

Honeywell

Field Devices

Application and Selection Guide

Commercial HVAC Components – Engineered for Success



About valve selection

The valve selection section is constructed in one of two ways:

For unassembled product:

As a reference, pictures will represent the valves and actuators separately; and part numbers are highlighted in blue. To order a complete product one OS# must be chosen from each blue box.

For factory assembled product:

The complete assembled OS# will be displayed in the body of the chart (except for cartridge cage valves, both an actuator and valve must be chosen). Pictures will also reference the factory assembled configuration.

Additional product information

To find more detailed information on the individual products included in this document, go to: <http://customer.honeywell.com> and use the search text box to quickly locate product specific content.

SUPPORT

Contact Information

Commercial Components

Technical Hotline 888.516.9347

Take-Off Service

Let Honeywell Take-Off Service provide a complete job schedule for your projects for dampers, actuators, valves and VFDs.

E-mail

buildingsproductsupport@honeywell.com

takeoff.service@honeywell.com

Online Resources

Honeywell Product Ordering

Get the information you want and order the products you need.

URL

<http://customer.honeywell.com>

Honeywell Partner Web Site

A web site developed for our partners. Get product information, guide specs, wiring diagrams, training videos, and more.

<http://buildingcontrols.honeywell.com>

Configure Price, Quote (CPQ)

The easy-to-use online tool used to configure, price, and quote Honeywell field devices.

www.cpq.honeywell.com

Configure, Price, Quote – CPQ Select

Product Selection And Quoting Made Easy

New CPQ Select saves time and ensures accuracy.



Configure



Price



Quote

QUOTE YOUR NEXT JOB WITH CPQ SELECT

Honeywell CPQ Select; the single, easy to use tool to configure, price, and quote Honeywell Field Device products.

No special software is required and it is available and current, 24/7.

Easy to use CPQ Features:

- Quickly find and select the right product for your application
- Compare specifications across different products
- View and download technical literature
- Configure and tag Valve Assemblies
- Create quotations and save automatically to the cloud for future projects
- Export simple quotations or include full submittal documentation

Honeywell Commercial Products Included:

- Control Valves & Actuators
- Control dampers
- Actuators – Direct Coupled Actuators (DCA) and Foot Mounted
- Variable Frequency Drives (VFDs)
- Sensors
- Submeters
- Standalone Controllers
- Pneumatics

CPQ Select Website – Check It Out Today

www.CPQ.Honeywell.com

Damper Pricing Tool

Use the Damper Pricing tool to select and price custom made dampers that are not listed in CPQ. Click on the “Commercial Estimating Tools” link at customer.honeywell.com under "Support and Resources."

Specification Take-Off Service

The Honeywell Take-Off Service can create product schedules from:

- Product specifications
- Existing schedules
- Drawings
- Obsolete or competitive schedules

Our goal is to help provide you with the best possible solution for each job.



Products Supported by the Take-Off Service

- Commercial Water and Steam Valves
- Valve Actuators (Electric or Pneumatic)
- Commercial Control Dampers
- Custom Dampers
- Damper Actuators (Electric or Pneumatic)
- Variable Frequency Drives

1. Submit your information by Email to takeoff.service@honeywell.com
2. Include your desired turn-around time.
3. Take-Off Service staff will send you a confirmation that your email was received. We always attempt to have your request finished as soon as possible. Please note, however, that the quality of the submitted information largely determines the turn-around time. We will work closely with you to ensure that we have enough information to move forward as quickly as possible.
4. A final product schedule document will be returned to you following take-off completion.

Included In the Final Take-Off Document

We send a comprehensive spreadsheet, which contains:

- A complete product schedule
- Base price
- Directions on how to order Honeywell products
- Links to product submittals
- Quote identification number

Questions

If you have questions about the Honeywell Take-Off Service, please call the dedicated Take-Off Service phone number at 1.888.664.4092 or email us at takeoff.service@honeywell.com.

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Section 1: Dampers

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Use the following guidelines to determine the actuator quantity and torque requirements for your damper configuration.

Determine Damper Actuator Locations

Use the following configuration to determine the amount of actuator locations your damper will require.

Single Section $\leq 48 \times 74$ D2, D3
 $\leq 60 \times 74$ D1

Dampers will never ship more than 2 sections wide and one section high.

Configuration

Dampers less than 96x74 inch size have a single actuator location. Dampers 96x74 and less than 144x74 are made of three sections, and have two actuator locations, one with two thirds of the area (and torque), and the other with one third.

Exception: Three section wide dampers that are less than 42 square feet, have a single actuator location.

If damper exceeds 74" height a second row is necessary. Apply the same logic above to each row of dampers.

For dampers larger than 144 x 144, please contact the Take-Off Service (takeoff.service@honeywell.com) for a quote and actuator location.

Mounting

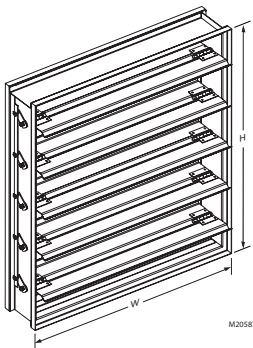
Internal Mount: Only blade drive lever provided. Customer is responsible for providing actuator mounting hardware, and linkage.

External Mount: Actuator shaft will be provided as extension pin to be mounted on side or with jackshaft pre-mounted on damper.

Determining Damper Actuator Torque Requirements

Use the following procedure to determine the required torque for your damper.

NOTE: Damper area is measured using the W and H dimensions.



Measuring Damper Area and Torque Requirements

1. Calculate the damper area by multiplying width by height in inches and divide by 144 to obtain square feet.
2. Multiply the area by the correct torque factor from Table 2 below, to show total torque required.
3. Select an actuator with torque higher than the calculated value.

EXAMPLE:

W dimension = 96 in.

H dimension = 48 in.

$48 \text{ in.} \times 96 \text{ in.} \div 144 = 32 \text{ sq. ft.}$

$32 \text{ sq. ft.} \times 7 \text{ lb-in./sq. ft.} = 224 \text{ lb-in.}$

In this example you need one or more actuators with a combined torque of 224 lb-in or more. Sometimes it's necessary to use more than one actuator in the same actuator location, in which case extra hardware must be used, such as a tandem mounting kit.

Table 2. Approximate industry standard damper lb-in. per sq ft value.

		Face Velocity (fpm)/ Static Pressure (in. wc)				
Leakage	Damper Blades	500/ 1	1000/ 2	1500/ 3	2000/ 4	2500/ 5
D1 & D2	Parallel	4	7	10.5	12	14
D1 & D2	Opposed	3	5	7.5	8.5	10
D3	Parallel	3	4.5	6.5	7	8
	Opposed	2	3	4.5	5	6

Damper Sizing

Dampers can be sized using two methods; actual sizing or nominal sizing.

Dampers with actual sizing are made exactly to the dimensions specified, meaning a 24x24 damper is exactly 24x24 inches when built.

Nominally sized dampers are undersized by one quarter inch in both dimensions, meaning a 24x24 damper will be 23.75x23.75 inches when built.

Nominal sizing is the most common method, since that is how dampers destined for duct installation should be sized to fit. Actual sizing is more common with flange or wall mounting

Nominal sizing is Honeywell's default method of manufacturing. If actual sizing is required, please specify accordingly at the time of ordering.

Product Selection - Dampers

Standard Rectangular Dampers

HVAC performance is largely dependent on airflow, and Honeywell Control Dampers are built to support improved airflow and heavy use. Honeywell has long been a leading source for commercial control dampers, with products that meet the benchmark AMCA 500D air performance standards. With excellent leakage performance and manufacturing standards, Honeywell control dampers provide efficient and trouble free operation.

Standard Rectangular Dampers



Honeywell D1, D2, and D3 Control Dampers are constructed to be durable. They feature a symmetrical blade design that translates into a damper that is not flow directional, has maximized free area, and reduced actuator torque compared to asymmetrical blade designs.

The Right Choice

There's a Honeywell Control Damper that's just right for your application. The D1 ultra-low leakage airfoil damper has low airflow resistance for a more efficient system, and is typically used in high pressure and velocity applications, such as fan isolation. The D2 model is an ultra-low leakage damper with blade and jamb seals, and it's designed for medium pressure and velocity systems, like outdoor air intake or exhaust. The D3 control damper is built for applications with medium pressure and velocity, and where low leakage is not important, like return air.

Blade Design

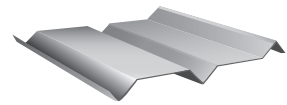
Airfoil Blades - D1 Dampers

Honeywell Airfoil Control Dampers have blades constructed of double skin galvanized steel. Its shape results in increased strength, but also a lower resistance to airflow, which makes it ideal for high pressure systems.

3V Blades - D2 and D3 Dampers

The D2 and D3 models feature a 3V blade design, with three V-grooves that run the length of the blade for structural rigidity and strength. The 3V

blade is primarily designed to be used in low to medium pressure and velocity applications.



Applications And Operation

Honeywell Commercial Control Dampers are designed for isolation or airflow control in medium- to high-pressure and velocity HVAC systems. Typical use includes volume control in zone applications and air handling units, generator room ventilation, stand-alone exhaust air units, or economizer applications. Operating range is from 2000 to 4000 fpm maximum velocity, and 2.5 to 10 inch wg pressure.

Dampers are designed to operate with a wide range of Honeywell actuators and accessories. Spring return and non-fail-safe actuators are available with a wide range of control options and output torque, to insure precise control of your damper application.

Performance

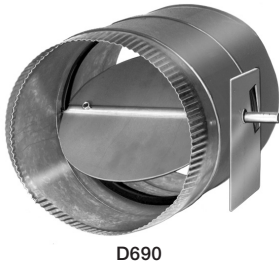
Honeywell certifies that the D1, D2, and D3 models of control dampers are tested according to AMCA Publication 511 and Standard 500D for air performance in pressure drop and leakage.

Both D1 and D2 offer leakage ratings equivalent to both AMCA Class 1A and Class 1. The Class 1A rating offers IECC (International Energy Conservation Code) leakage compliance.

				Material		Frame Gauge		Blade Seals		Jamb Seals	Blade Axle Bearings		Axles		Linkage Material		Flange	
S — Standard O — Optional				Galvanized	Stainless	16	12	TPE	Silicone	Stainless	Synthetic	Stainless	Galvanized	Stainless	Galvanized	Stainless	None	Single, Double, Reverse
	Leakage @ 1 in wg cfm/ft2	Max Velocity fpm	Max Pressure in wg															
D1 Ultra-Low Leakage	3	4000	10	S	O	S	O	S	O	S	S	O	S	O	S	O	S	O
D2 Ultra-Low Leakage	3	3000	5	S	O	S	O	S	O	S	S	O	S	O	S	O	S	O
D3 Control Damper	120	3000	5	S	O	S	O	n/a	n/a	n/a	S	O	S	O	S	O	S	O

For a copy of the specification sheet the D1 (63-2671) or D2 and D3 (63-2398), visit customer.honeywell.com.

Standard Round Dampers



D690

The D690 round control dampers are available in sizes from 6 to 16 inches, and are used in zone applications controlling airflow in round duct. The dampers are constructed with neoprene and silicone seals for tight close off and low leakage.

- Oilite bearings for durability
- 90 degree damper travel
- Designed to accept Honeywell direct coupled actuators up to 44 lb-in torque
- Maximum velocity 2,500 fpm
- Temperature range 32°F to 130°F (0°C to 54°C)

D690 ROUND DAMPERS SELECTION GUIDE

Product Number	Damper Diameter	
	(inch)	(mm)
D690A1002	6	152
D690A1010	8	203
D690A1028	10	254
D690A1036	12	305
D690A1044	14	356
D690A1051	16	406

Custom Dampers

Need a custom damper? Contact the Take-Off Service at takeoff.service@honeywell.com.

Below is a sample list of the products we frequently provide.

CUSTOM RECTANGULAR DAMPERS

Number	Description
VCD-34	Galvanized Insulated Airfoil Damper
VCD-40	Aluminum Narrow Frame Airfoil Damper
VCD-42	Aluminum Airfoil Damper (Galvanized Frame)
VCD-43	Aluminum Airfoil Damper
ICD-45	Aluminum thermally broken insulated Damper

CUSTOM ROUND DAMPERS

Number	Description
VCDR-53	Galvanized Round Damper – to 24 inches
VCDRM-53	Galvanized Round Multi-Blade Damper – to 36 inches

Submittal Data - Dampers

D1 Series Rectangular Volume Control Dampers



The D1 series control damper is an ultra-low leakage damper, with rugged steel airfoil blades designed to meet the highest standards established. It is leakage and pressure drop tested according to the AMCA 500D standard, and meets leakage Class 1 and Class 1A, which also qualifies the damper for the International Energy Conservation Code (IECC). It is intended for application in medium to high pressure and velocity systems.

PERFORMANCE DATA

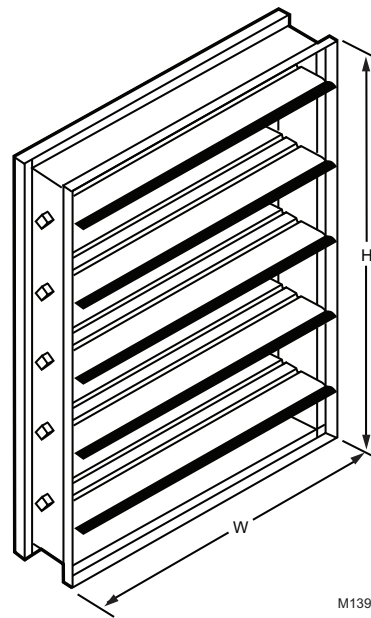
D1 Velocity Limits.

Damper Width (in.)	Maximum Velocity (fpm)
12	4000
24	4000
36	3500
48	3000
60	2500

SPECIFICATIONS

Size Range ¹	
Minimum Size	
One Blade	6 in. wide by 6 in. high
Two Blade	6 in. wide by 10 in. high
Maximum Size	
Single Section	60 in. wide by 74 in. high
Multiple Section.....	Unlimited
Temperature Rating.....	180 °F (82 °C) maximum ²
Maximum Pressure.....	10 in. wg.
Standard Construction ³	14 gauge galvanized steel, airfoil shaped
Blade Action.....	Parallel or Opposed
Frame ³	16 gauge galvanized steel Hat-channel
Blade Axle Bearings	Synthetic (Acetal)
Linkage ³	Steel Side linkage out of airstream (concealed in frame)
Axles ³	1/2 in. diameter plated steel
Jamb Seals ³	304 Stainless Steel
Blade Edge Seals ³	TPE
¹ Width and height dimensions furnished 1/4 in. undersized - standard	
² Temperature rating with standard options	
³ Customized options are available	

DIMENSIONS DIAGRAM



M13905

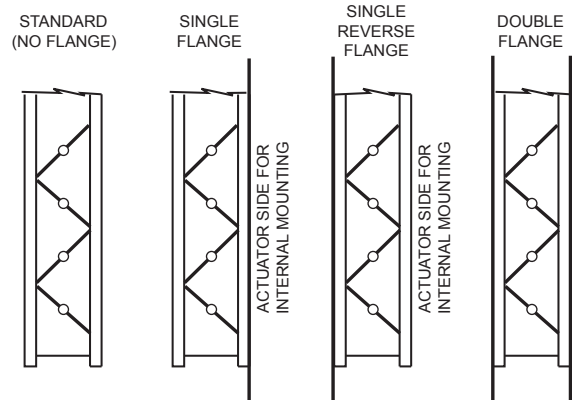
LEAKAGE RATE

Leakage Class Definitions

The *maximum* allowable leakage is defined by AMCA as the following:

- Leakage Class 1A-3 cfm/ft² @ 1 in. wg (class 1A is only defined at 1 in. wg).
- Leakage Class 1
 - 4 cfm/ft² @ 1 in. wg
 - 8 cfm/ft² @ 4 in. wg
 - 11 cfm/ft² @ 8 in. wg
 - 12.6 cfm/ft² @ 10 in. wg

FLANGE OPTIONS



M18986

D2 and D3 Series Rectangular Volume Control Dampers



The D2 series control damper is an ultra-low leakage damper, with strong 3V blades. It is leakage and pressure drop tested according to the AMCA 500D standard, and meets leakage Class 1 and Class 1A, which also qualifies the damper for the International Energy Conservation Code (IECC).

