

# EasyLogic RP-V Room Controllers

EcoStruxure™ Building



## Introduction

EasyLogic™ RP-V-5C-M is a room-purpose, fully programmable, BACnet MS/TP based field controller dedicated for VAV cooling and Heating applications. The RP-V integrates a controller, a damper actuator, and an air flow sensor in a single compact package for ease of installation. The RP-V can either be used as a standalone field controller or as part of an EcoStruxure BMS with a SpaceLogic AS-P or AS-B server or an Enterprise Server as the parent server.

The RP-V has the following features:

- Native BACnet MS/TP support
- Integrated damper actuator with feedback signal
- Factory-calibrated air flow sensor
- Versatile onboard I/O point mix
- Built-in isolated power supply
- Advanced monitoring
- Configurable RS-485 port
- Sensor bus for SpaceLogic living space sensors
- EasyLogic living space sensors
- Modbus RTU subnetwork
- Commission mobile application for commissioning of the controller before the BMS is in place
- Full EcoStruxure Building Operation software support, providing efficient engineering tools

# EasyLogic RP-V

- Upgrade with signed firmware

## Native BACnet MS/TP support

The EasyLogic range of RP and MP controllers and RP-IO I/O modules natively communicate with automation servers and field devices using the BACnet MS/TP protocol.

The RS-485 port with 3-pole screw terminal block is used for connection to the BACnet MS/TP network.

The other RS-485 port (Com A), with RJ45 interface, can be configured to support either sensor bus or Modbus network. For more information, see section “Configurable RS-485 port”.

## Versatile mix of I/O points

The RP-V-5C-M controller has an 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

I/O Point Types	RP-V-5C-M
Universal I/O Type Ub	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
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.

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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.

## I/O expansion

For applications that require more I/O resources, the EasyLogic RP-IO modules provide a versatile mix of I/O points for any application. For more information, see the EasyLogic RP-IO Specification Sheet.

## 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, TAC Vista, TAC I/A Series, and TAC I/NET 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.

## Advanced monitoring

The RP and MP 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 helps prevent data loss and allows seamless and quick recovery after a power disruption.

In WorkStation, you update the firmware of multiple RP and MP controllers at the same time and with minimum down time. The EcoStruxure BMS server keeps track of the installed firmware to support backup, restore, and replacement of the controllers and sensors. The server can host controllers of different firmware versions.

## Configurable RS-485 port

The RP-V-5C-M controller has one configurable RS-485 port (Com A), which can be configured to support two different types of networks:

- Sensor bus
- Modbus network

The controller can host one of the network types.

## Sensor bus for SpaceLogic living space sensors

The RP and MP 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.

# EasyLogic RP-V



SpaceLogic Sensor devices

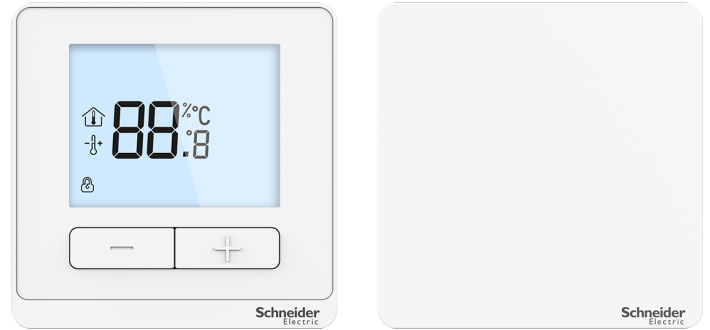
The RP controller sensor bus provides both power and communications for up to four sensors that are daisy-chained using standard Cat 5 (or higher) cables. This maximum number of sensors that can be connected to a controller is regardless of the sensor model and the combination of cover and sensor base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

## EasyLogic living space sensors

The EasyLogic Sensor devices provide a cost-effective solution to measure, control, and communicate the temperature. The sensors are connected to analog inputs of the RP or MP controller. The EasyLogic Sensor devices are available in two models with different user interfaces, a blank cover or an LCD display with buttons for setpoint control. For more information, see the EasyLogic Sensors - Temperature Sensors – Analog - Specification Sheet.



