Wade Company
708 Garland St.
Little Rock, AR 72201
Phone: (501) 375-1181

Arkansas Children's Hospital

One Children's Way
Little Rock, Arkansas

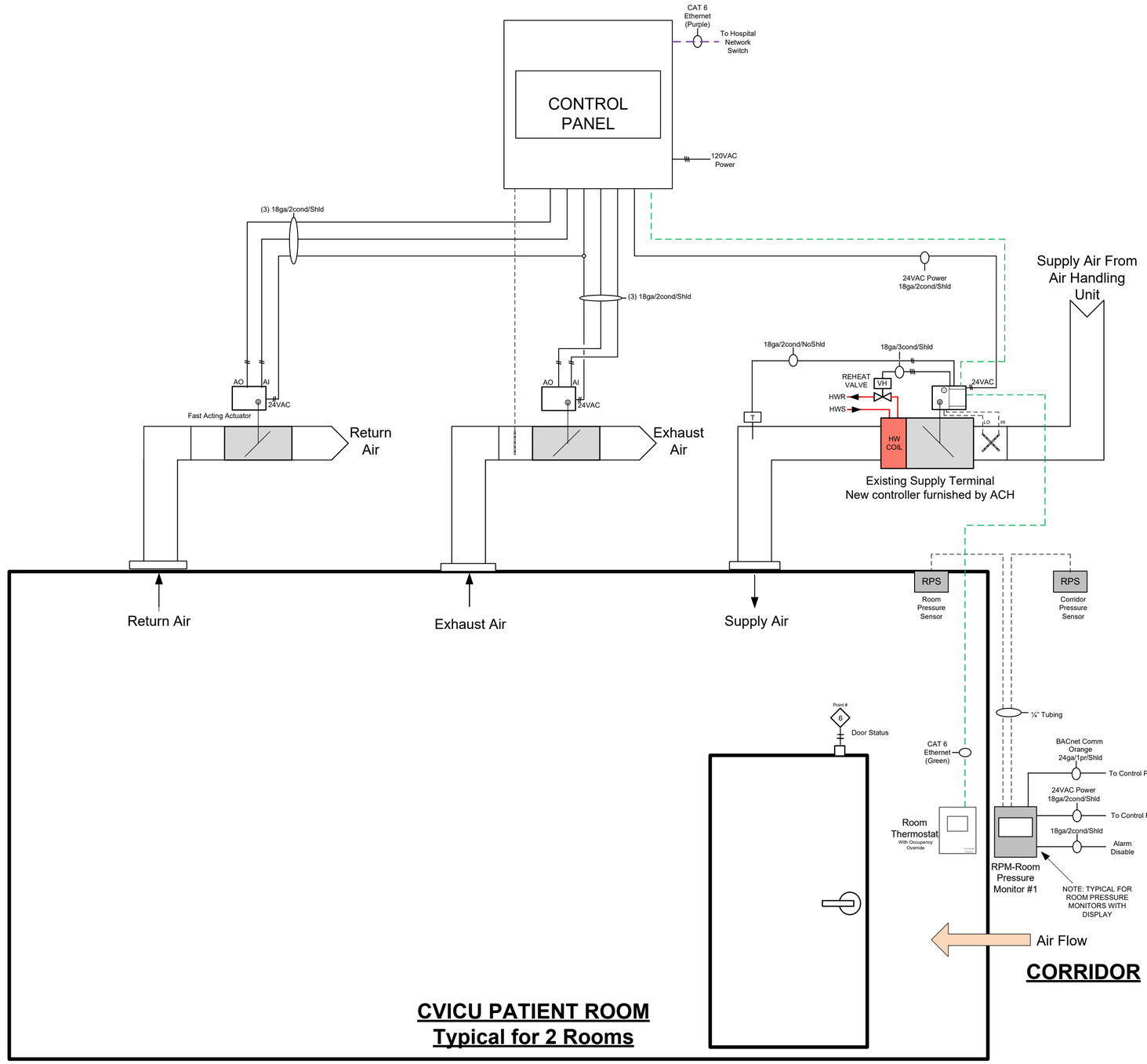
Architect: Cromwell Architects Engineers, Inc.
Engineer: Cromwell Architects Engineers, Inc.
Contractor: Comfort Systems USA

CVICU ROOM EXHAUST

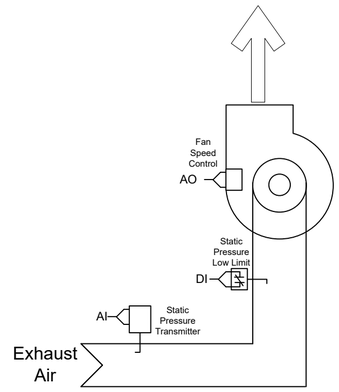
Drawing # 9110A23J

2/27/24 Revised for IOM Manual

Drawing Index:



CVICU PATIENT ROOM
Typical for 2 Rooms



CVICU EXHAUST FAN K-EF-19
Fan has built in speed control

CVICU ROOM K4510 & K4511 CONTROL

Schneider Electric

Revisions

#	Change:	Date:
–	IOM Manual	2/27/2024
1		
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3		
4		
5		

Architect:	Cromwell Architects Engineers, Inc.
Engineer:	Cromwell Architects Engineers, Inc.
Contractor:	Comfort Systems USA
Designed by:	J.Wade Date: 2/27/2024
Software by:	Date:
Checked by:	Date:

Arkansas Children's Hospital
One Children's Way
Little Rock, Arkansas

CVICU Patient Rooms

JOB NUMBER
9110A23J

FILE NAME
CVICU Patient Room.vsd

SHEET NO.
1 OF 4

SEQUENCE OF OPERATION

POSITIVE MODE OF OPERATION

MODE OF OPERATION IS OCCUPIED AT ALL TIMES WITH POSITIVE DIFFERENTIAL PRESSURE WITH RESPECT TO THE ADJACENT CORRIDOR.

SUPPLY AIR TERMINAL

EXISTING SUPPLY AIR TERMINAL DAMPER POSITION MODULATES AS REQUIRED TO MAINTAIN ROOM TEMPERATURE SETPOINT WITH A MINIMUM DAMPER POSITION TO MAINTAIN A MINIMUM AIR CHANGE RATE OF 6 ACPH.

EXISTING HOT WATER REHEAT VALVE MODULATES TO MAINTAIN THE PATIENT ROOM TEMPERATURE AT SETPOINT. SPACE TEMPERATURE SETPOINT IS ADJUSTABLE BY THE OCCUPANT AT THE THERMOSTAT FROM A MINIMUM OF 68 DEG. F. (ADJUSTABLE) TO A MAXIMUM OF 75 DEG. F. (ADJUSTABLE).

RETURN AIR MOTORIZED DAMPER:

TWO-POSITION RETURN AIR MOTORIZED DAMPER ENERGIZES TO THE OPEN POSITION. DAMPER POSITION END SWITCH IS MONITORED BY THE BUILDING AUTOMATION SYSTEM.

EXHAUST AIR TERMINAL:

EXHAUST AIR TERMINAL DAMPER WILL BE CLOSED.

NEGATIVE MODE OF OPERATION

MODE OF OPERATION IS OCCUPIED AT ALL TIMES WITH NEGATIVE DIFFERENTIAL PRESSURE WITH RESPECT TO THE ADJACENT CORRIDOR.

SUPPLY AIR TERMINAL

EXISTING SUPPLY AIR TERMINAL DAMPER POSITION MODULATES AS REQUIRED TO MAINTAIN ROOM TEMPERATURE SETPOINT WITH A MINIMUM DAMPER POSITION TO MAINTAIN A MINIMUM AIR CHANGE RATE OF 6 ACPH.

EXISTING HOT WATER REHEAT VALVE MODULATES TO MAINTAIN THE PATIENT ROOM TEMPERATURE AT SETPOINT. SPACE TEMPERATURE SETPOINT IS ADJUSTABLE BY THE OCCUPANT AT THE THERMOSTAT FROM A MINIMUM OF 68 DEG. F. (ADJUSTABLE) TO A MAXIMUM OF 75 DEG. F. (ADJUSTABLE).

RETURN AIR MOTORIZED DAMPER:

TWO-POSITION RETURN AIR MOTORIZED DAMPER DE-ENERGIZES TO THE CLOSED POSITION. DAMPER POSITION END SWITCH IS MONITORED BY THE BUILDING AUTOMATION SYSTEM.

EXHAUST AIR TERMINAL:

ROOM DIFFERENTIAL PRESSURE SENSOR MODULATES EXHAUST AIR TERMINAL DAMPER TO MAINTAIN ROOM DIFFERENTIAL PRESSURE SETPOINT OF -0.02 INCHES TO -0.05 INCHES W.C. (ADJ) WITH RESPECT TO THE ADJACENT CORRIDOR.

ROOM PRESSURE MONITOR

ROOM DIFFERENTIAL PRESSURE MONITOR/SENSOR MONITORS AND DISPLAYS THE DIFFERENTIAL PRESSURE RELATIONSHIP BETWEEN PATIENT ROOM AND THE ADJACENT CORRIDOR.

DOOR POSITION SWITCH BYPASSES ROOM PRESSURE CONTROL WHILE THE DOOR IS IN THE OPEN POSITION. SYSTEM GENERATES A PROPPED OPEN-DOOR ALARM TO BAS AFTER 120 SECONDS (ADJ).

ALARM PARAMETERS:

BAS MONITORS THE FOLLOWING ALARM CONDITIONS. All SETPOINTS ARE ADJUSTABLE.

ROOM LOW TEMPERATURE ALARM: 65 Deg. F. OR BELOW

ROOM HIGH TEMPERRATURE ALARM: 80 Deg. F. OR ABOVE

LOW ROOM DIFFERENTIAL PRESSURE: -0.05 INCHES W.C. OR BELOW

(WHEN IN NEGATIVE MODE)

HIGH ROOM DIFFERENTIAL PRESSURE: -0.02 INCHES W.C. OR ABOVE

(WHEN IN NEGATIVE MODE)

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Designed by: J.Wade Date: 2/27/2024
Software by: Date:
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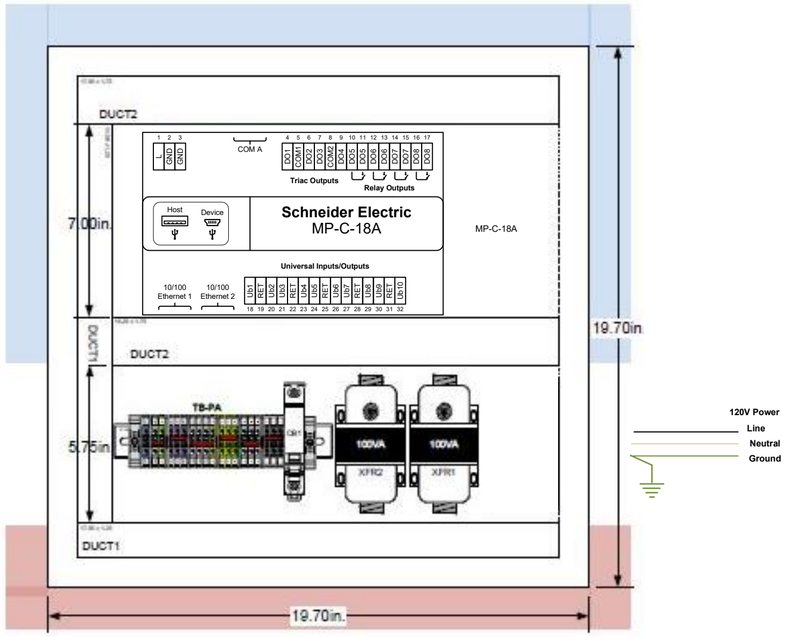
Arkansas Children's Hospital
One Children's Way
Little Rock, Arkansas

CVICU Sequence

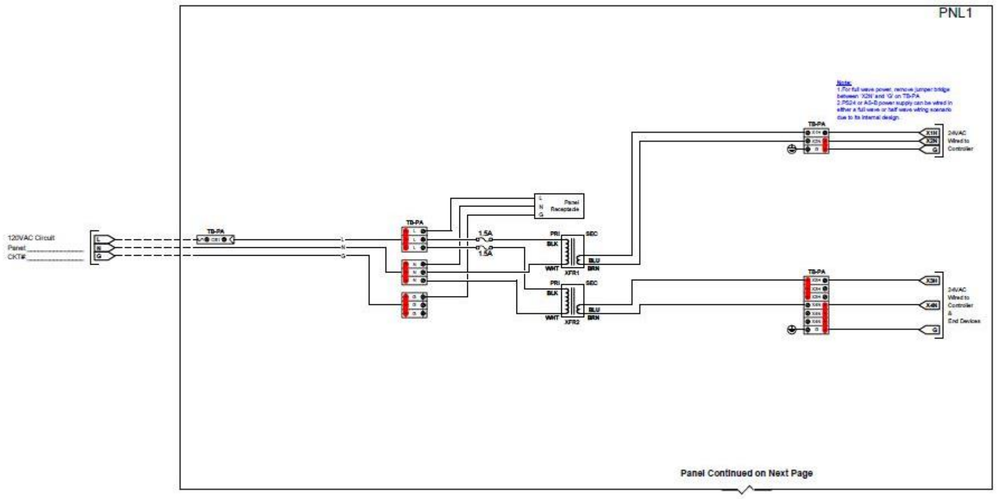
JOB NUMBER 9110A23J

FILE NAME CVICU Patient Room.vsd

SHEET NO. 2 OF 4



Typical Control Panel for 2 CVICU Rooms
20"x20"x8" mounted above ceiling



Control Panel Power Wiring

K4510 Controller Point List

MP-C-18A Point Schedule 18 Point										
Point	TAG	Terminal Point	Point Description	Bom Tag	Cable	Positive	Negative	Part Number	Sheet	Detail	Point Name
Ub1	1	18 & 19	K4510 Exh Term DP	ETDP	C1	White	Black	EPP-301LCD		AI	K4510EtDp
Ub2	2	20 & 19	K4510 Exh Term Dpr	ETDpr	C1	White	Black	NMQB24-MFT		AO	K4510EtDpr
Ub3	3	21 & 22	K4510 Ret Dpr Pos	RetDpr	C1	White	Black	NMQB24-MFT		AI	K4510RetDprPos
Ub4	4	23 & 22	K4510 Return Dpr	RetDpr	C1	White	Black	NMQB24-MFT		AO	K4510RetDpr
Ub5	5	24 & 25	Exh Fan Static Press	ExhStPr	C1	White	Black	Epp-302LCD		AI	ExhStPr
Ub6	6	26 & 25	Exh Fan Status	ExhFanSts	C1	White	Black	H600		DI	EFSts
Ub7	7	27 & 28	Exh Fan Speed Ctrl	EFSpeedCtrl	C1	White	Black	EMC motor		AO	EFspeedCtrl
Ub8	8	29 & 28	Exh Fan Speed FB	EFSpeedFB	C1	White	Black	EMC motor		AI	EFSpeedFB
Ub9	9	30 & 31	Exh Fan Static Limit	EFStaticLim	C1	White	Black	Dwy 1910-5		DI	EFSpeedFB
Ub10	10	32 & 31	K4510 Exh Dpr Pos	ETDprPos	C1	White	Black	NMQB24-MFT		AI	K4510EtPos
DO1	11	5 & 4			C1						
DO2	12	5 & 6			C1						
DO3	13	8 & 7			C1						
DO4	14	8 & 9			C1						
DO5	15	10 & 11	Exh Fan S/S Cmd	ExhFanSS	C1	White	Black	RIBU1-C		DO	ExhFanSS
DO6	16	12 & 13			C1						
DO7	17	14 & 15			C1						
DO8	18	16 & 17			C1						

K4511 Controller Point List

MP-C-18A Point Schedule 18 Point											
Point	TAG	Terminal Point	Point Description	Bom Tag	Cable	Positive	Negative	Part Number	Sheet	Detail	Point Name
Ub1	1	18 & 19	K4511 Exh Term DP	ETDP	C1	White	Black	EPP-301LCD		AI	K4511EtDp
Ub2	2	20 & 19	K4511 Exh Term Dpr	ETDpr	C1	White	Black	NMQB24-MFT		AO	K4511EtDpr
Ub3	3	21 & 22	K4511 Ret Dpr Pos	RetDpr	C1	White	Black	NMQB24-MFT		AI	K4511RetDprPos
Ub4	4	23 & 22	K4511 Return Dpr	RetDpr	C1	White	Black	NMQB24-MFT		AO	K4511RetDpr
Ub5	5	24 & 25			C1						
Ub6	6	26 & 25			C1						
Ub7	7	27 & 28			C1						
Ub8	8	29 & 28			C1						
Ub9	9	30 & 31			C1						
Ub10	10	32 & 31	K4511 Exh Dpr Pos	ETDprPos	C1	White	Black	NMQB24-MFT		AI	K4511EtPos
DO1	11	5 & 4			C1						
DO2	12	5 & 6			C1						
DO3	13	8 & 7			C1						
DO4	14	8 & 9			C1						
DO5	15	10 & 11			C1						
DO6	16	12 & 13			C1						
DO7	17	14 & 15			C1						
DO8	18	16 & 17			C1						

CVICU ROOM EXHAUST CONTROL PANEL

Notes

1. Cap Unused Wires
2. Check Polarity In Field Before Terminating
3. Do Not Make Joints In Control Wiring. Terminate at Device and Control Panel Only
4. Not Typical, Refer to System Overview For More Detail
0. Wire Number, Referred to as TAG in Points List

Notes

1. Cap Unused Wires
2. Check Polarity In Field Before Terminating
3. Do Not Make Joints In Control Wiring. Terminate at Device and Control Panel Only
4. Not Typical, Refer to Overview Diagram For More Detail
0. Wire Number, Referred to as TAG in Points List. Tag 0 is communication and should be wired in Series.

