

SpaceLogic RP-C Pro for Niagara Framework® Room Controllers

I/A Series



Introduction

SpaceLogic™ RP-C Pro for Niagara Framework® is a high-power, fully programmable, IP based field controller that suits a wide range of HVAC applications.

The RP-C Pro 24 VAC/VDC controller has more memory space and more I/O points (16) than the RP-C Advanced controllers.

The RP-C Pro controller can either be used as a standalone BACnet/IP field controller or as part of an I/A Series Niagara BMS with a JACE or Niagara Supervisor as the parent server.

The controller features a wireless chip, which enables commissioning of the controller with the Commission mobile application.

RP-C Pro has the following features:

- IP enabled with dual-port Ethernet switch
- Versatile onboard I/O point mix
- Optional covers
- Wireless connectivity
- Advanced monitoring
- Sensor bus for living space sensors
- Commission mobile application for commissioning of the controller before the BMS is in place
- Seamless integration with I/A Series Niagara software
- Upgrade with signed firmware

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IP connectivity and flexible network topologies

The BACnet/IP controllers are based on open protocols that simplify interoperability, IP configuration, and device management:

- IP addressing
- BACnet/IP communications
- DHCP for easy network configuration

The BACnet/IP controllers have a dual-port Ethernet switch, which enables flexible network topologies:

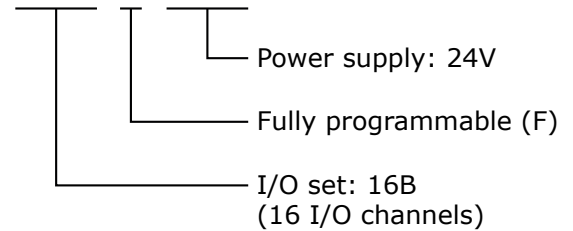
- Star
- Daisy chain
- Rapid Spanning Tree Protocol (RSTP) ring

In a star topology, the controller and the parent Niagara or I/A Series Niagara server are individually connected to an Ethernet switch. Daisy-chain multiple controllers together to reduce installation time and cost. When using a ring network topology, in the event of a broken IP network or a non-operational controller, RSTP will enable rapid identification of the location of the detected error while maintaining communication with the controllers on either side of the break.

Controller model

The RP-C Pro range includes a single model, which offers a wide range of I/O point types, through an I/O set named 16B. The RP-C-16B-F-24V model supports 24 VAC/VDC power supply.

RP-C-16B-F-24V



Fully programmable

The fully programmable RP-C model provides flexibility through support of both Script and graphical programming options.

Versatile mix of I/O points

The RP-C-16B-F-24V model provides 16 I/O points, consisting of four different sets of I/O point types. The versatile mix of I/O point types match a wide variety of applications. The universal inputs/outputs are highly flexible and can be configured as either inputs or outputs.

I/O Point Types

I/O Point Types	RP-C-16B-F-24V
Universal I/O Type Ub	8
Solid-state relay outputs (MOSFET)	4
Relay outputs Form A	3
High power relay outputs Form C	1

Configurations by I/O Point Types

Configurations	Universal I/O Type Ub	Solid-state Relay Outputs (MOSFET)	Relay Outputs Form A	High Power Relay Outputs Form C
Digital inputs	yes	-	-	-
Counter inputs	yes	-	-	-
Supervised inputs	yes	-	-	-
Voltage inputs (0 to 10 VDC)	yes	-	-	-
Current inputs (0 to 20 mA)	yes	-	-	-

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Continued

Configurations	Universal I/O Type Ub	Solid-state Relay Outputs (MOSFET)	Relay Outputs Form A	High Power Relay Outputs Form C
Temperature inputs	yes	-	-	-
Resistive inputs	yes	-	-	-
2-wire RTD temperature inputs	yes	-	-	-
Voltage outputs (0 to 10 VDC)	yes	-	-	-
Digital outputs	-	yes	yes	yes
Digital pulsed outputs	-	yes	yes	yes
PWM outputs	-	yes	yes	yes
Tristate outputs	-	yes	yes	-
Tristate pulsed outputs	-	yes	yes	-

Universal inputs/outputs

The universal inputs/outputs are ideal for any mix of temperature, pressure, flow, status points, and similar point types in a building control system.