EasyLogic Sensor devices

## Modbus RTU subnetwork

The RP controller Modbus network allows standard Modbus devices to be connected to the controller.

The Modbus RTU protocol is used for the communication. The RP controller acts as the Modbus client and the connected devices act as servers.

For connection to Modbus devices, it is recommended to use the non-isolated RS-485 adapter to provide screw termination. The adapter converts an RS-485 RJ45 interface to screw terminals. The adapter can be ordered from Schneider Electric. For more information, see the RS-485 Adapters Specification Sheet.

To connect the adapter, it is recommended that you use a Cat 5 (or higher) UTP cable with eight conductors and RJ45 connectors. The cable should be rated for the target environment and have a maximum length of 0.3 m (12 in.). The cable is not included and needs to be purchased separately.

The maximum number of Modbus devices that can be connected to an RP controller depends on the type of Modbus device and the number of Modbus registers.

The EasyLogic RP controller Modbus network supports up to 10 connected Modbus devices with the following restrictions:

- Maximum of 250 Modbus registers per network

64-bit Modbus registers are supported, which can be used in energy metering.

### Modbus device types

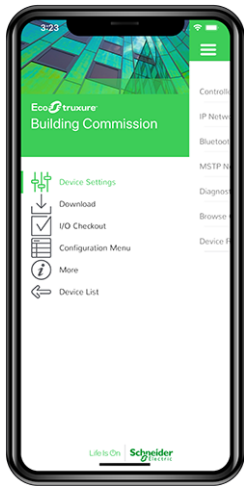
Modbus device types are pre-configured Modbus applications for quick and easy Modbus device integration in EcoStruxure Building Operation solutions. For information on the Modbus devices supported using Modbus device types, see the document EcoStruxure Building - Modbus Device Integration - Supported Device Brochure.

# EasyLogic RP-V

## Commission mobile application

The Commission mobile application is designed for local configuration, field deployment, commissioning of RP and MP 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 an RP controller. To connect to the RP controller, you use the SpaceLogic Bluetooth Adapter connected to a SpaceLogic Sensor.

### Device configuration

With the Commission mobile application, you can easily discover RP controllers on the BACnet network. You can change the configuration of each controller, including the BACnet 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.

### Field deployment and I/O checkout

The Commission mobile application does not require an EcoStruxure BMS server or a network infrastructure to be in place. You can use the mobile application to load the controller application directly into the local controller and deploy the controller. The controller application can be created offline using Project Configuration Tool or WorkStation. 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 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.

## Full EcoStruxure Building Operation software support

The power of the RP and MP controllers is fully realized when it is part of an EcoStruxure BMS, which provides the following benefits:

- WorkStation/WebStation interface
- Script and Function Block programming options
- Device discovery
- Engineering efficiency

### WorkStation/WebStation interface

WorkStation and WebStation provide a consistent user experience regardless of which EcoStruxure BMS server the user is logged on to. The user can log on to the parent EcoStruxure BMS server to engineer, commission, supervise, and monitor the RP or MP controller and its I/O as well as its attached SpaceLogic Sensor devices. For more information, see the WorkStation and WebStation specification sheets.

### Script and Function Block programming options

The fully programmable RP and MP controller models have both Script and Function Block programming options. Existing programs can easily be reused between the EcoStruxure BMS server and the controller.

### Device discovery

The enhanced Device Discovery in WorkStation enables you to easily identify RP and MP controllers on a BACnet network and to associate the controllers with their parent server.

