F4-SNC Installation Guide

Part No. 24-10143-02031 Rev. A

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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-SNC25151-0H and F4-SNC25151-04H models have a display where you can view Alarms, Overrides, Equipment Data, and Trends. You can command Equipment Data points. Display settings can be viewed and edited but Controller settings can only be viewed. You can navigate the display using the direction arrows, back, OK, and menu buttons.

The F4-SNC25151-0x/x models have a total of 40 I/O points - with 25 inputs and 15 outputs. The F4-SNC16121-0x 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**151-0x/x) and the next two numbers represent the number of outputs (SNC25**15**1-0x/x). The SNC offers various integration options.

Field Bus integrations supported

- BACnet MS/TP

Ethernet integrations supported

- BACnet/IP

Physical features

The following figures display the physical features of the SNC25151-0x/x and SNC16121-0x with display models. The accompanying table provides a description of the physical features and a reference to further information where relevant.

Note: The physical features labelled with callouts 9-16 are only available on SNC models with the display.

Figure 1: F4-SNC25151-0x/x

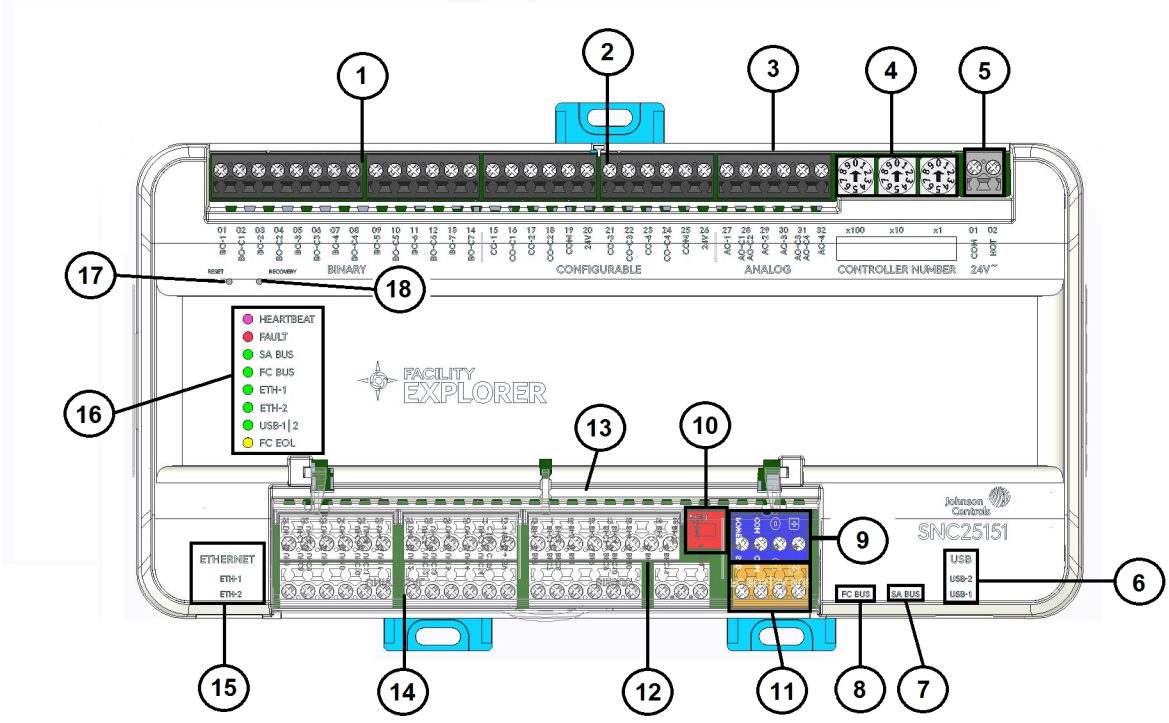


Figure 2: F4-SNC16121-0x

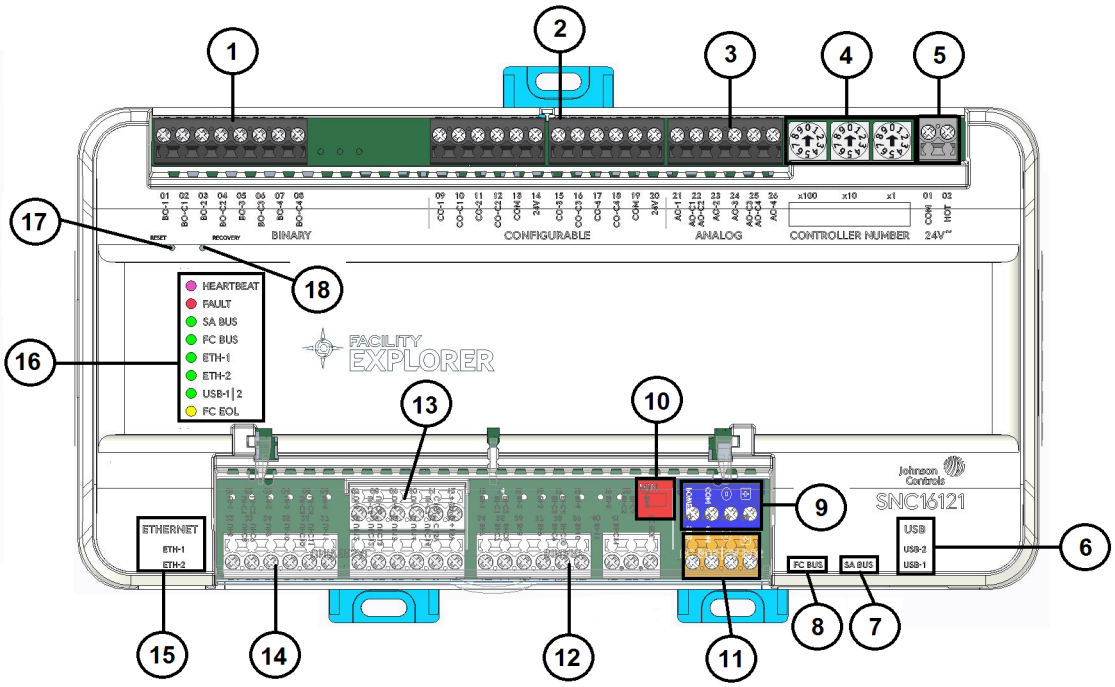


Table 1: Physical features of the SNC25151-0x and SNC16121-0x

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.
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: RJ12 6-Pin Modular Jack.

Table 1: Physical features of the SNC25151-0x and SNC16121-0x

Callout	Physical features
8	Field Controller (FC) Bus port: RJ12 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	Two active Ethernet ports, 1000/100/10 Mbps; 8-pin RJ45 connector, labeled **ETH-1** (top) and **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

