

# SpaceLogic RP-V Advanced for Niagara Framework® Room Controllers

## I/A Series



### Introduction

SpaceLogic™ RP-V Advanced for Niagara Framework® is a room-purpose, fully programmable, IP based field controller dedicated for VAV cooling and Heating applications. RP-V Advanced integrates a controller, a damper actuator, and an air flow sensor in a single compact unit for ease of installation.

The RP-V Advanced controller can either be used as a standalone BACnet/IP 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-V Advanced comes in two models with different I/O count.

RP-V Advanced has the following features:

- IP enabled with dual-port Ethernet switch
- Integrated damper actuator with feedback signal
- Torque rating of 10 Nm (88.5 lbf.in)
- Factory-calibrated air flow sensor
- Versatile onboard I/O point mix
- Built-in isolated power supply
- Wireless connectivity
- Advanced monitoring

# SpaceLogic RP-V Advanced for Niagara Framework®

- 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

## 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.

## Models with a versatile mix of I/O points

The RP-V Advanced range includes two models with different I/O point count and a versatile mix of I/O point types that match a wide variety of VAV applications. The universal inputs/outputs are highly flexible and can be configured as either inputs or outputs.

### I/O Point Types by RP-V Models

I/O Point Types	RP-V-4A	RP-V-5A
Universal I/O Type Ub	4	2
Solid-state relay outputs (MOSFET)	-	3

### Configurations by I/O Point Types

Configurations	Universal I/O Type Ub	Solid-state Relay Outputs (MOSFET)
Digital inputs	yes	-
Counter inputs	yes	-
Supervised inputs	yes	-
Voltage inputs (0 to 10 VDC)	yes	-
Current inputs (0 to 20 mA)	yes	-
Temperature inputs	yes	-
Resistive inputs	yes	-
Voltage outputs (0 to 10 VDC)	yes	-
Digital outputs	-	yes
Digital pulsed outputs	-	yes
PWM outputs	-	yes

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Configurations	Universal I/O Type Ub	Solid-state Relay Outputs (MOSFET)
Tristate outputs	-	yes
Tristate pulsed outputs	-	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 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.

For UL-compliant applications, the SSR outputs are rated for 24 VAC, Class 2 circuits.

## Integrated damper actuator with feedback signal

The integrated damper actuator allows for simplified installation of RP-V directly over the damper shaft. This means that separate installation, wiring, and positioning of the damper motor is not needed. RP-V uses the same actuator mechanics as MP-V and many Schneider Electric VAV controller models from the Andover Continuum, Vista, and I/A Series product lines. The feedback signal from the actuator makes it possible to determine the exact position of the damper. The actuator also features a push button for manual positioning of the damper during commissioning.

## Factory-calibrated air flow sensor

The factory-calibrated air flow sensor uses a micro-flow channel integrated with the sensor chip that requires only a small air flow from the velocity probe. The sensor requires no maintenance and a minimum of field adjustments.

## Built-in isolated power supply

The RP-V controller has a built-in power supply designed to accommodate 24 VAC input power. The AC power input (L and N) is galvanically isolated from the electronics. This minimizes the risk of damage due to earth currents and permits the input power to be wired without concern for AC polarity matching. With the isolated AC power input, you can use a central transformer for many RP-Vs, instead of one transformer for each RP-V, to reduce installation costs.

## Wireless connectivity

RP-V is a Bluetooth Low Energy (BLE) enabled product. You can use this wireless connectivity option to connect the RP-V with a 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, CO<sub>2</sub>, 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.

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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.



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 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

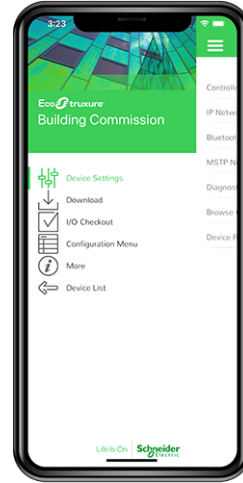
The maximum total length of the sensor bus is 61 m (200 ft). For more information, see the SpaceLogic Sensors - SXWS Sensors for MP and RP IP Controllers - Specification Sheet.

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, commissioning of BACnet/IP controllers, and air flow balancing of VAV units. 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.



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.

### 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.

### Air flow balancing

Using the Commission mobile application, you can perform air flow balancing of VAV units controlled by RP-Vs. An intuitive

# SpaceLogic RP-V Advanced for Niagara Framework®

workflow automatically guides you through the process. After the flow balancing, you can generate a report in HTML format for one or more VAV units. The balancing parameters associated with each RP-V are stored in the parent server, which makes it easier to replace the controller if necessary.