### Engineering efficiency

The engineering and maintenance of RP and MP controllers can be done very efficiently using the EcoStruxure Building Operation reusability features. With these features, you can create library items (Custom Types) for a complete controller application that contains programs and all necessary objects such as trends, alarms, and schedules. The controller application in the Custom Types library is reusable across all controllers of the same model. You can use the controller application as a base for creating new controllers intended for similar applications. You can then edit the controller application, and the changes are automatically replicated to all controllers, while each controller keeps its local values.

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WorkStation supports both online and offline engineering of RP and MP controllers. You can make the configuration changes online or use database mode to make the changes offline. In database mode, the changes are saved to the EcoStruxure Building Operation database so that you can apply the changes to the controllers later.

Project Configuration Tool enables you to perform all the engineering off site, without the need for physical hardware, which minimizes the time you need to spend on site. You can run the EcoStruxure BMS servers virtually and engineer the RP and MP controllers before you deploy your server and controller applications to the servers and controllers on site. For more

information, see the Project Configuration Tool specification sheet.

## 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 Schneider Electric firmware. 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 EasyLogic RP-V

Product	Part number
RP-V-5C-M	SXWRPV5CM10001

### Part Numbers for RP-V Accessories

Product	Part number
Adapter for damper shaft diameter 9.5 mm (0.375 inch)	AM-135
Non-isolated RS-485 adapter	SXWNISORS48510001
SpaceLogic Bluetooth Adapter	SXWBTAECXX10001

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

## Specifications

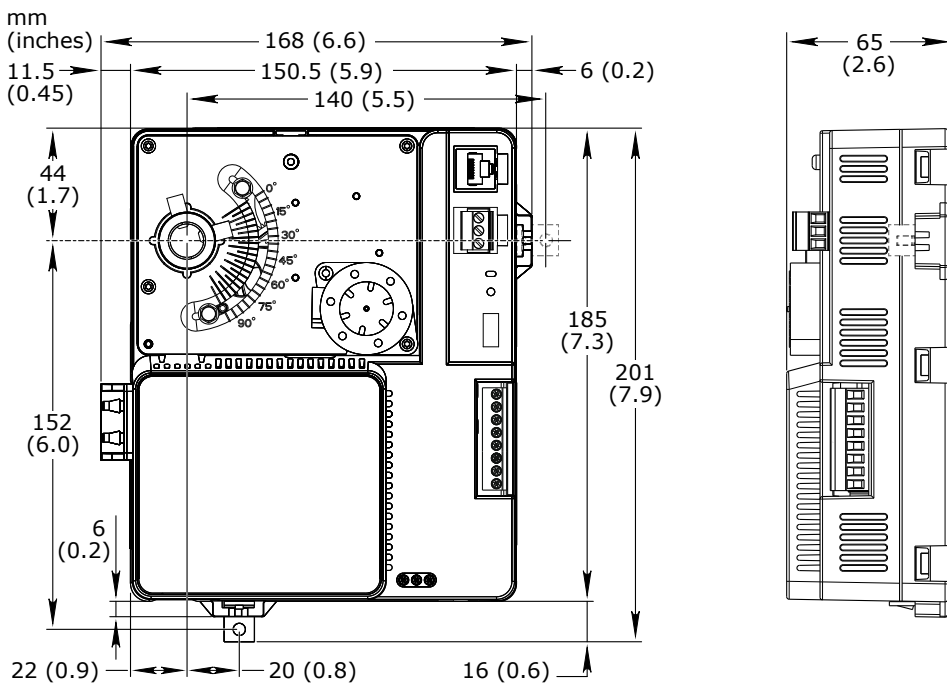
EasyLogic RP-V			
AC input			
Type	Isolated Class 2 input		
Nominal voltage	24 VAC		
Operating voltage range	+/-15 %		
Frequency	50/60 Hz		
Maximum power consumption	11 VA		
Base Load Including All I/O	SpaceLogic Sensors on Sensor Bus	Total	
6.4 VA	4.6 VA <sup>a</sup>	11 VA	
a) The example of 4.6 VA for the Sensor Bus (Com A) is based on a 2.8 W load on Com A. This gives an approximate conversion factor of 1.644 VA per Watt, which can be applied to the Com A load, which should not exceed 3 W.			
Power input protection	MOV suppression and internal fuse		
Environment			
Ambient temperature, operating	0 to 50 °C (32 to 122 °F)		