Follow these 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. See Accessories ordering information for the list of qualified and supported USB adapters.

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 SNC
- One installation sheet

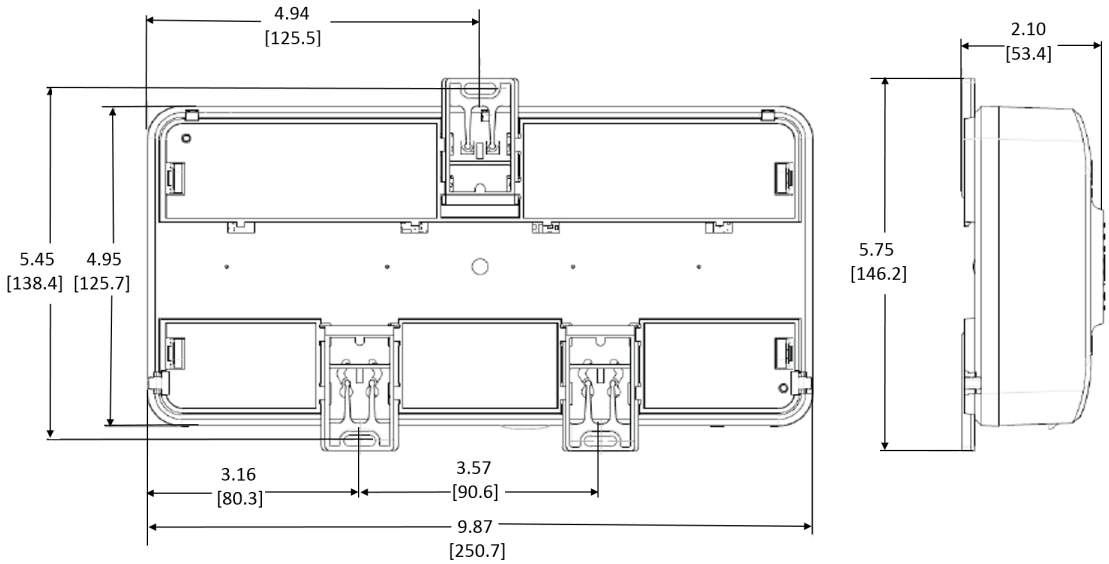
Materials and special tools needed

You can mount the SNC by using the fasteners option or the DIN rail option.

- Fasteners option - Three fasteners appropriate for the mounting surface:
  - #8 screws - North America
  - M4 screws - Europe
- DIN rail option - 20.3 cm (8 in.) DIN rail for DIN rail mount applications only.

Dimensions

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



Mounting

Location considerations

Follow these 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 proper orientation (horizontal preferred, vertical 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.

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 overtighten the mounting screws. If you overtighten the screws, you can crack the mounting clips.

Mounting the SNC for DIN rail mount applications

About this task:

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.
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.

Wiring overview

Power supply, network, and communication connections

See 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 properly 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 should be powered from a separate source when not using internal power.

Ethernet port

The Ethernet port is an 8-pin RJ45 network port used to connect the SNC to Ethernet IP networks. You can connect the SNC to Ethernet networks at 1000, 100, or 10 Mbps. The maximum allowable cable length is 100 m (328 ft). There are two active Ethernet ports on the SNC25151-0x/x and SNC16121-0x models that you can use to daisy-chain BACnet/IP devices.

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 has 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 Site Management Portal (SMP). 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.