The D3 series features the same blades and hardware as the D2 damper, but lacks the seals, making it a damper intended for applications where low leakage performance is not necessary. D2 and D3 dampers are intended for application in low to medium pressure and velocity systems.

The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 511 and comply with the requirements of the AMCA Certified Ratings Programs. The AMCA Certified Ratings Seal applies to air performance ratings only.

PERFORMANCE DATA

D2, D3 Velocity Limits.

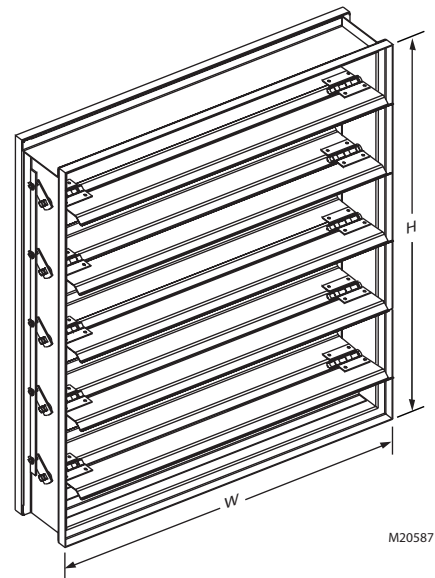
Damper Size in inches.	Maximum Velocity (fpm)
12	3000
24	3000
36	2500
48	2000

Same logic as D1 window above.

SPECIFICATIONS

- Size Range¹
 - Minimum Size
 - One Blade.....6 in. wide by 6 in. high
 - Two Blade.....6 in. wide by 10 in. high
 - Maximum Size
 - Single Section.....48 in. wide by 72 in. high
 - Multiple Section.....Unlimited
 - Temperature Rating.....180 °F (82 °C) maximum
 - Maximum Pressure5 in. wg.
 - Standard Construction².....Blade: 16 gauge galvanized steel 3-V
 - Blade ActionParallel or Opposed
 - Frame²16 gauge galvanized steel Hat-channel
 - Blade Axle BearingsSynthetic (Acetal)
 - LinkageSide linkage out of airstream (concealed in frame)
 - Axles.....1/2 in. square plated steel
 - Jamb Seals³Compression-type Stainless Steel
 - Blade Edge Seals²TPE
- ¹ Width and height dimensions furnished 1/4 in. undersized - standard
- ² Customized options are available
- ³ D2 Dampers only

DIMENSIONS DIAGRAM



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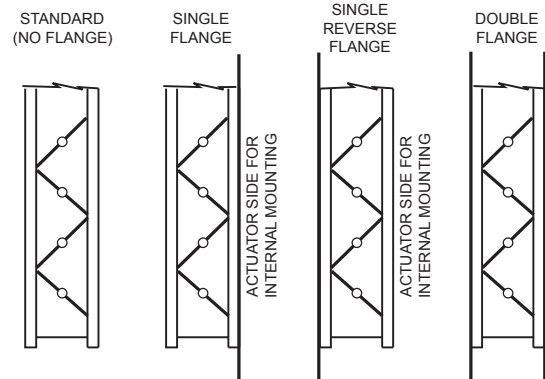
LEAKAGE RATE (Applies to D2 only)

Leakage Class Definitions

The *maximum* allowable leakage is defined by AMCA as the following:

- Leakage Class 1A-3 cfm/ft² @ 1 in. wg (class 1A is only defined at 1 in. wg).
- Leakage Class 1
 - 4 cfm/ft² @ 1 in. wg
 - 8 cfm/ft² @ 4 in. wg

FLANGE OPTIONS



M18986

Submittal Data - Dampers

D690 Round Volume Control Dampers



The D690 Round Control Damper is used in commercial air handling system zone applications to control airflow, but is also suitable for residential zoning applications where the ML6161 actuator is used. The damper is designed for use with all low torque Honeywell Direct Coupled Actuators.

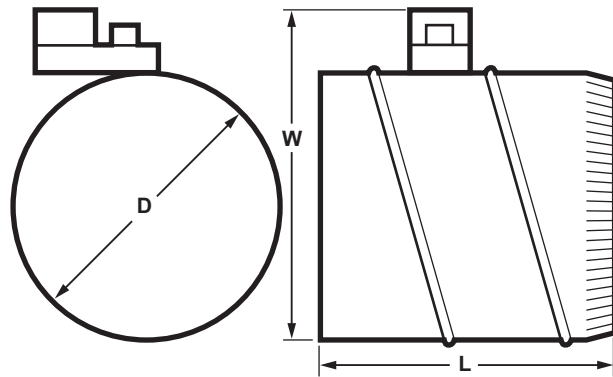
FEATURES

- Neoprene seal for tight closing and low leakage.
- Oilite bearings for long life.

SPECIFICATIONS

ApplicationHeating, cooling, ventilating
 Type of BladeSingle-blade, round
 Temperature Range.....32 °F to 130 °F (0 °C to 54 °C)
 Used With.....All Honeywell direct coupled actuators up to 44 lb-in torque.

DIMENSIONS DIAGRAM



DAMPER DIAMETER (D)		WIDTH (W)		LENGTH (L)	
in.	mm	in.	mm	in.	mm
6	152	9-1/2	241	12	305
8	203	11-1/2	292	12	305
10	254	13-1/2	343	12	305
12	305	15-1/2	394	13	330
14	356	17-1/2	445	15	381
16	406	19-1/2	495	17	432

M17412

Section 2: Actuators

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Spring Return S10 Series		Non-spring Return N34 Series	
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Non-spring Return ML6161; ML7161		Product Selection	16
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Overview - Actuators

Direct Coupled Actuators



Spring Return,
Low Torque

Precise, reliable performance. Lasting value. Ease of installation. Everything you look for in direct-coupled actuators hinges on quality. And quality engineering is what makes Honeywell's complete line of actuators the top performers in the industry. Our global engineering team designs and tests our direct-coupled actuators to exceed rigorous global standards — and to meet Honeywell's own demanding life testing.



Spring Return,
Low Torque

But we don't stop there. Thanks to our continuous improvement process, Honeywell actuators are now easier than ever to install. You'll also benefit from consistent wiring regardless of signal type, common accessories and a simplified selection process.



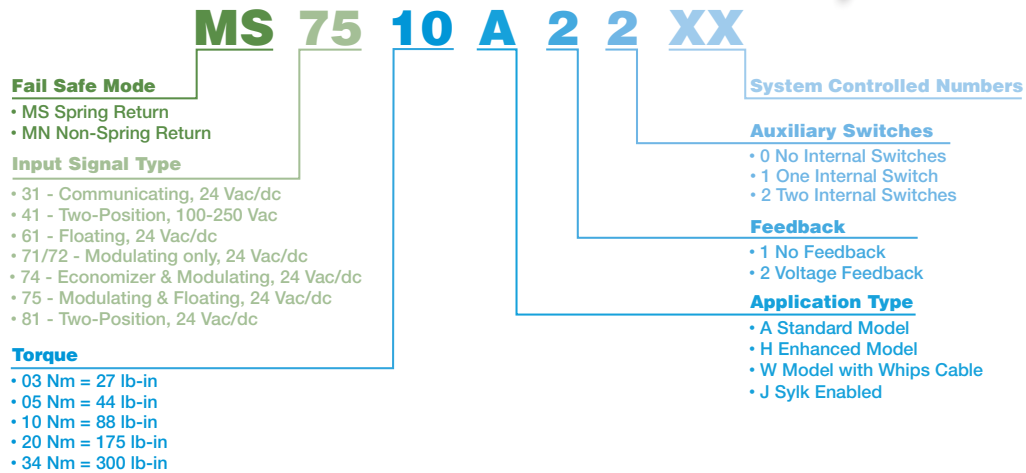
Spring Return,
High Torque

Honeywell's complete line of building control products, including valves and actuators, are already proven in more than three million buildings worldwide. So when you need spring or non-spring return actuators for your damper and valve applications, specify Honeywell. We make precision easy.



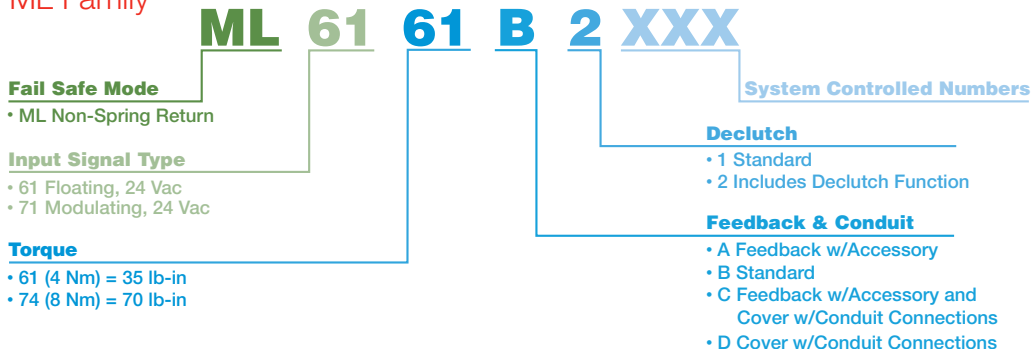
Non-Spring Return,
Low Torque

EASY-TO-SELECT MODEL NUMBERS MS, MN, and Diamond Families



Non-Spring Return,
High Torque






ML Family



Product Selection - Actuators

Direct Coupled Actuators





SPRING RETURN

Order Specification Number (without whips)	Order Specification Number (with whips)	Damper Area (4.5 lb-in/sq. ft.)	Running Time		Power Supply		Control Input/Output							SPDT Auxiliary Switches	
			Drive (sec)	Spring Return (sec)	24 Vac/dc	120-230 Vac	VA Rating (Running)	Sylk-Enabled	On/Off	0/2-10 Vdc	Floating	3 kOhm NTC, 3-Position	Feedback (0/2-10 Vdc)		Adj. Zero and Span
Diamond 3 Nm (3 Nm, 27 lb-in)															
	MS7103A1021	6	90	<25	•	•	4				•**				0
	MS7103A2021	6	90	<25	•	•	4				•**				0
	MS7103A2221	6	90	<25	•	•	4				•**				2 (SPST)
	MS7503A2021	6	90	<25	•	•	4				•	•			0
	MS7503A2221	6	90	<25	•	•	4				•	•			2 (SPST)
S03 Series (3 Nm, 27 lb-in)															
	MS4103A1030	6	45	<25		•	9			•					0
	MS4103A1130	6	45	<25		•	9			•					1
	MS8103A1030	6	45	<25	•	•	6			•					0
	MS8103A1130	6	45	<25	•	•	6			•					1
	MS3103J1030	6	90	<25	•	•	6		•						0
	MS7503A2030	6	90	<25	•	•	6				•	•			0
	MS7503A2130	6	90	<25	•	•	6				•	•			1
	MS7403A2030*	6	90	<25	•	•	6				•	•	•		0
S05 Series (5 Nm, 44 lb-in)															
	MS4105A1030	10	45	<25		•	9			•					0
	MS4105A1130	10	45	<25		•	9			•					1
	MS8105A1030	10	45	<25	•	•	6			•					0
	MS8105A1130	10	45	<25	•	•	6			•					1
	MS3105J3030	10	90	<25	•	•	6		•						0
	MS3105J3130	10	90	<25	•	•	6		•						1
	MS7505A2030	10	90	<25	•	•	6				•	•			0
	MS7505A2130	10	90	<25	•	•	6				•	•			1
	MS7405A2030*	10	90	<25	•	•	6				•	•	•		0
S10 Series (10 Nm, 88 lb-in)															
	MS4110A1002	20	45	<25		•	45			•					0
	MS4110A1200	20	45	<25		•	45			•					2
	MS8110A1008	20	45	<25	•	•	30			•					0
	MS8110A1206	20	45	<25	•	•	30			•					2
	MS3110J1008	20	90	<25	•	•	14		•						0
	MS3110J1206	20	90	<25	•	•	14		•						2
	MS7510A2008	20	90	<25	•	•	14				•	•			0
	MS7510A2206	20	90	<25	•	•	14				•	•			2
	MS7510H2209	20	90	<25	•	•	14				•	•	•		2
S20 Series (20 Nm, 175 lb-in)															
	MS4120A1001	39	45	<25		•	60			•					0
	MS4120A1209	39	45	<25		•	60			•					2
	MS8120A1007	39	45	<25	•	•	40			•					0
	MS8120A1205	39	45	<25	•	•	40			•					2
	MS3120J1007	39	90	<25	•	•	16		•						0
	MS3120J1205	39	90	<25	•	•	16		•						2
	MS7520A2007	39	90	<25	•	•	16				•	•			0
	MS7520A2205	39	90	<25	•	•	16				•	•			2
	MS7520H2208	39	90	<25	•	•	16				•	•	•		2

* Model includes Internal Minimum Position Potentiometer

**2-10 Vdc control only

NON-SPRING RETURN

Order Specification Number (without whips)	Order Specification Number (with whips)	Damper Area (4.5 lb-in/sq. ft.)	Running Time	Power Supply		Control Input/Output							SPDT Auxiliary Switches		
				24 Vac/dc	24 Vac	VA Rating (Running)	On/Off	Floating	0/2-10 Vdc	2-10 Vdc	Feedback (0/2-10 Vdc)				
N05 Series (5 Nm, 44 lb-in)															
	MN6105A1011	MN6105W1011	10	90	•	•	5			•	•				0
	MN6105A1201		10	90	•	•	5			•	•				2
	MN7505A2001	MN7505W2001	10	90	•	•	5			•	•				0
	MN7505A2209		10	90	•	•	5			•	•				2
N10 Series (10 Nm, 88 lb-in)															
	MN6110A1003		20	90	•	•	5			•	•				0
	MN6110A1201		20	90	•	•	5			•	•				2
	MN7510A2001		20	90	•	•	5			•	•				0
	MN7510A2209		20	90	•	•	5			•	•				2
N20 Series (20 Nm, 175 lb-in)															
	MN6120A1002		39	90	•	•	6			•	•				0
	MN6120A1200		39	90	•	•	6			•	•				2
	MN7220A2007		39	90	•	•	6			•	•				0
	MN7220A2205		39	90	•	•	6			•	•				2
N34 Series (34 Nm, 300 lb-in)															
	MN6134A1003		67	90	•	•	9			•	•				0
	MN7234A2008		67	90	•	•	8			•	•				0
ML6161/7161 (4 Nm, 35 lb-in)															
	ML6161A2009		8	90	•	•	1.8			•	•			w/ accessory	0
	ML6161A2017		8	420	•	•	1.8			•	•			w/ accessory	0
	ML6161A2025		8	180	•	•	1.8			•	•			w/ accessory	0
	ML6161B2024		8	90	•	•	1.8			•	•				0
	MS6161B2032		8	420	•	•	1.8			•	•				0
	ML6161B2073		8	180	•	•	1.8			•	•				0
	ML6161C2007		8	90	•	•	1.8			•	•			w/ accessory	0
	ML6161D2006		8	90	•	•	1.8			•	•				0
	ML7161A2008		8	90	•	•	5.4			•	•				0
ML6174/7174 (8 Nm, 70 lb-in)															
	ML6174A2002		16	90	•	•	2.4			•	•			w/ accessory	0
	ML6174A2010		16	180	•	•	2.4			•	•			w/ accessory	0
	ML6174B2019		16	90	•	•	2.4			•	•				0
	ML6174B2035		16	420	•	•	2.4			•	•				0
	ML6174D2009		16	90	•	•	2.4			•	•				0
	ML6174E2008		16	90	•	•	2.4			•	•				0
	ML7174A2001		16	90	•	•	5.4			•	•				0
	ML7174E2007		16	90	•	•	5.4			•	•				0

Product Selection - Actuators

Fire and Smoke Damper Actuators

Honeywell's complete line of two position, fast-acting spring-return actuators meets all of your needs for fire and smoke control applications. All models are designed to meet the UL-555 and UL-555S high temperature requirements for fire dampers and combined fire and smoke dampers.