As counter inputs, the universal inputs/outputs are commonly used in energy metering applications. As RTD inputs, they are ideal for temperature points in a building control system. As supervised inputs, they are used for security applications where it is critical to know whether or not a wire has been cut or shorted. These events provide a separate indication of alarms and events in the system.

For all analog inputs, maximum and minimum levels can be defined to automatically detect over-range and under-range values.

The universal inputs/outputs are capable of supporting analog outputs of type voltage outputs. Therefore, the universal inputs/outputs support a wide range of devices, such as actuators.

Only devices with safe extra low voltage equipment (SELV/PELV) inputs/outputs should be connected to the universal inputs/outputs.

Solid-state relay outputs

The solid-state relay (SSR) outputs can be used in many applications to switch 24 VAC or 24 VDC on or off for external loads such as actuators, relays, or indicators. SSRs are silent and are not adversely affected by relay contact wear.

Relay outputs

The relay outputs support digital Form A point types. The Form A relays are designed for direct load applications.

High power relay output

The high power relay output is of type Form C. The normally-open (NO) contact is ideal for switching resistive loads of up to 12 A, such as electrical heating elements. The normally-closed (NC) contact can be used to switch inductive loads of up to 3 A.

Optional covers

All RP-C models can be equipped with optional covers to reduce access to the screw terminals and wires.



RP-C with equipped with optional covers

Wireless connectivity

RP-C is a Bluetooth Low Energy (BLE) enabled product. You can use this wireless connectivity option to connect the RP-C with a

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smartphone or tablet running the Commission mobile application.

Advanced monitoring

The BACnet/IP controllers support local trends, schedules, and alarms, enabling local operation when the controller is offline or used in standalone applications.

The battery-free power backup of the memory and real-time clock helps prevent data loss and allows seamless and quick recovery after a power disruption.

Sensor bus for living space sensors

The BACnet/IP controllers provide an interface designed for the SpaceLogic Sensor family of living space sensors. The SpaceLogic Sensor devices offer an efficient way to sense the temperature, humidity, CO₂, and occupancy in a room. The SpaceLogic Sensor devices are available with different combinations of sensor types and various covers and user interface options, such as touchscreen, setpoint and override buttons, and blank covers. For more information, see the SpaceLogic Sensors - SXWS Sensors for MP and RP IP Controllers - Specification Sheet.

The RP controller has two RS-485 ports. Either of these ports can be configured to support the sensor bus but only one sensor bus is supported per controller.

the sensor model and the combination of cover and sensor base type:

- Blank covers: Up to four sensors of any combination of sensor base types
- 3-button and touchscreen covers: Up to four sensors of any combination of sensor base types
- SpaceLogic LCD temperature sensors: Up to four sensors are supported

The maximum total length of the sensor bus is 61 m (200 ft). For more information, see the SpaceLogic Sensors - SXWS Sensors for MP and RP IP Controllers - Specification Sheet.

The RS-485 Power Adapter can be used for injecting 24 VDC from an external 24 VDC power supply to the bus. For more information, see the RS-485 Adapters Specification Sheet.

Commission mobile application

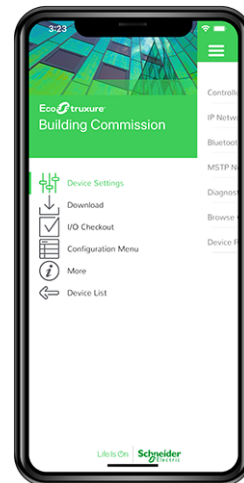
The Commission mobile application is designed for local configuration, field deployment, and commissioning of BACnet/IP controllers. The mobile application reduces the commissioning time, allows flexibility in project execution, and minimizes dependencies on network infrastructure.

The mobile application is designed for use with Android, Apple (iOS), and Microsoft Windows devices. For more information, see the EcoStruxure Building Commission Specification Sheet.