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

See Accessories ordering information for more information on the adapters.

Wiring the SNC

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

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.

WARNING

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

Connecting to the FC Bus port

The FC Bus port is an RJ12, 6-position modular jack that provides a connection for the Mobile Access Portal (MAP). The FC Bus port is connected 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 and Table 2.

Figure 4: Pin number assignments for FC Bus port or SA Bus port

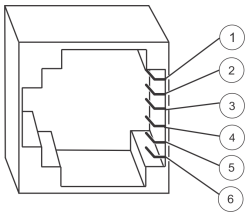


Table 2: Pin number assignments for FC Bus port or SA Bus port (RJ12 modular jack)

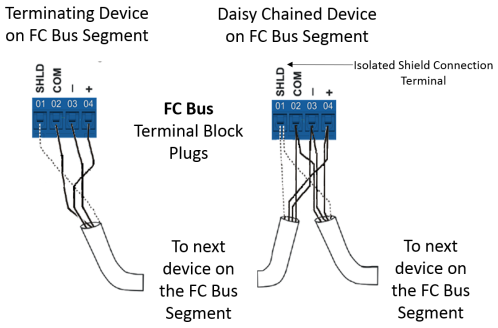
Callout	Signal
1	FC Bus or SA Bus (+)
2	FC Bus or SA Bus (-)
3	Bus and Power Common
4	Power (15 VDC)
5	Bus and Power Common
6	Power (15 VDC)

Connecting to the FC Bus terminal

About this task: 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 RJ12, 6-position modular jack that provides a connection for the MAP, or other SA Bus devices with RJ12 plugs.

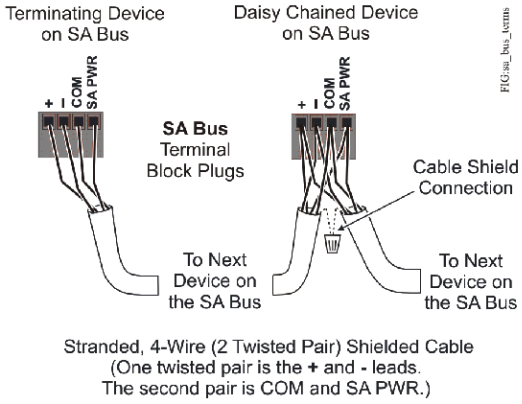
The Sensor port is connected internally to the SA Bus terminal block. See Communications Bus and supply terminal blocks, functions, ratings, requirements, and cables for more information. The SA Bus port pin assignment is shown in Figure 4 and Table 2.

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.

Connecting the power source

1. Connect power to the SNC using 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 7 and Table 3). The connections are **HOT** and **COM** (common).

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

Figure 7: Supply power wiring (24 VAC transformer)

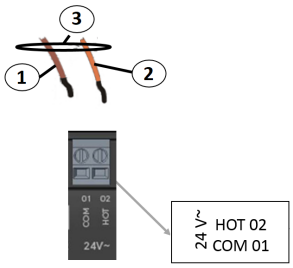


Table 3: Power source connection detail

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 SNC25151-0x/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 4: Onboard I/O points

SNC	Total I/O	Universal Inputs (UI)	Binary Inputs (BI)	Configurable Outputs (CO)	Analog Outputs (AO)	Binary Outputs (BO)
SNC25151-0x/x	40	14	11	4	4	7
SNC16121-0x	28	10	6	4	4	4

Note: The SNC has two sets of 24+ and common terminal block connections amongst 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). These extra power connections can be used to jumper power for switched high (externally sourced) or switched low (externally sourced) Triac loads.

Table 5: Input and output terminals

Type of Point	Options
Universal Inputs	• Voltage Analog inputs (0-10 VDC) • Current Analog inputs (4-20 mA) • Resistive Analog inputs (0-2k 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 (0-10 VDC) • Binary Outputs (24 VAC Rated Triac)
Analog Outputs	• Voltage Analog outputs (0-10 VDC) • Current Analog outputs (4-20 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/outputs with cables less than 30 m (100 ft) typically 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.

Terminal wiring and cable length guidelines

Table 6: 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 Pulldown.	See Guideline A in Table 7.
		Analog Input - Current Mode (4–20 mA) Internal 100 Ohms load impedance.	See Guideline B in Table 7.
		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 7.
		Binary Input - Dry Contact Maintained Mode 1 second minimum pulse width Internal 12 V, 15k Ohms pull up.	See Guideline A in Table 7.
	UI-C#	**Universal Input Common** for all Universal input terminals **Note:** All Universal UI-C# terminals share a common, which is isolated from all other commons.	Same as (Universal) UI-#.

Table 6: Terminal wiring

Terminal block label	Terminal labels	Function, ratings, and requirements	Determine wire size and maximum cable length
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 7.
		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	
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 7.
		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 7.
	AO-C#	**Analog Output Signal Common** for all Analog OUT terminals **Note:** All Analog AO-C# terminals share a common, which is isolated from all other commons.	Same as (Analog) AO-#.