# EasyLogic RP-V

Continued

Ambient temperature, storage	-40 to +70 °C (-40 to +158 °F)
Maximum humidity	95 % RH non-condensing
<b>Material</b>	
Plastic flame rating	UL94 V-0
Ingress protection rating	IP 20
<b>Mechanical</b>	

Dimensions 168 W x 201 H x 65 D mm (6.6 W x 7.9 H x 2.6 D in.)



Weight	0.972 kg (2.143 lb)
Installation	Over the damper shaft
Terminal blocks	Power and I/O: Fixed BACnet MS/TP communications: Removable
<b>Compatibility</b>	
EcoStruxure BMS server communication EcoStruxure Building Operation	version 4.0.3 and later
Modbus 64-bit register support EcoStruxure Building Operation	version 5.0.1 and later
<b>Agency compliances</b>	
Emission	RCM; BS/EN 61000-6-3; BS/EN IEC 63044-5-2; FCC Part 15, Sub-part B, Class B
Immunity	BS/EN 61000-6-2; BS/EN IEC 63044-5-3

# EasyLogic RP-V

## Continued

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) The RP-V-5C-M model is marked "Energy Management Equipment".

Fire performance in air-handling spaces<sup>a</sup>

UL 2043

a) The RP-V-5C-M model is approved for plenum applications.

## Communication ports

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

RS-485 (3-pole screw terminal block)  
Transient voltage suppressors on communication 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 MS/TP, maximum bus length: 1200 m (4000 ft), maximum baud rate: 76800  
BTL B-AAC (BACnet Advanced Application Controller)<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.

## CPU

Frequency

500 MHz

Type

ARM Cortex-A7 single-core

Internal SRAM

6 MB

NOR flash memory

32 MB

Memory backup

128 kB<sup>a</sup>, FRAM, non-volatile

a) RP-V-5C-M with hardware version earlier than 05 has a FRAM memory with a size of 8 kB. For these hardware versions, the use of Script programs is recommended to save FRAM memory space.

## Damper actuator

Torque rating

10 Nm (88.5 lbf.in)

Stroke

0° to 90°, fully adjustable

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)

# EasyLogic RP-V

## Continued

Air flow sensor		
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)
Universal inputs/outputs		
Channels		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	
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
Current inputs		
Range		0 to 20 mA
Accuracy		+/- (0.01 mA + 0.4 % of reading)
Resolution		1 µA
Impedance		47 ohm

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## Continued

### Resistive inputs

10 ohm to 10 kohm accuracy +/- (7 + 4 x 10<sup>-3</sup> x R) ohm

R = Resistance in ohm

10 kohm to 60 kohm accuracy +/- (4 x 10<sup>-3</sup> x R + 7 x 10<sup>-8</sup> x R<sup>2</sup>) ohm

R = Resistance in 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)