Safety First

As a life safety system component Honeywell is dedicated to meeting the UL-555 and UL-555S requirements. The elevated temperature test can be performed at the temperature ratings of 250°F or 350°F. Honeywell only offers models at 350°F to meet UL-555 and UL-555S for fire and combined fire and smoke applications to support the highest level of safety for building occupants.

Largest Torque Range in the Industry

Honeywell's fire and smoke actuators are available in 30, 80 and 175 lb-in with the 175 lb-in being the highest torque commercial fire and smoke actuator available on the market today.

Features

- Integral spring return that ensures the proper level of torque
- Patented design that eliminated limit switches, reducing power consumption
- Reliable service in smoke control systems requiring Underwriter's Laboratories Inc. UL-555 and UL-555S
- Robust die-cast aluminum housing ensures the proper level of torque
- Full life of two-position spring return fire and smoke actuators rated up to 350°F for all critical applications
- Fast acting with a maximum spring return timing of 15 seconds
- No audible noise during holding
- Reversible ("flippable") design enables one model to be used for both clockwise and counterclockwise spring return applications

Fire and Smoke Spring Return Actuators



Torque	Model Number	Voltage	SPST Aux Switch	Legacy Honeywell	Belimo Cross	Siemens Cross
30 lb-in (3.4 Nm)	MS4104F1010	120 Vac	0	ML4115A1009 ML4115A1017 ML4115B1008 ML4115B1016 ML4115H1002 ML4115J1009 ML4202F1000 ML4302F1008	FSLF120 US	None
	MS4104F1210	120 Vac	2 Internal	None	FSLF120-S US	None
	MS4604F1010	230 Vac	0	ML4115C1007 ML4115C1015 ML4115D1006 ML4115D1014 ML4702F1009 ML4802F1007	FSLF230 US	None
	MS4604F1210	230 Vac	2 Internal	None	FSLF230-S US	None
	MS8104F1010	24 Vac	0	ML8115A1005 ML8115A1013 ML8115B1004 ML8115B1012 ML8115H1008 ML8115J1005 ML8202F1006 ML8302F1004	FSLF24 US	None
	MS8104F1210	24 Vac	2 Internal	None	FSLF24-S US	None
80 lb-in (9 Nm)	MS4109F1010	120 Vac	0	MS4209F1007 MS4309F1005	FSNF120 US	GND221.1U
	MS4109F1210	120 Vac	2 Internal	None	FSNF120-S US	GND226.1U
	MS4609F1010	230 Vac	0	MS4709F1014 MS4809F1012	FSNF230 US	GND321.1U
	MS4609F1210	230 Vac	2 Internal	None	FSNF230-S US	GND326.1U
	MS8109F1010	24 Vac	0	MS8209F1003 MS8309F1001	FSNF24 US	GND121.1U
	MS8109F1210	24 Vac	2 Internal	None	FSNF24-S US	GND126.1U
175 lb-in (20 Nm)	MS4120F1006	120 Vac	0	None	FSAF120 US	GGD221.1U
	MS4120F1204		2 Internal		FSAF120-S US	None
	MS4620F1005	230 Vac	0		FSAF230 US	GGD321.1U
	MS4620F1203		2 Internal		FSAF230-S US	None
	MS8120F1002	24 Vac	0		FSAF24 US	GGD121.1U
	MS8120F1200		2 Internal		FSAF24-S US	None

Note: Honeywell's spring return fire and smoke actuators are designed to pass UL-555 and UL-555S 350°F requirements. They are not designed for HVAC applications. UL-555 and UL-555S requires that all new construction fire and smoke damper jobs have the actuator assembled and tested at the damper manufacturer. A like for like retrofit replacement or technically equal UL-555 and UL-555S approved device is recommended.



MS7103 and MS7503 Spring Return Direct Coupled Actuators (DCA) are used within heating, ventilating and air-conditioning (HVAC) systems. They can drive a variety of quarter-turn, final control elements requiring spring return fail-safe operation.

FEATURES

- Brushless DC submotor with electronic stall protection
- Self-centering shaft adaptor (shaft coupling) for wide range of shaft sizes
- Fast test mode
- MS7103 models for use with 2-10 Vdc control
- MS7503 universal models for use with floating, 0(2)-10 Vdc or 10-(2)0 Vdc control
- Models available with two internal end switches
- Durable plastic housing with built-in mechanical end limits
- Spring return direction field selectable
- Shaft position indicator and scale
- UL (cUL) listed and CE compliant
- Plenum rated actuator and control/power cable

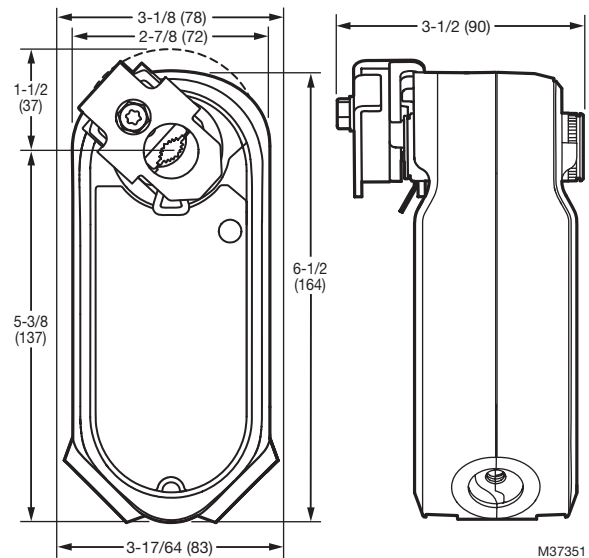
SPECIFICATIONS

Actuator Type	Damper; Valve
Rotational Stroke	95 ±3 degrees
Fail Safe Mode	Spring Return
Torque	27 lb-in. (3 Nm)
Spring Return Torque	27 lb-in (3 Nm)
Spring Return Direction.....	By orientation
External Auxiliary Switches Available...	No
Cable Specification	300 V, 75° C, Plenum Rated, 3 ft (0.914 m) length from end of access cover, 18 AWG
Ingress Protection Rating	IP54
Environmental Rating	NEMA2
Frequency	50 Hz; 60 Hz
Mounting	Direct Coupled
Maximum Noise Rating, Driving (dBA @ 1m)	40
Maximum Noise Rating, Spring Return (dBA @ 1m).....	65
Rotation to Open	By switch
Rotational Stroke Adjustment	Mechanically limited 5 degree increments
Compatible Damper Shafts	3/8 to 5/8 in. round or 1/4 to 1/2 in. square (9 to 16 mm round or 6 to 13 mm square)
Shaft Adapter Type	Self-centering clamping
Materials.....	Plenum rated plastic housing
Operating Humidity Range (% RH).....	5 to 95% RH, non-condensing
Ambient Operating Temperature.....	-40 F to +150F (-40 C to +65 C)
Shipping and Storage Temperature.....	-40 F to +150F (-40 C to +65 C)
Weight	1.7 lb (0.78 kg)
Includes.....	Mounting bracket, self- centering shaft adapter

APPROVALS

CE.....	EMC 2004/108/EC; Certification Low Voltage Directive 2006/95/EC; IEC 60730-1 and Part 2-14
C-Tick	N314
Underwriters Laboratories, Inc.....	UL 60730; UL 1097 for Double Insulation

DIMENSIONS DIAGRAM



Submittal Data - Actuators

Spring Return S03 Series



MS4103, MS7403, MS7503 and MS8103 Spring Return Direct Coupled Actuators (DCA) are used within heating, ventilating and air-conditioning (HVAC) systems. They can drive a variety of quarter-turn, final control elements requiring spring return fail-safe operation.

FEATURES

- Brushless DC submotor with electronic stall protection on all models
- Self-centering shaft adaptor (shaft coupling) for wide range of shaft sizes
- Models available for use with two-position, SPST, line- (Series 40) or low- (Series 80) voltage controls
- Models available for use with floating or switched SPDT (Series 60) controls
- Models available for use with proportional current or voltage (Series 70) controls
- Models available with combined floating and modulating control in a single device
- Models available with an internal end switch
- Access cover to facilitate connectivity
- Durable plastic housing with built-in mechanical end limits
- Spring return direction field selectable
- Shaft position indicator and scale
- UL (cUL) listed and CE compliant
- All models are plenum rated per UL873

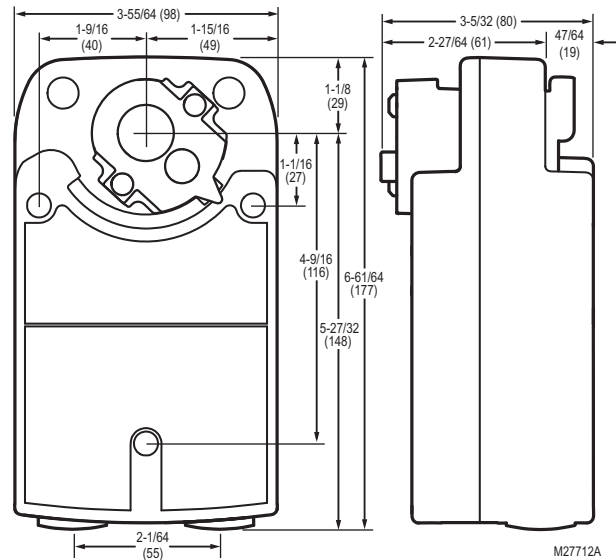
SPECIFICATIONS

Actuator Type	Damper; Valve
Rotational Stroke	95 ±3 degrees
Fail Safe Mode	Spring Return
Torque	27 lb-in. (3 Nm)
Spring Return Torque	27 lb-in (3 Nm)
Spring Return Direction.....	By orientation
External Auxiliary Switches Available...	No
Electrical Connections	Enclosed screw terminal strip (22 to 14 AWG)
Ingress Protection Rating	IP54
Environmental Rating	NEMA2
Frequency	50 Hz; 60 Hz
Mounting	Direct Coupled
Maximum Noise Rating, Holding (dBA @ 1m)	20 (no audible noise)
Maximum Noise Rating, Driving (dBA @ 1m)	50
Rotation to Open	By switch
Rotational Stroke Adjustment	Mechanically limited 5 degree increments
Compatible Damper Shafts.....	3/8 to 5/8 in. round or 1/4 to 1/2 in. square (9 to 16 mm round or 6 to 13 mm square)
Shaft Adapter Type	Self-centering clamping
Materials	Plenum rated plastic housing
Operating Humidity Range (% RH).....	5 to 95% RH, non-condensing
Ambient Temperature Range	-40 F to +149F (-40 C to +65 C) -22 F to +149F (-30 C to +65 C) for two-position actuators only
Temperature Ratings (Shipping)	-40 F to +150F (-40 C to +65 C)
Storage Temperature Range	-40 F to +150F (-40 C to +65 C)
Weight	3.5 lb (1.6 kg)
Includes.....	Mounting bracket, self-centering shaft adapter

APPROVALS

CE.....	EMC 2004/108/EC; Certification Low Voltage Directive 2006/95/EC; IEC 60730-1 and Part 2-14
C-Tick	N314
Underwriters Laboratories, Inc.....	UL 873
Canadian Underwriters Laboratories, Inc.	cUL C22.2 No. 24-93

DIMENSIONS DIAGRAM





MS4105, MS7405, MS7505, and MS8105 Spring Return Direct Coupled Actuators (DCA) are used within heating, ventilating and air-conditioning (HVAC) systems. They can drive a variety of quarter-turn, final control elements requiring spring return fail-safe operation.

FEATURES

- Brushless DC submotor with electronic stall protection on all models
- Self-centering shaft adaptor (shaft coupling) for wide range of shaft sizes
- Models available for use with two-position, SPST, line- (Series 40) or low- (Series 80) voltage controls
- Models available for use with floating or switched SPDT (Series 60) controls
- Models available for use with proportional current or voltage (Series 70) controls
- Models available with combined floating and modulating control in a single device
- Models available with an internal end switch
- Access cover includes enclosed screw terminal strip (22 to 14 AWG) for electrical connections.
- Models available with 3 foot 18 AWG color-coded cable
- Durable plastic housing with built-in mechanical end limits
- Spring return direction field selectable
- Shaft position indicator and scale
- UL (cUL) listed and CE compliant
- All models are plenum rated per UL873

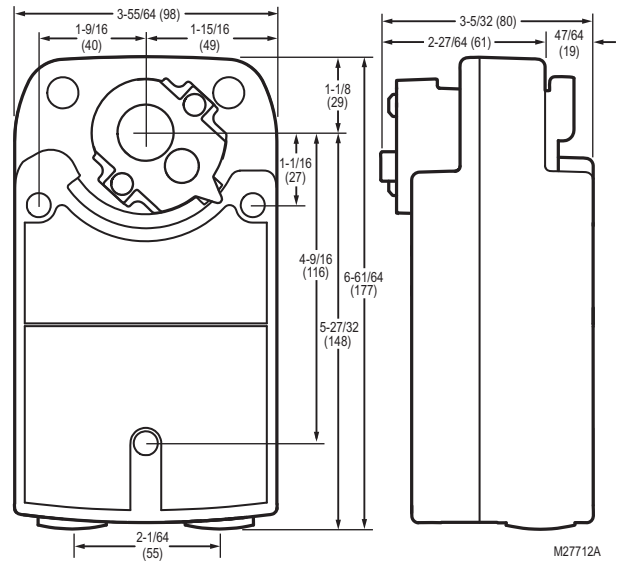
SPECIFICATIONS

Actuator Type	Damper; Valve
Rotational Stroke95 ±3 degrees
Fail Safe Mode	Spring Return
Torque	44 lb-in. (5 Nm)
Spring Return Torque	44 lb-in. (5 Nm)
Spring Return Direction	By orientation
External Auxiliary Switches Available	No
Environmental Rating	NEMA2
Ingress Protection Rating	IP54
Frequency	50 Hz; 60 Hz
Mounting	Direct Coupled
Maximum Noise Rating, Holding (dBA @ 1m)	20 (no audible noise)
Maximum Noise Rating, Driving (dBA @ 1m)	50
Rotation to Open	By switch
Rotational Stroke Adjustment	Mechanically limited 5 degree increments
Compatible Damper Shafts	3/8 to 5/8 in. round or 1/4 to 1/2 in. square (9 to 16 mm round or 6 to 13 mm square)
Shaft Adapter Type	Self-centering clamping
Materials	Plenum rated plastic housing
Operating Humidity Range (% RH)	5 to 95% RH, non-condensing
Ambient Temperature Range	-40 F to +149F (-40 C to +65 C) -22 F to +149F (-30 C to +65 C) for two-position actuators only
Temperature Ratings (Shipping)	-40 F to +150F (-40 C to +65 C)
Storage Temperature Range	-40 F to +150F (-40 C to +65 C)
Weight	3.5 lb (1.6 kg)
Includes	Mounting bracket, self-centering shaft adapter

APPROVALS

CE	EMC 2004/108/EC; Certification Low Voltage Directive 2006/95/EC; IEC 60730-1 and Part 2-14
C-Tick	N314
Underwriters Laboratories, Inc.	UL 873
Canadian Underwriters Laboratories, Inc.	cUL C22.2 No. 24-93

DIMENSIONS DIAGRAM



Submittal Data - Actuators

Spring Return S10 Series



MS4110, MS7510 and MS8110 Spring Return Direct Coupled Actuators (DCA) are used within heating, ventilating and air-conditioning (HVAC) systems. They can drive a variety of quarter-turn, final control elements requiring spring return fail-safe operation.

FEATURES

- Brushless DC submotor with electronic stall protection for floating/modulating models.
- Brush DC submotor with electronic stall protection for 2-position models.
- Self-centering shaft adapter (shaft coupling) for wide range of shaft sizes.
- Models available for use with two-position, single pole single throw (spst), line- (Series 40) or low- (Series 80) voltage controls.
- Models available for use with proportional current or voltage (Series 70) controls.
- Models available with combined floating/modulating control in a single device.
- Models available with adjustable zero and span.
- Models available with line-voltage internal end switches.
- Access cover includes enclosed screw terminal strip (22 to 14 AWG) for electrical connections.
- Models available with 3 foot 18 AWG color-coded cable.
- Metal housing with built-in mechanical end limits.
- Spring return direction field-selectable.
- Shaft position indicator and scale.
- Manual winding capability with locking function.
- UL (cUL) listed and CE compliant.
- All Models are plenum-rated per UL873.