SpaceLogic Sensor devices

The RP controller sensor bus provides both power and communications for up to four sensors that are daisy-chained using standard Cat 5 (or higher) cables. This maximum number of sensors that can be connected to a controller is regardless of



Commission mobile application

Using the Commission mobile application, you can connect to one or many RP controllers. You can connect to a single RP controller using the controller's built-in Bluetooth connectivity or using the SpaceLogic Bluetooth Adapter connected to a SpaceLogic Sensor. Using a wireless access point or a network switch, you can connect to a network of RP controllers on the local IP network.

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Device configuration

With the Commission mobile application, you can easily discover BACnet/IP controllers on the IP network. You can change the configuration of each controller, including the BACnet and IP network settings, location, and parent server. To save engineering time, you can save common device settings and then reuse them for controllers of the same model.

Firmware management

The Commission mobile application enables you to update the firmware of BACnet/IP controllers. Using a wired or wireless connection, you can audit and update the firmware for each controller.

Field I/O checkout

The Commission mobile application does not require an I/A Series Niagara server or a network infrastructure to be in place. You can use the mobile application to browse objects and view device status information. You can also perform an I/O checkout to verify that the controller's I/O points are configured, wired, and operating correctly.

Seamless integration with I/A Series Niagara software

The power of the BACnet/IP controller is fully realized when it is part of an I/A Series Niagara BMS, which provides the following benefits:

- Device discovery
- Full engineering capability from Workbench
- Graphical programming from a Wiresheet
- Support for custom Script programs
- Engineering efficiency

Device discovery

The enhanced Device Discovery in Workbench enables you to easily identify BACnet/IP controllers on a BACnet network and to associate the controllers with their parent server.

Full engineering capability from Workbench

Workbench provides a consistent user experience regardless of which I/A Series Niagara BMS server the user is logged on to. The user can log on to the parent Niagara BMS server to engineer, commission, supervise, and monitor the BACnet/IP

controller and its I/O as well as its attached SpaceLogic Sensor devices.

Graphical programming from a Wiresheet

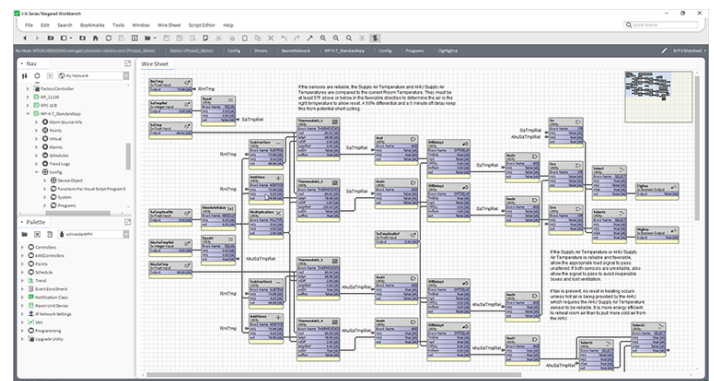
The BACnet/IP controllers can be programmed directly using the familiar Wiresheet interface and an extensive palette of graphical program objects. Users can quickly drag, drop, and configure program objects to create full applications and download to the controllers.

Support for custom Script programs

The BACnet/IP controllers also support custom Script programs. Users can write their own custom Script programs, compile, and download them to the controller. These custom Script programs will appear graphically on a Wiresheet where they can be bound with other objects.

Engineering efficiency

Workbench supports both online and offline engineering of BACnet/IP controllers. You can create and engineer controllers offline and then associate with an online controller when complete.



Workbench

Upgrade with signed firmware

Using digitally signed firmware provides more secure upgrading of the device. During an upgrade, the device verifies that the firmware is authentic and uncompromised. If the device detects discrepancies in the authenticity or integrity of the firmware, it will reject the upgrade. Once the device is upgraded with signed firmware, all upgrades thereafter must be with a signed firmware version.

