

# EasyLogic RP-IO for Niagara Framework® I/O Expansion Modules

## I/A Series



### Introduction

EasyLogic™ RP-IO for Niagara Framework® provides I/O expansion to your HVAC application over BACnet MS/TP. The I/O module can share its I/O resources across applications running in I/A Series servers, RP and MP controllers, or third-party systems. With the support of local alarms and local trend logs, the I/O module avoids unnecessary traffic over the network while being able to log important information locally. The I/O module can be installed near facilities in the field, away from the I/A Series server or the RP or MP controller.

The RP-IO has the following features:

- Native BACnet MS/TP support
- Full range of I/O module models

- Versatile onboard I/O point mix
- Built-in isolated power supply
- Optional covers
- Advanced monitoring
- EasyLogic living space sensors
- Seamless integration with I/A Series Niagara software
- Upgrade with signed firmware

A maximum of three RP-IO modules can be used with an RP or MP controller. For more information, see the Architectural Guidelines.

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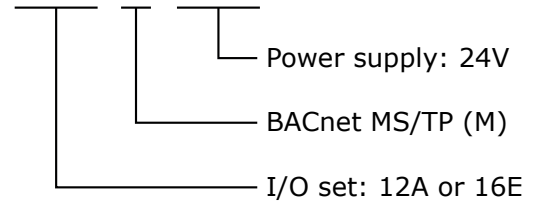
# EasyLogic RP-IO for Niagara Framework®

## Native BACnet MS/TP support

The EasyLogic range of RP and MP controllers and RP-IO I/O modules natively communicate with JACE controllers/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.

## RP-IO-12A-M-24V



## Full range of I/O module models

The EasyLogic RP-IO range of BACnet MS/TP based I/O modules includes two different models, which offer two different sets of I/O point types, named 12A and 16E. The two models support 24 VAC/DC power supply.

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

The RP-IO-12A and -16E models provide 12 or 16 I/O points, consisting of two 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 by RP-IO Models

I/O Point Types	RP-IO-12A model	RP-IO-16E model
Universal I/O Type Ub	8	16
Solid-state relay outputs (MOSFET)	4	-

### 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

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## 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.

## Built-in isolated power supply

The device has a built-in power supply designed to accommodate 24 VAC or 24 VDC input power. The AC/DC power input 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/DC power input, you can use a central transformer for many devices, instead of one transformer for each device, to reduce installation costs.

## Optional covers

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

## Advanced monitoring

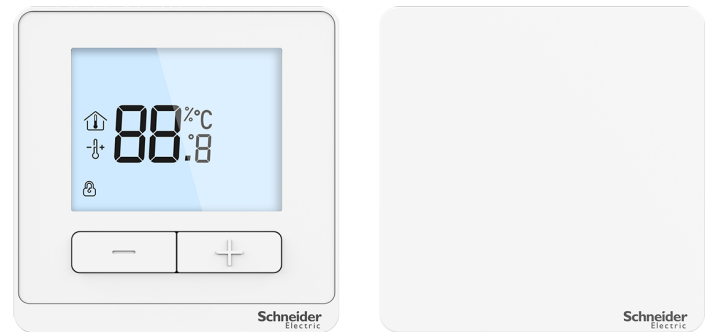
The I/O module supports local trends and alarms, enabling local operation when the I/O module is offline.

With user-defined fallback values, the I/O module outputs will be in a predictable state in cases of network disruption.

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

## 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 I/O module. 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

## Seamless integration with I/A Series Niagara software

The power of the I/O module is fully realized when 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
- Engineering efficiency

### Device discovery

The enhanced Device Discovery in Workbench enables you to easily identify the I/O modules on a BACnet network and to associate the I/O modules 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 I/O module and its I/O.

### Graphical programming from a Wiresheet

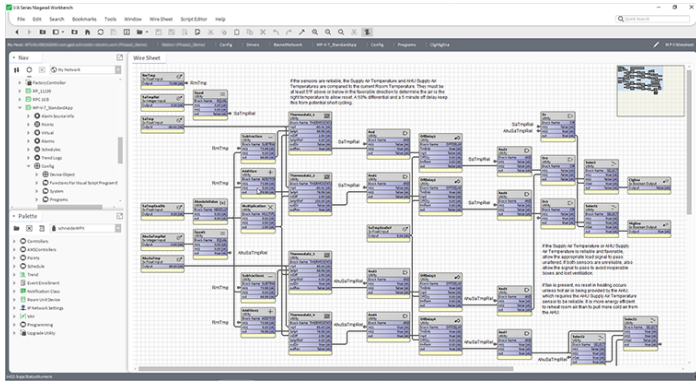
The I/O module can be programmed directly using the familiar Wiresheet interface and an extensive palette of graphical

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program objects. Users can quickly drag, drop, and configure program objects to create full applications and download to the module.