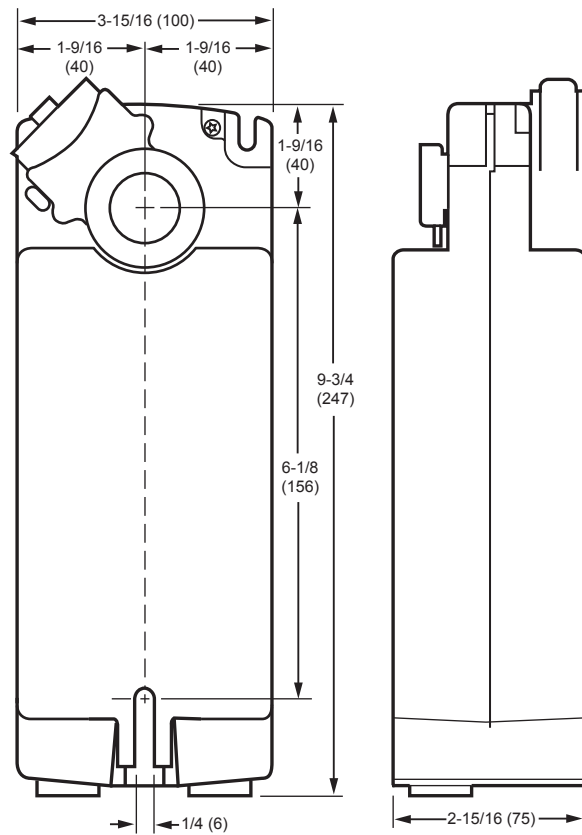
SPECIFICATIONS

Actuator Type	Damper; Valve
Rotational Stroke	95 ±3 degrees
Fail Safe Mode	Spring Return
Torque	88 lb-in. (10 Nm)
Spring Return Torque	88 lb-in. (10 Nm)
Spring Return Direction.....	By orientation
External Auxiliary Switches Available...	Yes, SW2-US
Environmental Rating	NEMA2
Frequency	50 Hz; 60 Hz
Manual operation	Manual crank
Mounting	Direct Coupled
Maximum Noise Rating, Holding (dBA @ 1m)	20 (no audible noise)
Maximum Noise Rating, Driving (dBA @ 1m).....	40
Rotational Stroke Adjustment.....	Mechanically limited 5 degree increments
Compatible Damper Shafts.....	3/8 to 1.06 in. round or 3/8 to 11/16 in. square (10 to 27 mm round or 10 to 18 mm square)
Shaft Adapter Type	Self-centering clamping
Materials.....	Aluminum housing, Plenum rated plastic access cover
Operating Humidity Range (% RH).....	5 to 95% RH, non-condensing
Ambient Temperature Range	-40 F to +140 F (-40 C to +60 C)
Storage Temperature Range	-40 F to +158 F (-40 C to +70 C)
Weight	6 lb (2.72 kg)
Includes.....	Mounting bracket, self-centering shaft adapter, 3mm crank
Comments.....	Integral 1/2 in. NPSM conduit connection.

APPROVALS

CE.....	89/336/ECC, 73/23/EEC
C-Tick	N314
Underwriters Laboratories, Inc.....	UL873, Plenum Rated
Canadian Underwriters Laboratories, Inc.	cUL C22.2 No. 24-93

DIMENSIONS DIAGRAM



M20952



MS4120, MS7520 and MS8120 Spring Return Direct Coupled Actuators (DCA) are used within heating, ventilating and air-conditioning (HVAC) systems. They can drive a variety of quarter-turn, final control elements requiring spring return fail-safe operation.

SPECIFICATIONS

Actuator Type	Damper; Valve
Rotational Stroke95 ±3 degrees
Fail Safe Mode.....	Spring Return
Torque.....	175 lb-in. (20 Nm)
Spring Return Torque	175 lb-in. (20 Nm)
Spring Return Direction	By orientation
External Auxiliary Switches Available...	Yes, SW2-US
Environmental Rating	NEMA2
Frequency	50 Hz; 60 Hz
Manual operation.....	Manual crank
Mounting.....	Direct Coupled
Maximum Noise Rating, Holding (dBA @ 1m).....	20 (no audible noise)
Maximum Noise Rating, Driving (dBA @ 1m).....	40
Rotational Stroke Adjustment	Mechanically limited 5 degree increments
Compatible Damper Shafts	3/8 to 1.06 in. round or 3/8 to 1 1/16 in. square (10 to 27 mm round or 10 to 18 mm square)
Shaft Adapter Type.....	Self-centering clamping
Materials	Aluminum housing, Plenum rated plastic access cover
Operating Humidity Range (% RH)	5 to 95% RH, non-condensing
Ambient Temperature Range	-40 F to +140 F (-40 C to +60 C)
Storage Temperature Range	-40 F to +158 F (-40 C to +70 C)
Weight	6 lb (2.72 kg)
Includes.....	Mounting bracket, self-centering shaft adapter, 3mm crank
Comments	Integral 1/2 in. NPSM conduit connection.

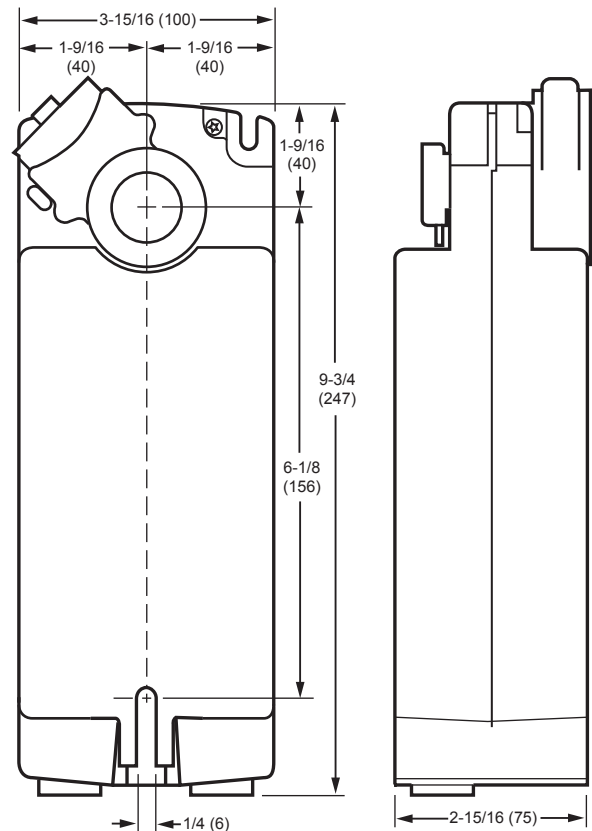
APPROVALS

CE.....	89/336/ECC, 73/23/EEC
C-Tick	N314
Underwriters Laboratories, Inc.....	UL873, Plenum Rated
Canadian Underwriters Laboratories, Inc.	cUL C22.2 No. 24-93

FEATURES

- Brushless DC submotor with electronic stall protection for floating/modulating models.
- Brush DC submotor with electronic stall protection for 2-position models.
- Self-centering shaft adapter (shaft coupling) for wide range of shaft sizes.
- Models available for use with two-position, single pole single throw (spst), line- (Series 40) or low- (Series 80) voltage controls.
- Models available for use with proportional current or voltage (Series 70) controls.
- Models available with combined floating/modulating control in a single device.
- Models available with adjustable zero and span.
- Models available with line-voltage internal end switches.
- Access cover includes enclosed screw terminal strip (22 to 14 AWG) for electrical connections.
- Models available with 3 foot 18 AWG color-coded cable.
- Metal housing with built-in mechanical end limits.
- Spring return direction field-selectable.
- Shaft position indicator and scale.
- Manual winding capability with locking function.
- UL (cUL) listed and CE compliant.
- All models are plenum-rated per UL873.

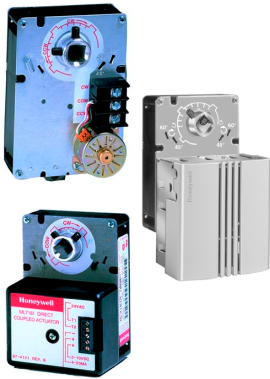
DIMENSIONS DIAGRAM



M20952

Submittal Data - Actuators

Non-spring Return ML6161; ML7161



Used to control dampers in applications such as variable air volume (VAV) terminal units and for mounting on ball valves; suitable for use with SPDT or floating thermostats or building automation controls.

FEATURES

- Control for air damper applications with up to 10 sq.ft. assuming 3.5 in-lb per sq.ft. of damper area, velocity independent.
- Superior A/C synchronous submotor for consistent timing and actuator longevity.
- Eliminate need for limit switches or mechanical stops by providing magnetic coupling.
- All models include manual declutch lever and bag assembly with two minimum position setscrews.
- Mount directly on 3/8 inch or 1/2 inch square or round damper shaft.
- Selectable 45, 60 and 90 stroke in either clockwise or counterclockwise direction.

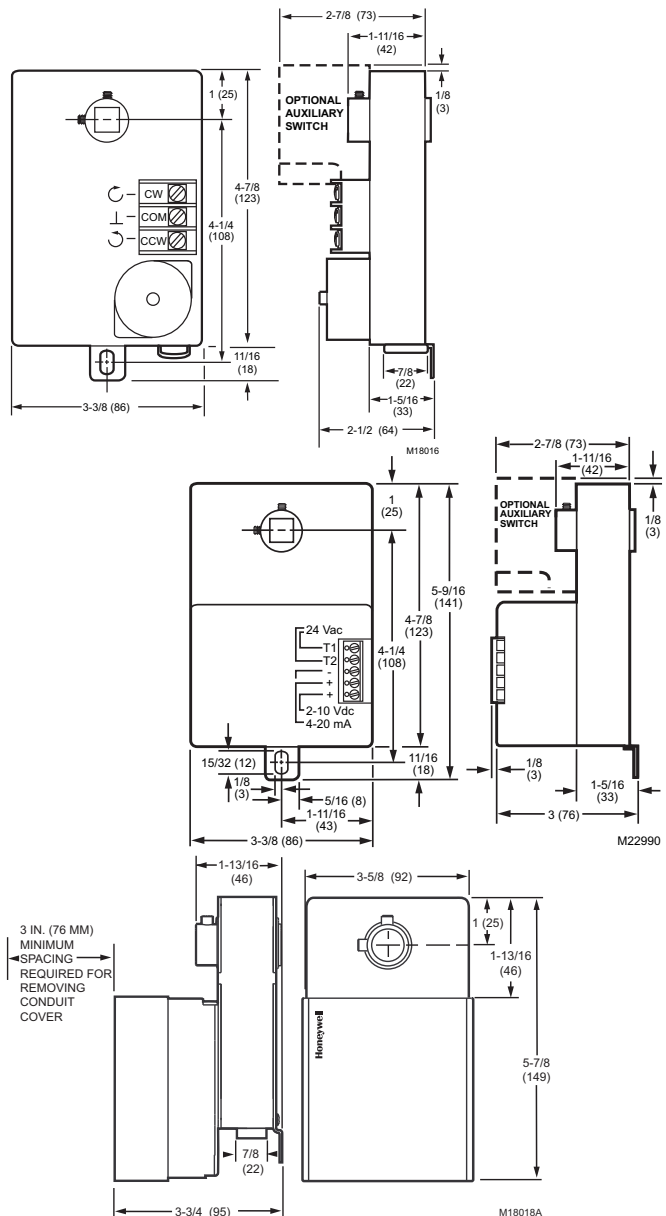
SPECIFICATIONS

Actuator Type	Damper
Rotational Stroke	90 degrees
Fail Safe Mode	Non-Spring Return
Torque	35 lb-in. (4 Nm)
External Auxiliary Switches Available... Yes, 201052B	
Electrical Connections	Screw terminals
Environmental Rating	NEMA 1
Feedback	With accessory
Frequency	50 Hz; 60 Hz
Manual operation	Declutch mechanism
Mounting	Direct Coupled
Maximum Noise Rating, Driving (dBA @ 1m).....	45
Rotation to Open	By wiring
Rotational Stroke Adjustment	Mechanically limited at 45 or 60 degrees in cw or ccw directions
Compatible Damper Shafts	3/8 to 1/2 in. square or round (10 to 13 mm square/round)
Shaft Adapter Type	Aluminum Hub, two set screws
Supply Voltage	24 Vac ±20%
Materials.....	Steel plate and Plenum rated plastic
Operating Humidity Range (% RH).....	5 to 95% RH, non-condensing
Ambient Temperature Range	20 F to 125 F (-18 C to +50 C)
Storage Temperature Range	20 F to 130 F (-18 C to +54 C)
Weight	1.5 lb (0.68 kg)
Includes.....	4074ENY Bag Assembly

APPROVALS

CE.....	89/336/ECC, 73/23/EEC
C-Tick	N314
Underwriters Laboratories, Inc.....	UL873, Plenum Rated
Canadian Underwriters Laboratories, Inc.	cUL C22.2 No. 24-93

DIMENSIONS DIAGRAMS



Submittal Data - Actuators

Non-spring Return ML6174; ML7174



Used to control dampers in applications such as variable air volume (VAV) terminal units and for mounting on ball valves; suitable for use with SPDT or floating thermostats or building automation controls.

FEATURES

- Control for air damper applications with up to 20 sq.ft. assuming 3.5 in-lb per sq.ft. of damper area, velocity independent.
- Magnetic coupling eliminates the need for mechanical stops or limit switch adjustments by limiting stall torque to 130 lb-in. maximum.
- Mount directly on 3/8 to 1/2 in. round and square damper shafts. All models include manual declutch lever for ease of mounting and bag assembly with two minimum position setscrews. 90 second timing models are suitable for use with pressure independent VAV systems.
- Selectable 45, 60, and 90 degree stroke in either clockwise or counterclockwise direction.