Part Number for RP-C Pro

Product	Part number
RP-C-16B-F-24V	SXWRCF16B1001

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Part Numbers for RP-C Accessories

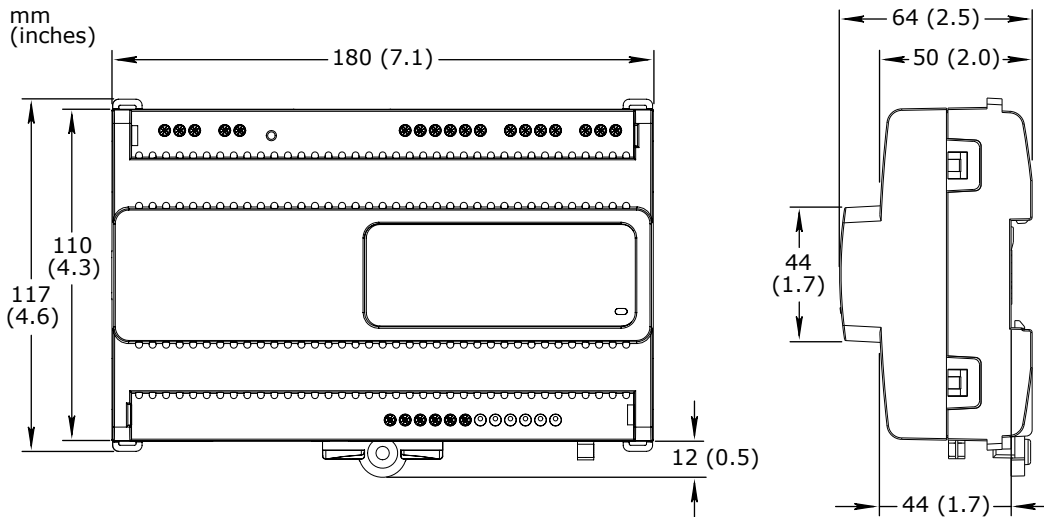
Product	Part number
Optional covers	SXWRPCCOV10001
DIN-RAIL-CLIP, DIN-rail end clip package of 25 pieces	SXWDINEND10001
RS-485 power adapter	SXWNISORS485P10001
SpaceLogic Bluetooth Adapter	SXWBTAECXX10001

For more information on part numbers for Network Connectivity Accessories, see the Product Selection Guide - EcoStruxure Building.

Specifications

SpaceLogic RP-C Pro for Niagara Framework®	
AC input	
Nominal voltage	24 VAC
Operating voltage range	+/-15 %
Frequency	50/60 Hz
Maximum power consumption	30 VA
Power input protection	MOV suppression and internal fuse
DC input	
Nominal voltage	24 to 30 VDC
Operating voltage range	23.5 to 33 VDC
Maximum power consumption	16 W
Power input protection	MOV suppression and internal fuse
Environment	
Ambient temperature, operating	0 to 50 °C (32 to 122 °F) at normal operation -40 to +60 °C (-40 to +140 °F) for rooftop applications, horizontal installation only
Ambient temperature, storage	-20 to +70 °C (-4 to +158 °F)
Maximum humidity	95 % RH non-condensing
Material	
Plastic flame rating	UL94 V-0
Ingress protection rating	IP 20
Mechanical	
Dimensions	180 W x 110 H x 64 D mm (7.1 W x 4.3 H x 2.5 D in.)

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Weight

0.390 kg (0.860 lb)

Recommended installation

DIN rail or flat surface in a cabinet[†]

a) It is recommended to install the device in an enclosure (cabinet), unless local regulations allow an exception.