## Engineering efficiency

Workbench supports both online and offline engineering of the I/O modules. You can create and engineer I/O modules offline and then associate with an online device 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 Numbers for EasyLogic RP-IO

Product	Part number
RP-IO-12A-M-24V	SXWRIOF12AM10001
RP-IO-16E-M-24V	SXWRIOF16EM10001

## Part Numbers for RP-IO Accessories

Product	Part number
Optional covers	SXWRPCCOV10001
DIN-RAIL-CLIP, DIN-rail end clip package of 25 pieces	SXWDINEND10001

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

## Specifications

EasyLogic RP-IO for Niagara Framework®	
AC input	
Nominal voltage	24 VAC
Operating voltage range	+/-15 %
Frequency	50/60 Hz
Maximum power consumption	7 VA

# EasyLogic RP-IO for Niagara Framework®

Power input protection

MOV suppression and internal fuse

## DC input

Nominal voltage

24 to 30 VDC

Operating voltage range

21 to 33 VDC

Maximum power consumption

3 W

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

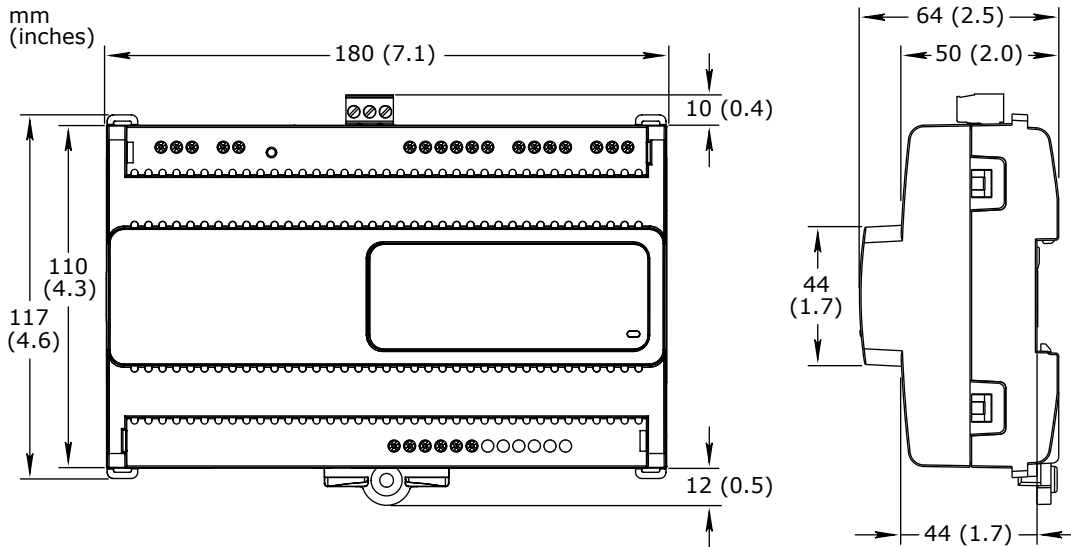
Ingress protection rating

IP 20

## Mechanical

Dimensions

180 W x 110 H x 64 D mm (7.1 W x 4.3 H x 2.5 D in.)



Weight, RP-IO-12A-M-24V

0.336 kg (0.741 lb)

Weight, RP-IO-16E-M-24V

0.334 kg (0.736 lb)