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Little Rock, Arkansas

Control Panel

JOB NUMBER 9110A23J

FILE NAME CVICU Patient Room.vsd

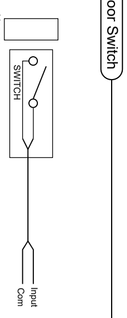
SHEET NO. 3 OF 4

3 Room Pressure Monitor

ROOM PRESSURE MONITOR

TYPICAL for (20) SYSTEMS
Part # SRPM-OR1WB-A2-E

4 Door Switch



Door Switch

JOB NUMBER	9110A23J
FILE NAME	CVICU Patient Room.vsd
SHEET NO.	4 OF 4

Arkansas Children's Hospital
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Little Rock, Arkansas

Control Details

Architect:	Cromwell Architects Engineers, Inc.		
Engineer:	Cromwell Architects Engineers, Inc.		
Contractor:	Comfort Systems USA		
Designed by:	J.Wade	Date:	2/27/2024
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Environmental Systems for Energy Conservation

HVACR #090432

Security License #E2006-0054

Operation & Maintenance Manual

Job Name: **ACH CVICU Room Exhaust**

City/State: Little Rock, Arkansas

Contractor: Comfort Systems USA

Submitted: February 27, 2024

MP-C

SmartX IP Controller

Introduction

SmartX IP Controller – MP-C is a multi-purpose, fully programmable, IP based field controller. The MP-C models offer a flexible mix of I/O point types that suit a wide range of HVAC applications. MP-C can either be used as a standalone BACnet/IP field controller or as part of an EcoStruxure BMS with a SmartX AS-P or AS-B server or an Enterprise Server as the parent server. The MP-C models support an optional display that provides insight and control of the inputs and outputs.

The MP-C has the following features:

- IP enabled with dual port Ethernet switch
- Versatile onboard I/O point mix
- High reliability
- Sensor bus for living space sensors
- Mobile commissioning application
- Full EcoStruxure Building Operation software support, providing efficient engineering tools

IP connectivity and flexible network topologies

The MP Series 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 MP Series 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 EcoStruxure BMS server are individually connected to an Ethernet switch. You can reduce the installation time and cost by daisy-chaining multiple controllers together. You can use an RSTP ring topology when you want failures of a single controller to be detected and recovered quickly and efficiently.

Models with a versatile mix of I/O points

MP-C comes in five models with different I/O point count and a versatile mix of I/O point types that match a wide variety of applications. Most of the I/O points are universal inputs/outputs, which are highly flexible and can be configured as either inputs or outputs.

03-20035-01-en, May 2018

MP-C

SmartX IP Controller

I/O Point Types by MP-C Models

I/O Point Types	MP-C-15A	MP-C-18A	MP-C-18B	MP-C-24A	MP-C-36A
Universal I/O Type Ub	8	10	10	16	20
Universal I/O Type Uc	-	-	-	4	8
Triac outputs	6	4	8	-	-
Relay outputs Form A	-	3	-	4	8
High power relay outputs Form A	1	1	-	-	-

Configurations by I/O Point Types

Configurations	Universal I/O Type Ub	Universal I/O Type Uc	Triac Outputs	Relay Outputs Form A	High Power Relay Outputs Form A
Digital inputs	yes	yes	-	-	-
Counter inputs	yes	yes	-	-	-
Supervised inputs	yes	yes	-	-	-
Voltage inputs (0 to 10 VDC)	yes	yes	-	-	-
Current inputs (0 to 20 mA)	yes	yes	-	-	-
Temperature inputs	yes	yes	-	-	-
Resistive inputs	yes	yes	-	-	-
2-wire RTD temperature inputs	yes	yes	-	-	-
Voltage outputs (0 to 10 VDC)	yes	yes	-	-	-
Current outputs (0 to 20 mA)	-	yes	-	-	-
Digital outputs	-	-	yes	yes	yes
Digital pulsed outputs	-	-	yes	yes	yes
PWM outputs	-	-	yes	yes[a]	yes[a]
Tristate outputs	-	-	yes	yes	-
Tristate pulsed outputs	-	-	yes	yes	-

a) Not suitable as Pulse Width Modulated (PWM) outputs.

03-20035-01-en, May 2018

MP-C

SmartX IP Controller

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 trouble conditions to 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 can also be used as voltage outputs or current outputs (Uc only), without the need for external bias resistors. Therefore, the universal inputs/outputs support a wide range of devices, such as actuators.

Triac outputs

The triac outputs can be used in many applications to switch 24 VAC on or off for external loads such as actuators, relays, or indicators. The triac outputs are isolated from the controller. Triacs are silent and do not suffer from 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

MP-C-15A and MP-C-18A have a high power relay output, which is ideal for switching loads of up to 12 A, such as electrical heating elements.

High reliability

The MP Series 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 prevents data loss and ensures seamless and quick recovery after a power failure.

All MP-C models can be equipped with the MP-C Display add-on module, which features an LCD display and five keys. With this module, you can manually override analog and digital outputs for testing, commissioning, and maintenance of equipment connected to the outputs. The module's dedicated processing power ensures reliable override for maintenance applications. The override status is readable through EcoStruxure Building Operation WorkStation and WebStation, enabling precise monitoring and reliable control.

MP-C Display

WorkStation allows you to update the firmware of multiple MP Series 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.

Sensor bus for living space sensors

The MP Series controllers provide an interface designed for the SmartX Sensor family of living space sensors. The SmartX Sensors offer an efficient way to sense the temperature, humidity, CO_2, and occupancy in a room. The SmartX Sensors 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.

03-20035-01-en, May 2018

MP-C

SmartX IP Controller

SmartX Sensors

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

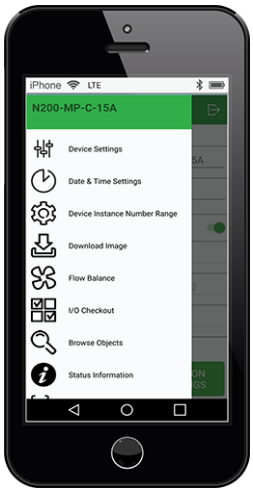
- Blank covers: Up to four sensors of any combination of sensor base types
- 3-button and touchscreen covers:
  - Up to two sensor bases with CO_2 option
  - Up to four sensor bases without CO_2 option
- SmartX LCD temperature sensors: Up to four sensors are supported

The maximum total length of the sensor bus is 61 m (200 ft). For more information, see the SmartX Living Space Sensors Specification Sheet.

Mobile commissioning application

The eCommission SmartX Controllers mobile application is designed for local configuration, field deployment, and commissioning of MP Series controllers. The mobile application reduces the commissioning time, allows flexibility in project execution, and eliminates dependencies on network infrastructure.

The mobile application is designed for use with Android, Apple (iOS), and Microsoft Windows 10 devices. For more information, see the eCommission SmartX Controllers Specification Sheet.



eCommission SmartX Controllers mobile app

Using the eCommission SmartX Controllers mobile application, you can connect to one or many MP Series controllers. You can connect to a single MP Series controller using the eCommission Bluetooth Adapter connected to a SmartX Sensor. You can connect to a network of MP Series controllers on the local IP network, using a wireless access point or a network switch.

Device configuration

With the eCommission SmartX Controllers mobile application, you can easily discover MP Series controllers on the IP network and change each controller's configuration, 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.

Field deployment and I/O checkout

The eCommission SmartX Controllers 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 MP Series 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 ensure that the controller's I/O points are configured, wired, and operating correctly.

03-20035-01-en, May 2018

MP-C

SmartX IP Controller

Full EcoStruxure Building Operation software support

The power of the MP Series controller 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 MP Series controller and its I/O as well as its attached SmartX Sensors. For more information, see the WorkStation and WebStation specification sheets.

Script and Function Block programming options

Unique to the industry, the MP Series controllers have both Script and Function Block programming options. This flexibility assures that the best programming method can be selected for the application. 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 MP Series controllers on a BACnet network and to associate the controllers with their parent server.

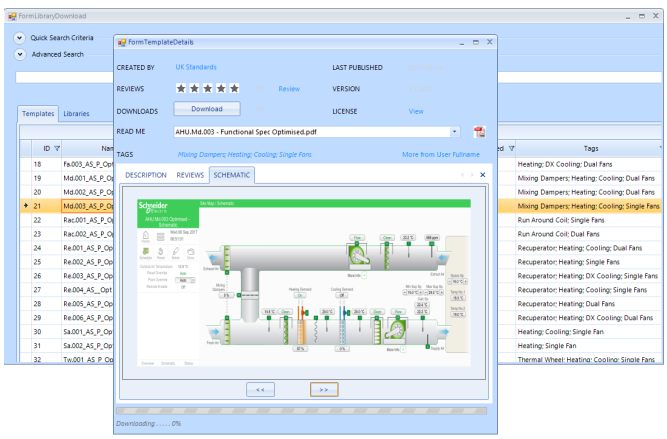
Engineering efficiency

The engineering and maintenance of MP Series 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.

WorkStation supports both online and offline engineering of MP Series 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 MP Series 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.

In addition, you can use Automated Engineering Tool to facilitate your engineering process when using MP Series controllers. This tool provides access to a library of standard controller applications. These standard applications can be quickly configured and customized using the wizards and mass edit functions provided in the tool and then loaded into your target server. The tool also enables the quick creation of your own templates based on MP Series controller applications that you have developed. This facilitates a standard approach and drives the ability to easily reuse and duplicate common controller applications. For more information, see the Automated Engineering Tool specification sheet.



Library of standard HVAC applications

03-20035-01-en, May 2018

Life Is On Schneider Electric

MP-C

SmartX IP Controller

Part Numbers

Product	Part number
MP-C-15A	SXWMPC15A10001
MP-C-18A	SXWMPC18A10001
MP-C-18B	SXWMPC18B10001
MP-C-24A	SXWMPC24A10001
MP-C-36A	SXWMPC36A10001
MP-C DISPLAY (MP-C override display module)	SXWMPCDSP10001
Spare terminal blocks for all MP-C models (4 x 3-pin, 1 x 4-pin, 7 x 6-pin, 2 x 8-pin terminal blocks)	SXWMPCCON10001
DIN-RAIL-CLIP, DIN-rail end clip package of 25 pieces	SXWDINEND10001
eCommission Bluetooth Adapter	SXWBTAECXX10001

Specifications

AC input

Nominal voltage.....24 VAC
Operating voltage range.....+/-20 %
Frequency.....50/60 Hz
Maximum power consumption (MP-C-15A, -18A, -18B).....22 VA
Maximum power consumption (MP-C-24A).....28 VA
Maximum power consumption (MP-C-36A).....33 VA
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 (MP-C-15A, -18A, -18B)..... 12 W
Maximum power consumption (MP-C-24A)..... 15 W
Maximum power consumption (MP-C-36A)..... 18 W
Power input protection.....MOV suppression and internal fuse

Environment

Ambient temperature, operating .....0 to 50 °C (32 to 122 °F) at normal operation[a]
.....-40 to +60 °C (-40 to +140 °F) for rooftop applications, horizontal installation only[a]
a) MP-C Display has an operating temperature range of -30 to +60 °C (-22 to +140 °F).
Ambient temperature, storage .....-40 to +70 °C (-40 to +158 °F)
Maximum humidity.....95 % RH non-condensing

03-20035-01-en, May 2018

MP-C

SmartX IP Controller

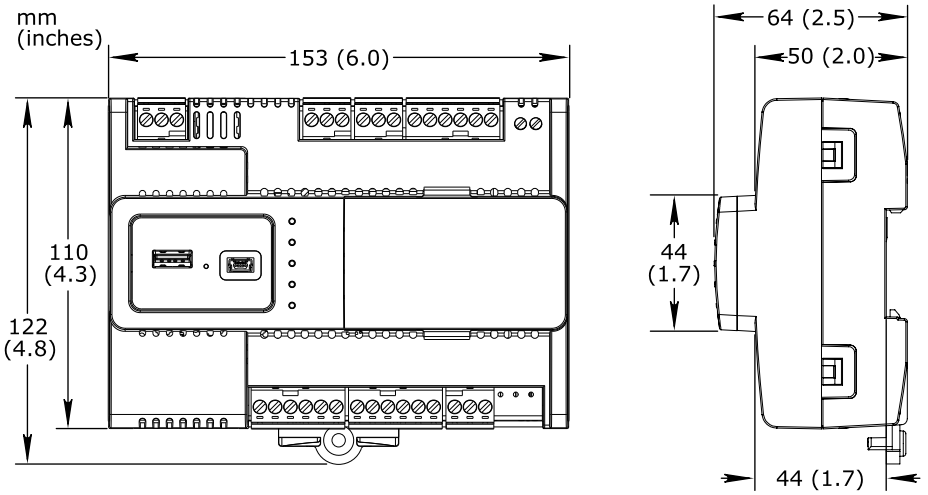
Material

Plastic flame rating UL94-5V

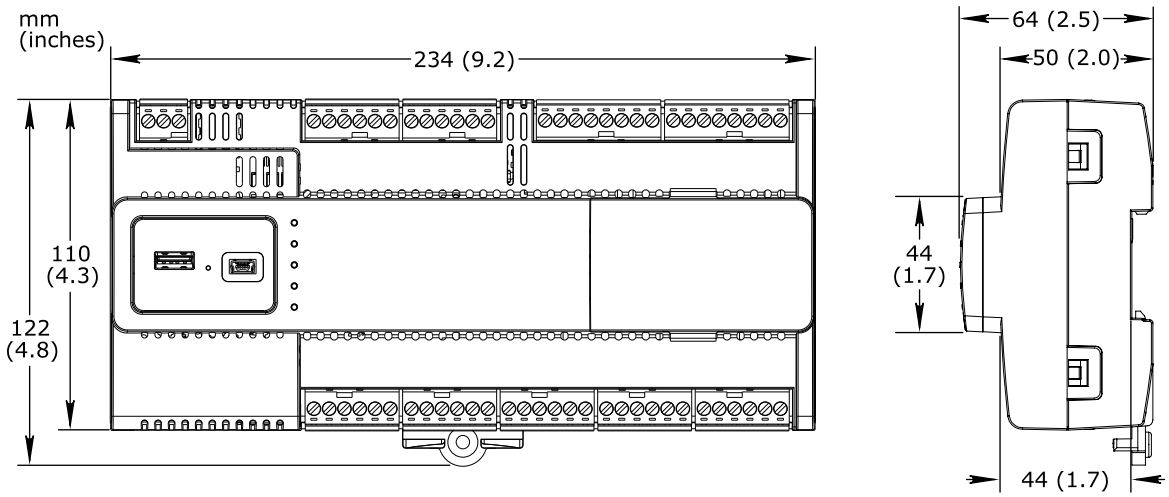
Ingress protection rating ..... IP 20

Mechanical

Dimensions (MP-C-15A, -18A, -18B) ..... 153 W x 110 H x 64 D mm (6.0 W x 4.3 H x 2.5 D in.)



Dimensions (MP-C-24A, -36A) ..... 234 W x 110 H x 64 D mm (9.2 W x 4.3 H x 2.5 D in.)



Weight, MP-C-15A
Including terminal blocks ..... 0.358 kg (0.789 lb)

Weight, MP-C-18A
Including terminal blocks ..... 0.371 kg (0.818 lb)

Weight, MP-C-18B
Including terminal blocks ..... 0.361 kg (0.796 lb)

Weight, MP-C-24A
Including terminal blocks ..... 0.495 kg (1.091 lb)

Weight, MP-C-36A
Including terminal blocks ..... 0.547 kg (1.206 lb)

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MP-C

SmartX IP Controller

Installation.....DIN rail or other flat surface inside a cabinet
Terminal blocks .....Removable

Software compliance

EcoStruxure Building Operation software .....version 2.0 or later

Agency compliances

Emission.....RCM; EN 61000-6-3; EN 50491-5-2; FCC Part 15, Sub-part B, Class B
Immunity .....EN 61000-6-2; EN 50491-5-3
Safety .....EN 60730-1; EN 60730-2-11; EN 50491-3; UL 916 C-UL US Listed

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)
USB ..... USB 2.0, 5 VDC, 2.5 W, 1 device port (mini-B) and 1 host port (type-A)
Sensor Bus .....24 VDC, 2 W, RS-485 (RJ45)
Sensor Bus protection .....Transient voltage suppressors on communication and power signals

Communications

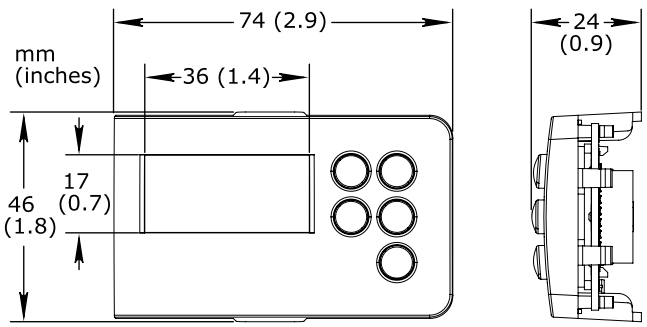
BACnet.....BACnet/IP, port configurable, default 47808
.....BTL B-AAC (BACnet Advanced Application Controller)[a]
a) See the BTL Product Catalog for up-to-date details on BTL listed firmware revisions on BACnet International's home page.