Table 6: Terminal wiring

Terminal block label	Terminal labels	Function, ratings, and requirements	Determine wire size and maximum cable length
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 7.
	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.	
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 7.
		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 7.
	CO-C#	**Analog Output Signal Common**: All Configurable Outputs defined as Analog Outputs share a common, which 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.

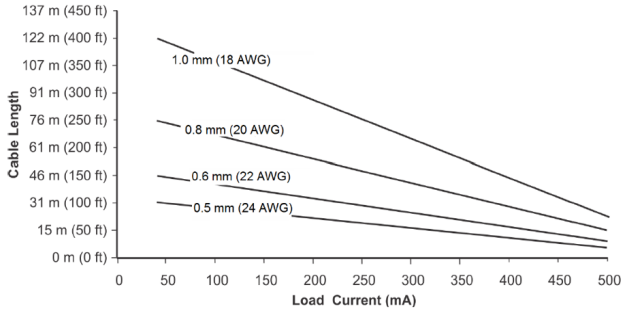
Table 7: Cable length guidelines for recommended wire sizes

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 8 to select wire size/gauge. Use stranded copper wire.	See Figure 8 to determine cable length. Use twisted wire cable.	N/A

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 8 to estimate the maximum cable length relative to the wire size and the load current (in mA) when wiring inputs and outputs.

Figure 8: Maximum wire length by current and wire size



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

Table 8: 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	RJ12 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)

Table 8: Communications Bus and supply terminal blocks, functions, ratings, requirements, and cables

Terminal block/ port label	Terminal labels	Function, electrical ratings/requirements	Recommended cable type
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 7 to determine wire size and cable lengths for cables other than the recommended cables.

FC Bus and SA Bus and supply power wiring guidelines

Table 8 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 wiring the communication buses and supply power.

In addition to the guidelines in Table 8, 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

A set of Johnson Controls termination diagrams provides details for wiring inputs and outputs to the controllers.

See the figures in this section for the applicable termination diagrams.

Table 9: Termination diagrams

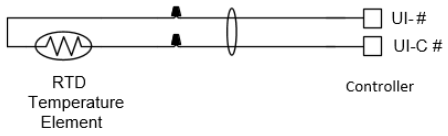
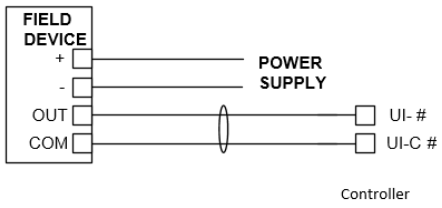
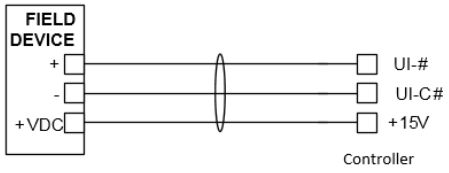
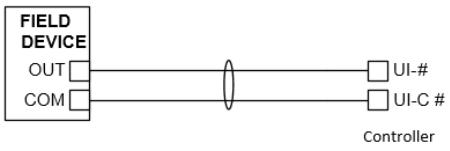
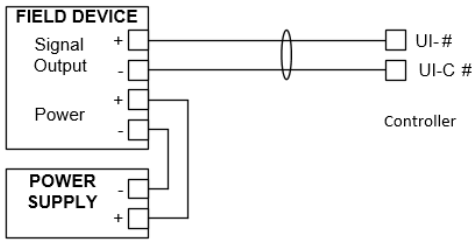
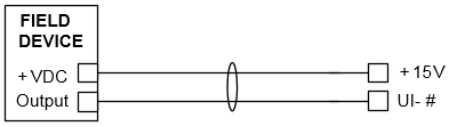
Type of field device	Type of input/ output	Termination diagrams
Temperature Sensor	UI	
Voltage Input - External Source	UI	
Voltage Input - Internal Source	UI	
Voltage Input (self-powered)	UI	
Current Input - External Source (isolated)	UI	
Current Input - Internal Source (2-wire)	UI	

