Introduction

The Facility Explorer SNC series (F4-SNC) are Ethernet-based, supervisory controllers that connect Building Automation System (BAS) networks to IP networks.

The SNC perform a key role in the FX system architecture. They provide network management and system-wide control coordination over one or more networks of controllers, including the following devices:

- CGM series general purpose equipment controllers
- CVM series VAV box controllers
- PCG and PCA programmable controllers
- PCV series VAV box controllers
- LX series controllers

These devices monitor and control networks of field-level building automation devices, including HVAC equipment, lighting, security, and fire safety equipment.

In addition to providing supervisory control capabilities, the SNC series also feature onboard input and output interfaces (I/O) and direct digital control capabilities of a controller.

SNC Series

- SNC25151-0
- SNC25151-04
- SNC25151-0H (display model)
- SNC25151-04H (display model)
- SNC16121-0
- SNC16121-04

Figure 1: F4-SNC25151-0

Figure 2: F4-SNC25151-0H

Figure 3: F4-SNC16121-0

See Ordering information for SNC models for more information on the model types available.

Features and benefits

Multiple models available

Multiple models are available with varying device capacities for integrations and integral control I/O provide flexibility to select the appropriate model for the intended application.

Linux® operating system

Provides a robust, widely-accepted, and readily-supported operating system.

User interface

You can use the Site Management Portal (SMP) user interface (UI) to access system data in the network engines from any supported web browser device connected to the network, including remote users connected by Virtual Private Network (VPN).

Encrypted communications

All SNC supervisory controllers have self-signed certificates that provide for encrypted communication.

Optionally, you can deploy trusted certificates from the customer's IT department or from a Certificate Authority (CA).

Memory

The memory of the SNC has 2 GB RAM and 16 GB Flash non-volatile memory. This memory provides capacity for further upgrades and a longer operational life.

Supports background file transfer

You can transfer files such as firmware upgrades, archive databases, or security transfers from the System Configuration Tool (SCT) to the SNC while it remains operational, minimizing system disruptions.

Device security

Ensures device integrity while the system is rebooting and during normal operation. Embedded technology provides trusted boot operation, firmware protection, secure storage, secure communications, and secure firmware updates complying with strong cyber security practices.

Diagnostic multi-color LEDs

The use of multi-color LEDs can decrease installation and troubleshooting time.

Removable terminal blocks

The use of removable terminal blocks facilitates installation and servicing.

Supervision of controller networks including Johnson Controls devices and third-party protocol devices

Supports connectivity to open network standards for complete flexibility in the selection of field devices. They include BACnet/IP and BACnet MS/TP..

No battery

The SNC use a supercapacitor, not a battery, to provide temporary power for data backups during shutdown due to AC power loss. This design is more environmentally friendly and saves the eventual cost of replacing the battery. When the supercapacitor is fully charged, the SNC can maintain the real time clock for up to 72 hours during AC power loss.

Updated BACnet compliance

Network Engines are enhanced to support BACnet Protocol Revision 18. Assures end customers of compliance to BACnet standard to support interoperability with third-party BACnet devices.

Onboard inputs and outputs

Provides direct equipment-level control including central plant and large air-handler applications combined with enterprise-level IP network connectivity. The SNC2515x has 25 inputs and 15 outputs, and the SNC1612x has 16 inputs and 12 outputs.

Expandable I/O point capacity, NS sensor connectivity, and Variable Frequency Drive (VFD) control on SA Bus

You can connect to multiple I/O Expansion Modules, NS Series Network Sensors, and VFD connections to the SA Bus, which greatly expands control capabilities.

Generic SA Bus object

A more nimble method for supporting the integration of approved BACnet MS/TP edge devices on the SA Bus. Provides system designers with more SA Bus device options to cost-effectively meet controls project requirements.

SA Bus provisioning expanded to support XPM and NS8000 SA Bus devices (SNC only)

SA Bus devices (for example, XPMs and NS8000s) can be updated through the host controller. Saves field technicians time by streamlining upgrade workflows.

New SNC models with onboard user interface

New SNC models feature a onboard, 2.4 in., 320 x 240 resolution display and associated keypad, which provides local user interface capabilities. Provides end customers with the ability to quickly and clearly monitor equipment status, view alarms, see trends, issue overrides, and change setpoints and parameters.