CPU

Frequency ..... 500 MHz
Type.....ARM Cortex-A7 dual-core
DDR3 SDRAM .....128 MB
NOR flash memory .....32 MB
Memory backup.....128 kB, FRAM, non-volatile

MP-C Display (Optional)

Removable .....No
Dimensions .....74 W x 46 H x 24 D mm (2.9 W x 1.8 H x 0.9 D in.)



MP-C

SmartX IP Controller

Display size	36 W x 17 H mm (1.4 W x 0.7 H in.)
Display resolution	128 x 64 pixels
Display type	FSTN monochrome LCD, white color transflective backlight
Power consumption	max. 0.15 W (45 mA at 3.3 V)
Ambient temperature, operating	-30 to +60 °C (-22 to +140 °F)
Ambient temperature, storage	-40 to +70 °C (-40 to +158 °F)
Maximum humidity	95 % RH non-condensing
Weight	0.035 kg (0.077 lb)
Compliance with standards	EN ISO 16484-2

Universal inputs/outputs, Ub and Uc

Channels, MP-C-15A	8 Ub, Ub1–Ub8
Channels, MP-C-18A	10 Ub, Ub1–Ub10
Channels, MP-C-18B	10 Ub, Ub1–Ub10
Channels, MP-C-24A	16 Ub, Ub1–Ub16 4 Uc, Uc1–Uc4
Channels, MP-C-36A	20 Ub, Ub1–Ub20 8 Uc, Uc1–Uc8
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	100 kohm

Current inputs

Range	0 to 20 mA

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MP-C

SmartX IP Controller

Accuracy.....+/-(0.01 mA + 0.4 % of reading)
Resolution.....1 µA
Impedance .....47 ohm

Resistive inputs

10 ohm to 10 kohm accuracy .....+/-(7 + 4 x 10^{-3} x R) ohm
R = Resistance in ohm

10 kohm to 60 kohm accuracy .....+/-(4 x 10^{-3} x R + 7 x 10^{-8} x R^2) 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)

RTD temperature inputs

Supported RTDs.....Pt1000

Pt1000

Sensor range.....-50 to +150 °C (-58 to +302 °F)

Controller 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)

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MP-C

SmartX IP Controller

Continued

Controller environment	Sensor range	Measurement accuracy
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)

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 ..... 5 kohm

Load range ..... -1 to +2 mA

Current outputs (Uc only)

Range ..... 0 to 20 mA

Accuracy ..... +/-0.2 mA

Resolution ..... 21 µA

Load range ..... 0 to 650 ohm

Relay outputs, DO

Channels, MP-C-15A 0

Channels, MP-C-18A 3, DO5–DO7

Channels, MP-C-18B 0

Channels, MP-C-24A 4, DO1–DO4

Channels, MP-C-36A 8, DO1–DO8

Contact rating ..... 250 VAC/30 VDC, 2 A, Pilot Duty (C300)

Switch type ..... Form A Relay
..... Single Pole Single Throw
..... Normally Open

Isolation contact to system ground ..... 3000 VAC

Cycle life (Resistive load) ..... At least 100,000 cycles

Minimum pulse width ..... 100 ms

High power relay outputs, DO

Channels, MP-C-15A 1, DO7

Channels, MP-C-18A 1, DO8

Channels, MP-C-18B 0

Channels, MP-C-24A 0

Channels, MP-C-36A 0

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MP-C

SmartX IP Controller

Contact rating.....250 VAC/24 VDC, 12 A, Pilot Duty (B300)
Switch type.....Form A Relay
.....Single Pole Single Throw
.....Normally Open
Isolation contact to system ground.....5000 VAC
Cycle life (Resistive load) .....At least 100,000 cycles
Minimum pulse width .....100 ms

Triac outputs, DO

Channels, MP-C-15A 6, DO1–DO6
Channels, MP-C-18A 4, DO1–DO4
Channels, MP-C-18B 8, DO1–DO8
Channels, MP-C-24A 0
Channels, MP-C-36A 0
Output rating (for each triac output) .....Max. 0.5 A
Voltage.....24 VAC +/-20 %
Commons .....COM1 for DO1 and DO2 (on MP-C-15A, -18A, -18B)
.....COM2 for DO3 and DO4 (on MP-C-15A, -18A, -18B)
.....COM3 for DO5 and DO6 (on MP-C-15A, -18B)
.....COM4 for DO7 and DO8 (on MP-C-18B only)
The common terminals can be connected to 24 VAC or to ground.
Common voltage, high side output.....24 VAC
Common voltage, low side output .....0 VAC (ground)
Minimum pulse width .....100 ms
Triac output protection.....MOV and snubber across each triac output
.....MOV from triac COM to ground

Terminals

Be sure to follow proper installation wiring diagrams and instructions, including these instructions:

- All MP-C models have several RET terminals for connection of I/O returns, so a common chassis/signal ground rail is optional and may not be needed.
- Individual 24 VDC power sources to the field must be current limited to maximum 4 A for UL compliant installations, and maximum 6 A in other areas.
- For more information on wiring, see Hardware Reference Guide.

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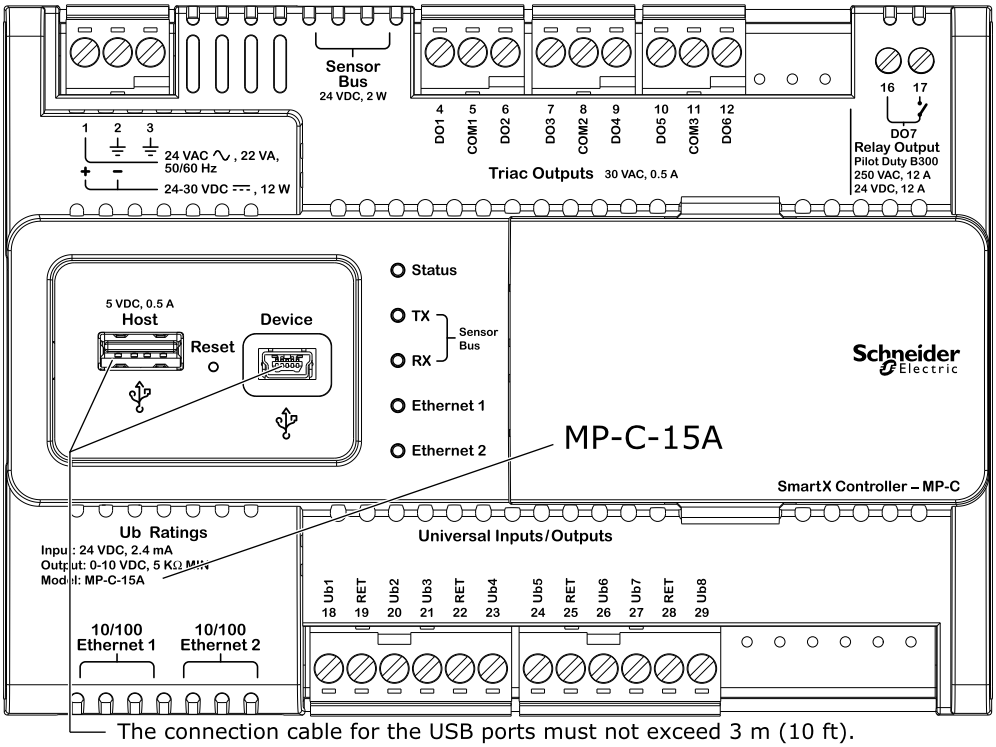
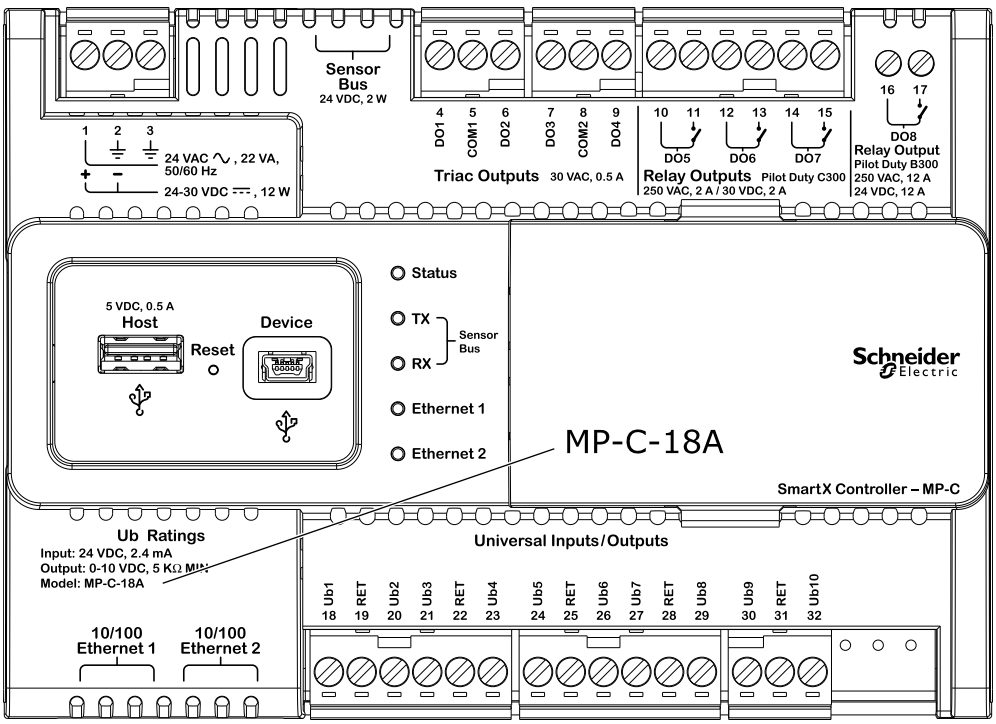
MP-C

SmartX IP Controller



MP-C-15A



MP-C-18A

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MP-C

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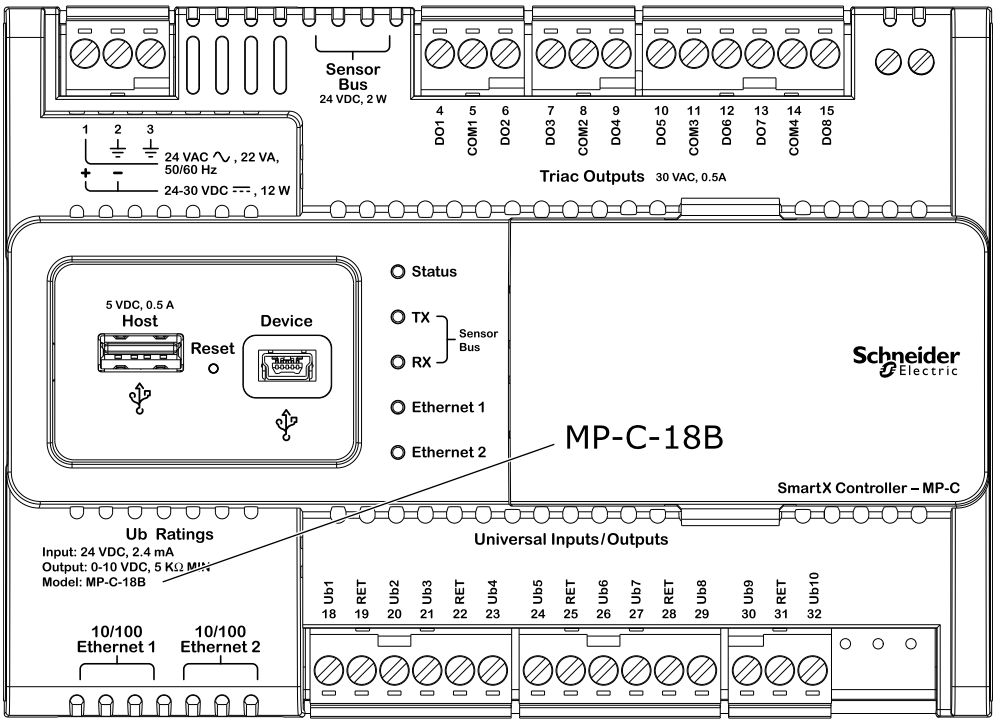
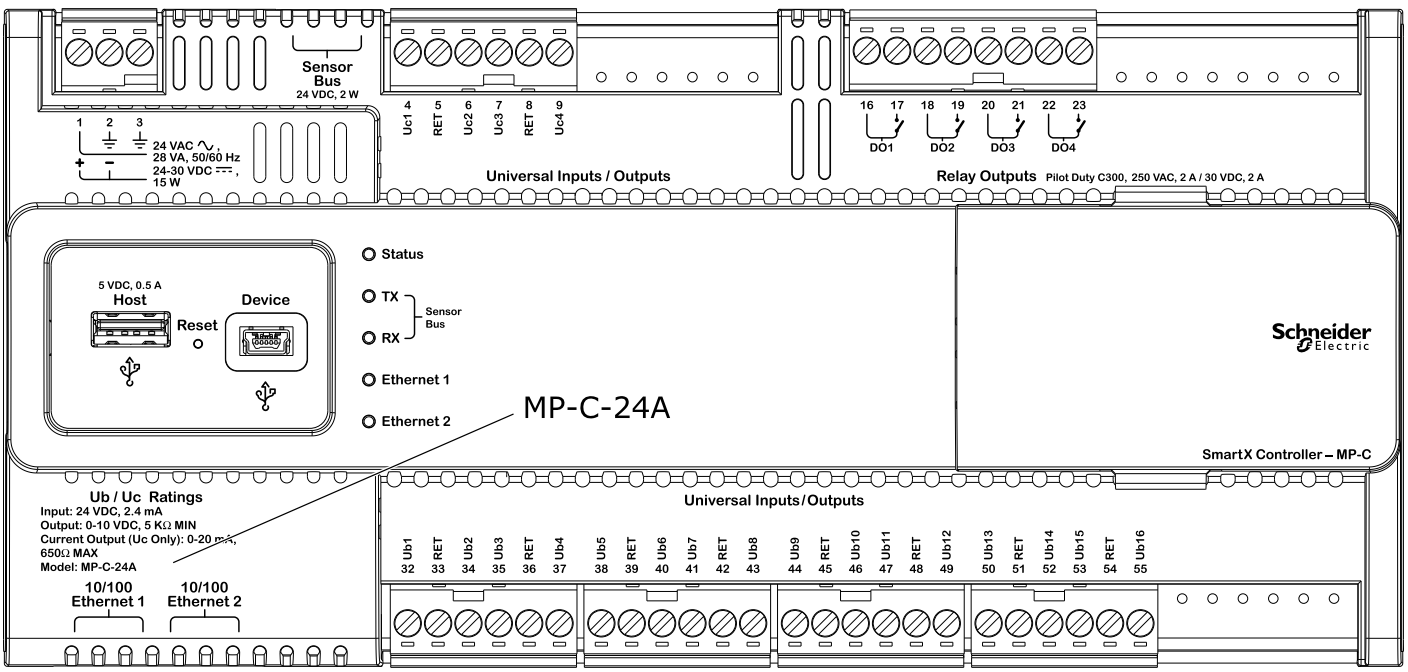


