	2
BACnet/IP maximum devices per trunk	50	4	50	4
BACnet/SC maximum trunks ⓘ **Note:** Direct Ethernet connection only. USB to Ethernet dongle does not support BACnet/SC at this time.	1	1	1	1
BACnet/SC maximum devices per trunk[3]	50	4	50	4
BACnet MS/TP maximum trunks	1	1	1	1

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Table 13: SNC capabilities

	SNC2515x-0x	SNC2515x-04x	SNC1612x-0x	SNC1612x-04x
BACnet MS/TP maximum devices per trunk (Johnson Controls devices only)	50	4	50	4
BACnet MS/TP maximum devices per trunk (with 3rd party)	50	4	50	4
N2 maximum trunks	1	1	1	1
Mapped N2 devices per trunk	50	4	50	4
Remote Field Bus maximum trunks	3	3	3	3
LON network variables	1500	1500	1500	1500
LON maximum devices	64	4	60	4
Modbus - standard number of trunks	2	2	2	2
M-Bus - standard number of trunks	2	2	2	2
KNX -standard number of trunks	1	1	1	1
C•CURE and victor number of trunks	1	1	1	1
Zettler number of trunks	1	1	1	1
OPC-UA number of trunks	1	1	1	1
Maximum MQTT client applications	1	1	1	1

1 Suggested object limit for performance considerations.
2 There is one active Ethernet port for the SNC25152-0x, SNC16122-0x, SNC25150-0x, and SNC16120-0x models.
3 The total number of BACnet/IP or BACnet/SC devices that you can map is 50. You cannot map 50 IP and 50 SC devices at the same time because they use the same BACnet Integration object.
4 Remote Field Bus maximum trunks is 0 for the SNC25150-0x and SNC16120-0x.
5 Suggested LON network variables limits for performance considerations.

SNC technical specifications

Table 14: SNC2515x-0xx and SNC1612x-0xx

Specification	Description
Power requirement	Dedicated nominal 24 VAC, Class 2 power supply (North America), SELV power supply (Europe), at 50/60 Hz (20 VAC minimum to 30 VAC maximum) ⓘ **Note:** The super capacitor in the SNC that backs up volatile memory during shutdown can degrade if the engine sits idle without power for over nine months. Ensure you connect an idle SNC to power for approximately 24 hours every 8 to 9 months, which sufficiently charges the super capacitor.
Power consumption	33 VA maximum from main power supply ⓘ **Note:** The VA rating does not include any power supplied to the peripheral devices connected to Binary Outputs (BOs) or Configurable Outputs (COs), which can consume up to 12 VA for each BO or CO, for a possible total consumption of an additional 132 VA (maximum).
Power source	+15 VDC power source terminals provide 100 mA total current; quantity of inputs: five, located in Universal Input terminals; for active (3-wire) input devices
Display screen	2.4 in (61 mm), 320 x 240 resolution display (-0H and -04H models only)
SA Bus power	15 V at 240 mA maximum
Operating System	Wind River® Linux LTS 19 (LTS=long-term support)

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Table 14: SNC2515x-0xx and SNC1612x-0xx