Table 9: Termination diagrams

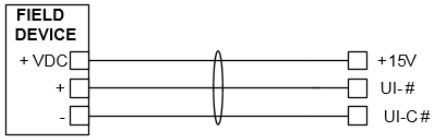
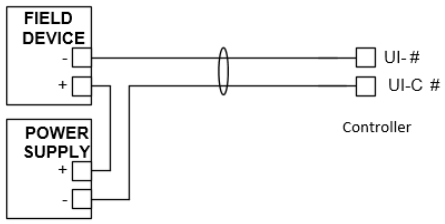
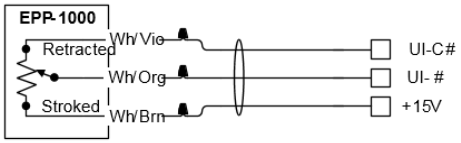
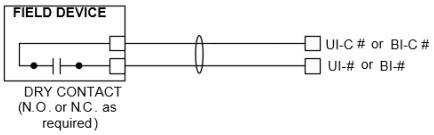
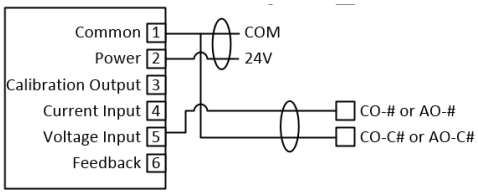
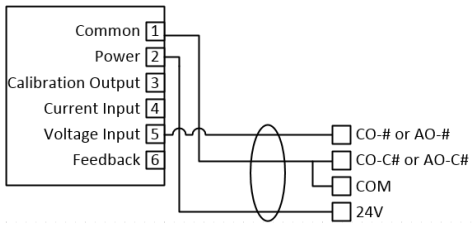
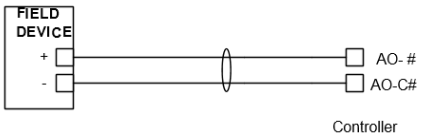
Type of field device	Type of input/ output	Termination diagrams
Current Input - Internal Source (3-wire)	UI	
Current Input - External Source (in loop)	UI	
Feedback from EPP-1000	UI	
Dry Contact (binary input)	UI or BI	
0–10 VDC Output to Actuator (external source)	CO or AO	
0–10 VDC Output to Actuator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

Table 9: Termination diagrams

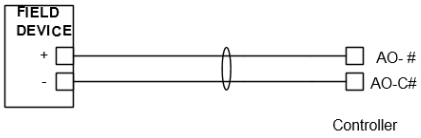
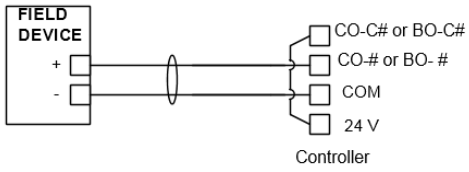
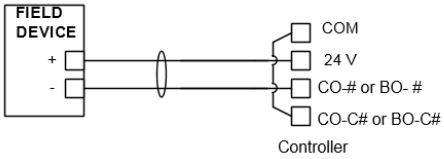
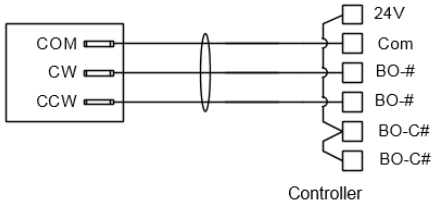
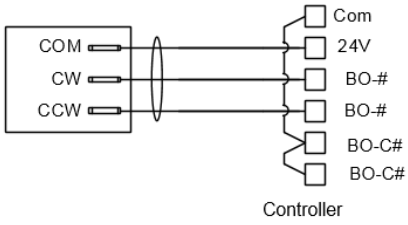
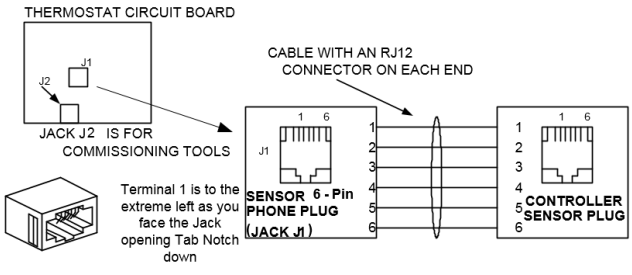
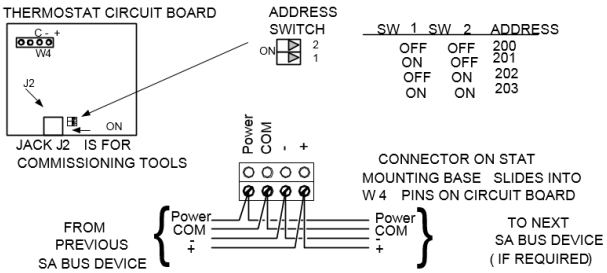
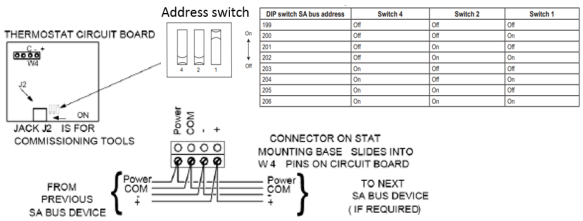
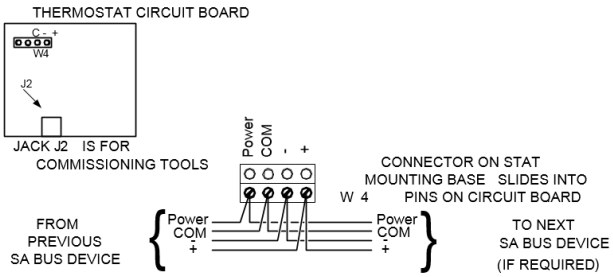
Type of field device	Type of input/ output	Termination diagrams
Analog Output (current)	AO	
24 VAC Triac output (switch high, internally sourced, Triac)	BO or CO	
24 VAC Triac output (switch low, external source)	BO or CO	
Incremental control to actuator (switch high, internally sourced, Triac)	BO	
Incremental control to actuator (switch low, internally sourced, Triac)	BO	
Network Stat with Phone Jack (Fixed Address = 199)	SA Bus	

Table 9: Termination diagrams

Type of field device	Type of input/ output	Termination diagrams
Network Stat with Terminals Addressable	SA Bus	
NS8000 series sensors	SA Bus	
Network Stat with Terminals (Fixed Address = 199)	SA Bus	

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 prior to download of an application file. No special actions need to be taken to make use of 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. The points are viewable under the **Local Hardware** folder of the device and are named according to the I/O they represent, for example UI-1. It is possible to upload the default state application with the Site 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.