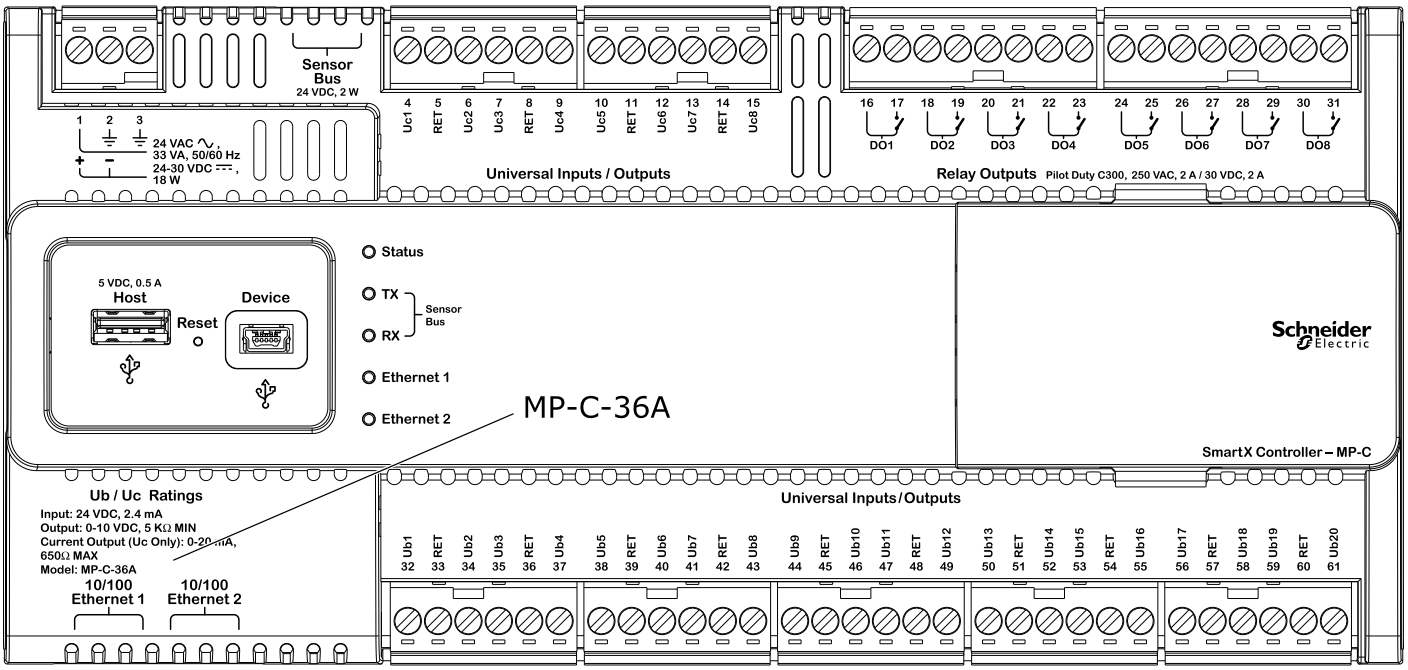
MP-C-18B



MP-C-24A

MP-C

SmartX IP Controller



MP-C-36A

Part Numbers in AMER Region for Network Connectivity Accessories

Product description[a]	Part number (AMER region)
Cat 6 field-term plug, UTP	ACTPG6TLU001
Cat 6 pull-through plug, UTP, 100-pack	ACTPG6PTU100
Actassi crimping tool	ACTTLCPT
Cat 6 cable, UTP, 1000 ft (305 m), CMP, green	ACT4P6UCP1ARXGR
Cat 6 patch cord, UTP, 30 ft (9 m), CMP, green	ACTPC6UBCP30AGR
Cat 6 patch cord, UTP, 50 ft (15 m), CMP, green	ACTPC6UBCP50AGR
Cat 6 patch cord, UTP, 70 ft (21 m), CMP, green	ACTPC6UBCP70AGR
Cat 6 patch cord, UTP, 90 ft (27 m), CMP, green	ACTPC6UBCP90AGR
Cat 5e pull-through plug, UTP, 100-pack	ACTPG5PTU100
Cat 5e cable, UTP, 1000 ft (305 m), CMP, green	ACT4P5UCP1ARXGR
Cat 5e patch cord, UTP, 30 ft (9 m), CMP, green	ACTPC5EUBCP30AGR
Cat 5e patch cord, UTP, 50 ft (15 m), CMP, green	ACTPC5EUBCP50AGR
Cat 5e patch cord, UTP, 70 ft (21 m), CMP, green	ACTPC5EUBCP70AGR
Cat 5e patch cord, UTP, 90 ft (27 m), CMP, green	ACTPC5EUBCP90AGR

a) Abbreviations: UTP (Unshielded Twisted Pair), CMP (Plenum-rated cable)

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SmartX IP Controller

Part Numbers in EMEA Region for Network Connectivity Accessories

Product description[a]	Part number (EMEA region)
Cat 6 field-term plug, UTP	ACTPG6TLU001
Cat 6 pull-through plug, UTP, 100-pack	ACTPG6PTU100
Actassi crimping tool	ACTTLCPT
Cat 6 LAN cable, UTP, 4-Pair, 250 MHz, LSZH, 305 m (1000 ft)	VDICD116118
Cat 6 patch cord, UTP, 10 m (32 ft), LSZH, green	ACTPC6UBLS100GR
Cat 6 patch cord, UTP, 15 m (49 ft), LSZH, green	ACTPC6UBLS150GR
Cat 6 patch cord, UTP, 20 m (65 ft), LSZH, green	ACTPC6UBLS200GR
Cat 6 patch cord, UTP, 25 m (82 ft), LSZH, green	ACTPC6UBLS250GR
Cat 5e pull-through plug, UTP, 100-pack	ACTPG5PTU100
Cat 5e cable, UTP, 1000 ft (305 m), CMP, green	VDICD115118
Cat 5e patch cord, UTP, 10 m (32 ft), LSZH, green	ACTPC5EUBLS100GR
Cat 5e patch cord, UTP, 15 m (49 ft), LSZH, green	ACTPC5EUBLS150GR
Cat 5e patch cord, UTP, 20 m (65 ft), LSZH, green	ACTPC5EUBLS200GR
Cat 5e patch cord, UTP, 25 m (82 ft), LSZH, green	ACTPC5EUBLS250GR

a) Abbreviations: UTP (Unshielded Twisted Pair), CMP (Plenum-rated cable), LSZH (Low Smoke Zero Halogen)

Part Numbers in APAC Region for Network Connectivity Accessories

Product description[a]	Part number (APAC region)
Cat 6 field-term plug, UTP	ACTPG6TLU001
Cat 6 pull-through plug, UTP, 100-pack	ACTPG6PTU100
Actassi crimping tool	ACTTLCPT
Cat 6 LAN cable, 305 m	2D4P6IPV3B-GR
Cat 6 patch lead, UTP, 10 m (32 ft), green	RJ6_100PL-GR
Cat 6 patch lead, UTP, 15 m (49 ft), green	RJ6_150PL-GR
Cat 6 patch lead, UTP, 20 m (65 ft), green	RJ6_200PL-GR
Cat 6 patch lead, UTP, 25 m (82 ft), green	RJ6_250PL-GR
Cat 5e field-term plug, UTP	ACTPG5ETLU001
Cat 5e pull-through plug, UTP, 100-pack	ACTPG5EPTU100
Cat 5e LAN cable, 305 m (1000 ft)	2D4P5IPV3B-GR
Cat 5e patch lead, UTP, 10 m (32 ft), green	RJ5_100PL-GR
Cat 5e patch lead, UTP, 15 m (49 ft), green	RJ5_150PL-GR
Cat 5e patch lead, UTP, 20 m (65 ft), green	RJ5_200PL-GR
Cat 5e patch lead, UTP, 25 m (82 ft), green	RJ5_250PL-GR

a) Abbreviations: UTP (Unshielded Twisted Pair)

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MP-C

SmartX IP Controller

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
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) per the provisions of the following standards: EN 60730-1, EN 60730-2-11, and EN 50491-3 Safety Standards.

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, Open Class Energy Management Equipment. UL file E80146.

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www.schneider-electric.com

03-20035-01-en, May 2018

Room Pressure Monitor

Qty = 1

Model SRPM

Room Pressure Monitor

The SRPM is Setra's standard single room BACnet capable room pressure monitor for measuring low differential pressure in critical applications. The SRPM's backlit touchscreen LCD provides an intuitive graphic user interface for ease of setup. The SRPM has a built-in calibration feature and only requires zeroing when installed, significantly reducing the cost of ownership. The SRPM monitors and alarms while providing a digital input for a door alarm. The SRPM is a simple, cost-effective solution which combines state-of-the-art electronics with Setra's superior true differential pressure sensing technology to ensure safety in critical environments. The SRPM also incorporates two-level password protection.

Monitor & Alarm Critical Rooms

The SRPM is most user friendly room pressure monitor on the market today. It has an intuitive touchscreen interface that allows the user to easily configure alarm set points, passwords and audible alarming conditions. With its bi-directional sensor, the unit can switch between protection and isolation room modes, or be put into standby mode when the room is not in use.

On-Board Dead-Ended Pressure Sensor

Protection and isolation rooms are designed to adhere to strict standards in order to provide a proper barrier between the room and reference space. Unlike a flow-through design, the SRPM utilizes an on-board dead-ended low differential pressure sensor. This technology provides the user with a trusted solution & peace of mind that the sensor will prevent contaminated air from passing through it.

Save Time and Money on Installation & Calibration

The SRPM is designed with both the installer and end user in mind. The BACnet enabled unit can be installed in an off-the-shelf electrical box, improving the ease of installation instead of having to use a custom electrical box that is not typically available at the rough stage of the project. The SRPM offers push button zero and span calibration that is easily performed by any low differential pressure calibrator and can be calibrated in minutes.

- **Maximize Patient Safety**
- **Save on Installation Costs**
- **Low-Cost BACnet Solution**

Model SRPM Features:

- On-board Sensor - Industry Best Accuracy
- LCD Touch Screen for Easy Setup and Room Display
- Monitor Single Pressure Relationship and Door Status
- Configurable Audible & Visual Alarms to Avoid Nuisance
- Easy Surface Mounting - Wall Thickness is Irrelevant
- Increased Safety with 2 Layer Password Protection
- Calibration: Only Requires Zeroing Once Installed

Where We're Installed:

- Brigham and Women's Hospital
- Emory University Medical Center
- Memorial Sloan Kettering Cancer Center
- Stanford University Medical Center
- Veterans Affairs (VA) Medical Center

Phone: 800-257-3872 • Fax: 978-264-0292 • setra.com

Model SRPM
Room Pressure Monitor

ORDERING INFORMATION

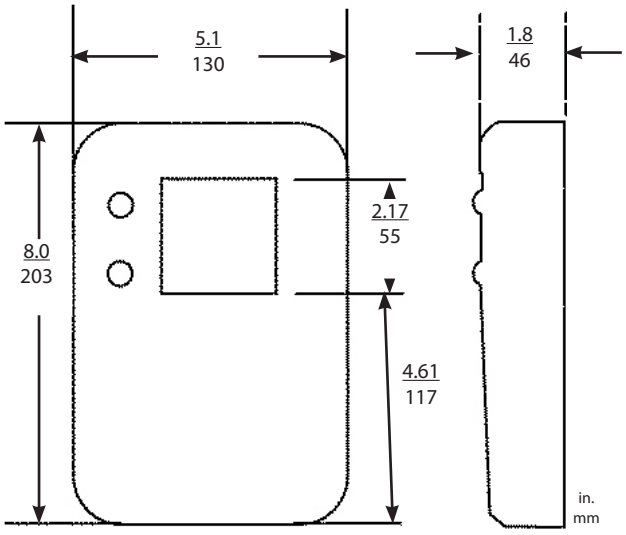
S R P M – [ ][ ][ ][ ][ ] – [ ][ ] – [ ]

Model	Range Code		Excitation/Output		Accuracy	
SRPM = SRPM	RANGE CODE	INCHES W.C.	A1	24 VAC/4-20 mA or 0-5 and 0-10 VDC	E	±0.5% FS
	005WB	±5	V1	120/240 VAC/4-20 mA or 0-5 and 0-10 VDC	V	±0.25% FS
	2R5WB	±2.5	A2	24 VAC w/ BACnet®		
	001WB	±1.0	V2	120/240VAC BACnet®		
	0R5WB	±0.50				
	R25WB	±0.25				
	0R1WB	±0.1				

"BACnet" is a registered trademark of ASHRAE"

Ordering Example: Part No. SRPM005WBA1E for a SRPM, ±5 in. W.C. Range, 24 VAC EXC. with 4 to 20 mA output, and ±0.5% FS Accuracy.*
Please contact factory for versions not shown..

DIMENSIONS



GENERAL SPECIFICATIONS

Performance Data		
	Standard	Optional
Accuracy RSS[1]	±0.5%	±0.25%
Non-Linearity (BFSL)	±0.49%	±0.24%
Hysteresis	±0.05%	±0.05%
Non-Repeatability	±0.05%	±0.05%
Span Setting Tol.[5]	±0.5% Rdg.	±0.5% Rdg.
Thermal Effects[2]		
Compensated Range (°F°C)	40 to 120 (4.5 to 50)	
Zero/Span Shift %FS	±0.03% FS (±0.05%FS)	
Overpressure	±15"W.C.	

Physical Description	
Case	Fire-Retardant Plastic (NEMA1, IP20 Rated for Indoor Applications)
Dimensions	8"H x 5.1"W x 1.8"D (203 x 130 x 46 mm)
Electrical Connection	Removable Terminal Block
Pressure Fittings	Barbed Fittings 1/4" O.D. Tubing
Weight (approx.)	1.5lbs (680g)

Environmental Data	
Operating Temp.[3] °F (°C)	32 to +120 (0 to +50)
Storage Temp. °F (°C)	-20 to +160 (-30 to +170)
Operating Humidity	5 to 95% RH (Non-Condensing)

Electrical Data (Voltage)	
Circuit	3-Wire (Exc, Out, Com)
Output[4]	0 to 5 VDC, 0 to 10 VDC
Alarm Output	SPDT Relay: 1A @ 24 VDC, 1A @ 120 VDC
Power Consumption	5W
Excitation:	
Code V1	85-265 VAC, 50-60 Hz
Code A1	18-32 VAC, 50-60 Hz
Code V2	85-265 VAC, BACnet®
Code A2	18-32 VAC, BACnet®

Electrical Data (Current)	
Circuit	2-Wire
Output	4 to 20 mA
External Load	0 to 510 ohms
Excitation:	
Code Vi:	85-265 VAC, 50-60 Hz1
Code A1	8-32 VAC, 50-60 Hz

[1]RSS of Non-Linearity, Hystereis, and Non-Repeatability.
[2]Units calibrated at nominal 70°F. Max thermal error computer from this datum.
[3]Operating temperature limits of the electronics only.
[4]Calibrated into a 50K ohm load, operable into a 5000 ohm load or greater
[5] Zero setting tol. negated by zero push button
Specifications subject to change.

Phone: 800-257-3872 • Fax: 978-264-0292 • setra.com

SpaceLogic Sensors
Pressure - Dry Differential Analog
EP Series, Bluetooth® Enabled

Patent Pending

Product Description

The SpaceLogic EP Series pressure sensors can measure either air pressure or velocity with the flip of a switch. The EP is available in three installation configurations: duct, panel or universal. Duct and panel models have two pressure and velocity options: 0-1 in. WC/ 0-3,000 ft/min or 1-10 in. WC / 3,000-6,000 ft/min with four field-selectable sub-ranges. The universal model comes in one pressure/velocity range: 0-10 in. WC / 0-7,000 ft/min with seven field-selectable sub-ranges for pressure and eight for velocity. All variants are available with and without display. The EP has an IP65/NEMA 4 environmental rating and a 5-year limited warranty.

The Veris Sensors App provides the ability to connect to a device and configure a variety of field-selectable parameters remotely from a smartphone via Bluetooth wireless technology. The app allows users to create and store commonly used parameters that will reduce commissioning time and provide assurance that all parameters are properly configured with no call backs. The app can also create a trend log while connected, providing critical data for troubleshooting purposes. iOS® users can download the app through the iOS App Store on their smart device. Android users can download the app through the Google Play™ store.

Note: This product is not intended for life or safety applications. Do not install this product in hazardous or classified applications.