SNC models updated to include a second Ethernet port

Updated SNC models contain two Ethernet ports that support daisy-chain IP networking topology. Provides system designers with the installation flexibility and reduced installation costs of daisy-chain network topology for IP controller installations.

Network management and integration

F4-SNC supervisory controllers provide network management over one or more networks of controllers and other field devices. The SNCs feature several optional communication port and protocol selections to integrate FX controllers, types of non-FX devices, and third-party devices typically found in commercial buildings.

The following list includes a brief description of the supported integrations:

- **BACnet/IP**—for FX IP-based equipment controllers and other third-party BACnet/IP devices. The following are BACnet/IP integrations available:
- **BACnet MS/TP**—for FX equipment controllers and TEC equipment controllers, non-FX BACnet controllers, and other third-party BACnet MS/TP devices.

Automated system-wide control and coordination

The SNC provides automated system-wide control and coordination over multiple field devices under one or

more field device networks. Some examples of the system-wide control coordination capabilities include:

- **Scheduling:** The SNC can automatically command mechanical or electrical equipment to a operational state, such as On/Off, Occupied/Unoccupied, Economy/Comfort, or Heating/Cooling/Economizer/Auto based on a user-defined schedule. You can set the operating parameters according to time of day, days of the week, holidays, or calendar dates.
- **Alarm and event management:** The SNC can generate alarms based on user-defined criteria; to send alarm and event messages to web browsers, email servers, and Network Management Systems; and to store and view alarm and event logs, and transfer the data to the Application and Data Server.
- **Network-wide system interlocking:** The SNC can collect data from field devices, make logical comparisons between the data, and issue relevant commands to other field controllers, anywhere on the network.
- **Transaction recording:** Audits and logs all user actions performed through the system. Operators can review these logs to understand what changes have been made to the system, who made them, and when they were made.
- **Historical data:** Historical data can be collected and stored by the SNC for any monitored data point value based on user-defined intervals or on a change of value. The SNC can transfer the data logs to the Application and Data Server at defined intervals, or when the SNC logs are full.
- **Totalization:** The SNC can calculate rolling sums of any monitored data point value stream. Operators can use this information to monitor runtime information useful for service, maintenance, and early identification of building system problems.
- **Optimal start:** The SNC can automatically determine the best time to start heating and cooling systems to ensure that the facility is conditioned for occupancy. It adjusts to seasonal variations and reduces energy use.
- **Demand Limiting Load Rolling (DLLR):** The SNC can monitor energy meters, such as electricity, gas, steam, or water, and automatically shed equipment loads according to user-defined levels. Demand Limiting helps manage utility demand charges. Load Rolling controls equipment operating levels to reduce total energy consumption.
- **Access control system integration:** The SNC can monitor and control systems that notify the security guard when an access badge scan is permitted or denied, when access control devices go offline, and when monitored doors are locked and unlocked. The SNC can use building events to trigger logic and automate access control functions throughout a facility.

SNC series network control engines

The following table contains a brief comparison of the features of the SNC models.

ⓘ **Note:** Each device counts towards the overall limit of the SNC. For example, you cannot have 50 MS/TP devices and 50 BACnet/IP devices connected to an SNC25151-xx

- **Video management system integration:** The SNC can access systems that track the health of video system components, and reports on a variety of analytics and events. Video streaming directly within the user interface is not available; you can view the surveillance system adjacent to the SMP UI in a separate browser window.
- **Lighting control system integration:** the SNC can access and control lighting groups, zones, and spaces without the engine needing a large number of points. Options include turning lights on and off, adjusting light levels, and obtaining sensor data that indicates such data as occupancy, ambient light level, and power consumption.

Scalable

Different SNC models are available, each with different field device capacities, so you can select the model that best meets the size, complexity, and scope of your specific project.