## 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.

### Part Numbers for RP-V Advanced

Product	Part number
RP-V-4A	SXWRPV4A10001
RP-V-5A	SXWRPV5A10001

### Part Numbers for RP-V Accessories

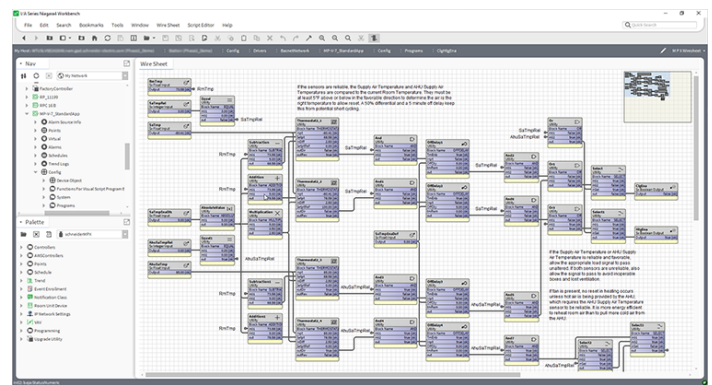
Product	Part number
Adapter for damper shaft diameter 9.5 mm (0.375 inch)	AM-135
RS-485 power adapter	SXWNISORS485P10001
SpaceLogic Bluetooth Adapter	SXWBTAECXX10001

### 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.

# SpaceLogic RP-V Advanced for Niagara Framework®

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

## Specifications

### SpaceLogic RP-V Advanced for Niagara Framework®

#### AC input

Type	Isolated Class 2 input
Nominal voltage	24 VAC
Operating voltage range	+/-15 %
Frequency	50/60 Hz
Maximum power consumption (RP-V-4A and RP-V-5A)	18 VA
Power input protection	MOV suppression and internal fuse

#### Environment

Ambient temperature, operating	0 to 50 °C (32 to 122 °F)
Ambient temperature, storage	-40 to +70 °C (-40 to +158 °F)
Maximum humidity	95 % RH non-condensing

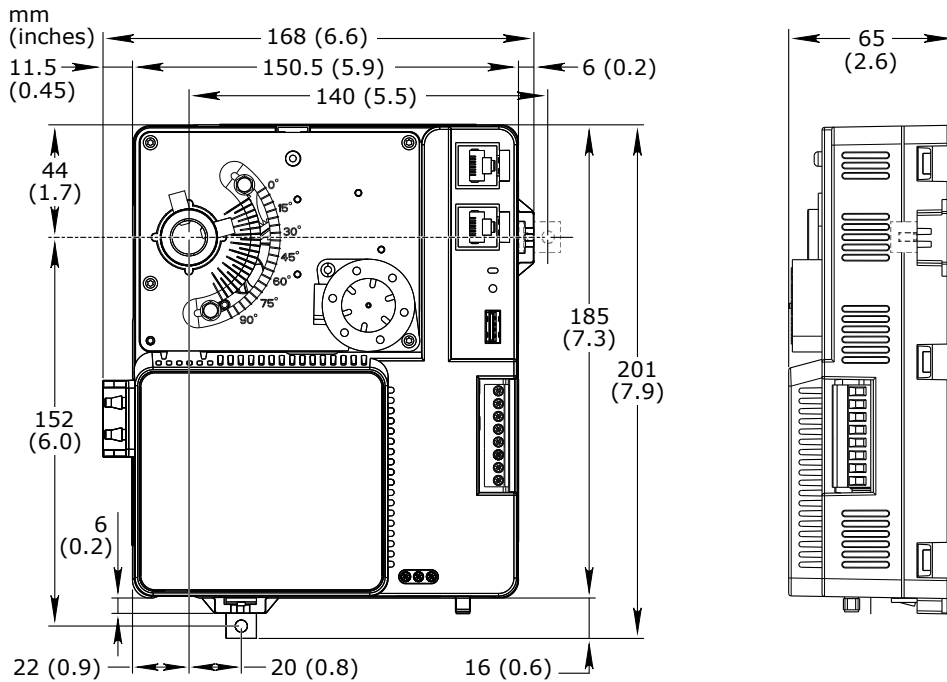
#### Material

Plastic flame rating	UL94 V-0
Ingress protection rating	IP 20

#### Mechanical

Dimensions	168 W x 201 H x 65 D mm (6.6 W x 7.9 H x 2.6 D in.)
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# SpaceLogic RP-V Advanced for Niagara Framework®