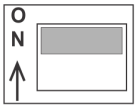
Note: The SNC is not currently supported at MAP Gateway release 5.1.

Setting the EOL switch

The network devices at the end of an FC Bus segment must be set as network terminated devices. The SNC has one red EOL switch labeled FC EOL for the FC Bus connection that sets the engine 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 9.

Figure 9: 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 9. 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.

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 LEDremains 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 network engines 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.

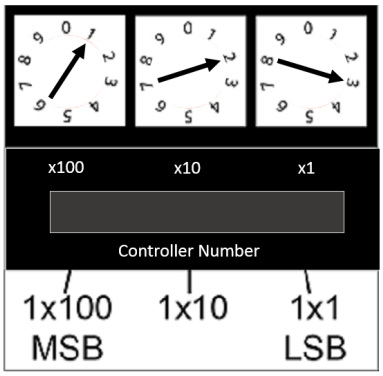
Rotary switch dials

The SNC has 3 rotary switch dials labeled Controller Number for setting the controller number which 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

About this task:
The controller number is set using three rotary switches and may be numbered from 000 to 999. The numbers are ordered from left to right, most significant bit (MSB) to least significant bit (LSB) when the controller is oriented as shown in . In Figure 10 the switches are set to 1 2 3. If you change the controller number, refresh the SMP **Hardware** tab to see the change.

Figure 10: Rotary switch controller number



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 10.

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 an unsupported device is connected. The LED is off if no device is connected.

SNC LED indication table

Table 10 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 10: 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 (network engine transmitting only)
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 (network engine transmitting only)
ETH-1 and ETH-2	Green	**Flickering**	Data is transferring on the Ethernet connection
		Off	No communications
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|2
		On	Solid red = an unapproved device is connected to USB 1 and/or USB 2. In this case a user needs to 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
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

Reset button

The SNC features a recessed Reset button that is located directly above the LEDs and to the left of the Recovery button. To force an immediate restart of the SNC engine 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. During the 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. 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.

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.

Recovery button

The SNC features a recessed Recovery button that is located above the LEDs and to the right of the Reset button. Use the Recovery button to restore device functionality. To place the SNC into recovery mode, press and immediately release the Recovery button with an extended paper clip or mini screwdriver. Use the Recovery operation under these conditions:

- the current password is unknown
- the device is rebooting continuously
- the device is unresponsive or is in a frozen state
- the device fails to take a code download from SCT

Important: If you are unsure about whether to use the Recovery operation, contact Johnson Controls technical support.

When you press the Recovery button, the action that takes place depends on whether this is the first time or a subsequent time you pressed the button. The actions taken are as follows:

- **First press (odd-numbered)**: The SNC resets and restores the factory default settings on the active partition.
- **Second press (even-numbered)**: The SNC resets and makes the opposite partition the currently active partition with the factory default settings. Any staged configuration files are lost. If the SNC has never been imaged with a release other than the shipped factory release, then both partitions (active and inactive) are now at the same release. Once the SNC is imaged in the field with a release other than the factory release, the active and inactive partitions are at different releases. At this point, it is your responsibility to verify the SNC's active partition is at the correct release. If it is not, you need to download the SNC with the correct code from SCT.

This process repeats the next time the Recovery button is pressed with the exception of each time an SCT code download is performed, which resets the Recovery button back to the default setting.

The differences between the two states are further described in Partition example.

Notes:

- To determine which partition is currently active, open the FX SMP UI in Expert mode and locate the Update object of the SNC under All Items - Expert tab. The Active System Partition attribute is visible under the Focus window of the Update object as either A (Partition 0) or B (Partition 1).
- After you press the Recovery button, allow time for the SNC to restart **before** you press the button again. Pressing the button twice in fast sequence equates to pressing the button only once.
- The firmware version in the inactive partition may be older than the version in the active partition, and may, in fact, lack security enhancements that are present in the newer, active partition.
- If the system partition to which you are switching is corrupt, the operating system loader does not switch to the defective partition, but instead keeps the currently active partition in place.