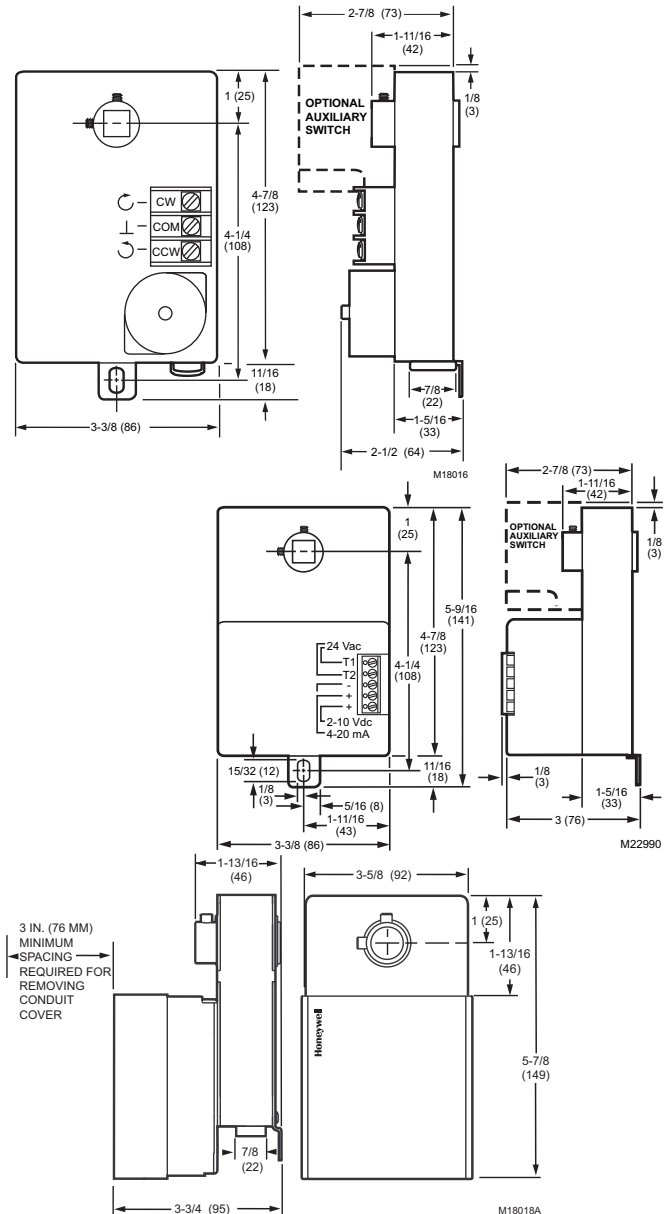
SPECIFICATIONS

Actuator Type	Damper
Rotational Stroke	90 degrees
Fail Safe Mode	Non-Spring Return
Torque	70 lb-in (8 Nm)
External Auxiliary Switches Available	Yes, 201052B
Environmental Rating	NEMA1
Feedback	With accessory
Frequency	50 Hz; 60 Hz
Manual operation	Declutch mechanism
Mounting	Direct Coupled
Maximum Noise Rating, Driving (dBA @ 1m)	45
Rotation to Open	By wiring
Rotational Stroke Adjustment	Mechanically limited at 45 or 60 degrees in cw or ccw directions
Compatible Damper Shafts	3/8 to 1/2 in. square or round (10 to 13 mm square/round)
Shaft Adapter Type	Aluminum Hub, two set screws
Supply Voltage	24 Vac ±20%
Materials	Steel plate and Plenum rated plastic
Operating Humidity Range (% RH)	5 to 95% RH, non-condensing
Ambient Temperature Range	20 F to 125 F (-18 C to +50 C)
Storage Temperature Range	20 F to 130 F (-18 C to +54 C)
Weight	1.5 lb (0.68 kg)
Includes	4074ENY Bag Assembly

APPROVALS

Underwriters Laboratories, Inc.UL873, Plenum Rated
Canadian Underwriters Laboratories, Inc. cUL C22.2 No. 24-93

DIMENSIONS DIAGRAMS



Submittal Data - Actuators

Non-spring Return N05 Series



This non-spring return direct-coupled damper actuator provides modulating and floating/2-position control for: air dampers, air handlers, ventilation flaps, louvers and reliable control for air damper applications with up to 10 sq. ft./44lb.-in. (5 Nm) and 20 sq. ft./88 lb.-in. (10 Nm) (seal-less damper blades; air friction-dependent).

FEATURES

- Declutch for manual adjustment
- Adjustable mechanical end limits
- Access cover includes enclosed screw terminal strip (22 to 14 AWG) for electrical connections
- Models available with 3 foot 18 AWG color-coded cable
- Mountable in any orientation
- Function selection switch for selecting modulating or floating/2-position control

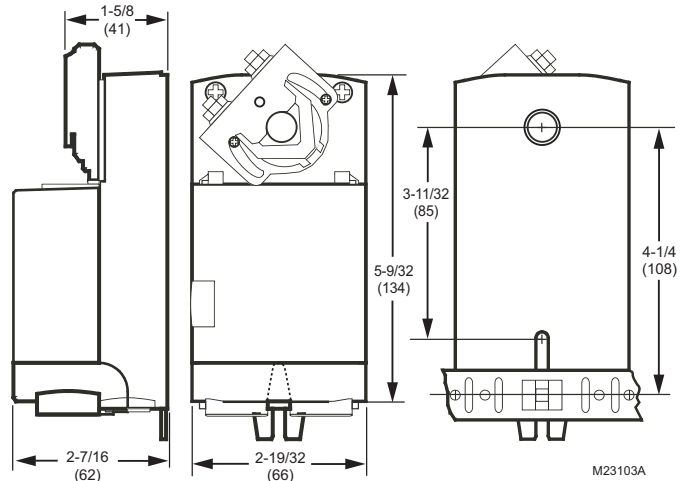
SPECIFICATIONS

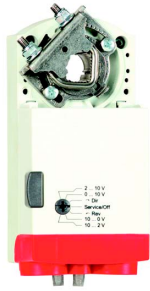
Actuator Type	Damper; Valve
Rotational Stroke	95 ±3 degrees
Fail Safe Mode	Non-Spring Return
Torque	44 lb.-in. (5 Nm)
External Auxiliary Switches Available...	Yes, SSW2-1M
Environmental Rating	NEMA2
Frequency	50 Hz; 60 Hz
Manual operation	Declutch mechanism
Mounting	Direct Coupled
Maximum Noise Rating, Driving (dBA @ 1m).....	35
Rotation to Open	By switch
Rotational Stroke Adjustment	Dual Integral Adj. Stops (3 degree increments)
Compatible Damper Shafts.....	1/4 to 1/2 in. square or 3/8 to 5/8 in. round (6 to 13 mm square or 8 to 16 mm round)
Shaft Adapter Type	U-bolt clamp
Supply Voltage	24 Vac +20%, -15%, 24 Vdc
Materials.....	Plenum rated plastic housing
Ingress Protection Rating.....	IP54
Operating Humidity Range (% RH).....	5 to 95% RH, non-condensing
Ambient Temperature Range	-5 F to +140 F (-20 C to +60 C)
Storage Temperature Range	-22 F to +176 F (-30 C to +80 C)
Weight	1 lb (0.45 kg)
Includes.....	Mounting bracket, screws, shaft adapter, water-tight strain-relief cable fittings
Comments	Integral 1/2 in. NPSM conduit connection.

APPROVALS

CE.....	89/336/ECC, 73/23/EEC
C-Tick.....	N314
Underwriters Laboratories, Inc.....	UL873, Plenum Rated
Canadian Underwriters Laboratories, Inc.	cUL C22.2 No. 24-93

DIMENSIONS DIAGRAM





This non-spring return direct-coupled damper actuator provides modulating and floating/2-position control for air dampers, air handlers, ventilation flaps, louvers and reliable control for air damper applications with up to 20 sq ft/88 lb-in. (10 Nm) (seal-less damper blades; air friction-dependent).

FEATURES

- Declutch for manual adjustment
- Adjustable mechanical end limits
- Removable access cover for direct wiring
- Mountable in any orientation
- Function selection switch for selecting modulating or floating/2-position control

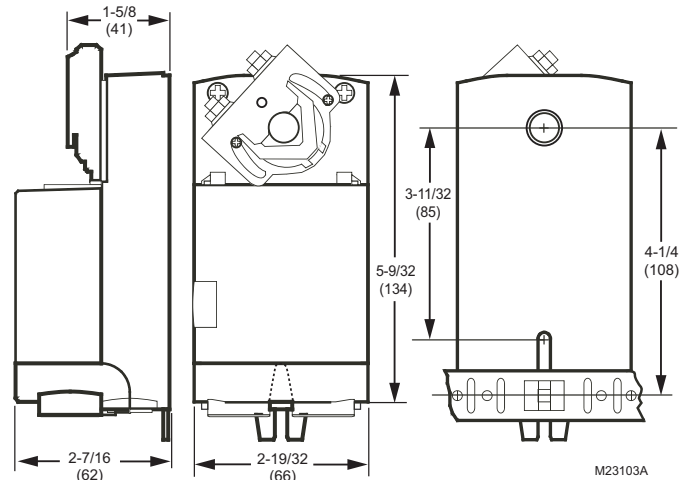
SPECIFICATIONS

Actuator Type	Damper; Valve
Rotational Stroke	95 ±3 degrees
Fail Safe Mode	Non-Spring Return
Torque	88 lb-in. (10 Nm)
External Auxiliary Switches Available	Yes, SSW2-1M
Electrical Connections	Enclosed screw terminal strip (22 to 14 AWG)
Environmental Rating	NEMA2
Frequency	50 Hz; 60 Hz
Manual operation	Declutch mechanism
Mounting	Direct Coupled
Maximum Noise Rating, Driving (dBA @ 1m)	35
Rotation to Open	By switch
Rotational Stroke Adjustment	Dual Integral Adj. Stops (3 degree increments)
Compatible Damper Shafts	1/4 to 1/2 in. square or 3/8 to 5/ 8 in. round (6 to 13 mm square or 8 to 16 mm round)
Shaft Adapter Type	U-bolt clamp
Supply Voltage	24 Vac +20%, -15%, 24 Vdc
Materials	Plenum rated plastic housing
Ingress Protection Rating	IP54
Operating Humidity Range (% RH)	5 to 95% RH, non-condensing
Ambient Temperature Range	-5 F to +140 F (-20 C to +60 C)
Storage Temperature Range	-22 F to +176 F (-30 C to +80 C)
Weight	1 lb (0.45 kg)
Includes	Mounting bracket, screws, shaft adapter, water-tight strain-relief cable fittings
Comments	Integral 1/2 in. NPSM conduit connection.

APPROVALS

CE	89/336/ECC, 73/23/EEC
C-Tick	N314
Underwriters Laboratories, Inc.	UL873, Plenum Rated
Canadian Underwriters Laboratories, Inc.	cUL C22.2 No. 24-93

DIMENSIONS DIAGRAM



Submittal Data - Actuators

Non-spring Return N20 Series



These direct-coupled damper actuators provide adjustable modulating control for: air dampers, air handling units, ventilation flaps, louvers and reliable control for air damper applications with up to 4.6 m²/50 sq ft (seal-less dampers; air friction-dependent).

FEATURES

- Control for air damper applications with up to 50 sq ft assuming 3.5 in-lb per sq ft of damper area, velocity independent.
- Patented self-centering shaft adapter.
- Access cover to facilitate connectivity.
- Declutch for manual adjustment.
- Mechanical end limits.
- Field-installable auxiliary switches.
- Rotation direction selectable by switch.
- Mountable in any orientation (no IP54 if upside down).
- Mechanical position indicator.
- CE approved. UL approved.

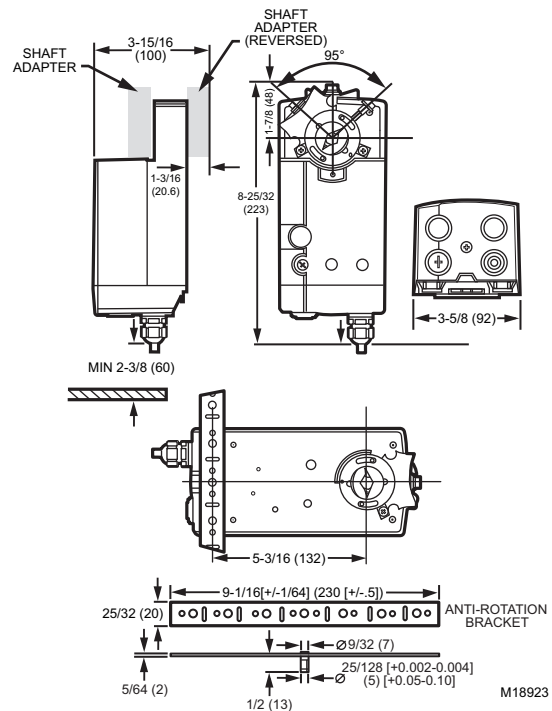
SPECIFICATIONS

Actuator Type	Damper; Valve
Rotational Stroke	95 ±3 degrees
Fail Safe Mode	Non-Spring Return
Torque	175 lb-in. (20 Nm)
External Auxiliary Switches Available...	Yes, SW2-US
Electrical Connections	Enclosed screw terminal strip (22 to 14 AWG)
Environmental Rating	NEMA2; IP54
Frequency	50 Hz; 60 Hz
Manual operation	Declutch mechanism
Mounting	Direct Coupled
Maximum Noise Rating, Driving (dBA @ 1m).....	40
Rotation to Open	By switch
Rotational Stroke Adjustment.....	Dual Integral Adj. Stops (3 degree increments)
Compatible Damper Shafts.....	3/8 to 1.06 in. round or 3/8 to 1 1/16 in. square (10 to 27 mm round or 10 to 18 mm square)
Shaft Adapter Type	Self-centering clamping
Materials.....	Plenum rated plastic housing
Operating Humidity Range (% RH).....	5 to 95% RH, non-condensing
Ambient Temperature Range	-5 F to +140 F (-20 C to +60 C)
Storage Temperature Range	-40 F to +175 F (-40 C to +80 C)
Weight	3.2 lb (1.45 kg)
Includes.....	Mounting bracket, self- centering shaft adapter
Comments.....	Integral 1/2 in. NPSM conduit connection.

APPROVALS

CE.....	89/336/ECC, 73/23/EEC
C-Tick	N314
Underwriters Laboratories, Inc.....	UL873, Plenum Rated
Canadian Underwriters Laboratories, Inc.	cUL C22.2 No. 24-93

DIMENSIONS DIAGRAM





These direct coupled damper actuators provide adjustable modulating control for air dampers, air handling units, ventilation flaps, louvers and reliable control for air damper applications with up to 7.9 m²/85 sq ft (seal-less dampers; air friction-dependent).

FEATURES

- Control for air damper applications with up to 85 sq ft assuming 3.5 in-lb per sq ft of damper area, velocity independent.
- Patented self-centering shaft adapter.
- Access cover to facilitate connectivity.
- Declutch for manual adjustment.
- Mechanical end limits.
- Field-installable auxiliary switches.
- Rotation direction selectable by switch.
- Mountable in any orientation (no IP54 if upside down).
- Mechanical position indicator.
- CE approved. UL approved.

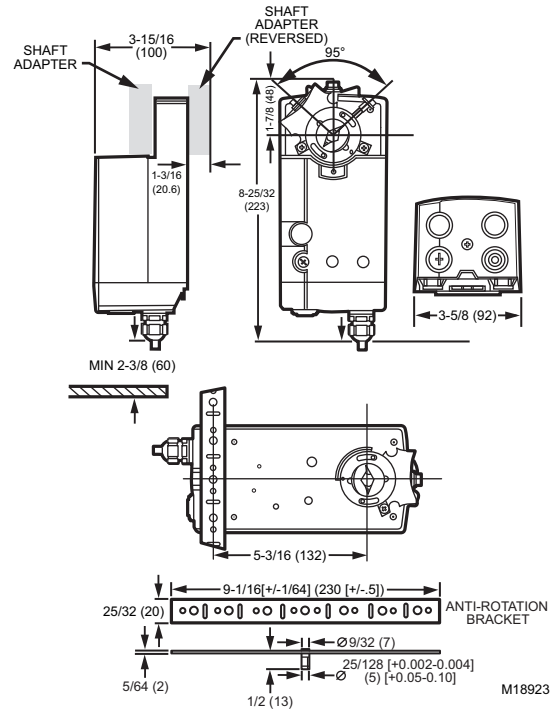
SPECIFICATIONS

Actuator Type	Damper; Valve
Rotational Stroke	95 ±3 degrees
Fail Safe Mode	Non-Spring Return
Torque	300 lb-in. (34 Nm)
External Auxiliary Switches Available	Yes, SW2-US
Electrical Connections	Enclosed screw terminal strip (22 to 14 AWG)
Environmental Rating	NEMA2
Frequency	50 Hz; 60 Hz
Manual operation	Declutch mechanism
Mounting	Direct Coupled
Maximum Noise Rating, Driving (dBA @ 1m)	40
Rotation to Open	By switch
Compatible Damper Shafts	3/8 to 1.06 in. round or 3/8 to 11/16 in. square (10 to 27 mm round or 10 to 18 mm square)
Shaft Adapter Type	Self-centering clamping
Materials	Plenum rated plastic housing
Operating Humidity Range (% RH)	5 to 95% RH, non-condensing
Ambient Temperature Range	-5 F to +140 F (-20 C to +60 C)
Storage Temperature Range	-40 F to +175 F (-40 C to +80 C)
Weight	3.2 lb (1.45 kg)
Includes	Mounting bracket, self-centering shaft adapter
Comments	Integral 1/2 in. NPSM conduit connection.

APPROVALS

CE	89/336/ECC, 73/23/EEC
C-Tick	N314
Underwriters Laboratories, Inc.	UL873, Plenum Rated
Canadian Underwriters Laboratories, Inc.	cUL C22.2 No. 24-93

DIMENSIONS DIAGRAM



Submittal Data - Actuators

Spring Return MS4104F, MS4604F, MS8104F



Fire and Smoke Damper Actuator

Spring return direct coupled actuators (DCA) for on/off damper control. The actuator accepts an on/off signal from a single-pole, singlethrow (SPST) controller. They are designed to operate reliably in smoke control systems requiring Underwriters Laboratories Inc. UL555S ratings up to 350 F.