Weight	1.132 kg (2.496 lb)
Installation	Over the damper shaft
Terminal blocks	Fixed
Software compatibility	
I/A Series Niagara software	version 4.10 and later
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 <sup>a</sup>
a) RP-V-4A and RP-V-5A are marked "Enclosed Energy Management Equipment".	
FCC ID	DVE-RV1
ISED certification number	IC: 24775-RV1
Fire performance in air-handling spaces <sup>a</sup>	UL 2043
a) The RP-V-4A and RP-V-5A models are 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

# SpaceLogic RP-V Advanced for Niagara Framework®

USB	1 USB 2.0 host port (type-A), 5 VDC, 2.5 W			
RS-485 port Com A	RS-485 (RJ45), 24 VDC Maximum 3 W load per RS-485 port Maximum 4 W total load for the two RS-485 ports Transient voltage suppressors on communication and power signals			
RS-485 port Com B	RS-485 (RJ45), 24 VDC Maximum 3 W load per RS-485 port Maximum 4 W total load for the two RS-485 ports 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) <sup>a</sup>			
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)			
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)			
<b>Manufacturer</b>	<b>Model (Part number)</b>	<b>Gain</b>	<b>Type</b>	<b>Impedance</b>
Linx Technologies	ANT-2.4-WRT-MON-SMA	0.8 dBi	Monopole	50 ohm
CPU				
Frequency	500 MHz			
Type	ARM Cortex-A7 single-core			
Internal SRAM	6 MB			
NOR flash memory	48 MB			
Memory backup	128 kB, FRAM, non-volatile			
Damper actuator				
Torque rating	10 Nm (88.5 lbf.in)			
Stroke	0° to 90°, fully adjustable			

# SpaceLogic RP-V Advanced for Niagara Framework®

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Timing	Approximately 2 seconds/degree at 60 Hz and 2.4 seconds/degree at 50 Hz
Position indication	Visual indication
Damper position feedback	Yes
Manual override	Push-button clutch release
Damper shaft diameter	12.7 mm (0.5 inch) or 9.5 mm (0.375 inch) Adapter kit AM-135 is required for 9.5 mm (0.375 inch) diameter shafts.
Damper shaft minimum length (from VAV box)	22.2 mm (0.875 inch)
<b>Air flow sensor</b>	
Range	0 to 249 Pa (0 to 1 inH <sub>2</sub> O)
Resolution	0.0167 Pa (0.000067 inH <sub>2</sub> O)
Accuracy	±5% of reading (typical) at 25°C (77°F)
<b>Universal inputs/outputs</b>	
Channels, RP-V-4A	4 Ub, Ub1 to Ub4
Channels, RP-V-5A	2 Ub, Ub1 to Ub2
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
<b>Digital inputs</b>	
Range	Dry contact switch closure or open collector/open drain, 24 VDC, typical wetting current 2.4 mA
Minimum pulse width	150 ms
<b>Counter inputs</b>	
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
<b>Supervised inputs</b>	
5 V circuit, 1 or 2 resistors Monitored switch combinations	Series only, parallel only, and series and parallel
Resistor range For a 2-resistor configuration, each resistor must have the same value +/- 5 %	1 to 10 kohm
<b>Voltage inputs</b>	
Range	0 to 10 VDC
Accuracy	+/- (7 mV + 0.2 % of reading)
Resolution	1.0 mV
Impedance	1 Mohm