Partition example

Table 11: Partition example using Recovery button and SCT Code Download

User Action	Partition		SNE Release per Partition
	A	B	
Verify currently active partition	**Active**	Inactive	Partitions A and B have Rel. 10.1.0.3976
Press button 1st time	**Active**	Inactive	Partitions A and B have Rel. 10.1.0.3976
Press button 2nd time	Inactive	**Active**	Partitions A and B have Rel. 10.1.0.3976
Press button 3rd time	Inactive	**Active**	Partitions A and B have Rel. 10.1.0.3976
Press button 4th time	**Active**	Inactive	Partitions A and B have Rel. 10.1.0.3976
Press button 5th time	**Active**	Inactive	Partitions A and B have Rel. 10.1.0.3976
Perform SNC code download Rel. 11.0.0.7212 with SCT.	Inactive	**Active**	Partition B has Rel. 11.0.0.7212 Partition A has Rel. 10.1.0.3976
Press button 6th time	Inactive	**Active**	Partition B has Rel. 11.0.0.7212 Partition A has Rel. 10.1.0.3976
Perform SNC code download Rel. 11.0.0.7212 with SCT.	**Active**	Inactive	Partition A has Rel. 11.0.0.7212 Partition B has Rel. 11.0.0.7212
Press button 7th time	**Active**	Inactive	Partition A has Rel. 11.0.0.7212 Partition B has Rel. 11.0.0.7212

Wiring considerations and guidelines

Table 12: 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 13: FC Bus rules for MS/TP devices

Category	Allowed maximums and rules
General	One FC Bus with up to 50 MS/TP devices for SNC25151-0 and SNC16121-0 and up to 4 MS/TP devices for the SNC25151-0x/x and SNC16121-04. **Note:** An FC port on a SNC can connect to only one bus segment on an FC Bus. Only a daisy-chain topology is allowed (no 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 SNC25151-0 or SNC16121-0.
	One FC Bus Supports up to 4 MS/TP controllers on a single FC Bus segment. for the SNC25151-0x/x or SNC16121-04.

Table 13: FC Bus rules for MS/TP devices

Category	Allowed maximums and rules
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	The EOL switch must be set to on (or an EOL terminator installed) on the two devices located at either end of each bus segment on an FC Bus. The EOL switches must be set to off (or EOL termination disabled) for all other devices on the bus segment on an FC Bus.

Table 14: 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.
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 typically 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 15: SNC capabilities

	F4-SNC25151-0	F4-SNC25151-0x/x	F4-SNC16121-0	F4-SNC16121-04
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.	96	4	60	4
Ethernet	2	2	2	2
BACnet/IP maximum trunks	1	1	1	1
BACnet/IP maximum devices per trunk	50	4	50	4

Table 15: SNC capabilities

	F4-SNC25151-0	F4-SNC25151-0x/x	F4-SNC16121-0	F4-SNC16121-04
BACnet MS/TP maximum trunks	1	1	1	1
BACnet MS/TP maximum devices per trunk	50	4	50	4
BACnet MS/TP maximum devices per trunk (with 3rd party)	32	4	32	4

SNC ordering information

The SNC models listed in the following tables are also available as reconditioned models. To order a reconditioned version, add an **R** after the product code number.

Table 16: SNC base features

Product code number	Description
F4-SNCxxxx-0x/x	Supervisory Network Control Series Every SNC model includes the following functionality: • Pluggable terminal blocks • Site Management Portal (SMP) UI • Wind River® Linux Operating System • Three mounting clips for direct screw-mounting, or for DIN Rail mounting

Table 17: SNC model features

	F4-SNC25151-0x/x	F4-SNC25151-0	F4-SNC16121-0	F4-SNC16121-04
Integral Equipment Controller	40 Integral I/O points - 25 inputs, 15 outputs • 14 UI • 11 BI • 4 AO • 7 BO • 4 CO	40 Integral I/O points - 25 inputs, 15 outputs • 14 UI • 11 BI • 4 AO • 7 BO • 4 CO	28 Integral I/O points - 16 inputs, 12 outputs • 10 UI • 6 BI • 4 AO • 4 BO • 4 CO	28 Integral I/O points - 16 inputs, 12 outputs • 10 UI • 6 BI • 4 AO • 4 BO • 4 CO
Ethernet Port	2	2	2	2
Field Controller (FC) Bus	1	1	1	1
Devices per FC Bus/ Trunk	50	4	50	4
SA Bus	1	1	1	1
USB Ports	2	2	2	2
Supported type of parent server	• FX Server software • FX80 Supervisory Controller			

Accessories ordering information

Table 18: SNC accessories ordering information

Product Code Number	Description
TL-MAP1810-xx	Pocket-sized web server that provides a wireless mobile user interface to Facility Explorer field controllers, thermostats, and smart rooftop units. Refer to the *Mobile Access Portal Gateway Catalog Page (LIT-1900869)* to identify the appropriate product for your region. **Note:** The initial release only supports MAP communication with equipment controllers connected to the FC Bus and not with the application within the SNC (which comes at a later release).
AS-XFR010-1	Power transformer, no enclosure, class 2, 24 VAC, 92 VA maximum output.
AS-XFR100-1	Power transformer with enclosure, class 2, 24 VAC, 92 VA maximum output.
ACC-TBKINOUT-0	Replacement terminal block kit for input and output terminal blocks. All blocks are removable and labeled. Kit includes 5 of each 2, 3, and 4-pin terminal blocks
ACC-TBKPWFCSA-0	Replacement terminal block kit for power, FC Bus, SA Bus terminal blocks. All blocks are removable and labeled. Kit includes 5 of each terminal block type.
ACC-USBRS232-0	USB to RS-232 Adapter. Tested and qualified for use on the SNC.
TL-CCT-0	License enabling CCT software for one user.
TL-SCT-6	System Configuration Tool software for local installations. Upgrade software for previous SCT versions being upgraded to the latest release.
TL-SCT-0	System Configuration Tool software for local installations. New project software for sites that do not have a previous version of SCT installed.
FX-FCP-0	License enabling FX Equipment Controller Firmware Package Files required for the Controller Configuration Tool (CCT).