Recommended installation

DIN rail or flat surface in a cabinet<sup>a</sup>

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

Terminal blocks

Power and I/O: Fixed  
BACnet MS/TP communications: Removable

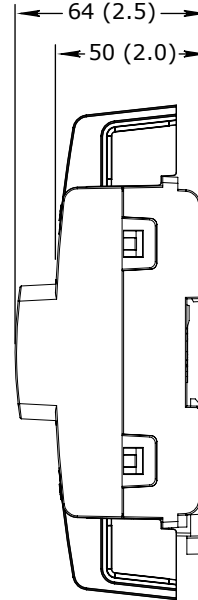
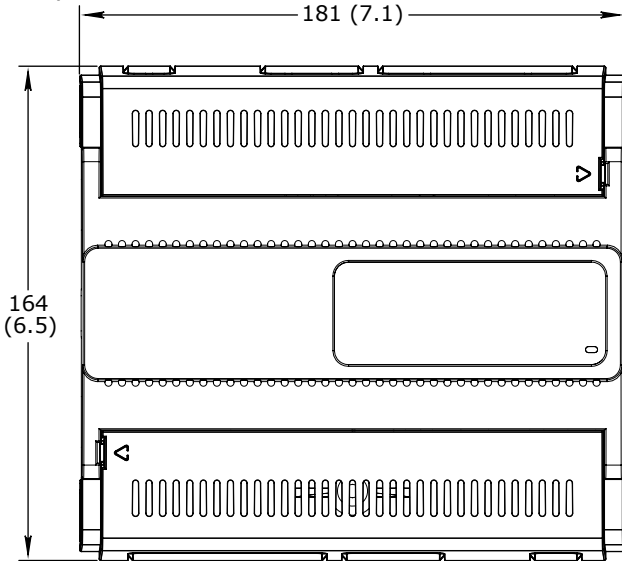
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## Optional covers

### Dimensions

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

mm  
(inches)



Weight, optional covers

0.070 kg (0.154 lb)

## 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, Sub-part B, Class B

Immunity

BS/EN 61000-6-2; BS/EN IEC 63044-5-3

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-IO-12A and -16E models are marked "Open Energy Management Equipment".

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

UL 2043

a) The RP-IO-12A and -16E models are approved for plenum applications.

## Communication ports

RS-485 port

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

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## Communications

BACnet BACnet MS/TP, maximum bus length: 1200 m (4000 ft), maximum baud rate: 76800 BTL B-ASC (BACnet Application Specific 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-IO-12A-M-24V with hardware version earlier than 01 and RP-IO-16E-M-24V with hardware version earlier than 03 have 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.

## Universal inputs/outputs

Channels, RP-IO-12A-M-24V 8 Ub, Ub1 to Ub8

Channels, RP-IO-16E-M-24V 16 Ub, Ub1 to Ub16

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 <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>-6</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)
Voltage outputs	
Range	0 to 10 VDC

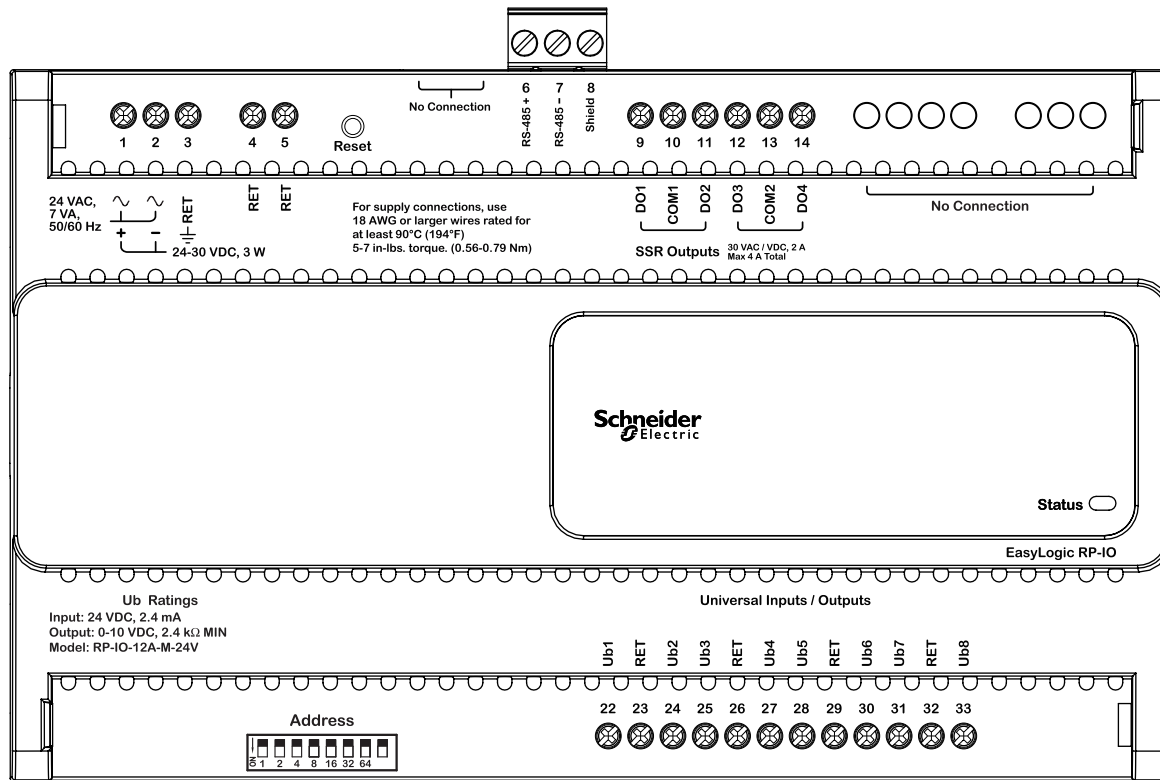
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Accuracy	+/-60 mV
Resolution	10 mV
Minimum load resistance	2.4 kohm
Source current	+4.2 mA
Sink current	-1 mA (0 to 0.4 VDC) -4.2 mA (0.4 to 10 VDC)
<b>Solid-state relay outputs, DO</b>	
Channels, RP-IO-12A-M-24V	4, DO1 to DO4
Channels, RP-IO-16E-M-24V	0
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 (on RP-IO-12A model) COM2 for DO3 and DO4 (on RP-IO-12A model)
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