Features

- High reliability sensor technology for long-term, maintenance-free operation
- Seven pressure and eight velocity sub-ranges with three selectable outputs for easy on-the-job setup
- IP65/NEMA 4 housing allows mounting in wash-down locations
- Circuit protection avoids damage due to incorrect input wiring

Available Products

Enclosure	Range	Local Display
EP □	AMS □	□
D = Duct P = Panel	301 = Pressure: 0 to 1 in. WC 0 to 250 Pa Velocity: 0 to 3,000 ft/min 0 to 15 m/s	Blank = No Display LCD = LCD Display
	Duct 302 = Pressure: 0 to 10 in. WC 0 to 2,500 Pa Velocity: 0 to 6,000 ft/min 0 to 30 m/s	

Enclosure	Range	Local Display
EP U	□	□
U = Universal	305 = Pressure: 0 to 10 in. WC 0 to 2,500 Pa Velocity: 0 to 7,000 ft/min 0 to 35 m/s	Blank = No Display LCD = LCD Display

USA: +1 888-444-1311
Europe: +46 10 478 2000
Asia: +65 6484 7877
www.schneider-electric.com

Life Is On Schneider Electric

June 2021
F-28091-10 nk

Specifications

Media Compatibility	Dry or inert gas
Input Power	Three-wire Volt mode: 24 Vac or 12-30 Vdc*, Two-wire mA mode: 12-30 Vdc*
Output Power	Field-selectable: 2-wire, loop-powered 4-20 mA Minimum input voltage for 4-20 mA operation: 250 Ω loop = 12 Vdc; 500 Ω loop = 19 Vdc (DC only, clipped and capped), 24 Vac/dc or 3-wire 0-5V/0-10V Minimum load resistance for Volt operation: 5 kΩ
301 Pressure Range	Pressure mode: Unidirectional: 0.1/0.25/0.5/1 in. WC, switch selectable Bidirectional: ±0.1/±0.25/±0.5/±1 in. WC, switch selectable Unidirectional: 25/50/100/250 Pa, switch selectable Bidirectional: ±25/±50/±100/±250 Pa, switch selectable Velocity mode: 500/1,000/2,000/3,000 ft/min, 2.5/5/10/15 m/s
302 Pressure Range	Pressure mode: Unidirectional: 1.0/2.5/5/10 in. WC, switch selectable Bidirectional: ±1.0/±2.5/±5/±10 in. WC, switch selectable Unidirectional: 250/500/1,000/2,500 Pa, switch selectable Bidirectional: ±250/±500/±1,000/±2,500 Pa, switch selectable Velocity mode: 3,000/4,000/5,000/6,000 ft/min, 15/20/25/30 m/s
305 Pressure Range	Pressure mode: Unidirectional: 0.1/0.25/0.5/1/2.5/5/10 in. WC, switch selectable Bidirectional: ±0.1/±0.25/±0.5/±1/±2.5/±5/±10 in. WC, switch selectable Unidirectional: 25/50/100/250/500/1,000/2,500 Pa, switch selectable Bidirectional: ±25/±50/±100/±250/±500/±1,000/±2,500 Pa, switch selectable Velocity mode: 500/1,000/2,000/3,000/4,000/5,000/6,000/7,000 ft/min, 2.5/5/10/15/20/25/30/35 m/s
Response Time	Standard: T95 in 20 sec, Fast: T95 in 2 sec, DIP switch selectable
Mode	Unidirectional or bidirectional, DIP switch selectable
Display (Option)	Pressure mode: Signed 3-1/2 digit LCD, indicates pressure, overrange indicator Velocity mode: Signed 4-1/2 digit LCD, indicates velocity, overrange indicator
Proof Pressure	3 psid (20,600 Pa)
Burst Pressure	5 psid (34,500 Pa)
Pressure Mode Accuracy	±1% FS (combined linearity and hysteresis)
Velocity Mode Accuracy	±90 ft/min (±0.45 m/s) plus 5% of measured value**
Temperature Effect	1 in. WC (250 Pa) models: 0.05%/°C; 10 in. WC (2,500 Pa) models: 0.01%/°C (Relative to 25 °C) 0 to 50 °C (32 to 122 °F)
Zero Drift (1 year)	1 in. WC (250 Pa) models: 2.5% FS typ.; 10 in. WC (2,500 Pa) models: 0.25% FS typ.
Zero Adjust	Pushbutton auto-zero and digital input (2-position terminal block)
Operating Environment	-20 to 60 °C (-4 to 140 °F)***
Altitude of Operation	0 to 3,000 m
Pollution Degree	2
Humidity Range	100% RH, non-condensing
Mounting Location	For indoor or outdoor use (display will not function below 0 °C (32 °F))
Fittings	Brass barb; 0.24” (6.1 mm) o.d.
Bluetooth Frequency Range	2.402 to 2.480 GHz (Bluetooth version 4.2), enabled by DIP switch
Maximum Output Power	0dBm
Environmental Rating	IP65, NEMA 4

USA: +1 888-444-1311
Europe: +46 10 478 2000
Asia: +65 6484 7877
www.schneider-electric.com

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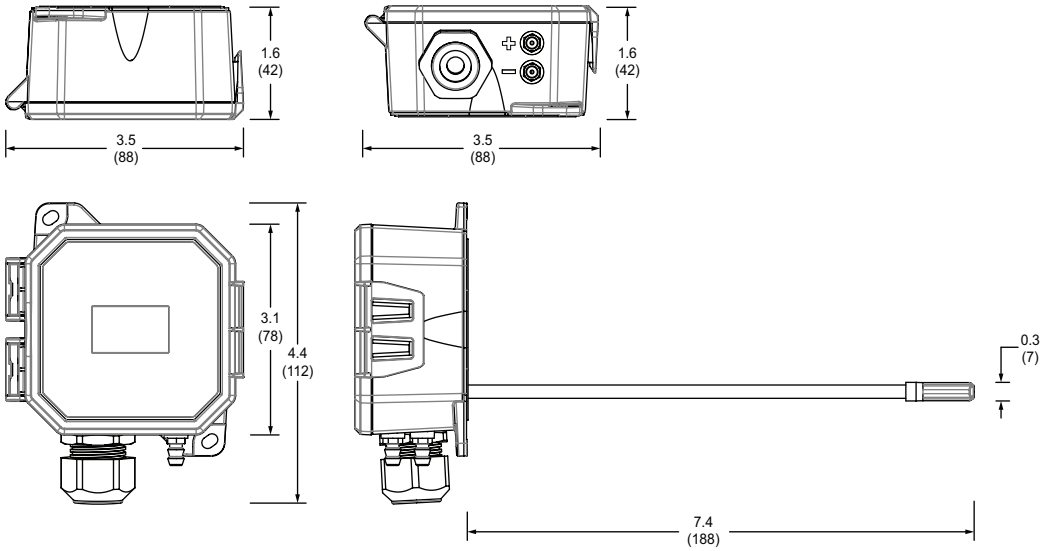
F-28091-10 nk

Specifications (cont.)

Flammability Rating	UL 94 5VA fire retardant ABS, plenum rated
Limited Warranty	5 years

EMC Conformance: EN 61000-6-3 and A1, Class B, EN 61000-6-1, EN61326-1 and EN61326-2-3.
* Class 2/II power source.
** For measured values between 200 and 7,000 ft/min (1 and 35 m/s).
*** Display will not function below 0 °C (32 °F).

Dimensions in. (mm)



Accessories

VFXP Series Air Velocity Measurement Probe*

Velocity Pitot Tubes, 8-5/8”, 12-5/8”, 18-5/8”
(AA18, AA19, AA20)*

Static-04 Pick-up - 4” Duct Static Pickup Probe (AA06)

Static-08 Pick up - 8” Duct Static Pickup Probe) (AA07)

Wall Plate Remote Pickup (AA56)

*For use with EPP (panel) and EPU (universal) models in Velocity mode only. Sold separately.


VFXP Series


AA18, AA19, AA20


AA06


AA07


AA56

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Junel 2021
F-28091-10 nk

Exhaust Duct Low Static Pressure Switch

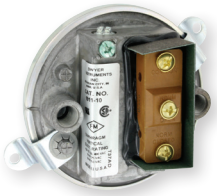
Qty = 1

Dwyer

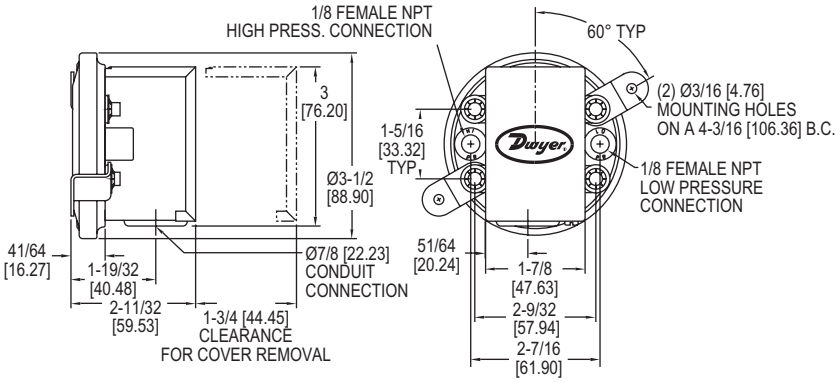
SERIES 1900

COMPACT LOW DIFFERENTIAL PRESSURE SWITCHES

Set Points from 0.07 to 20 in w.c. Repetitive Accuracy within 3%



Series 1910 switch with conduit enclosure off. Shows electric switch and set point adjustment screw located on same side for easy installation.



The Dwyer-engineered force-motion amplifier increases the leverage of diaphragm movement and results in a switch with excellent sensitivity and repeatability.

Our most popular **Series 1900 Compact Low Differential Pressure Switches** combine advanced design and precision construction to make these switches able to perform many of the tasks of larger, costlier units. Designed for air conditioning service, they also serve many fluidics, refrigeration, oven and dryer applications. Series 1900 switches have set points from 0.07 to 20 in w.c. (1.8 to 508 mm). Set point adjustment is easy with range screw located inside conduit enclosure. Internal location helps prevent tampering. UL, CE and CSA listed, and FM approved. For use with air or compatible gages.

FEATURES/BENEFITS

- Compact size and repeatability, provides a high-value switch for many industrial and OEM applications
- Wide range of models from 0.07 in w.c. to 20 in w.c. can meet exacting OEM specifications for a low pressure switch
- Range screw protected inside enclosure provides simplifies making adjustments but prevents tampering

APPLICATIONS

- Air conditioning refrigeration coil icing detection; defrost cycle initiation
- Clogged filter detection
- Variable air volume controller

SPECIFICATIONS

Service: Air and non-combustible, compatible gases.
Wetted Materials: Consult factory.
Temperature Limits: -30 to 180°F (-34 to 82.2°C).
Pressure Limits: 45 in w.c. (11.2 kPa) continuous, 10 psig (68.95 kPa) surge.
Switch Type: Single-pole double-throw (SPDT).
Repeatability: ±3%.
Electrical Rating: 15 A @ 120-480 VAC, 60 Hz. Resistive 1/8 HP @125 VAC, 1/4 HP @ 250 VAC, 60 Hz. Derate to 10 A for operation at high cycle rates.
Electrical Connections: 3 screw type, common, normally open and normally closed.
Process Connections: 1/8″ female NPT.
Mounting Orientation: Diaphragm in vertical position. Consult factory for other position orientations.
Set Point Adjustment: Screw type inside conduit enclosure.
Weight: 1 lb 4.5 oz (581 g).
Agency Approvals: CE, CSA, FM, and UL. Optional-EXPL explosion-proof enclosure does not possess any agency approvals.

MODEL CHART

Model	Operating Range in w.c.	Approximate Deadband	
		At Min. Set Point	At Max. Set Point
1910-00	0.07 to 0.15	0.04	0.04
1910-0	0.15 to 0.5	0.10	0.10
1910-1	0.40 to 1.6	0.15	0.16
1910-5	1.40 to 5.5	0.30	0.30
1910-10	3.0 to 11.75	0.40	0.40
1910-20	4.0 to 20.0	0.40	0.50

ACCESSORIES

Model	Description
A-399	Duct pressure monitor kit; for use with standard or manual reset model switches; includes mounting flange, tubing and adapters
A-329	Street ell; brass adapter for applications requiring right angle connections; two required for differential pressures
A-302F-A	303 SS static pressure tip with mounting flange; for 3/16″ ID rubber or plastic tubing; 4″ insertion depth; includes mounting screws
A-489	4″ straight static pressure tip with flange

OPTIONS

Weatherproof Housing

16 ga. steel enclosure with gasketed cover (NEMA 4, IP66) for wet or oily conditions. Withstands 200 hour salt spray test. Wt. 5-1/2 lb (2.5 kg). Switch must be factory installed.

Note: To order, change 1910 base number to 1911, add -WP suffix.
Example: 1911-1-WP

Explosion-Proof Housing

Cast iron base with brass cover. Rated Class I, Groups D; Class II, Div. 2, Groups E, F, G; Class III and NEMA 7, 9 NEMA 3. (7 lb). Switch must be factory installed.

Note: To order, change 1910 base number to 1911, add -EXPL suffix.
Example: 1911-1-EXPL

Manual Reset Option (Model 1900 MR)

Includes special snap switch which latches on pressure increase above the setpoint. Switch must be manually reset after pressure drops below the setpoint. Available on -1, -5,-10 or -20 ranges only. Option is not UL, CSA or FM listed. For use only in single positive pressure applications.

Note: To order, change 1910 base number to 1900, add -MR suffix.
Example: 1900-10-MR

Part # 1900-5-MR

Manual reset option

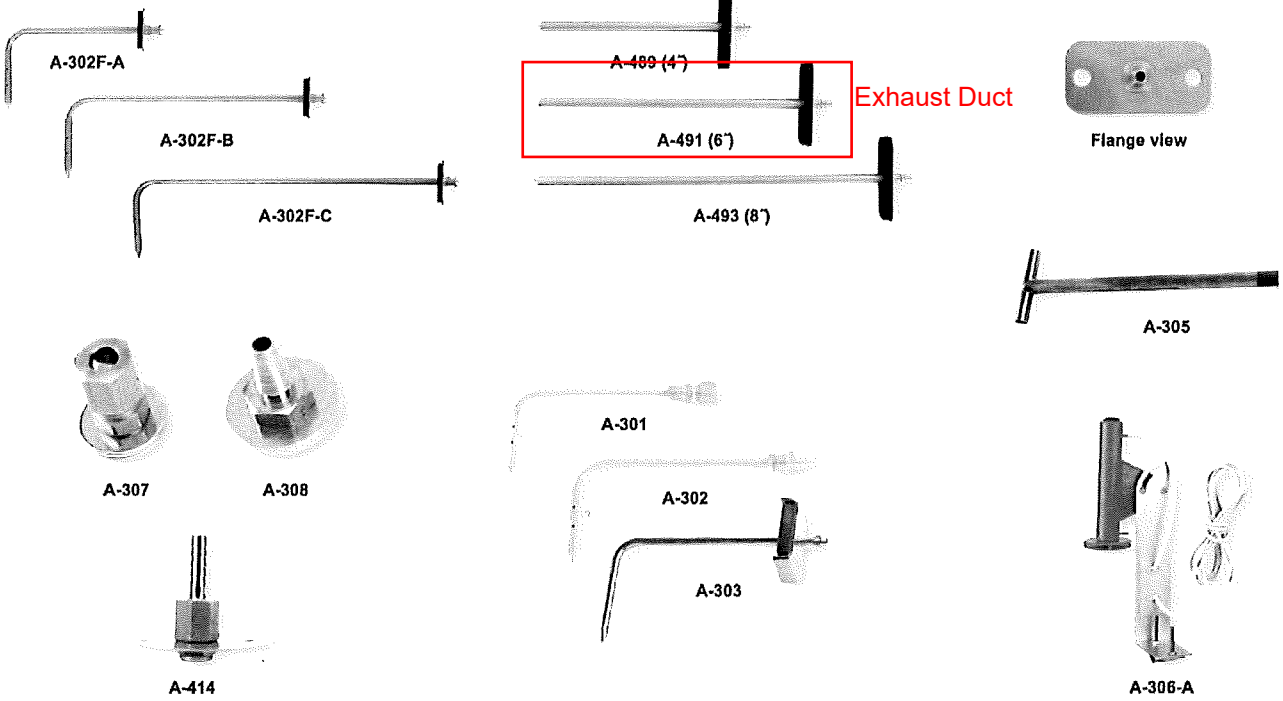
USA: California Proposition 65
⚠WARNING: Cancer and Reproductive Harm - www.P65Warnings.ca.gov

Process Tubing Options: See page 453 (Gage Tubing Accessories)

Exhaust Duct Static Pressure Tip Qty = 1

Dwyer

STATIC PRESSURE TIPS



MODEL CHART	
Model	**Description**
The stainless steel static pressure tips are used to measure static pressures in ducts or rooms. They are to be connected to differential pressure switches and transmitters. Two static sensors are used in applications where differential pressure is required across a filter or coil. These sensors include a mounting flange with integral rubber gasket and two screws for simplifying mounting on a duct.	
A-302F-A	4" hook style SS static pressure tip with mounting flange
A-302F-B	6" hook style SS static pressure tip with mounting flange
A-302F-C	8" hook style SS static pressure tip with mounting flange
A-489	4" straight SS static pressure tip with mounting flange
A-491	6" straight SS static pressure tip with mounting flange
A-493	8" straight SS static pressure tip with mounting flange
Designed for simplified installation, these are easy to install, inexpensive, and provides accurate static pressure sensing in smooth air at velocities up to 1500 FPM.	
A-307	Static pressure fitting, for 1/4" metal tubing connection
A-307-SS	SS static pressure fitting, for 1/4" metal tubing connection
A-308	Static pressure fitting, for 3/16" and 1/8" ID plastic or rubber tubing
A-414	SS clean room pressure sensor
These static pressure tips are ideal for applications such as sensing the static pressure drop across industrial air filters and refrigerant coils. Here the probability of air turbulence requires that the pressure sensing openings be located away from the duct walls to minimize impingement and aspiration, and thus ensure accurate readings. For a permanent installation of this type, the Dwyer No. A-301 or A-302 static pressure tip is used. It senses static pressure through radially-drilled holes near the tip and can be used in air flow velocities up to 12,000 FPM. The angled tips shown have 4" insertion depth. Each has four radially drilled .040" sensing holes. All except Model A-303 mount in 3/8" hole in duct. For portable use, a magnet holds No. A-303 in place.	
A-301	Static pressure tip, for 1/4" metal tubing connection
A-301-A	Static pressure tip, same as A-301 with 6" insertion depth
A-301-B	Static pressure tip, same as A-301 with 8" insertion depth
A-301-C	Static pressure tip, same as A-301 with 12" insertion depth
A-301-SS	SS static pressure tip, for 1/4" metal tubing connection
A-302	Static pressure tip, for 3/16" and 1/8" ID plastic or rubber tubing
A-302-A	Static pressure tip, same as A-302 with 6" insertion depth
A-303	Portable static pressure tip, for 3/16" ID rubber or plastic tubing with 4" insertion
A-305 low resistance static pressure tip is designed for use in dust-laden air and for rapid response applications. It is recommended where a very low actuation pressure is required for a pressure switch or indicating gage — or where response time is critical.	
A-305	Static pressure tip, low resistance application, furnished with two (2) hex jam nuts and two (2) mounting washers for duct mounting and with 1/8" NPT pipe thread for pressure connection
A-305-SS	SS static pressure tip, low resistance application, furnished with two (2) hex jam nuts and two (2) mounting washers for duct mounting and with 1/8" NPT pipe thread for pressure connection
A-306	Outdoor static pressure sensor. Provides average outdoor pressure signal for reference in building pressurization applications. Includes sensor, 50' vinyl tubing, mounting bracket and hardware. Red sensor
A-306-A	Outdoor static pressure sensor. Provides average outdoor pressure signal for reference in building pressurization applications. Includes sensor, 50' vinyl tubing, mounting bracket and hardware. Gray sensor