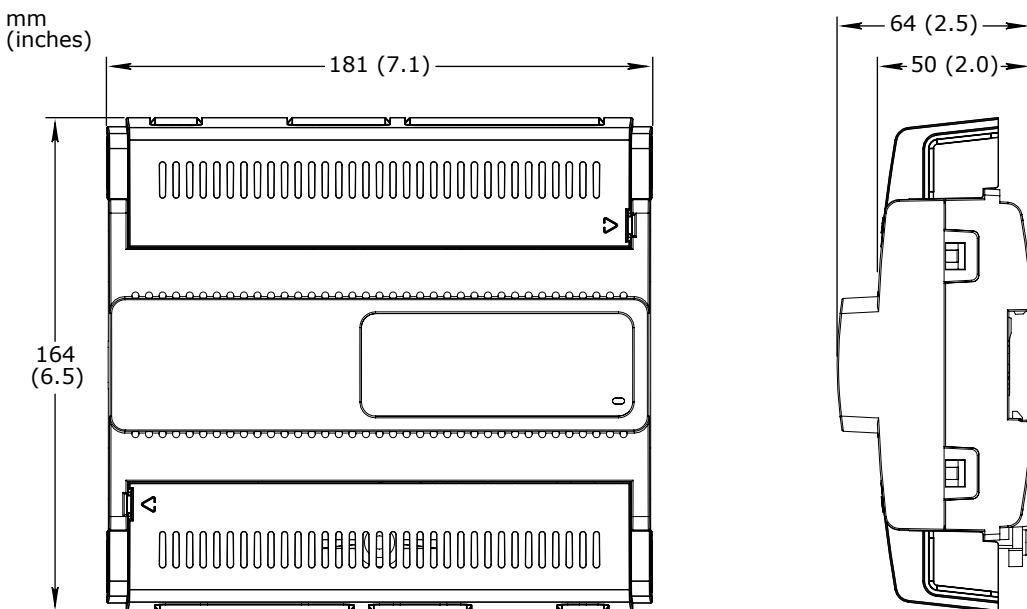
Terminal blocks

Fixed

Optional covers

Dimensions

181 W x 164 H x 64 D mm (7.1 W x 6.5 H x 2.5 D in.)



Weight, optional covers

0.070 kg (0.154 lb)

Software compatibility

I/A Series Niagara software

version 4.10 and later

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Agency compliances	
Emission	RCM; BS/EN 61000-6-3; BS/EN IEC 63044-5-2; FCC Part 15, Subparts B and C, Class B
Immunity	BS/EN 61000-6-2; BS/EN IEC 63044-5-3
Radio	ETSI EN 300 328 V2.2.2
Safety standards	BS/EN 60730-1; BS/EN 60730-2-11; BS/EN IEC 63044-3; UL 916 C-UL US Listed ^a
a) RP-C-16B-F-24V is marked "Open Energy Management Equipment".	
FCC ID	DVE-RPC24
ISED certification number	IC: 24775-RPC24
Fire performance in air-handling spaces ^a	UL 2043
a) The RP-C-16B-F-24V model is approved for plenum applications.	
Real-time clock	
Accuracy, at 25 °C (77 °F)	+/-1 minute per month
Backup time, at 25 °C (77 °F)	7 days minimum
Communication ports	
Ethernet	Dual 10/100BASE-TX (RJ45), IEEE 802.3 compliant
USB	1 USB 2.0 device port (mini-B) 1 USB 2.0 host port (type-A), 5 VDC, 2.5 W
RS-485 port Com A	24 VDC, 3 W, RS-485 (RJ45) Transient voltage suppressors on communication and power signals
RS-485 port Com B	24 VDC, 3 W, RS-485 (RJ45) Transient voltage suppressors on communication and power signals
RS-485 transceiver characteristics	
Transceiver type	Failsafe Non-isolated
External biasing	None required
Total Unit Load (UL) per device	Maximum 0.5 UL
Communications	
BACnet	BACnet/IP, port configurable, default 47808 BTL B-AAC (BACnet Advanced Application Controller), B-GW (BACnet Gateway) ^a
a) See the BTL Product Catalog for up-to-date details on BTL listed firmware revisions on BACnet International's home page.	
Wireless connectivity	
Bluetooth Low Energy	
Communication protocol	Bluetooth® 5.1 Low Energy compliant
Frequency	2.402 to 2.480 GHz
Maximum output power	10 dBm
Maximum communication distance	Line-of-sight: 100 m (328 ft)