### Voltage outputs

Range 0 to 10 VDC

Accuracy +/-60 mV

Resolution 10 mV

Minimum load resistance 2.4 kohm

Source current +4.2 mA

# EasyLogic RP-V

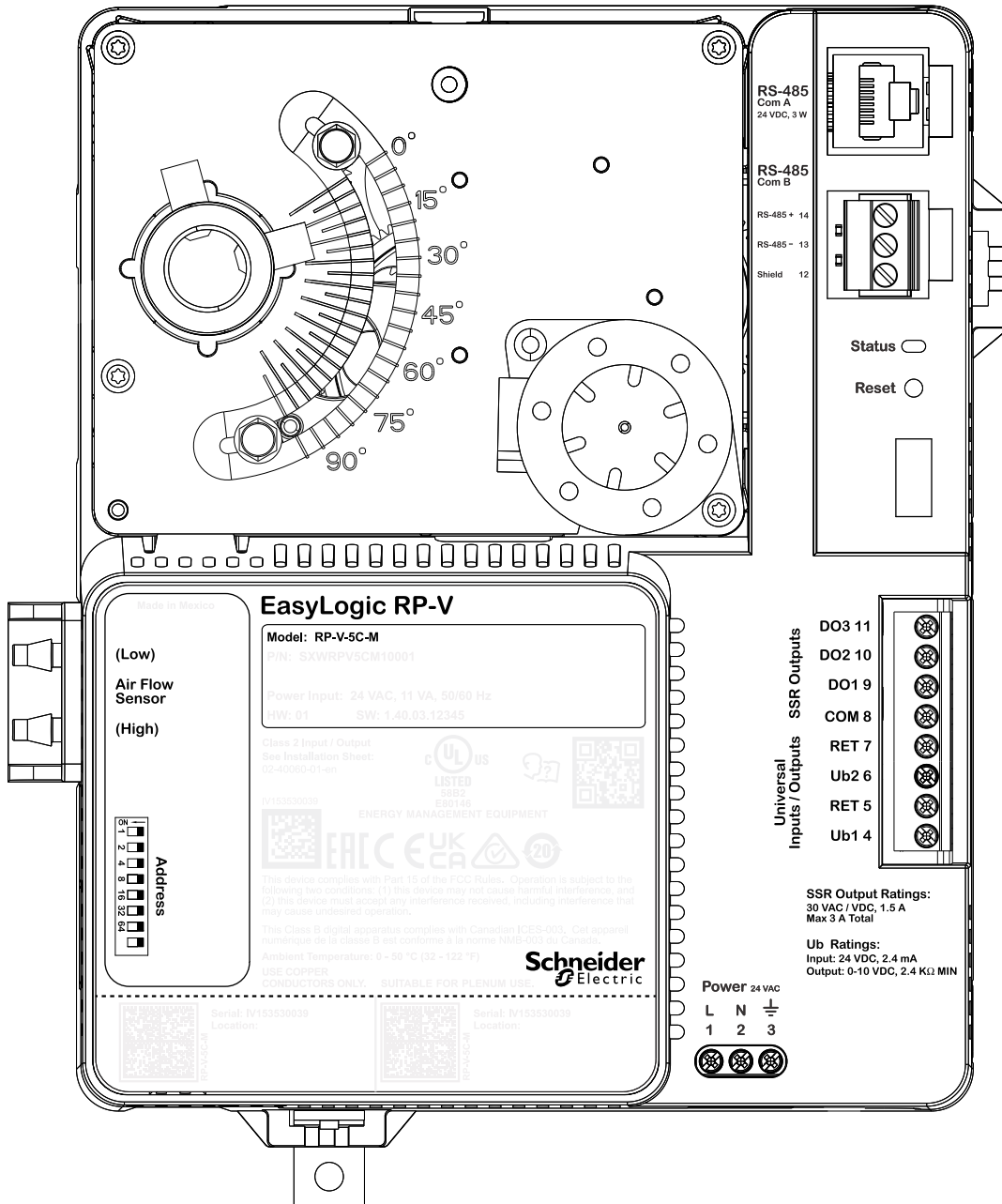
## Continued

Sink current	-1 mA (0 to 0.4 VDC) -4.2 mA (0.4 to 10 VDC)
Solid-state relay outputs, DO	
Channels	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.

# EasyLogic RP-V



RP-V-5C-M

# EasyLogic RP-V

## 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.

### 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.



### 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)

2014/30/EU Electromagnetic Compatibility 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.



### UK Conformity Assessed

S.I. 2016/1091 - Electromagnetic Compatibility 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).



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

[www.se.com/buildings](http://www.se.com/buildings)

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