SPECIFICATIONS

Actuator Type	Damper
Rotational Stroke	95 +/- 3 degrees
Fail Safe Mode	Spring Return
Torque	30 lb-in. (3.4 Nm)
Minimum Driving Torque at 350 F	30 lb-in.
Spring Return Torque	30 lb-in. (3.4 Nm)
Number of Internal Auxiliary Switches:	2
Electrical Connections	Color-coded leads
Electrical Connection Length	32 in. (0.8 m)
Environmental Rating	NEMA 1, IP40
Frequency	60 Hz
Mounting	Direct Coupled
Maximum Noise Rating, Holding (dBA @ 1m) ..	20 (no audible noise)
Maximum Noise Rating, Driving (dBA @ 1m) ..	80
Compatible Damper Shafts	3/8 to 1/2 in. round (10 to 13 mm square/round)
Shaft Adapter Type	Aluminum Hub, two set screws
Materials	Aluminum housing
Operating Humidity Range (% RH)	5 to 95% RH, non-condensing
Ambient Temperature Range	0 F to +130 F (-18 C to +55 C)
Storage Temperature Range	-40 F to 140 F (-40 C to +60 C)
Weight	5 lb (2.27 kg)
Comments	Two integral 3/8 in. clip-in flexible conduit connections

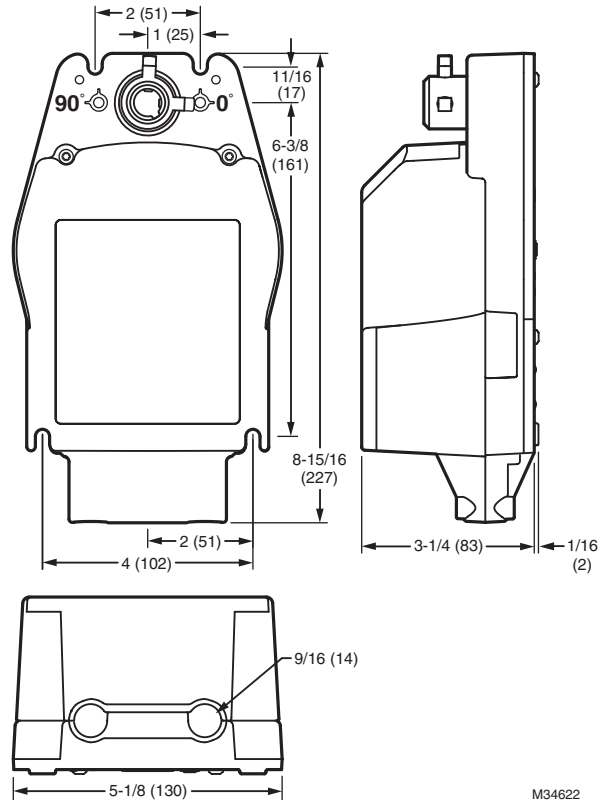
APPROVALS

CE	89/336/ECC, 73/23/EEC
C-Tick	N314
Underwriters Laboratories, Inc	UL873, Plenum Rated
Canadian Underwriters Laboratories, Inc.	cUL C22.2 No. 24-93

FEATURES

- Reversible mounting facilitates use in either clockwise (cw) or counterclockwise (ccw) spring rotation.
- Integral spring return ensures level of return torque.
- Fifteen-second spring return timing.
- No special cycling required during long-term holding. (See Operation section.)
- No audible noise during holding.
- Patent pending design eliminates need for limit switches to reduce power consumption.
- Models available for 24, 120, and 230 Vac.
- Ninety-five degree angle of rotation.
- Actuator holds rated torque at reduced power level.
- Die-cast aluminum housing.
- Housing design allows flush mounting to damper.
- Designed to operate reliably in smoke control systems requiring Underwriters Laboratories Inc. UL555S ratings up to 350°F.
- Models available with SPST position-indicating switches (7°, 85° stroke).

DIMENSIONS DIAGRAM



M34622



Fire and Smoke Damper Actuator

Spring return direct coupled actuators (DCA) for on/off damper control. The actuator accepts an on/off signal from a single-pole, singlethrow (SPST) controller. They are designed to operate reliably in smoke control systems requiring Underwriters Laboratories Inc. UL555S ratings up to 350 F.

FEATURES

- Reversible mounting facilitates use in either clockwise (cw) or counterclockwise (ccw) spring rotation.
- Integral spring return ensures level of return torque.
- Fifteen-second spring return timing.
- No special cycling required during long-term holding. (See Operation section.)
- No audible noise during holding.
- Patent pending design eliminates need for limit switches to reduce power consumption.
- Models available for 24, 120, and 230 Vac.
- Ninety-five degree angle of rotation.
- Actuator holds rated torque at reduced power level.
- Die-cast aluminum housing.
- Housing design allows flush mounting to damper.
- Designed to operate reliably in smoke control systems requiring Underwriters Laboratories Inc. UL555S ratings up to 350°F.
- Models available with SPST position indicating switches (7°, 85° stroke).

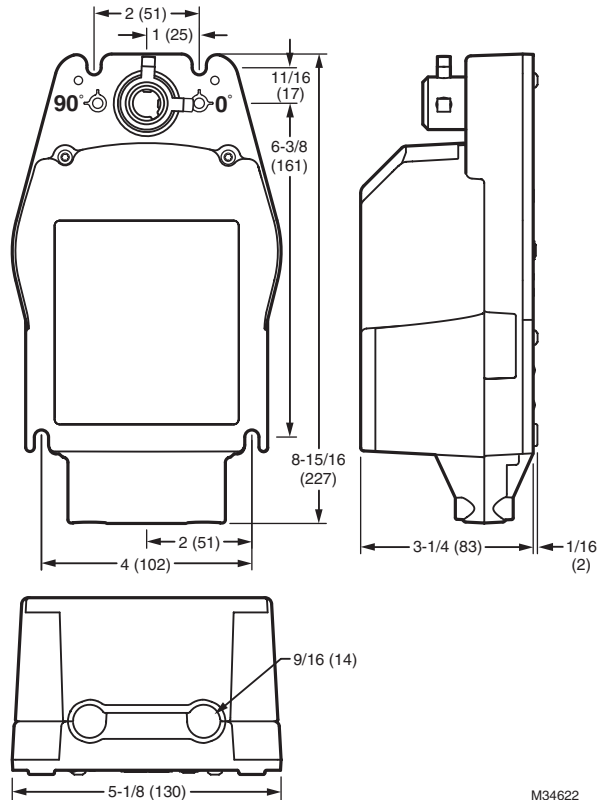
SPECIFICATIONS

Actuator Type	Damper
Rotational Stroke	95 +/- 3 degrees
Fail Safe Mode	Spring Return
Torque	80 lb-in. (9 Nm)
Minimum Driving Torque at 350 F	80 lb-in.
Spring Return Torque	80 lb-in. (9 Nm)
Number of Internal Auxiliary Switches:	2
Environmental Rating	NEMA 1, IP40
Frequency	60 Hz
Mounting	Direct Coupled
Maximum Noise Rating, Holding (dBA @ 1m)	20 (no audible noise)
Maximum Noise Rating, Driving (dBA @ 1m)	80
Compatible Damper Shafts	3/8 to 1/2 in. round (10 to 13 mm square/round)
Shaft Adapter Type	Aluminum Hub, four set screws
Supply Voltage	120 Vac +10%, -15%
Materials	Aluminum housing
Operating Humidity Range (% RH)	5 to 95% RH, non-condensing
Ambient Temperature Range	0 F to +130 F (-18 C to +55 C)
Storage Temperature Range	-40 F to 140 F (-40 C to +60 C)
Weight	5 lb (2.27 kg)
Comments	Two integral 3/8 in. clip-in flexible conduit connections

APPROVALS

CE	89/336/ECC, 73/23/EEC
C-Tick	N314
Underwriters Laboratories, Inc	UL873, Plenum Rated
Canadian Underwriters Laboratories, Inc.	cUL C22.2 No. 24-93

DIMENSIONS DIAGRAM



M34622

Submittal Data - Actuators

Spring Return MS4120F; MS4620F; MS8120F



Fire and Smoke Damper Actuator

Spring return direct coupled actuators (DCA) for on/off damper control with an integral junction box. The actuator accepts an on/off signal from a single-pole, single-throw (SPST) controller. They are designed to operate reliably in smoke control systems requiring Underwriters Laboratories Inc. UL555S ratings up to 350 F.

FEATURES

- Brush DC submotor with electronic stall protection for 2-position models
- Self-centering shaft adapter (shaft coupling) for wide range of shaft sizes
- Models available for use with two-position, single pole single throw (spst), line- (Series 40) or low- (Series 80) voltage controls
- Metal housing with built-in mechanical end limits
- Spring return direction field-selectable
- Shaft position indicator and scale
- Manual winding capability with locking function
- UL (cUL) listed and CE compliant
- All models are plenum-rated per UL873

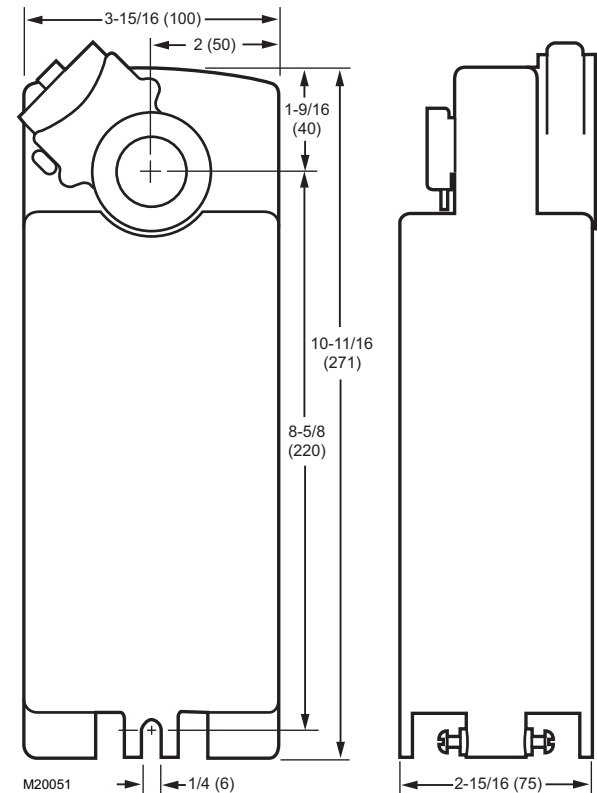
SPECIFICATIONS

Actuator Type	Damper
Rotational Stroke	95 ±3 degrees
Fail Safe Mode	Spring Return
Torque	175 lb-in. (20 Nm)
Minimum Driving Torque at 350 F	175 lb-in.
Spring Return Torque	175 lb-in. (20 Nm)
Spring Return Direction:	By orientation
External Auxiliary Switches Available... No	
Electrical Connections	Teflon-jacketed cable
Electrical Connection Length	40 in. (1 m)
Environmental Rating	NEMA2
Ingress Protection Rating	IP54
Frequency	60 Hz
Manual operation	Manual crank
Mounting	Direct Coupled
Maximum Noise Rating, Holding (dBA @ 1m)	20 (no audible noise)
Maximum Noise Rating, Driving (dBA @ 1m)	70
Compatible Damper Shafts	3/8 to 1.06 in. round or 3/8 to 1 1/16 in. square (10 to 27 mm round or 10 to 18 mm square)
Shaft Adapter Type	Self-centering clamping
Supply Voltage	120 Vac ±10%
Materials	Aluminum housing
Operating Humidity Range (% RH)	5 to 95% RH, non-condensing
Ambient Temperature Range	-40 F to +130 F (-40 C to +55 C)
Storage Temperature Range	-40 F to +140 F (-40 C to +60 C)
Weight	8 lb (3.63 kg)
Includes	Self-centering shaft adapter, 3mm crank
Comments	Two integral 3/8 in. flexible conduit connections

APPROVALS

CE	89/336/ECC, 73/23/EEC
C-Tick	N314
Underwriters Laboratories, Inc.	UL873, Plenum Rated
Canadian Underwriters Laboratories, Inc.	cUL C22.2 No. 24-93

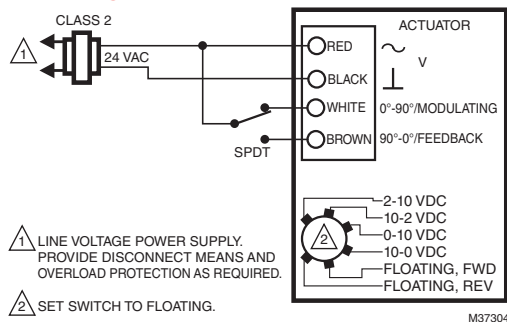
DIMENSIONS DIAGRAM



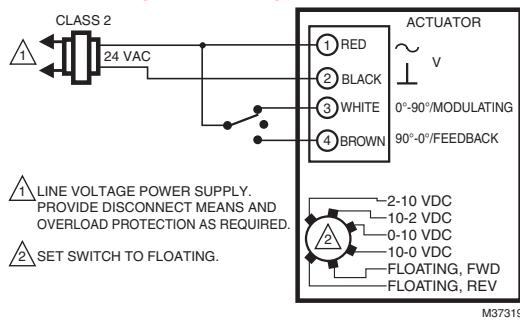
Wiring Diagrams - Actuators

Diamond 3 Nm (MS7103, MS7503)

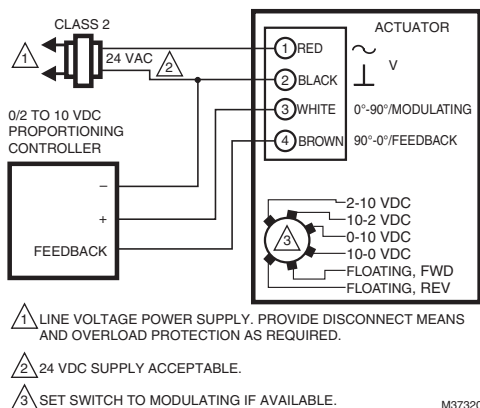
Wiring for SPDT on/off control, MS75.



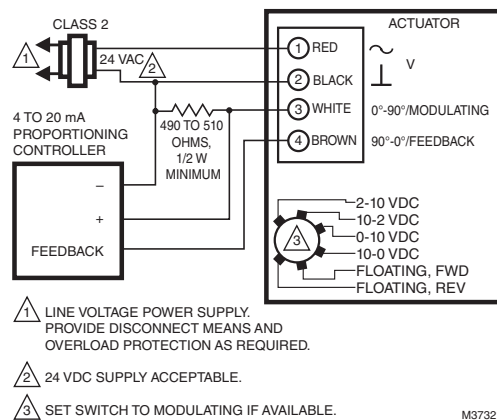
Wiring for floating control, MS75.



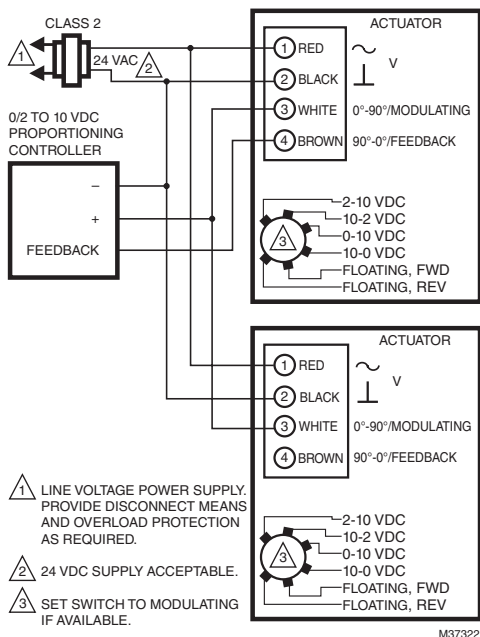
Wiring for modulating (0/2-10 VDC) proportioning control, MS75 (shown) and MS71.