# SpaceLogic RP-V Advanced for Niagara Framework®

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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 <sup>-3</sup> x R) ohm
10 kohm to 60 kohm accuracy R = Resistance in ohm	+/(4 x 10 <sup>-3</sup> x R + 7 x 10 <sup>-8</sup> x R <sup>2</sup> ) 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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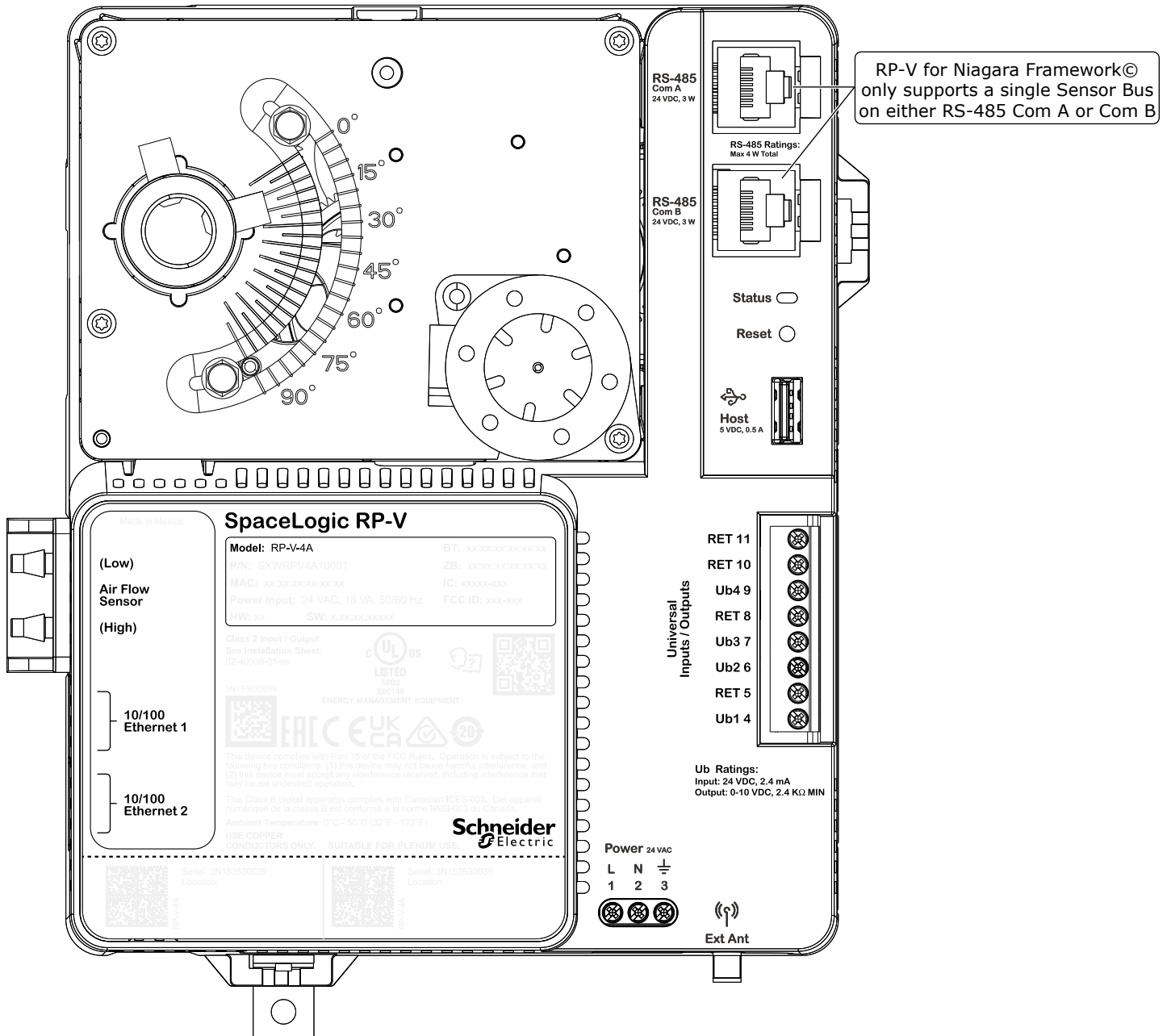
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Voltage outputs	
Range	0 to 10 VDC
Accuracy	+/-60 mV
Resolution	10 mV
Minimum load resistance	2.4 kohm
Source current	+4.2 mA
Sink current	-1 mA (0 to 0.4 VDC) -4.2 mA (0.4 to 10 VDC)
Solid-state relay outputs, DO	
Channels, RP-V-4A	0
Channels, RP-V-5A	3, DO1 to DO3
Output ratings for Non-UL applications	
Current range	Maximum 1.5 A load per output Maximum 3 A total load for the 3 outputs
AC voltage range	Maximum 30 VAC
DC voltage range	Maximum 30 VDC
Commons	COM for DO1, DO2, and DO3
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
Output ratings for UL applications	
Classification	Class 2
Current range	Maximum 1.5 A load per output Maximum 3 A total load for the 3 outputs
AC voltage range	Maximum 24 VAC
Commons	COM for DO1, DO2, and DO3
When the SSR outputs are used to switch AC, the common terminals can be connected to 0 to 24 VAC.	
Common voltage range (AC)	0 to 24 VAC
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.