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-12013520)* for more information.

SNC technical specifications

Table 19: SNC25151-0x and SNC16121-0x (display models)

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)
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
SA Bus power	15 V at 240 mA maximum
Operating System	Wind River® Linux LTS 17 (LTS=long-term support)
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

Table 19: SNC25151-0x and SNC16121-0x (display models)

Specification	Description
Universal Input (UI) resolution	Input: 24-bit Analog to Digital converter
Analog Output (AO) accuracy	Output: +/- 200 mV accuracy in 0–10 VDC applications
Supported integrations	BACnet/IP, BACnet MS/TP
Network and serial interfaces	Two Ethernet ports; 1000/100/10 Mbps; 8-pin RJ45 connector One FC port (RJ12 6-pin port; connects with 1.5 m [4.9 ft] RJ12 field bus cable) One SA port (RJ12 6-pin port; connects with 1.5 m [4.9 ft] RJ12 field bus cable) One optically isolated RS-485 port; with a removable 4-pin terminal block One optically isolated 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 Optically 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) Non-operating: -40°C to 70°C (-40°F to 158°F)
Ambient humidity conditions	Storage: 5% to 95% RH, 30°C (86°F) maximum dew point conditions Operating: 0% to 90% RH, 30°C (86°F) maximum dew point conditions
Housing	Black Polycarbonate and Acrylonitrile butadiene styrene (ABS) blend
Mounting	On flat surface with screws on three mounting clips or a single 35 mm DIN rail
Dimensions (width x height x depth)	250 mm x 145 mm x 45.5 mm (9.84 in. x 5.71 in. x 1.79 in.)
Weight	0.65 kg (1.433 lbs)
Compliance	**United States:** UL Listed, File E107041, CCN PAZX, UL 916, Energy Management Equipment; FCC Compliant to CFR47, Part 15, Subpart B, Class A, Conformance to FIPS 140-2 Level 1 and validated under NIST Certificate #3389
	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
	BACnet International: BTL 135-2016 Listed B-BC/B-RTR/B-BBMD, Protocol Revision 18

Table 20: SNC25151-0x and SNC16121-0x (without display)

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)
Power consumption	32 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
SA Bus power	15 V at 240 mA maximum
Operating System	Wind River® Linux LTS 17 (LTS=long-term support)
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 0–10 VDC applications
Supported integrations	BACnet/IP, BACnet MS/TP
Network and serial interfaces	Two Ethernet ports; 1000/100/10 Mbps; 8-pin RJ45 connector One FC port (RJ12 6-pin port; connects with 1.5 m [4.9 ft] RJ12 field bus cable) One SA port (RJ12 6-pin port; connects with 1.5 m [4.9 ft] RJ12 field bus cable) One optically isolated RS-485 port; with a removable 4-pin terminal block One magnetically isolated FC Bus 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 Optically 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) Non-operating: -40°C to 70°C (-40°F to 158°F)
Ambient humidity conditions	Storage: 5% to 95% RH, 30°C (86°F) maximum dew point conditions Operating: 0% to 90% RH, 30°C (86°F) maximum dew point conditions
Housing	White Polycarbonate and Acrylonitrile butadiene styrene (ABS) blend
Mounting	On flat surface with screws on three mounting clips or a single 35 mm DIN rail
Dimensions (width x height x depth)	250 mm x 145 mm x 45.5 mm (9.84 in. x 5.71 in. x 1.79 in.)
Weight	0.65 kg (1.433 lbs)
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

Table 20: SNC25151-0x and SNC16121-0x (without display)

Specification	Description
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
	BACnet International: BTL 135-2016 Listed B-BC/B-RTR/B-BBMD, Protocol Revision 18
	FIPS 140-2 Level 1: Compliant and certified with Federal Information Processing Standard; https://csrc.nist.gov/Projects/cryptographic-module-validation-program/Certificate/3389

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, Inc. shall not be liable for damages resulting from misapplication or misuse of its products.

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 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.

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.

Single point of contact

APAC	Europe	NA/SA
JOHNSON CONTROLS C/O CONTROLS PRODUCT MANAGEMENT NO. 32 CHANGJIJANG RD NEW DISTRICT WUXI JIANGSU PROVINCE 214028 CHINA	JOHNSON CONTROLS WESTENDHOF 3 45143 ESSEN GERMANY	JOHNSON CONTROLS 507 E MICHIGAN ST MILWAUKEE WI 53202 USA

Software terms

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Product warranty

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

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