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Antenna	Integrated antenna			
RF connector for optional external antenna	SMA connector			
External antenna (optional)	Restricted to the approved antenna type listed below (used in certification)			
Manufacturer	Model (Part number)	Gain	Type	Impedance
Linx Technologies	ANT-2.4-WRT-MON-SMA	0.8 dBi	Monopole	50 ohm
CPU				
Frequency				500 MHz
Type				ARM Cortex-A7 dual-core
DDR3 SDRAM				128 MB
NOR flash memory				64 MB
Memory backup				128 kB, FRAM, non-volatile
Universal inputs/outputs				
Channels				8 Ub, Ub1 to Ub8
Absolute maximum ratings				-0.5 to +24 VDC
A/D converter resolution				16 bits
Universal input/output protection				Transient voltage suppressor on each universal input/output
Digital inputs				
Range	Dry contact switch closure or open collector/open drain, 24 VDC, typical wetting current 2.4 mA			
Minimum pulse width				150 ms
Counter inputs				
Range	Dry contact switch closure or open collector/open drain, 24 VDC, typical wetting current 2.4 mA			
Minimum pulse width				20 ms
Maximum frequency				25 Hz
Supervised inputs				
5 V circuit, 1 or 2 resistors Monitored switch combinations				Series only, parallel only, and series and parallel
Resistor range				1 to 10 kohm
For a 2-resistor configuration, each resistor must have the same value +/- 5 %				
Voltage inputs				
Range				0 to 10 VDC
Accuracy				+/- (7 mV + 0.2 % of reading)
Resolution				1.0 mV
Impedance				1 Mohm

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Current inputs	
Range	0 to 20 mA
Accuracy	+/(0.01 mA + 0.4 % of reading)
Resolution	1 µA
Impedance	47 ohm
Resistive inputs	
10 ohm to 10 kohm accuracy R = Resistance in ohm	+/(7 + 4 x 10 ⁻³ x R) ohm
10 kohm to 60 kohm accuracy R = Resistance in ohm	+/(4 x 10 ⁻³ x R + 7 x 10 ⁻⁸ x R ²) ohm
Temperature inputs (thermistors)	
Range	-50 to +150 °C (-58 to +302 °F)
Supported thermistors	
Honeywell	20 kohm
Type I (Continuum)	10 kohm
Type II (I/NET)	10 kohm
Type III (Satchwell)	10 kohm
Type IV (FD)	10 kohm
Type V (FD w/ 11k shunt)	Linearized 10 kohm
Satchwell D?T	Linearized 10 kohm
Johnson Controls	2.2 kohm
Xenta	1.8 kohm
Balco	1 kohm
Measurement accuracy	
20 kohm	-50 to -30 °C: +/-1.5 °C (-58 to -22 °F: +/-2.7 °F) -30 to 0 °C: +/-0.5 °C (-22 to +32 °F: +/-0.9 °F) 0 to 100 °C: +/-0.2 °C (32 to 212 °F: +/-0.4 °F) 100 to 150 °C: +/-0.5 °C (212 to 302 °F: +/-0.9 °F)
10 kohm, 2.2 kohm, and 1.8 kohm	-50 to -30 °C: +/-0.75 °C (-58 to -22 °F: +/-1.35 °F) -30 to +100 °C: +/-0.2 °C (-22 to +212 °F: +/-0.4 °F) 100 to 150 °C: +/-0.5 °C (212 to 302 °F: +/-0.9 °F)
Linearized 10 kohm	-50 to -30 °C: +/-2.0 °C (-58 to -22 °F: +/-3.6 °F) -30 to 0 °C: +/-0.75 °C (-22 to +32 °F: +/-1.35 °F) 0 to 100 °C: +/-0.2 °C (32 to 212 °F: +/-0.4 °F) 100 to 150 °C: +/-0.5 °C (212 to 302 °F: +/-0.9 °F)
1 kohm	-50 to +150 °C: +/-1.0 °C (-58 to +302 °F: +/-1.8 °F)