Specification	Description
Processor	NXP i.MX6DualLite Processor, 1GHz 32-bit dual core Cortex A9 processor
Memory	16 GB flash nonvolatile memory for operating system, configuration data, and operations data storage and backup 2 GB SDRAM for operations data dynamic memory
Universal Input (UI) resolution	Input: 24-bit Analog to Digital converter
Analog Output (AO) accuracy	Output: +/- 200 mV accuracy in 0 VDC to 10 VDC applications
Supported integrations	BACnet/IP, BACnet/SC, BACnet MS/TP
Network and serial interfaces	**1 Ethernet port:** SNC25152-0, SNC25152-04, SNC25152-0H, SNC25152-04H, SNC16122-0, SNC16122-04, SNC16122-0H, and SNC16122-04H Ethernet port: 100/10 Mbps, 8-pin RJ-45 connector One FC port (RJ-12 6-pin port, connects with 1.5 m [4.9 ft] RJ-12 field bus cable) One SA port (RJ-12 6-pin port, connects with 1.5 m [4.9 ft] RJ-12 field bus cable) One galvanically isolated RS-485 port with a removable 4-pin terminal block One SA Bus port with a removable 4-pin terminal block Two USB A ports. All support USB 2.0 and Open Host Controller Interface [Open HCI] specification.
Transmission speeds	Ethernet communication: 100 or 10 Mbps The supervisory controller can reside and interoperate on a 1 Gbps network, but does not itself transmit at 1 Gbps. Galvanically isolated, serial communication (FC Bus): 76,800, 38,400, 19,200, 9600, or 1200 bps (selectable) Sensor/actuator communication (SA Bus): 38,400 bps
Ambient temperature conditions	Operating: 0°C to 50°C (32°F to 122°F) ⓘ **Note:** For F4-SNC25152-0U at Release 14.0, UL 864 10th Edition/cU: Operating: 0C to 49C (32°F to 120°F). Must remain at version 14.0. Non-operating: -40°C to 70°C (-40°F to 158°F)
Ambient humidity conditions	Storage: 5% RH to 95% RH, 30°C (86°F) maximum dew point conditions Operating: 0% RH to 90% RH, 30°C (86°F) maximum dew point conditions
Housing	White Polycarbonate and Acrylonitrile butadiene styrene (ABS) blend IP protection class: IP20 UL flammability rating: UL94-5VB
Mounting	On flat surface with screws on three mounting clips or a single 35 mm DIN rail
Dimensions, width x height x depth	9.84 in. x 5.71 in. x 1.79 in. (250 mm x 145 mm x 45.5 mm)
Weight	1.433 lb (0.65 kg)
Compliance	**United States:** UL Listed, File E107041, CCN PAZX, UL 916, Energy Management Equipment; FCC Compliant to CFR47, Part 15, Subpart B, Class A
	Canada: UL Listed, File E107041, CCN PAZX7, CAN/CSA C22.2 No. 205, Signal Equipment; Industry Canada Compliant, ICES-003
CE	**Europe:** Johnson Controls declares that this product is in compliance with the essential requirements and other relevant provisions of the EMC Directive.
	**Australia and New Zealand:** RCM Mark, Australia/NZ Emissions Compliant

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Table 14: SNC2515x-0xx and SNC1612x-0xx

Specification	Description
	BACnet International: BACnet Testing Laboratories™ (BTL) 135-2024 listed BACnet Building Controller (B-BC), BACnet Secure Connect Hub (B-SCHUB), BACnet Router (B-RTR), and BACnet Gateway (B-GW) profiles, Protocol Revision 19
	FIPS 140-2 Level 1: Compliant using FIPS validated components.
UK CA	**United Kingdom:** Johnson Controls declares that this product is in compliance with Electromagnetic Compatibility Regulations, The Electrical Equipment (Safety) Regulations, and Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations.

The performance specifications are nominal and conform to acceptable industry standard. For application at conditions beyond these specifications, consult the local Johnson Controls® office. Johnson Controls shall not be liable for damages resulting from misapplication or misuse of its products.

Repair information

If the SNC fails to operate within its specifications, replace it. The SNC is not a serviceable product; however, it does support software updates to enable feature enhancements. For a replacement unit, software updates, or accessories, contact your local Johnson Controls representative.

Do not open the SNC housing. The SNC has no user-serviceable parts inside and does not require periodic field maintenance. A non-replaceable super capacitor, not a battery, retains SNC data during a loss of power.

If you replace a SNC for any reason or add a new SNC to a site, you must update the site pairing to ensure that the new SNC is recognized and can communicate. Refer to *F4-SNC Commissioning Guide (LIT-12013549)* for more information.

Product warranty

This product is covered by a limited warranty, details of which can be found at www.johnsoncontrols.com/buildingswarranty.

Software terms

Use of the software that is in (or constitutes) this product, or access to the cloud, or hosted services applicable to this product, if any, is subject to applicable end-user license, open-source software information, and other terms set forth at www.johnsoncontrols.com/techterms. Your use of this product constitutes an agreement to such terms.

Patents

Patents: https://jcipat.com

Single point of contact

APAC	EU	UK	NA/SA
JOHNSON CONTROLS C/O CONTROLS PRODUCT MANAGEMENT NO. 32 CHANGJIANG RD NEW DISTRICT WUXI JIANGSU PROVINCE 214028 CHINA	JOHNSON CONTROLS VOLTAWEG 20 6101 XK ECHT THE NETHERLANDS	JOHNSON CONTROLS TYCO PARK GRIMSHAW LANE MANCHESTER M40 2WL UNITED KINGDOM	JOHNSON CONTROLS 5757 N GREEN BAY AVE. GLENDALE, WI 53209 USA

Contact information

Contact your local Johnson Controls representative: www.johnsoncontrols.com/locations

Contact Johnson Controls: www.johnsoncontrols.com/contact-us

North American emissions compliance

United States

This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when this equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency

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energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area may cause harmful interference, in which case the users will be required to correct the interference at their own expense.

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.

Canada

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

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

Industry Canada Statement(s)

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions:

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

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

1. L'appareil ne doit pas produire de brouillage, et
2. L'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

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