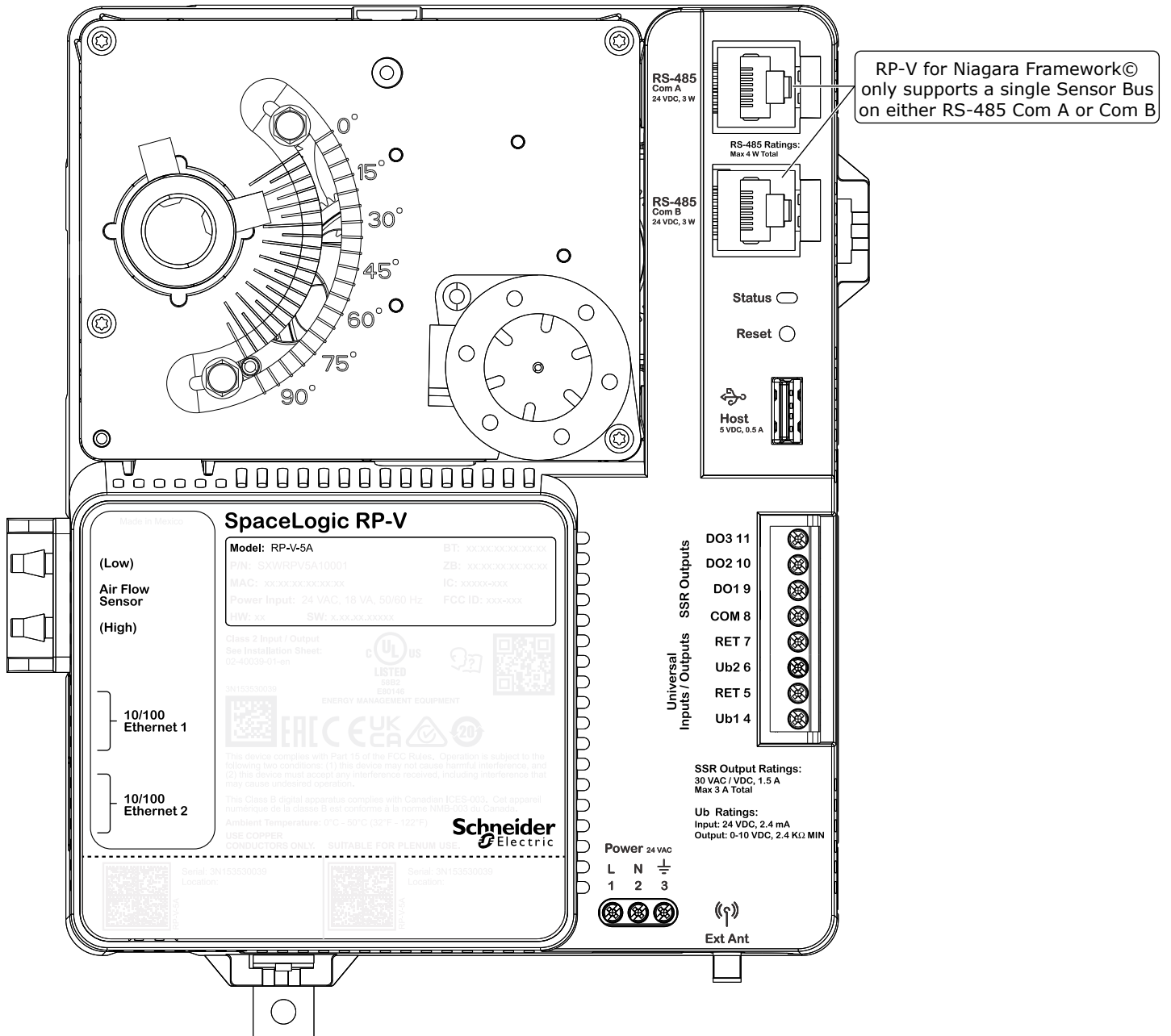
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RP-V for Niagara Framework® only supports a single Sensor Bus on either RS-485 Com A or Com B

RP-V-4A

# SpaceLogic RP-V Advanced for Niagara Framework®



RP-V for Niagara Framework® only supports a single Sensor Bus on either RS-485 Com A or Com B

RP-V-5A

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## 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-RV1

### 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-RV1



### 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.



### CE - Compliance to European Union (EU)

2014/53/EU Radio Equipment Directive (RED)

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.



### UK Conformity Assessed

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

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).



UL 916 Listed products for the United States and Canada, Enclosed Energy Management Equipment. UL file E80146.

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