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RTD temperature inputs		
Supported RTDs		Pt1000, Ni1000, and LG-Ni1000
Pt1000		
Sensor range		-50 to +150 °C (-58 to +302 °F)
BACnet/IP device environment	Sensor range	Measurement accuracy
0 to 50 °C (32 to 122 °F)	-50 to +70 °C (-58 to +158 °F)	+/-0.5 °C (+/-0.9 °F)
0 to 50 °C (32 to 122 °F)	70 to 150 °C (158 to 302 °F)	+/-0.7 °C (+/-1.3 °F)
-40 to +60 °C (-40 to +140 °F)	-50 to +150 °C (-58 to +302 °F)	+/-1.0 °C (+/-1.8 °F)
Ni1000		
Sensor range		-50 to +150 °C (-58 to +302 °F)
BACnet/IP device environment	Sensor range	Measurement accuracy
0 to 50 °C (32 to 122 °F)	-50 to +150 °C (-58 to +302 °F)	+/-0.5 °C (+/-0.9 °F)
-40 to +60 °C (-40 to +140 °F)	-50 to +150 °C (-58 to +302 °F)	+/-0.5 °C (+/-0.9 °F)
LG-Ni1000		
Sensor range		-50 to +150 °C (-58 to +302 °F)
BACnet/IP device environment	Sensor range	Measurement accuracy
0 to 50 °C (32 to 122 °F)	-50 to +150 °C (-58 to +302 °F)	+/-0.5 °C (+/-0.9 °F)
-40 to +60 °C (-40 to +140 °F)	-50 to +150 °C (-58 to +302 °F)	+/-0.5 °C (+/-0.9 °F)
RTD temperature wiring		
Maximum wire resistance		20 ohm/wire (40 ohm total)
Maximum wire capacitance		60 nF
The wire resistance and capacitance typically corresponds to a 200 m wire.		
Voltage outputs		
Range		0 to 10 VDC
Accuracy		+/-60 mV
Resolution		10 mV
Minimum load resistance		2.4 kohm
Source current		+4.2 mA
Sink current		-1 mA (0 to 0.4 VDC) -4.2 mA (0.4 to 10 VDC)
Relay outputs, DO		
Channels		3, DO5 to DO7
Contact rating		Pilot Duty (C300) Resistive load: 250 VAC/30 VDC, 4 A (cos phi = 1) Inductive load: 250 VAC/30 VDC, 4 A (cos phi = 0.4)

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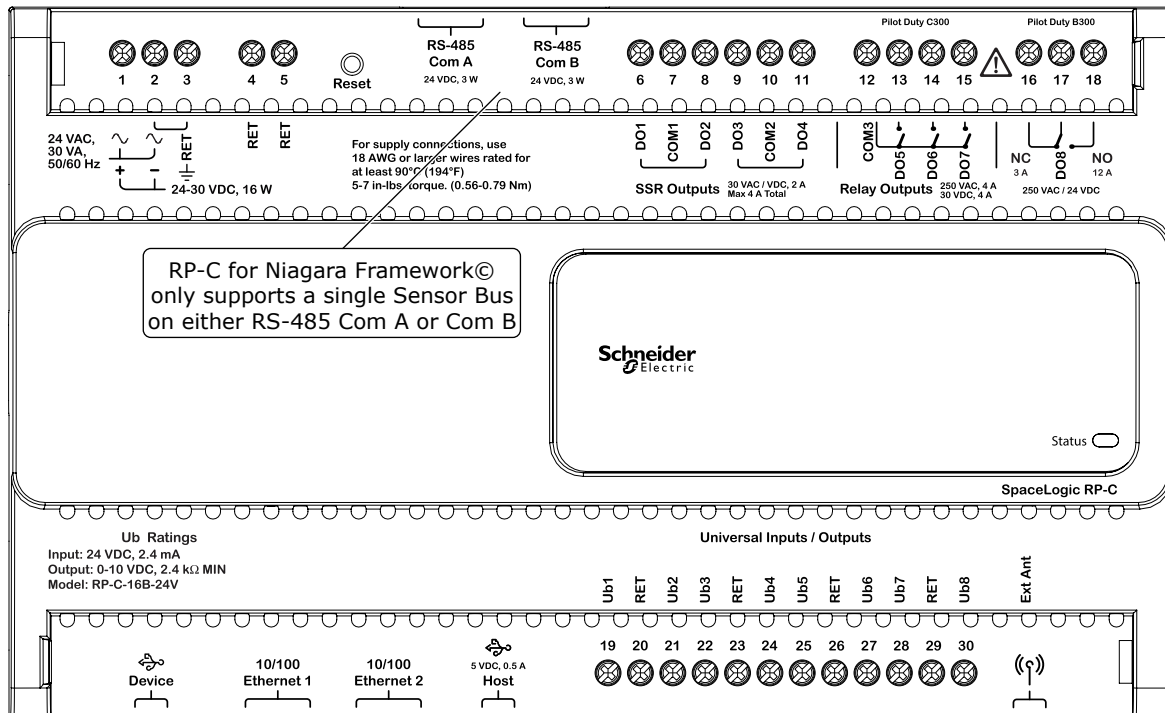
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Switch type	Form A Relay Single Pole Single Throw Normally Open
Commons	COM3 for DO5, DO6, and DO7
Isolation contact to system ground	3,000 VAC
Cycle life	At least 100,000 cycles
Minimum pulse width	100 ms
High power relay outputs, DO	
Channels	1, DO8
Contact rating	Pilot Duty (B300) Minimum current: 100 mA (5 VDC) Normally Open contact, resistive load: 250 VAC/24 VDC, 12 A (cos phi = 1) Normally Closed contact, inductive load: 250 VAC/24 VDC, 3 A (cos phi = 0.4)
Switch type	Form C Relay Single Pole Double Throw Normally Open and Normally Closed
Isolation contact to system ground	5,000 VAC
Cycle life	At least 100,000 cycles
Minimum pulse width	100 ms
Solid-state relay outputs, DO	
Channels	4, DO1 to DO4
Output rating	Maximum 2 A load per output Maximum 4 A total load for the 4 outputs
AC voltage range	Maximum 30 VAC
DC voltage range	Maximum 30 VDC
Commons	COM1 for DO1 and DO2 COM2 for DO3 and DO4
When the SSR outputs are used to switch AC, the common terminals can be connected to 0 to 30 VAC. When the SSR outputs are used to switch DC, the common terminals can be connected to -30 VDC to +30 VDC.	
Common voltage range (AC)	0 to 30 VAC
Common voltage range (DC)	-30 to +30 VDC
Minimum pulse width	100 ms
Solid-state relay output protection	Transient voltage suppressor across each solid-state relay (SSR) output