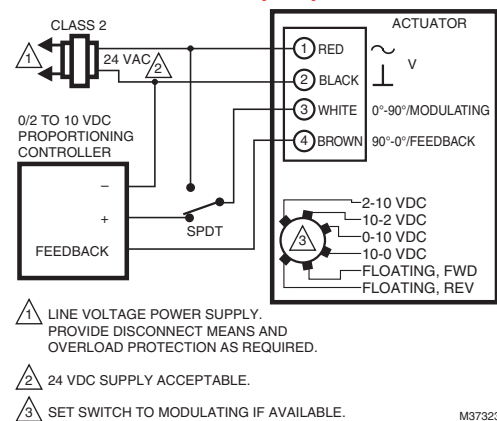
Wiring for 4-20 mA proportioning controllers, MS75 (shown) and MS71.



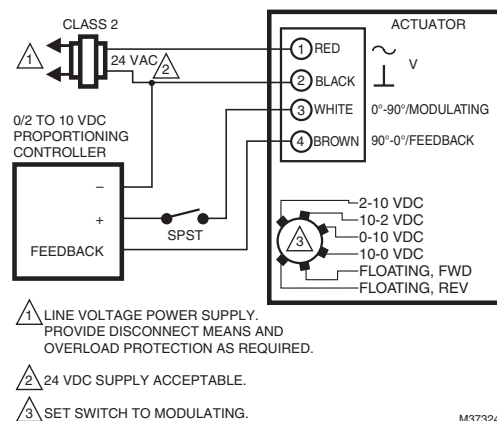
Wiring for modulating (0/2-10 VDC) proportioning control operating multiple actuators, MS75 (shown) and MS71.



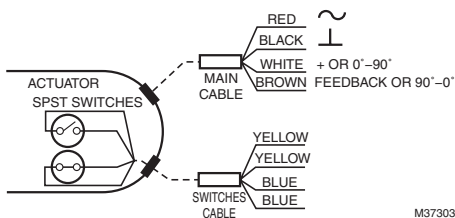
Override to open position



Cable installation details.



Return to closed position.

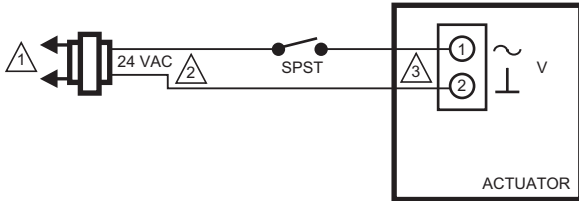


Wiring Diagrams - Actuators

Spring Return S03 and S05 Series

S03 Series (MS4103, MS7403, MS7403, MS7503, MS8103) and S05 Series (MS4105, MS7105, MS7405, MS7505, MS8105)

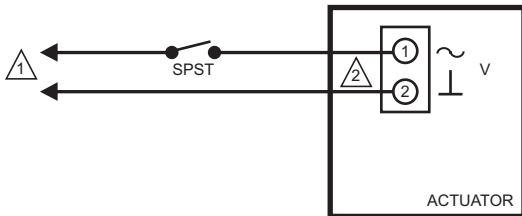
Wiring for low-voltage two-position control



- 1 LINE VOLTAGE POWER SUPPLY. PROVIDE DISCONNECT MEANS AND OVERLOAD PROTECTION AS REQUIRED.
- 2 24 VDC SUPPLY ACCEPTABLE.
- 3 ENSURE PROPER GROUNDING OF ACTUATOR CASE.

M19718C

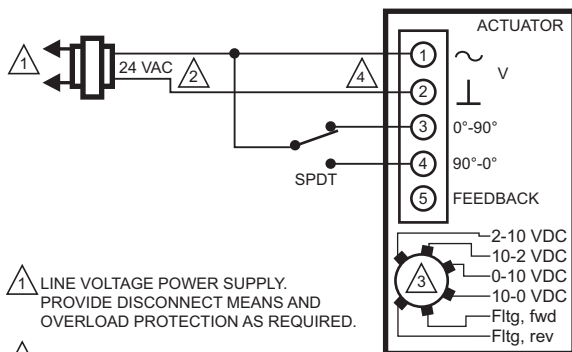
Wiring for line-voltage two-position control



- 1 LINE VOLTAGE POWER SUPPLY. PROVIDE DISCONNECT MEANS AND OVERLOAD PROTECTION AS REQUIRED.
- 2 ENSURE PROPER GROUNDING OF ACTUATOR CASE.

M22289A

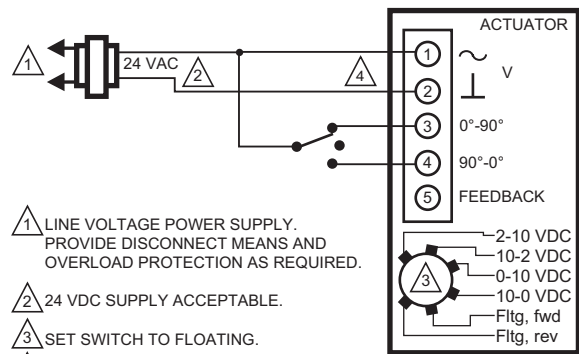
Wiring for SPDT on/off Control



- 1 LINE VOLTAGE POWER SUPPLY. PROVIDE DISCONNECT MEANS AND OVERLOAD PROTECTION AS REQUIRED.
- 2 24 VDC SUPPLY ACCEPTABLE.
- 3 SET SWITCH TO FLOATING.
- 4 ENSURE PROPER GROUNDING OF ACTUATOR CASE.

M27822

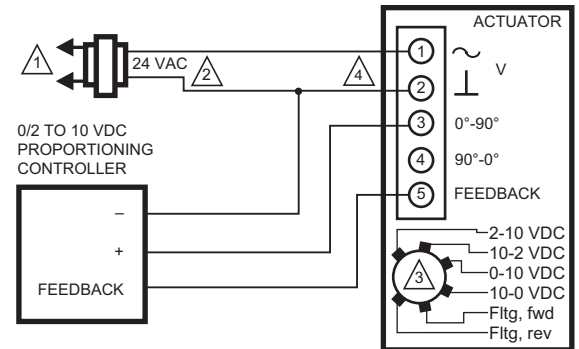
Wiring for floating control



- 1 LINE VOLTAGE POWER SUPPLY. PROVIDE DISCONNECT MEANS AND OVERLOAD PROTECTION AS REQUIRED.
- 2 24 VDC SUPPLY ACCEPTABLE.
- 3 SET SWITCH TO FLOATING.
- 4 ENSURE PROPER GROUNDING OF ACTUATOR CASE.

M27823

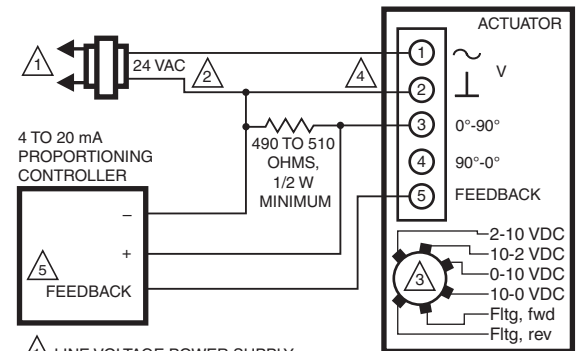
Wiring for (0)2-10 VDC proportioning controllers



- 1 LINE VOLTAGE POWER SUPPLY. PROVIDE DISCONNECT MEANS AND OVERLOAD PROTECTION AS REQUIRED.
- 2 24 VDC SUPPLY ACCEPTABLE.
- 3 SET SWITCH TO MODULATING.
- 4 ENSURE PROPER GROUNDING OF ACTUATOR CASE.

M27824

Wiring for 4-20 mA proportioning controllers



- 1 LINE VOLTAGE POWER SUPPLY. PROVIDE DISCONNECT MEANS AND OVERLOAD PROTECTION AS REQUIRED.
- 2 24 VDC SUPPLY ACCEPTABLE.
- 3 SET SWITCH TO MODULATING.
- 4 ENSURE PROPER GROUNDING OF ACTUATOR CASE.
- 5 FEEDBACK WILL BE A 2-10 VDC.

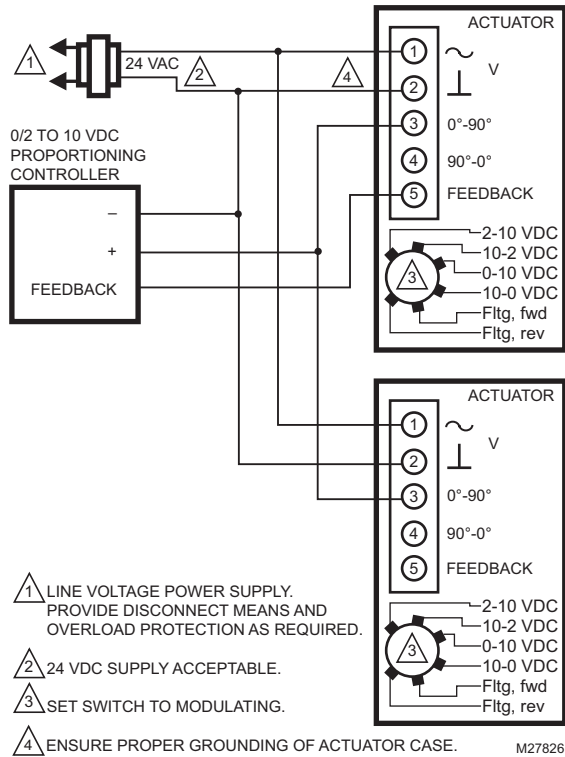
M27825A

Wiring Diagrams - Actuators

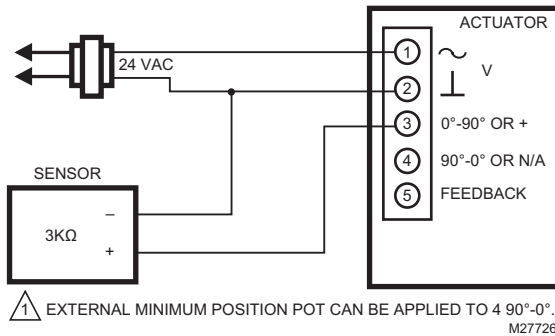
Spring Return S03 and S05 Series

ACTUATORS

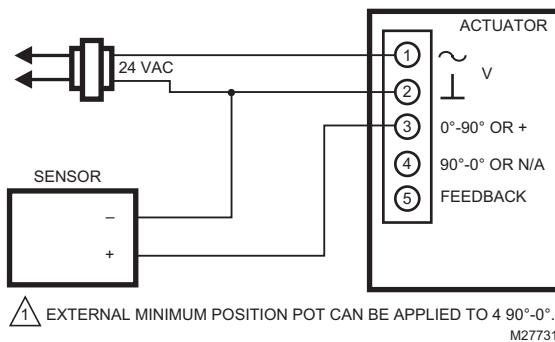
Wiring for (0)2-10 Vdc proportioning controller operating multiple actuators



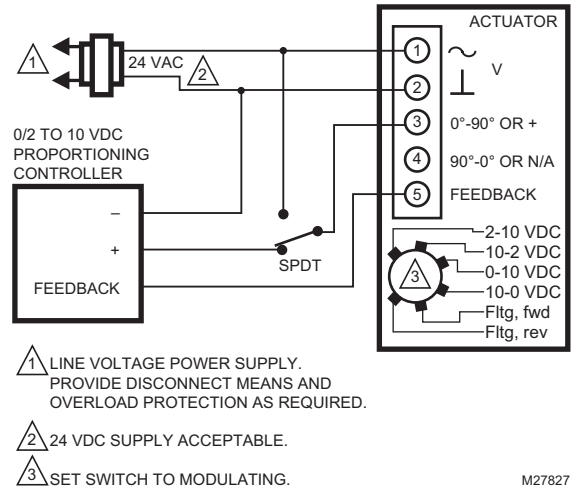
Wiring for 3 kOhm Economizer controllers



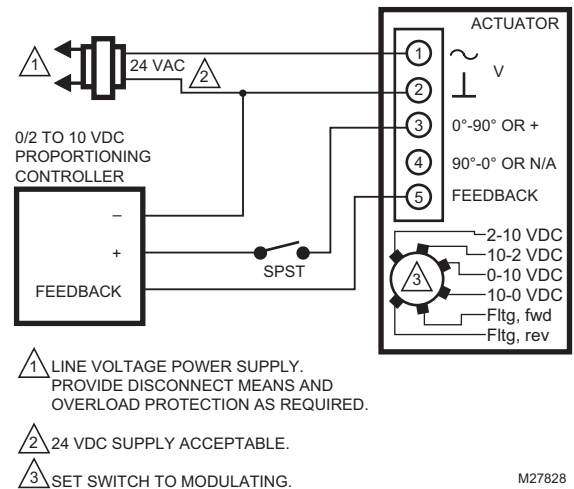
Wiring for 3 position Economizer controllers



Override to full open



Override to full close

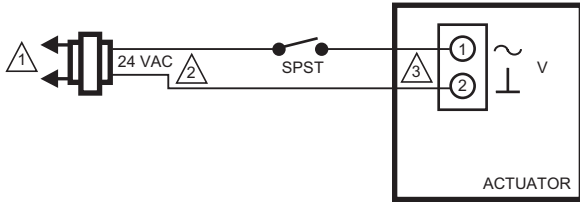


Wiring Diagrams - Actuators

Spring Return S10 and S20 Series

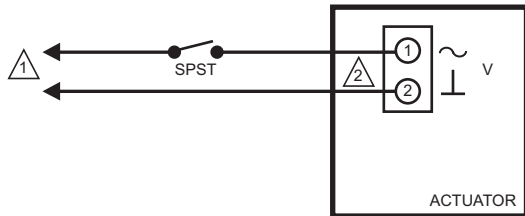
S10 Series (MS4110, MS7510, MS8110) and S20 Series (MS4120, MS7520, MS8120)

Wiring for On/Off Control



- 1 LINE VOLTAGE POWER SUPPLY. PROVIDE DISCONNECT MEANS AND OVERLOAD PROTECTION AS REQUIRED.
- 2 24 VDC SUPPLY ACCEPTABLE.
- 3 ENSURE PROPER GROUNDING OF ACTUATOR CASE.

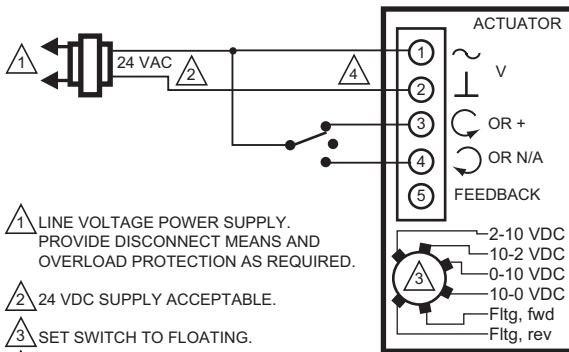
M19718C



- 1 LINE VOLTAGE POWER SUPPLY. PROVIDE DISCONNECT MEANS AND OVERLOAD PROTECTION AS REQUIRED.
- 2 ENSURE PROPER GROUNDING OF ACTUATOR CASE.

M22289A

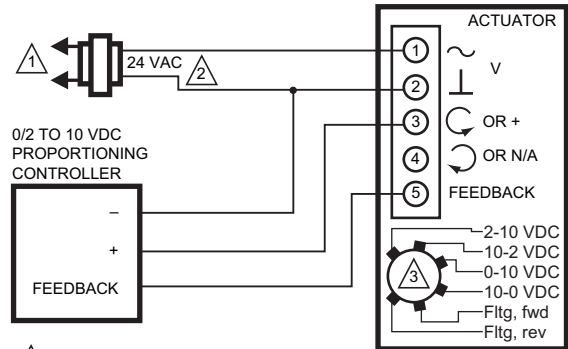
Wiring for Floating Control (Floating mode setting)



- 1 LINE VOLTAGE POWER SUPPLY. PROVIDE DISCONNECT MEANS AND OVERLOAD PROTECTION AS REQUIRED.
- 2 24 VDC SUPPLY ACCEPTABLE.
- 3 SET SWITCH TO FLOATING.
- 4 ENSURE PROPER GROUNDING OF ACTUATOR CASE.