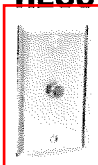
USA: California Proposition 65
⚠WARNING: This product can expose you to chemicals including Lead, which is known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

Room Static Pressure Pickup Sensor Qty = 4

Dwyer

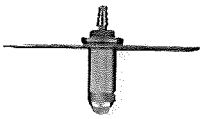
STATIC PRESSURE ACCESSORIES

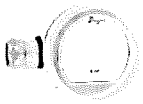

A-465

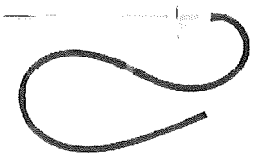

A-417A ++


A-418E


A-418N


A-419A


A-420A


A-421

Surge damper

MODEL CHART	
Model	**Description**
A-465	Static pressure pick-up provides a clean solution for sensing space pressure. The sensor can be mounted on sheetrock walls, single gang electrical boxes, or on ceiling tiles. Molded from ABS plastic, the A-465 provides an integral barb fitting and includes tubing, mounting screws and anchors.
A-417A	Static pressure pickup. For use in clean rooms, 60 micron filter picks up static pressure. Stainless steel wall plate fits 2" x 4" electrical box. Sealed with foam gasket, screws included. Barbed brass fitting holds 1/8" to 3/16" ID tubing.
A-418E	Static pressure pickup. Room mount with plastic enclosure fits 2" x 4" electrical box. Fine mesh screen hides static pressure pickup port. Clean connection to 1/8" to 3/16" ID tubing and pressure sensor. Sealed with foam gasket, screws included.
A-418N	Static pressure pickup. Room mount with plastic enclosure fits 2" x 4" electrical box. Fine mesh screen hides static pressure pickup port. Clean connection to 1/8" to 3/16" ID tubing and pressure sensor. Sealed with foam gasket, screws included.
A-419A	Static pressure pickup ceiling mount. Plate rests on top of standard 3/4" thick ceiling tile while 60 micron filter faces down through 5/8" hole in tile. Filter is barely noticeable in room being monitored. Unit mounts to junction box. Barbed brass fitting holds 1/8" to 3/16" ID tubing.
A-420A	Static pressure pickup for roof or outside mount. Reduces effects of wind gusts to keep pressure readings stable when plate is parallel to ground. Structure withstands harsh environmental elements. Structure is 3-1/4" across and 2-3/8" deep. EMT Conduit fitting is 1/2". Pressure connection is brass barbed fitting for 1/8" and 3/16" ID tubing.
A-421	Static pressure tip measures duct static air pressure. Assembly includes 6" probe, silicon rubber hose, and screws. Built-in surge damper ensures stable readings on pressure sensor. Pressure spike reducer can be added to end of tube to further smooth over pressure fluctuations.

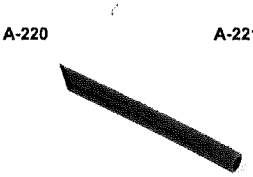
++USA: California Proposition 65
⚠ **WARNING:** This product can expose you to chemicals including Lead, which is known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

GAGE TUBING ACCESSORIES


A-200-1/A-200-2

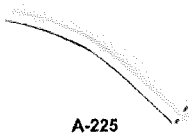

A-201/A-202


A-203


A-220

A-221


A-222


A-225

A-204-A/A-204-B/A-204-C/A-204-D


A-223

A-223P-1/A-223P-2

A-210/A-211

MODEL CHART	
Model	**Description**
Norprene® tubing is useful in a wide range of temperatures from -75 to 275°F (-60 to 135°C) and will not weaken after long term exposure to heat and ozone.	
A-200-1 A-200-2	3/16" ID x 5/16" OD, 13 psi maximum pressure @ 73°F (90 kPa @ 23°C); 50' 1/4" ID x 3/8" OD, 10 psi maximum pressure @ 73°F (69 kPa @ 23°C); 50'
Rubber latex tubing has less tendency to kink in storage and occupies less space, thus is best for portable work.	
A-201 A-202	3/16" ID, 9' length 3/16" ID, lengths to 50'
Clear PVC tubing is easily inspected and is therefore best for test applications where a possibility of fluid entering the tubing exists.	
A-203	1/8" ID x 1/4" OD, lengths to 100'; 60 psi max. pressure @ 73°F (22°C)
Clear flexible vinyl tubing is easily inspected, and is therefore best for test applications where a possibility of fluid entering the tubing exists.	
A-220 A-221 A-222	3/16" ID x 5/16" OD, lengths to 500'; 45 psi maximum pressure @ 73°F (310 kPa @ 23°C) 1/8" ID x 3/16" OD, lengths to 500'; 40 psi maximum pressure @ 165°F (276 kPa @ 74°C) .240" ID x .375" OD, lengths to 500'; 35 psi maximum pressure @ 73°F (240 kPa @ 23°C)
Flexible double column plastic tubing is used with Mark II manometers and the Wind Speed Indicator. Light gray with red color code stripe.	
A-225	1/8" ID, lengths to 750'
Flexible colored vinyl tubing is quickly distinguishable in applications where more than one line is required aiding installation.	
A-204-B A-204-C A-204-D	3/16" ID x 5/16" OD, lengths to 500'; 45 psi maximum pressure @ 165°F (310 kPa @ 74°C); Opaque blue 3/16" ID x 5/16" OD, lengths to 500'; 45 psi maximum pressure @ 165°F (310 kPa @ 74°C); Opaque white 3/16" ID x 5/16" OD, lengths to 500'; 45 psi maximum pressure @ 165°F (310 kPa @ 74°C); Opaque black
Black polyethylene tubing offers long life, great stability and resistance to corrosion.	
A-223	1/8" ID x 1/4" OD, 10' length; 200 psi maximum @ 140°F (1379 kPa @ 60°C)
Black nylon tubing is recommended for high temperature and pressure applications. -40 to 248°F (-40 to 120°C).	
Black plenum fire retardent polyethylene tubing meets NFPA standard 90A for installation in air-conditioning and ventilating plenum spaces; also used in building automation systems. Lengths to 500', 100 psig maximum pressure @ 75°F (689 kPa @ 24°C).	
A-223P-1 A-223P-2	.17" ID x .25" OD 1/4" ID x 3/8" OD
Aluminum tubing is recommended for permanent installations.	
A-210 A-211	1/4" OD, 5' length, 500 psi maximum pressure @ 200°F (3447 kPa @ 93°C) 1/4" OD, 50' length, 500 psi maximum pressure @ 200°F (3447 kPa @ 93°C)

Norprene® is a registered trademark of Saint-Gobain Abrasives, Inc. Corporation

Exhaust Fan VFD Start/Stop Relay

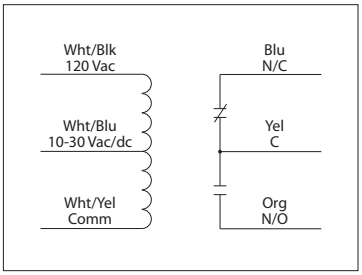
Qty = 1

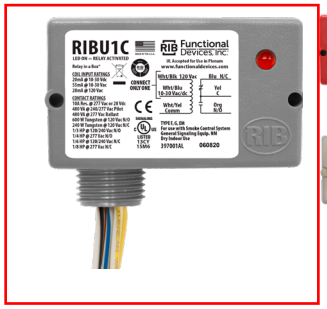
RIB Functional Devices, Inc.™ (800) 888-5538 sales@functionaldevices.com www.functionaldevices.com

10 AMP PILOT CONTROL RELAY

RIBU1C

Enclosed Relay 10 Amp SPDT with
10-30 Vac/dc/120 Vac Coil





RIBU1C-RD
- Red housing

RIBU1C-N4
- NEMA 4X housing, UL508 only

SPECIFICATIONS

 # Relays & Contact Type: One (1) SPDT Continuous Duty Coil
Expected Relay Life: 10 million cycles minimum mechanical
Operating Temperature: -30 to 140° F
Humidity Range: 5 to 95% (noncondensing)
Operate Time: 20ms
Relay Status: LED On = Activated
Dimensions: 1.70˝ x 2.80˝ x 1.50˝ with .50˝ NPT nipple
Wires: 16˝, 600V Rated
Approvals: UL Listed, UL916, UL864, C-UL California State Fire Marshal, CE, RoHS
Housing Rating: UL Accepted for Use in Plenum, NEMA 1
Gold Flash: Yes
Override Switch: No

Contact Ratings:
10 Amp Resistive @ 277 Vac
10 Amp Resistive @ 28 Vdc
480 VA Pilot Duty @ 240-277 Vac
480 VA Ballast @ 277 Vac
Not rated for Electronic Ballast
600 Watt Tungsten @ 120 Vac (N/O)
240 Watt Tungsten @ 120 Vac (N/C)
1/3 HP @ 120-240 Vac (N/O)
1/6 HP @ 120-240 Vac (N/C)
1/4 HP @ 277 Vac (N/O)
1/8 HP @ 277 Vac (N/C)

Coil Current:

33 mA @ 10 Vac	13 mA @ 10 Vdc
35 mA @ 12 Vac	15 mA @ 12 Vdc
46 mA @ 24 Vac	18 mA @ 24 Vdc
55 mA @ 30 Vac	20 mA @ 30 Vdc
28 mA @ 120 Vac	

Coil Voltage Input:
10-30 Vac/dc ; 120 Vac ; 50-60 Hz
Drop Out = 2.1 Vac / 2.8 Vdc
Pull In = 9 Vac / 10 Vdc

Note:
- Order in bulk by adding "-5PACK", "-10PACK", "-25PACK", or "-100PACK" to end of model number.

Fast Acting Return and Exhaust Damper Actuators

Qty = 4

NMQB(X)24-MFT

Proportional, Non-Spring Return, 24 V, Multi-Function Technology®

BELIMO

MFT

5 YEAR WARRANTY

Torque min. 70 in-lb for control of damper surfaces up to 17 sq ft.

Application

For proportional modulation of dampers in HVAC systems. Actuator sizing should be done in accordance with the damper manufacturer's specifications.

The actuator is mounted directly to a damper shaft up to 1.05" in diameter by means of its universal clamp, ½" self centered default. A crank arm and several mounting brackets are available for applications where the actuator cannot be direct coupled to the damper shaft.

The default parameters for 2 to 10 VDC applications of the …MFT actuator are assigned during manufacturing. If necessary, custom versions of the actuators can be ordered. The parameters can be changed by two means: pre-set and custom configurations from Belimo or on-site configurations using the Belimo PC-Tool software (version 3.3 or later).

Operation

The actuator is not provided with and does not require any limit switches, but is electronically protected against overload. The anti-rotation strap supplied with the actuator will prevent lateral movement.

The NMQB(X) series provides 95° of rotation and a visual indicator indicates position of the actuator. When reaching the damper or actuator end position, the actuator automatically stops. The gears can be manually disengaged with a button on the actuator cover.

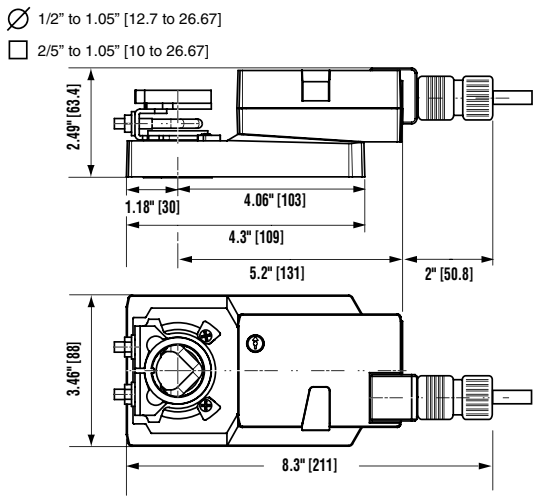
The NMQB(X)24-MFT actuators use a brushless DC motor, which is controlled by an Application Specific Integrated Circuit (ASIC). The ASIC monitors and controls the actuator's rotation and provides a digital rotation sensing (DRS) function to prevent damage to the actuator in a stall condition. Power consumption is reduced in holding mode.

Add-on auxiliary switches or feedback potentiometers are easily fastened directly onto the actuator body for signaling and switching functions.

Technical Data	NMQB(X)24-MFT
Power supply	24 VAC ±20% 50/60 Hz 24 VDC ±10%
Power consumption	13 W (1.5 W)
Transformer sizing	23 VA (Class 2 power source) (I max 20A@5ms)
Electrical connection	3 ft [1m] 10 ft [3m] 16 ft [5m] 18 GA plenum rated cable protected NEMA 2 (IP54)
Overload protection	electronic throughout 0 to 95° rotation
Operating range Y	2 to 10 VDC, 4 to 20 mA (default)
Variable (VDC, on/off)	on/off
Input impedance	100 kΩ (0.1 mA), 500 Ω, 1000 Ω (on/off)
Feedback output U	2 to 10 VDC, 0.5mA max, VDC variable
Angle of rotation	min. 30°, max. 95°, adjust. with mechanical stop electronically variable
Torque	70 in-lb [8 Nm]
Direction of rotation	reversible with ↷/↶ switch
Position indication	reflective visual indicator (snap-on)
Manual override	external push button
Running time	4, 10 or 15 seconds
Humidity	5 to 95% RH non-condensing (EN 60730-1)
Ambient temperature	-22°F to 122°F [-30°C to 50°C]
Storage temperature	-40°F to 176°F [-40°C to 80°C]
Housing	NEMA 2, IP54, UL enclosure type 2
Housing material	UL94-5VA
Agency listings	cULus acc. to UL 60730-1A/-2-14, CAN/CSA E60730-1:02, CE acc. to 2004/108/EEC and 2006/95/EC
Noise level	<52 dB(A)
Servicing	maintenance free
Quality standard	ISO 9001
Weight	1.8 lbs [0.85 kg]

Rated Impulse Voltage 800V, Type of action 1, Control Pollution Degree 3.

Dimensions (Inches [mm])



Accessories

K-NA	Reversible Clamp
ZG-100	Universal Mounting Bracket
ZG-101	Universal Mounting Bracket
ZG-103	Universal Mounting Bracket
ZG-104	Universal Mounting Bracket
ZG-NMA	Crank arm Adaptor Kit
AV8-25	Universal Shaft Extension
ZG-NMSA-1	Shaft Adaptor
ZS-100	Weather Shield - Steel
ZS-150	Weather Shield - Polycarbonate
Tool-06	8 mm & 10 mm Wrench
S1A, S2A	Auxiliary Switch (es)
P370	Shaft Mount Auxiliary Switch
P…A	Feedback Potentiometers
SGA24	Min positioners in NEMA 4 housing
SGF24	Min positioners for flush panel mounting
ADS-100	Analog to Digital Switch
ZG-R01	Resistor for 4 to 20 mA Conversion
NSV24 US	Battery Back-Up Module
ZG-X40	Transformer

NOTE: When using NMQB(X)24-MFT actuators, only use accessories listed on this page.

Typical Specification

Proportional control damper actuators shall be electronic direct-coupled type, which require no crank arm and linkage and be capable of direct mounting to a shaft up to 1.05" diameter. Actuators must provide proportional damper control in response to a 2 to 10 VDC or, with the addition of a 500 Ω resistor, a 4 to 20 mA control input from an electronic controller or positioner. Actuators shall have brushless DC motor technology and be protected from overload at all angles of rotation. Actuators shall have reversing switch and manual override on the cover.

Run time shall be constant and independent of torque. Actuators shall be cULus listed, have a 5-year warranty, and be manufactured under ISO 9001 International Quality Control Standards. Actuators shall be as manufactured by Belimo.

Wiring Diagrams

INSTALLATION NOTES

1 Provide overload protection and disconnect as required.

2 ***CAUTION** Equipment Damage!*
Actuators may be connected in parallel.
Power consumption and input impedance must be observed.

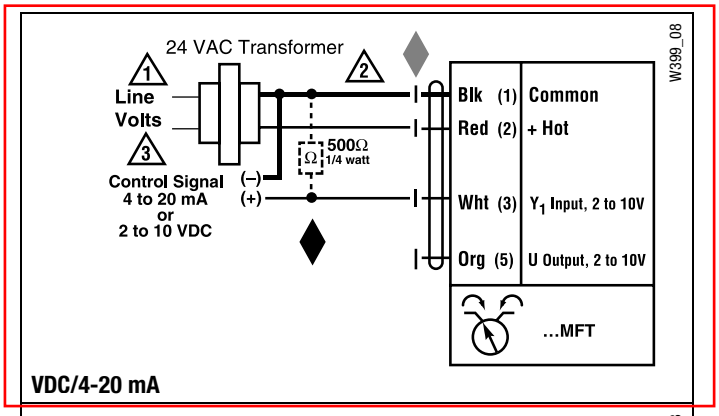
3 Actuators may also be powered by 24 VDC.