Terminals

For more information on wiring, see the SpaceLogic and EasyLogic - Hardware Installation System Guide.

SpaceLogic RP-C Pro for Niagara Framework®



RP-C-16B-F-24V model (24 VAC/DC)

SpaceLogic RP-C Pro for Niagara Framework®

Regulatory Notices



Federal Communications Commission

FCC Rules and Regulations CFR 47, Part 15, Class B

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference. (2) This device must accept any interference received, including interference that may cause undesired operation.

FCC ID: DVE-RPC24

Industry Canada

This Class B digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

IC: 24775-RPC24



Regulatory Compliance Mark (RCM) - Australian Communications and Media Authority (ACMA)

This equipment complies with the requirements of the relevant ACMA standards made under the Radiocommunications Act 1992 and the Telecommunications Act 1997. These standards are referenced in notices made under section 182 of the Radiocommunications Act and 407 of the Telecommunications Act.



UK Conformity Assessed

S.I. 2017/1206 - Radio Equipment Regulations 2017

S.I. 2016/1101 - Electrical Equipment (Safety) Regulations 2016

S.I. 2012/3032 - Restriction of the Use of Certain Hazardous Substances in Electrical and

Electronic Equipment Regulations 2012

S.I. 2013/3113 - Waste Electrical and Electronic Equipment Regulations 2013

This equipment complies with the rules, of the UK regulations, for governing the UKCA Marking for the United Kingdom specified in the above directive(s).



CE - Compliance to European Union (EU)

2014/53/EU Radio Equipment Directive (RED)

2014/35/EU Low Voltage Directive

2011/65/EU Restriction of Hazardous Substances (RoHS) Directive

2015/863/EU amending Annex II to Directive 2011/65/EU

This equipment complies with the rules, of the Official Journal of the European Union, for governing the Self Declaration of the CE Marking for the European Union as specified in the above directive(s).



WEEE - Directive of the European Union (EU)

This equipment and its packaging carry the waste of electrical and electronic equipment (WEEE) label, in compliance with European Union (EU) Directive 2012/19/EU, governing the disposal and recycling of electrical and electronic equipment in the European community.



UL 916 Listed products for the United States and Canada. UL file E80146.

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Life Is On

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