Secure

The Facility Explorer system uses industry-standard system security and encoding protocols to protect against unauthorized access to data and control systems. The system includes the following security features:

- Obscures user names and passwords.
- Enforces strong passwords.
- Provides an optional capability of sending its configured audit log entries and alarm notifications to an external, industry-standard Syslog server, conforming to Internet published RFC 3164.
- Provides dormant account settings for users and reports. Dormant User Account Reports are available in SMP. Dormant user account events are also included in the Audit Viewer and the Event Viewer.
- HTTPS with TLS 1.2 between components, including the System Configuration Tool (SCT) and supervisory controller. This enhancement ensures the highest level of security to protect your building automation system from unauthorized users and computer hackers.
- Certified FIPS 140-2 Level 1 compliance. FIPS 140-2 is a U.S. government cybersecurity standard used to approve cryptographic modules and algorithms used for encryption. Assures end customers that Facility Explorer uses strong cybersecurity techniques to prevent unauthorized access to systems and data.

Table 1: SNC series Network Control Engines details

Features	SNC25151-0 SNC25151-0H	SNC25151-04 SNC25151-04H	SNC16121-0	SNC16121-04
Onboard inputs and outputs	• 40 total onboard I/O: 14 UI, 11 BI, 4 CO, 4 AO, 7 BO • Supports SA Bus expansion		• 28 total onboard I/O: 10 UI, 6 BI, 4 CO, 4 AO, 4 BO • Supports SA Bus expansion	
Communication interfaces	• 2 Ethernet port: SNC25151-0, SNC25151-0H, SNC25151-04, SNC25151-04H, SNC16121-0, SNC16121-04 • 1 RS-485 port • 2 USB ports for connecting external integration adapters			
Maximum allowed devices across all integrations.	96	4	60	4
BACnet/IP maximum trunks	1	1	1	1
BACnet/IP maximum devices per trunk	50	4	50	4
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)	50	4	50	4
Maximum objects in device[1]	2500	2500	2500	2500
Supported integration drivers	• BACnet/IP • BACnet MS/TP			
Operating System	Wind River® Linux LTS 17 (LTS=long-term support)			
Microprocessor	NXP i.MX6 DualLite processor			
Memory	2 GB of DDR3 RAM and 16 GB of eMMC Flash			
User Interface	Site Management Portal (SMP)			

1   Suggested object limit for performance considerations.

SNC point type counts

The SNC2515x 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 2: Onboard I/O points

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

Table 3: 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

Conclusion

The SNC affirms the position of Johnson Controls as a leader and innovator in the Building Automation System (BAS) industry. The integration of IT and Internet standards into the SNC platform, as well as the use of open protocols for field networks, bring the benefits of the global communications and control industries into one system. Web browser-based access from any location is a key to the effective use of the automation network.

The Facility Explorer system continues to be the integrating network within buildings and has now been extended to bridge the gap between traditional control systems and the business and communication network systems of the enterprise.

Ordering information for SNC models

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.

ⓘ **Note:** Since the SNC is a new model, a reconditioned model may not be available.

ⓘ **Note:** Additional USB integration adapters can be expected at future releases.

Ordering information for SNC models

Table 4: SNC model features by product code number

	SNC25151-0 SNC25151-0H	SNC25151-04 SNC25151-04H	SNC16121-0	SNC16121-04
Integral Equipment Controller	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	
Maximum MS/TP or N2 devices per local FC Bus trunk	50	4	50	4
Ethernet Port	**2**: SNC25151-0, SNC25151-0H, SNC25151-04, SNC25151-04H, SNC16121-0, SNC16121-04			

Table 4: SNC model features by product code number

	SNC25151-0 SNC25151-0H	SNC25151-04 SNC25151-04H	SNC16121-0	SNC16121-04
Field Controller (FC) Bus	1			
SA Bus	1			
USB Ports for LonWorks, RS-232, M-Bus	2			

Technical specifications

Table 5: Technical specifications

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
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)

Table 5: Technical specifications

Specification	Description
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

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.

Repair information

If the SNC fails to operate within its specifications, replace the unit. For a replacement SNE or SNC, contact the nearest Johnson Controls representative.

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.

Product warranty

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

Single point of contact

APAC	Europe	NA/SA
JOHNSON CONTROLS C/O CONTROLS PRODUCT MANAGEMENT NO. 32 CHANGJIJIANG 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

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