5 Control signal may be pulsed from either the Hot (source) or the Common (sink) 24 VAC line.

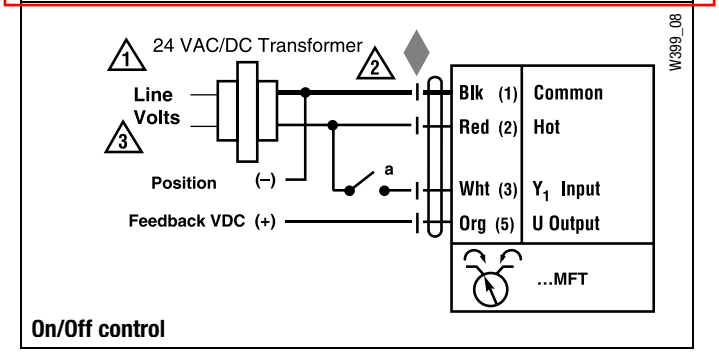
APPLICATION NOTES

◆ The ZG-R01 500 Ω resistor may be used.

***WARNING** Live Electrical Components!*
During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.



VDC/4-20 mA



On/Off control

Return Air Duct Dampers Qty = 2
8" Round Control Damper

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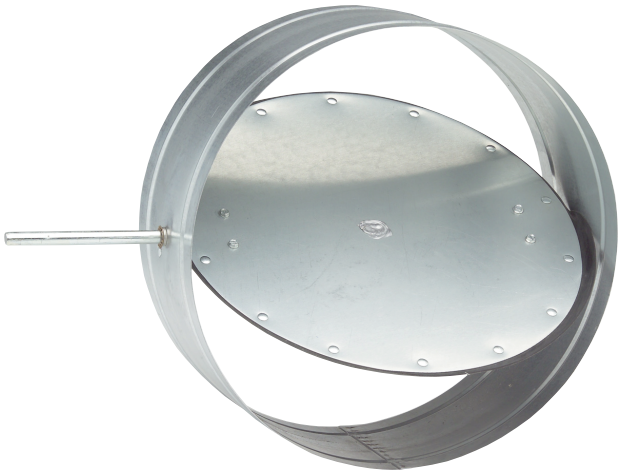
CDRS25 ROUND CONTROL DAMPER

APPLICATION

The CDRS25 is an **ultra low leak** "true" round control damper that easily installs in round spiral ductwork. The ultra low leak feature is a result of the specially designed blade-to-frame neoprene seal sandwiched between two round blades and fully encompassing the blade edge.

DAMPER DIA. INCHES	MAXIMUM SYSTEM PRESSURE
24" (610)	6.0" w.g.
18" (457)	6.0" w.g.
12" (305)	8.0" w.g.
6" (152)	10.0" w.g.



STANDARD CONSTRUCTION

FRAME
20 gage (1.0) galvanized steel up to 24" (610) diameter, 6" (152) long.

BLADE
Two layers of galvanized steel; 14 gage (2.0) equivalent thickness.

BLADE SEAL
Neoprene seal sandwiched between two sides of blades. Seal fully encompasses blade edge.

AXLE
1/2 " (13) diameter.

BEARING
Stainless steel sleeve pressed into frame.

CONTROL SHAFT
Axle extends 6" (152) beyond frame exterior.

FINISH
Mill galvanized.

DAMPER SIZES
Minimum 4" (102)
Maximum 24" (610)

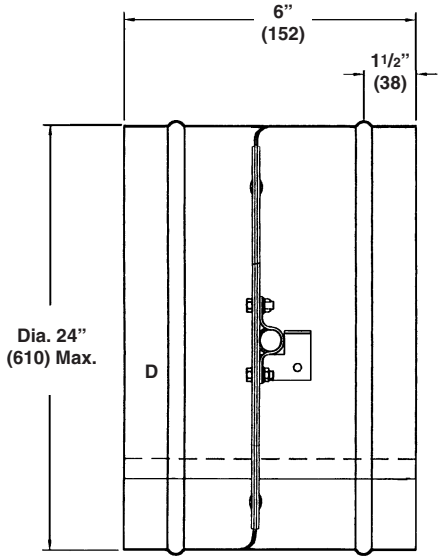
MAXIMUM VELOCITY
4000 FPM (1219 MPM)

LEAKAGE
.15 cfm per inch of perimeter at 4 in. w.g.

MAXIMUM TEMPERATURE
200°F (93°C)

OPTIONS

- Enamel, Epoxy and Kynar finishes
- Silicone rubber blade seal
- Stainless steel construction
- Factory installed electric and pneumatic actuators.



SUGGESTED SPECIFICATION

Furnish and install, at locations shown on plans or in accordance with schedules, round control dampers meeting the following specifications:

Dampers shall consist of a single circular blade mounted to a shaft. Inside frame surface shall be clean and smooth with no full circumference blade stops or similar inward projections.

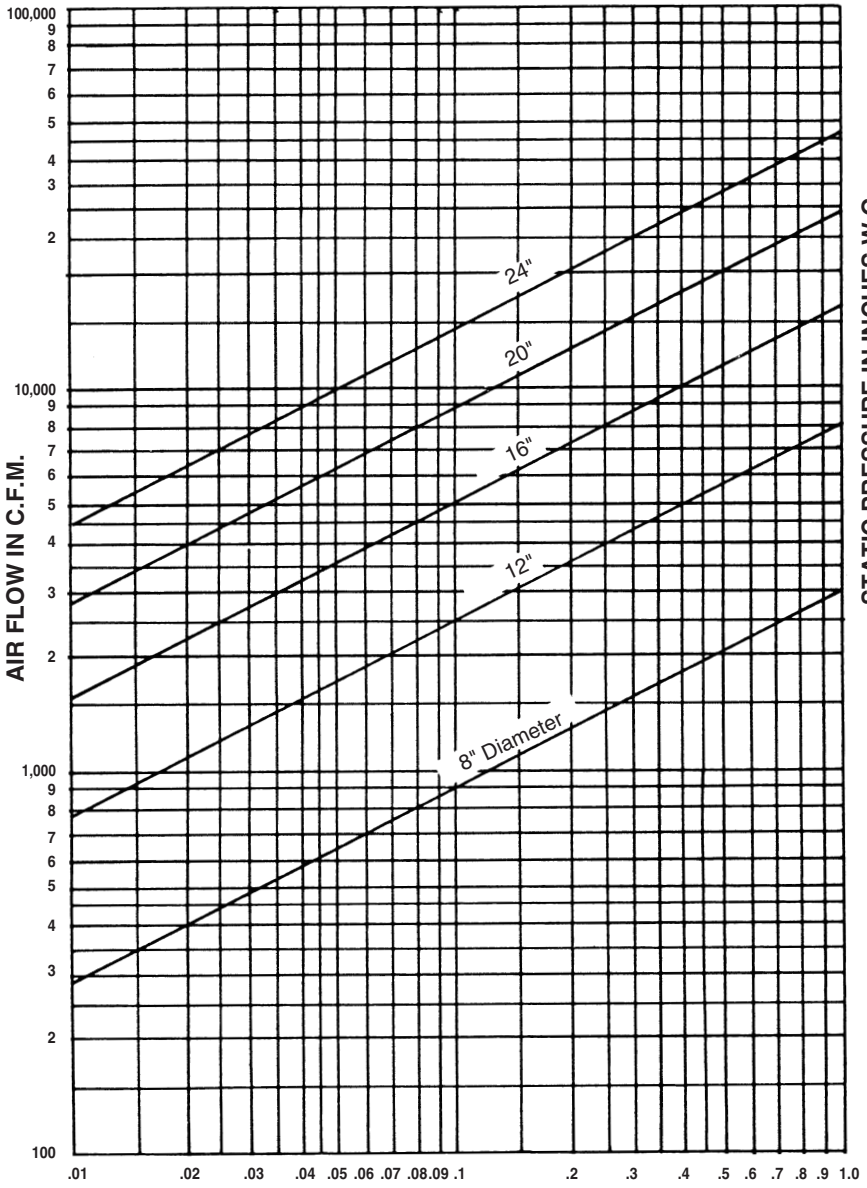
Frames shall be 20 gage galvanized steel and shall include rolled stiffener beads to allow easy sealing of spiral ductwork joints. Damper blade shall be double skin equivalent to 14 gage and shall include a neoprene seal sandwiched between the two sides. Leakage through the damper in the closed position shall not exceed .15 cfm per inch of blade circumference at a pressure differential of 4" w.g. Leakage through the bearings shall be less than 1/4" cfm at 4" static pressure. Dampers shall be in all respects equivalent to Ruskin Model CDRS25.

Dimensions in parenthesis ( ) indicate millimeters.*

Units furnished approximately 1/8" (3) smaller than D diameter dimensions.

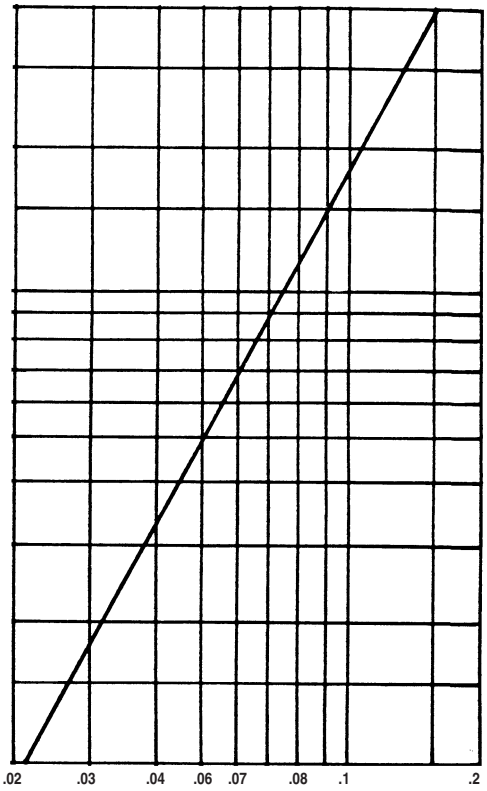
CDRS25 PERFORMANCE DATA

Static Pressure Drop Chart



STATIC PRESSURE IN INCHES W.G.

Leakage Chart



CFM PER INCH OF PERIMETER

DIMENSION D (Diameter)	MIN. IN. LBS. TORQUE AT 2" w.g. OR LESS STATIC PRESSURE
4"	36
5"	40
6"	44
7"	48
8"	52
9"	56
10"	60
12"	68
14"	76
16"	84
18"	92
20"	100
22"	108
24"	116

DETERMINING LEAKAGE

To determine damper leakage, enter Damper Leakage chart from the left side. Given the static pressure the damper will encounter in closed position, move horizontally to diagonal line, then go straight down the chart to CFM of leakage per inch of perimeter.

Example: Damper operating at 1.5" w.g. static pressure will leak .09 CFM per inch of perimeter. Total leakage on an 8" round will be 8 x 3.14 x .09 CFM per inch perimeter = 2.26 CFM leakage.

NOTES:

1. Ratings are based on AMCA Standard 500 using Test Set-up Apparatus Figure 5.3 (damper installed with duct upstream and downstream).
2. Static pressure and CFM are corrected to .075 lb./cu. ft. air density.

DETERMINING STATIC PRESSURE DROP

To determine static pressure drop through an open damper, enter the Damper Pressure Drop chart from the left side. Given the CFM of air flow through the damper, follow the CFM line to the diagonal line with the damper size required, then down to the static pressure drop of the unit.

Example:
The pressure drop of an 8" damper with 700 CFM flow is .06 inches w.g.

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CVICU Control Panel Qty = 2

EcoStruxure Panel Assemblies

BMS Solution

Product Description

EcoStruxure Panel Assemblies allow users to create a unique panel design by combining various panel categories and options. The panel categories and bills of material are listed in the bullets below. Note that each category includes installation labor for that category. A panel is made up of one item from each of the following categories:

- BOX (BOX) – Determines the panel's enclosure size, design I/O capacity and wire duct (required)
- POWER (PWR) – Defines whether the power is internal or external, as well as the AC and DC requirements (required)
- EQUIPMENT (EQP) – Specifies I/O configuration, communication requirements and the number of safety relays (required)
- CONTROLLER (CTL) – Defines which controller is used, along with labeled wiring (optional)
- MODULE (MOD) - Defines which module is used, along with labeled wiring (optional)
- ACCESSORY (ACC) - Defines additional panel accessories that are required

The combination of these panel categories results in over 1,000,000 unique panel designs which can include variables such as:

- Internal and external power
- AC power: 100VA, 200VA, 300VA, 400VA or 500VA
- DC power: 7.5W, 15W, 30W, 60W, or 90W
- UPS battery power: 750VA, 1000VA, or 1500VA
- 1 to 6 safety relays
- CAT5 and RS-485 communication connections

Refer to the specifications and information in this specification sheet to determine details and category interaction.

Specifications

Panel Dimensions	**Height x Width x Depth**
PNL0	500 x 500 x 250 mm (19.7 x 19.7 x 9.8 in.)
PNL1	600 x 600 x 200 mm (23.6 x 23.6 x 7.9 in.)
PNL2	800 x 600 x 250 mm (31.5 x 23.6 x 9.8 in.)
PNL3	1000 x 600 x 250 mm (39.4 x 23.6 x 9.8 in.)
PNL4	1000 x 800 x 250 mm (39.4 x 31.5 x 9.8 in.)
PNL5	1200 x 800 x 300 mm (47.2 x 31.5 x 11.8 in.)
BPL0	451.2 x 451.2 x 2.5 mm (17.7 x 17.7 x 0.1 in.)
BPL1	551.2 x 551.2 x 2.5 mm (21.7 x 21.7 x 0.1 in.)
BPL2	751.2 x 551.2 x 2.5 mm (29.6 x 21.7 x 0.1 in.)
BPL3	951.2 x 551.2 x 2.5 mm (37.4 x 21.7 x 0.1 in.)
BPL4	951.2 x 749.3 x 2.5 mm (37.4 x 29.5 x 0.1 in.)
BPL5	1143 x 749.3 x 2.5 mm (45.0 x 29.5 x 0.1 in.)
Power Options	
Main power location	Internal (main panel) External (external power panel)
Disconnect options: Circuit breakers (Square D)	M9F42170, MIN CIR BREAK 120V 0.5A M9F42101, MIN CIR BREAK 120V 1A M9F42102, MIN CIR BREAK 120V 2A M9F42103, MIN CIR BREAK 120V 3A1 M9F42104, MIN CIR BREAK 120V 4A M9F42105, MIN CIR BREAK 120V 5A M9F42106, MIN CIR BREAK 120V 6A M9F42107, MIN CIR BREAK 120V 7A M9F42108, MIN CIR BREAK 120V 8A M9F42110, MIN CIR BREAK 120V 10A

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Specifications (cont.)

Disconnect options: Fused switches (Kele)	KEL-GF-0.5, Fast Acting Fuse 0.5A, 250V KEL-GF-1, Fast Acting Fuse 1A, 250V KEL-GF-2, Fast Acting Fuse 2A, 250V KEL-GF-3, Fast Acting Fuse 3A, 250V KEL-GF-4, Fast Acting Fuse 4A, 250V KEL-GF-5, Fast Acting Fuse 5A, 250V
Main power	120 VAC @ 60 Hz
Supplemental power	100/200/300/400/500 VA @ 24 VAC 7.5/15/30/60/90 W @ 24 VDC
Terminal Assembly UIO Count	
Terminal Assembly A	8 UIO, 8 BO
Terminal Assembly B	12 UIO, 8 BO
Terminal Assembly C	20 UIO, 4 BO
Terminal Assembly D	28 UIO, 8 BO

Network Terminals	
No network terminals	PNL0, PNL1, PNL2, PNL3, PNL4, PNL5
2 CAT5 terminals	PNL0, PNL3, PNL4, PNL5
3 CAT5 terminals	PNL1, PNL2, PNL3, PNL4
RS-485 terminals	PNL0, PNL1, PNL2, PNL3, PNL4, PNL5
2 CAT5/RS-485 terminals	PNL0, PNL5
Safety Relays	
1 to 3 relays (FKIT-VMD2B-F24A)	PNL1
1 to 5 relays (FKIT-VMD2B-F24A)	PNL0, PNL2, PNL3
1 to 6 relays (FKIT-VMD2B-F24A)	PNL4, PNL5
Regulatory Information	
Agency approvals	UL, NEMA 4, Arc Flash

Replacement Part Numbers

Part Number	Description	Vendor
Panels		
SEBOX202010	ENC,20X20,N4,HC	Kele
SEBOX242408	ENC,24X24,N4,HC	Kele
SEBOX322410	ENC,24X32,N4,HC	Kele
SEBOX392410	ENC,24X39,N4,HC	Kele
SEBOX393210	ENC,32X39,N4,HC	Kele
SEBOX483212	ENC,32X48,N4,HC	Kele
KEL-T1-1030G	1”X3”X6.5’ GRAY DUCT W/CVR	Kele
KEL-T1-1530G	1.5”X3”X6.5’ GRAY DUCT W/CVR	Kele
KEL-DIN-3F	DIN RAIL, 1 METER LENGTH	Kele
KEL-PRK	PANEL RECEPTACLE ASSEMBLY	Kele
Power		
SEBOX161608	ENC, 16 X 16 X 8	Square D
SEBOX242408	ENC,24X24,N4,HC	Square D
KEL-T1-1030G	1”X3”X6.5’ GRAY DUCT W/CVR	Kele
X100CAB	XFR 120V/24V 99 VA 2HB+FT	Veris Industries
PS24-S7.5W	UNIVERSAL PWR SUP, 24VDC, 7.5W	Veris Industries
PS24-S15W	UNIVERSAL PWR SUP, 24VDC, 15W	Veris Industries
PS24-S30W	UNIVERSAL PWR SUP, 24VDC, 30W	Veris Industries
PS24-S60W	UNIVERSAL PWR SUP, 24VDC, 60W	Veris Industries
PS24-S90W	UNIVERSAL PWR SUP, 24VDC, 90W	Veris Industries
3045130	Single Terminal Block White	Phoenix Contact
3044128	Single Grounding Terminal	Phoenix Contact
3044115	Single Terminal Block Blue	Phoenix Contact