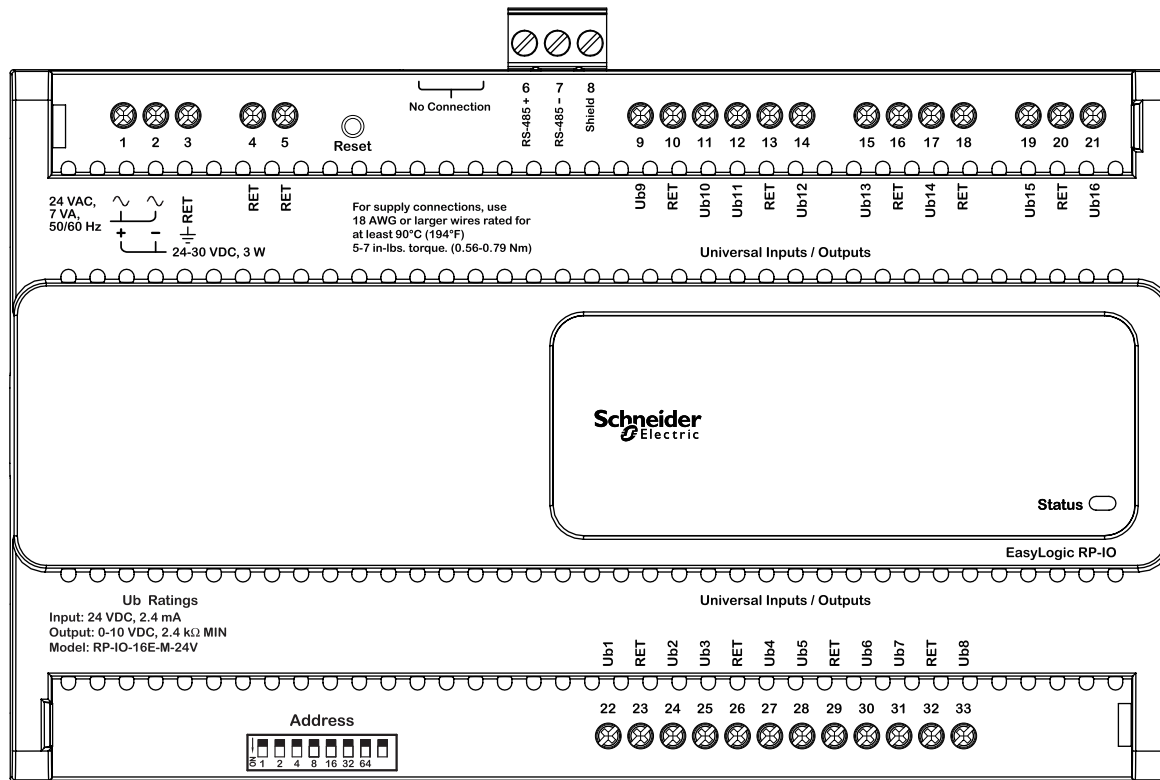
For more information on wiring, see the SpaceLogic and EasyLogic - Hardware Installation System Guide.

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RP-IO-12A-M-24V model

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RP-IO-16E-M-24V model

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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.

### 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

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.



### UK Conformity Assessed

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

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).



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

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