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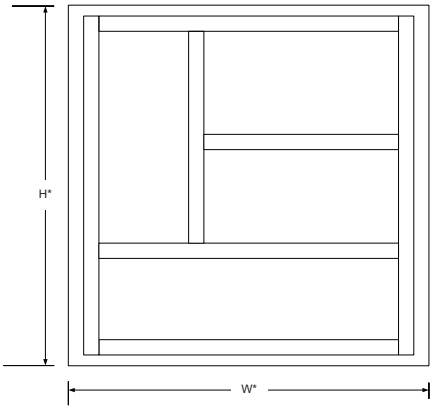
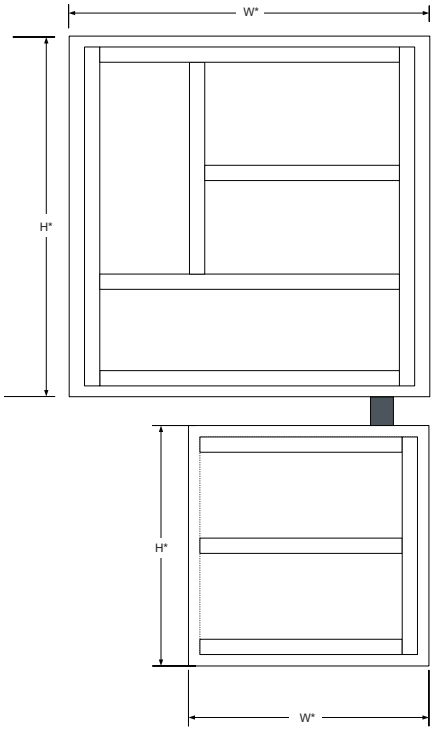
Panel Diagrams

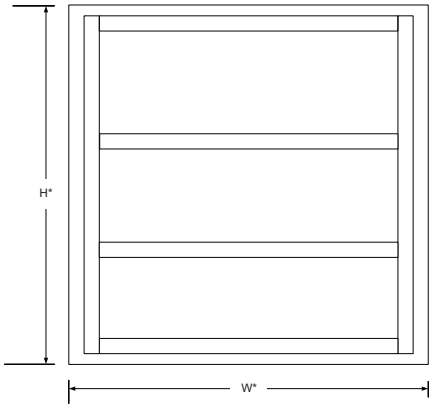
Internal Power



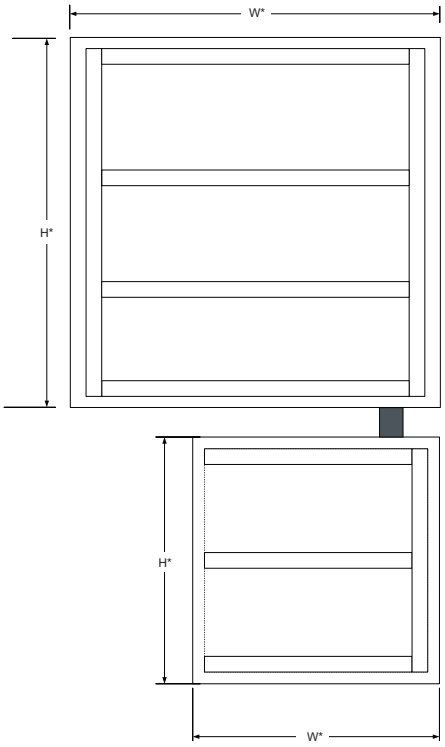
External Power



Internal Power - NT



External Power - NT



*Refer to Specifications for dimensions.

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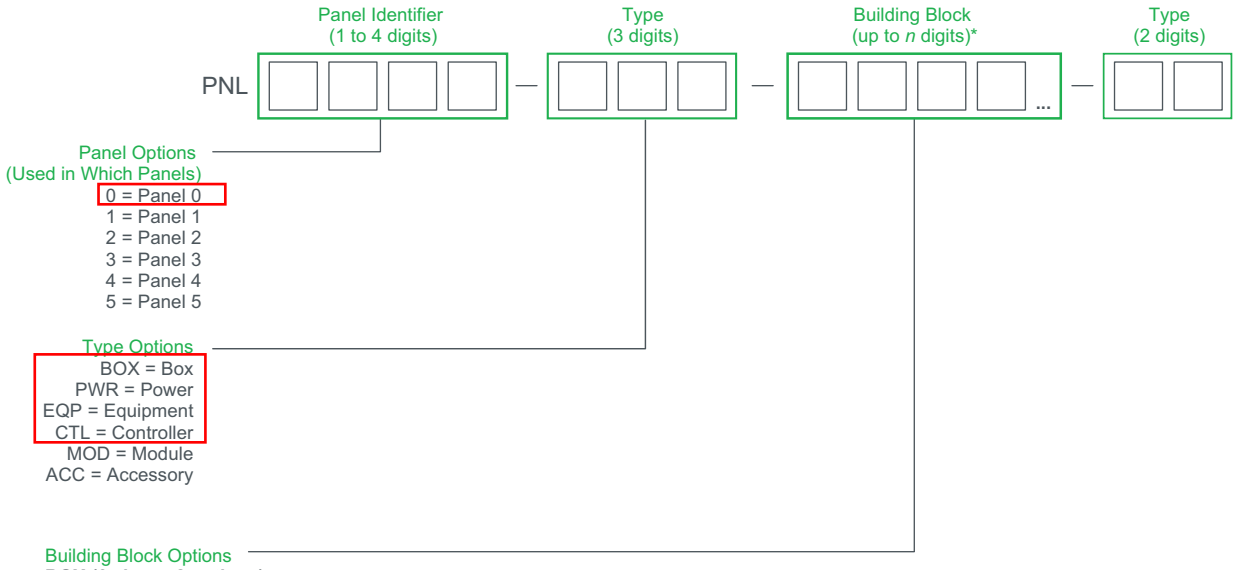
Part Number Description



Building Block Options

BOX (6 sizes - 2 options)

Option 1: Panels

PNL0-BOX-PNL0	=	500 x 500 x 250 mm (19.7 x 19.7 x 9.8 in.)
PNL1-BOX-PNL1	=	600 x 600 x 200 mm (23.6 x 23.6 x 7.9 in.)
PNL2-BOX-PNL2	=	800 x 600 x 250 mm (31.5 x 23.6 x 9.8 in.)
PNL3-BOX-PNL3	=	1000 x 600 x 250 mm (39.4 x 23.6 x 9.8 in.)
PNL4-BOX-PNL4	=	1000 x 800 x 250 mm (39.4 x 31.5 x 9.8 in.)
PNL5-BOX-PNL5	=	1200 x 800 x 300 mm (47.2 x 31.5 x 11.8 in.)
PNL0-BOX-BPL0	=	451.2 x 451.2 x 2.5 mm (17.7 x 17.7 x 0.1 in.)
PNL1-BOX-BPL1	=	551.2 x 551.2 x 2.5 mm (21.7 x 21.7 x 0.1 in.)
PNL2-BOX-BPL2	=	751.2 x 551.2 x 2.5 mm (29.6 x 21.7 x 0.1 in.)
PNL3-BOX-BPL3	=	951.2 x 551.2 x 2.5 mm (37.4 x 21.7 x 0.1 in.)
PNL4-BOX-BPL4	=	951.2 x 749.3 x 2.5 mm (37.4 x 29.5 x 0.1 in.)
PNL5-BOX-BPL5	=	1143 x 749.3 x 2.5 mm (45.0 x 29.5 x 0.1 in.)

Option 2: Panel Design Layout

-NT = Non UIO terminals

PWR (6 options)

Option 1: Power Type

X = None
I = Internal
E = External

Option 2: Disconnect Type

X = None
F = Fused Switches
C = Circuit Breakers

Option 3: AC Power

X = None
1 = 100 VA
2 = 200 VA
3 = 300 VA
4 = 400 VA
5 = 500 VA

Option 4: DC Power

X = None
1 = 7.5 W
2 = 15 W
3 = 30 W
4 = 60 W
5 = 90 W

Option 5: UPS Power

-U1 = 750 VA
-U2 = 1000 VA
-U3 = 1500 VA

EQP (3 options)

Option 1: Terminal Block

X = No terminal blocks
A = 8-UIO, 8-BO
B = 12-UIO, 8-BO
C = 20-UIO, 4-BO
D = 28-UIO, 8-BO

Option 2: Communication

X = No communication
2 = 2 CAT5
3 = 3 CAT5
4 = RS485
5 = 2 CAT5/RS485

Option 3: Safety Relays**

X = No relays
1 = 1 relay
2 = 2 relays
3 = 3 relays
4 = 4 relays
5 = 5 relays
6 = 6 relays

CTL (2 options)

Option 1: Controller

Part number = Controller

Option 2: Wiring Layout

-NT = Power wiring only

MOD (2 options)

Option 1: Module

Part number = Module

Option 2: Wiring Layout

-NT = Power wiring only

Part Number Example:

PNL12345-PWR-IF22

Example Breakdown:

Used in panels 1-4
Type = Power
I = Internal
F = Fuses
2 = AC 200 VA
2 = DC 15 kW

*If a building block can be configured in more than one box, the part number must include all box numbers. Controller building block options will exceed four characters.

**Refer to Specifications for relay count capacities.

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Building Blocks

Building blocks are designed to create specific engineered solutions. Available building blocks are shown in the tables below and are linked across each section (Box, Power, Equipment and Controller).

Box

PNL0	PNL1	PNL2	PNL3	PNL4	PNL5
PNL0-BOX-BPL0	PNL1-BOX-BPL1	PNL2-BOX-BPL2	PNL3-BOX-BPL3	PNL4-BOX-BPL4	PNL5-BOX-BPL5
PNL0-BOX-PNL0	PNL1-BOX-BPL1-NT	PNL2-BOX-BPL2-NT	PNL3-BOX-BPL3-NT	PNL4-BOX-BPL4-NT	PNL5-BOX-BPL5-NT
	PNL1-BOX-PNL1	PNL2-BOX-PNL2	PNL3-BOX-PNL3	PNL4-BOX-PNL4	PNL5-BOX-PNL5
	PNL1-BOX-PNL1-NT	PNL2-BOX-PNL2-NT	PNL3-BOX-PNL3-NT	PNL4-BOX-PNL4-NT	PNL5-BOX-PNL5-NT

Power

PNL0	PNL1	PNL2	PNL3	PNL4	PNL5
PNL0-PWR-XXXX					
PNL0-PWR-ICX5					
PNL0-PWR-ICX4					
PNL0-PWR-ICX3					
PNL0-PWR-ICX2					
PNL0-PWR-ICX1					
PNL0-PWR-IC2X					
PNL0-PWR-IC1X					
PNL0-PWR-IC15					
PNL0-PWR-IC14					
PNL0-PWR-IC13					
PNL0-PWR-IC12					
PNL0-PWR-IC11					
	PNL12345-PWR-EC2X				
	PNL12345-PWR-EC2X-U1				
	PNL12345-PWR-EC2X-U2				
	PNL12345-PWR-EC2X-U3				
	PNL12345-PWR-EC21				
	PNL12345-PWR-EC21-U1				
	PNL12345-PWR-EC21-U2				
	PNL12345-PWR-EC21-U3				
	PNL12345-PWR-EC22				
	PNL12345-PWR-EC22-U1				
	PNL12345-PWR-EC22-U2				
	PNL12345-PWR-EC22-U3				
	PNL12345-PWR-EC23				
	PNL12345-PWR-EC23-U1				
	PNL12345-PWR-EC23-U2				
	PNL12345-PWR-EC23-U3				

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Building Blocks (cont.)

Power (cont.)

PNL0	PNL1	PNL2	PNL3	PNL4	PNL5
	PNL12345-PWR-EC24				
	PNL12345-PWR-EC24-U1				
	PNL12345-PWR-EC24-U2				
	PNL12345-PWR-EC24-U3				
	PNL12345-PWR-EC25				
	PNL12345-PWR-EC25-U1				
	PNL12345-PWR-EC25-U2				
	PNL12345-PWR-EC25-U3				
	PNL12345-PWR-EC3X				
	PNL12345-PWR-EC3X-U1				
	PNL12345-PWR-EC3X-U2				
	PNL12345-PWR-EC3X-U3				
	PNL12345-PWR-IC1X				
	PNL12345-PWR-IC11				
	PNL12345-PWR-IC12				
	PNL12345-PWR-IC13				
	PNL12345-PWR-IC14				
	PNL12345-PWR-IC15				
	PNL12345-PWR-IC2X				
	PNL12345-PWR-IC21				
	PNL12345-PWR-IC22				
	PNL12345-PWR-IC23				
	PNL12345-PWR-IC24				
	PNL12345-PWR-IC25				
	PNL12345-PWR-IC3X				

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Building Blocks (cont.)

Equipment

PNL0	PNL1	PNL2	PNL3	PNL4	PNL5
PNL012345-EQP-XXX					
PNL012345-EQP-XX1					
PNL012345-EQP-XX2					
PNL012345-EQP-XX3					
PNL012345-EQP-XX4					
PNL012345-EQP-XX5					
PNL012345-EQP-XX6					
PNL05-EQP-X2X					PNL05-EQP-X2X
PNL05-EQP-X4X					PNL05-EQP-X4X
PNL05-EQP-X5X					PNL05-EQP-X5X
	PNL1-EQP-A31				
	PNL1-EQP-A32				
	PNL1-EQP-A33				
	PNL1-EQP-A3X				
	PNL1-EQP-A41				
	PNL1-EQP-A42				
	PNL1-EQP-A43				
	PNL1-EQP-A4X				
	PNL1-EQP-AX1				
	PNL1-EQP-AX2				
	PNL1-EQP-AX3				
	PNL1-EQP-AXX				
	PNL12345-EQP-X21				
	PNL12345-EQP-X22				
	PNL12345-EQP-X23				
	PNL12345-EQP-X24				
	PNL12345-EQP-X25				
	PNL12345-EQP-X26				
	PNL12345-EQP-X41				
	PNL12345-EQP-X42				
	PNL12345-EQP-X43				
	PNL12345-EQP-X44				
	PNL12345-EQP-X45				
	PNL12345-EQP-X46				
	PNL12345-EQP-X51				
	PNL12345-EQP-X52				
	PNL12345-EQP-X53				
	PNL12345-EQP-X54				
	PNL12345-EQP-X55				

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Building Blocks (cont.)

Controller

PNL0	PNL1	PNL2	PNL3	PNL4	PNL5
PNLM012345-CTL-SXWASPXXX10001					
PNLM012345-CTL-SXWASPXXX1S001					
PNL01234-CTL-SXWASB36H10001-NT					
PNL01234-CTL-SXWASB36H10002-NT					
PNL01234-CTL-SXWASB36X10001-NT					
PNL01234-CTL-SXWASB36X10002-NT					
PNL01234-CTL-SXWMPC36A10001-NT					
PNL0123-CTL-SXWASB24H10001-NT					
PNL0123-CTL-SXWASB24H10002-NT					
PNL0123-CTL-SXWASB24X10001-NT					
PNL0123-CTL-SXWASB24X10002-NT					
PNL0123-CTL-SXWMPC24A10001-NT					
PNLM012-CTL-SXWMPC18A10001-NT					
PNLM012-CTL-SXWMPC18B10001-NT					
PNLM01-CTL-SXWMPC15A10001-NT					
PNLM01-CTL-SXWRCF12A10001-NT					
PNLM01-CTL-SXWRCF12B10001-NT					
PNLM01-CTL-SXWRCF12C10001-NT					
PNLM01-CTL-B3851-NT					
PNLM01-CTL-B3867-NT					
PNLM01-CTL-I2851-NT					
PNLM01-CTL-I2867-NT					
PNLM01-CTL-MNB-300-NT					
PNLM01-CTL-MNL-15RS3-NT					
PNLM01-CTL-MNL-20RS3-NT					
PNLM01-CTL-MNL-20RS4-NT					
		PNL234-CTL-B3804-NT			
		PNL234-CTL-B3814-NT			
		PNL234-CTL-I2814-NT			
		PNL234-CTL-B3920-NT			
		PNL234-CTL-I2850-NT			
		PNL234-CTL-I2920-NT			
		PNL234-CTL-MNB-1000-NT			
		PNL234-CTL-SXWASB36H10001			
		PNL234-CTL-SXWASB36X10001			
		PNL234-CTL-SXWMPC36A10001			
	PNL1234-CTL-SXWASB24H10001				
	PNL1234-CTL-SXWASB24X10001				
	PNL1234-CTL-SXWMPC24A10001				

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