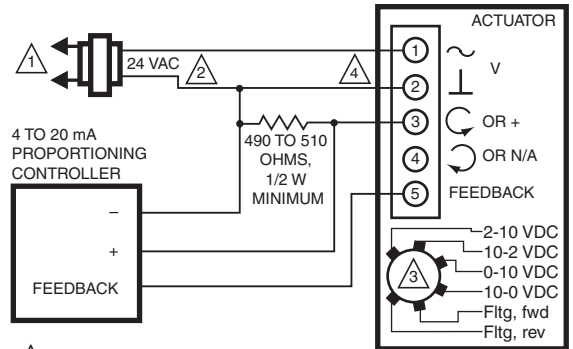
M19573B

Wiring for Proportioning controllers (Modulating mode setting)



- 1 LINE VOLTAGE POWER SUPPLY. PROVIDE DISCONNECT MEANS AND OVERLOAD PROTECTION AS REQUIRED.
- 2 24 VDC SUPPLY ACCEPTABLE.
- 3 SET SWITCH TO MODULATING.

M19574A



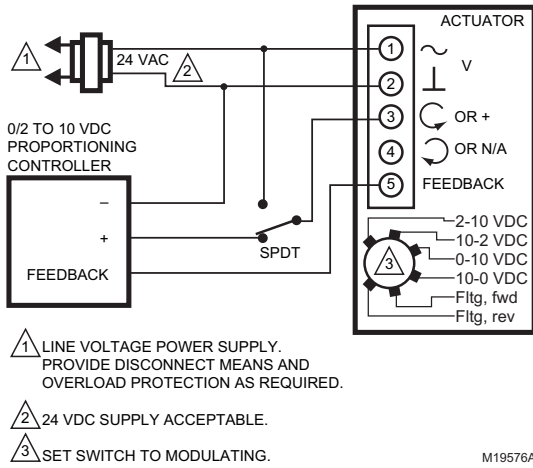
- 1 LINE VOLTAGE POWER SUPPLY. PROVIDE DISCONNECT MEANS AND OVERLOAD PROTECTION AS REQUIRED.
- 2 24 VDC SUPPLY ACCEPTABLE.
- 3 SET SWITCH TO MODULATING.
- 4 ENSURE PROPER GROUNDING OF ACTUATOR CASE.
- 5 FEEDBACK WILL BE A 2-10 VDC.

M22282C

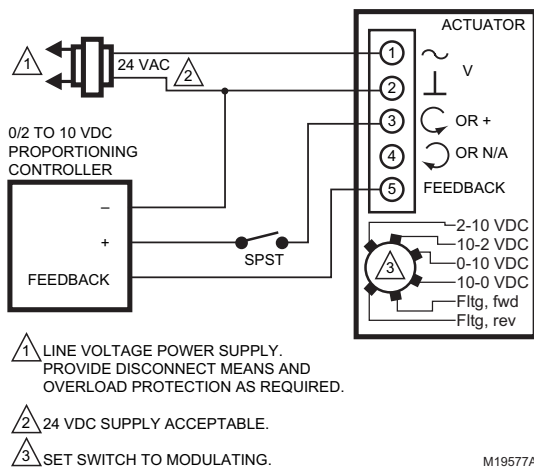
Wiring Diagrams - Actuators

Spring Return S10 and S20 Series

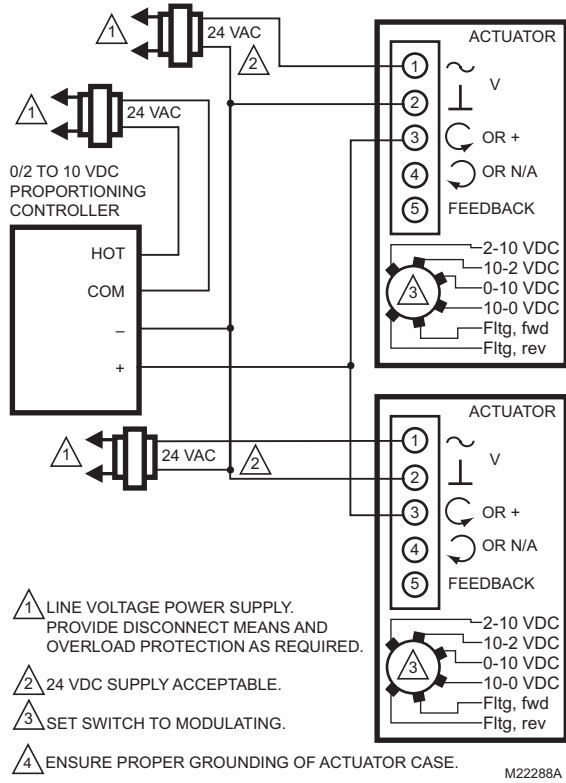
Override to full open (Modulating mode setting)



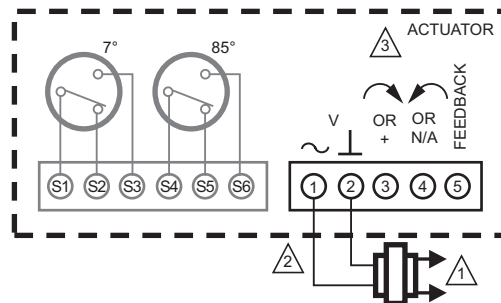
Override to full closed (Modulating mode setting)



Wiring for Proportioning controllers operating multiple actuators (Modulating mode setting)



Terminal Block Details



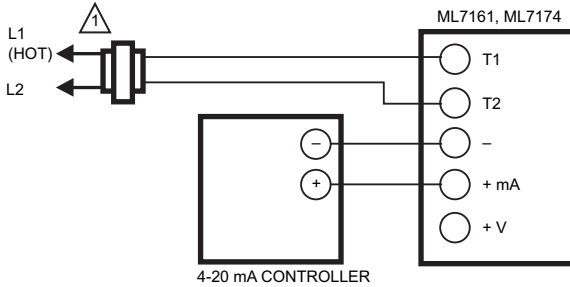
- 1 POWER SUPPLY. PROVIDE DISCONNECT MEANS AND OVERLOAD PROTECTION AS REQUIRED.
 - 2 THE INTERNAL AUXILIARY SWITCHES MUST BE CONNECTED TO THE SAME POWER SOURCE; OR THE AUXILIARY SWITCHES SHALL BE CONNECTED TO THE SAME POLE OF THE SAME SUPPLY CIRCUIT, CONNECTED IN A SAME POLARITY MANNER.
 - 3 ENSURE PROPER GROUNDING OF ACTUATOR CASE.
- M19571B

Wiring Diagrams - Actuators

Non-spring Return ML6161; ML7161

ML6161 and ML7161

ML7161 used with 4-20 mA control

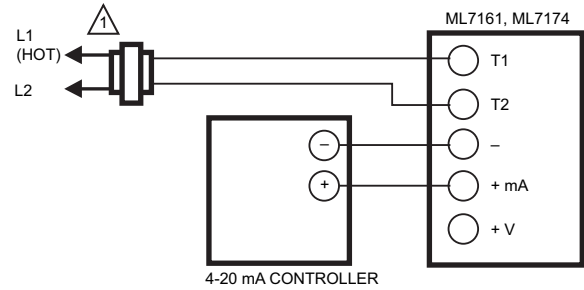


⚠ POWER SUPPLY. PROVIDE DISCONNECT MEANS AND OVERLOAD PROTECTION AS REQUIRED.

M18071

ML6174 and ML7174

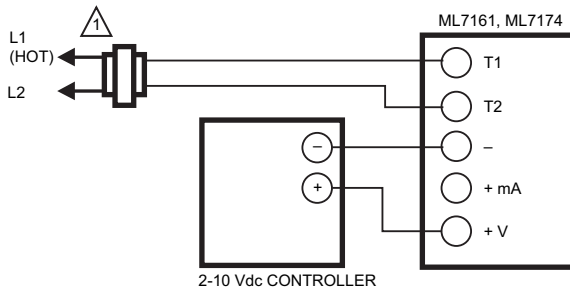
ML7174 used with 4-20 mA control



⚠ POWER SUPPLY. PROVIDE DISCONNECT MEANS AND OVERLOAD PROTECTION AS REQUIRED.

M18071

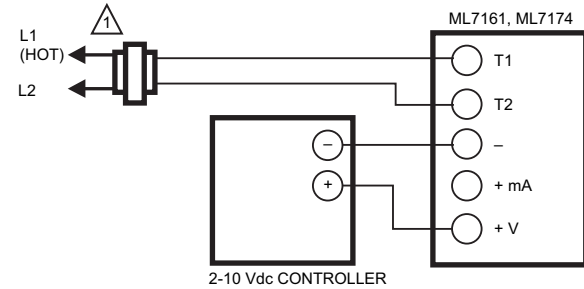
ML7161 used with 2-10 Vdc control



⚠ POWER SUPPLY. PROVIDE DISCONNECT MEANS AND OVERLOAD PROTECTION AS REQUIRED.

M18072

ML7174 used with 2-10 Vdc control



⚠ POWER SUPPLY. PROVIDE DISCONNECT MEANS AND OVERLOAD PROTECTION AS REQUIRED.

M18072

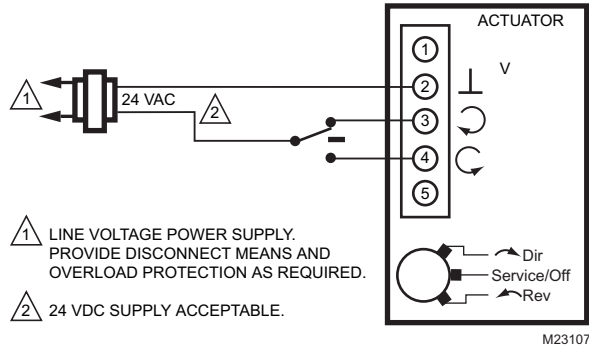
Wiring Diagrams - Actuators

Non-spring Return N05 and N10 Series

N05 Series (MN6105, MN7505) and N10 Series (MN6110, MN7510)

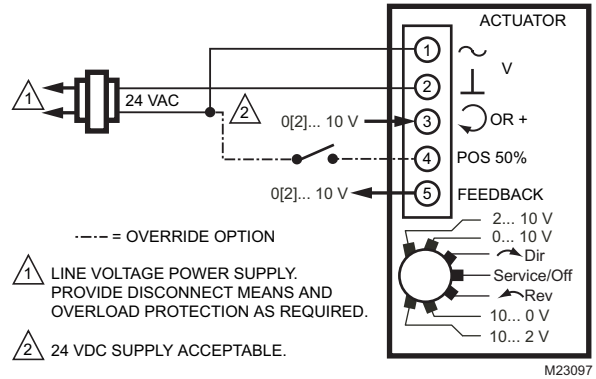
Wiring for Floating Control

MN6105, MN6110
FLOATING: DIR ↺



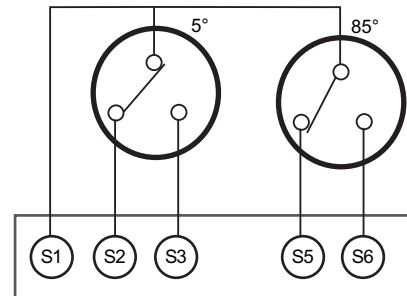
Wiring for Voltage Control

MN7505, MN7510
MODULATING: 0[2]... 10 V, 10... 0[2] V



Wiring for Auxiliary Switches

END SWITCHES (CLASS II-ONLY)

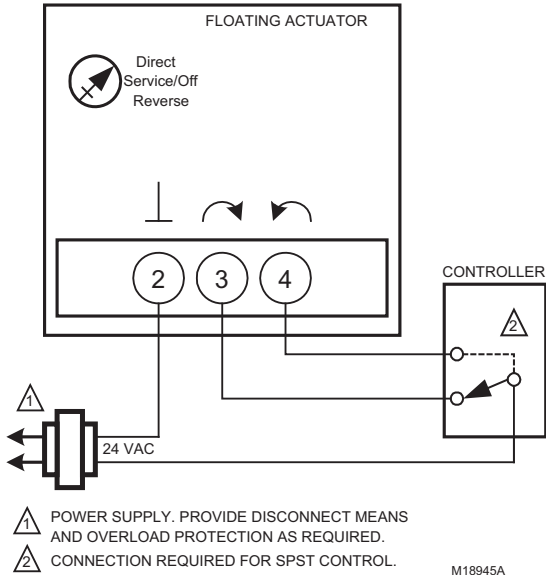


Wiring Diagrams - Actuators

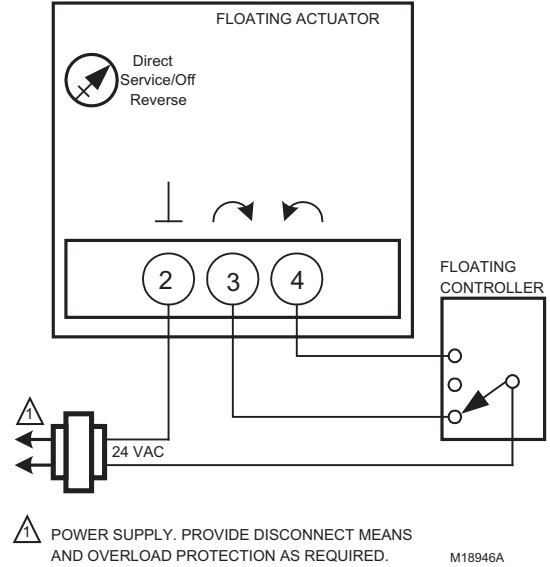
Non-spring Return N20 and N34 Series

N20 Series (MN6120, MN7220) and N34 Series (MN6134, MN7234)

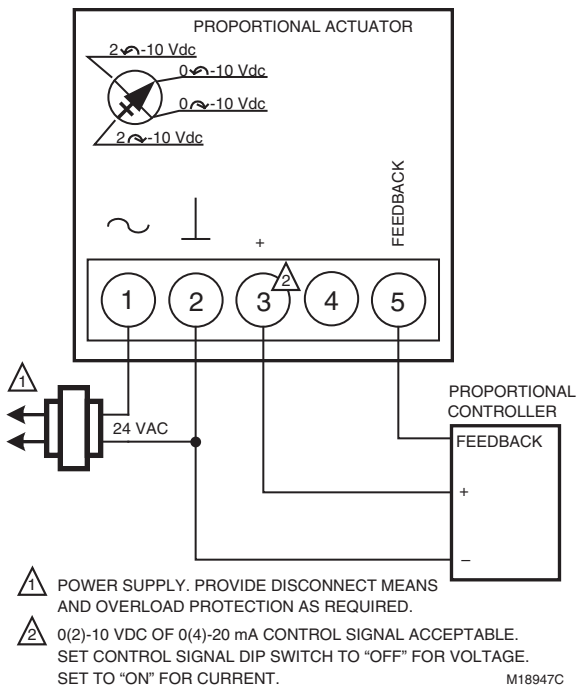
Used for On/Off Control



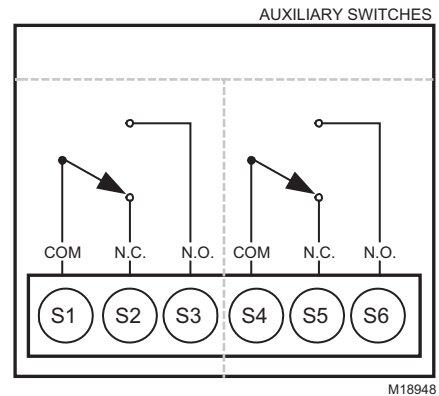
Wiring for Floating Control



Wiring for Modulating Control



Wiring for Auxiliary Switches

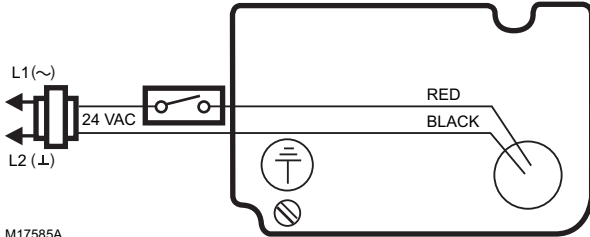


Wiring Diagrams - Actuators

Fire and Smoke Damper Actuators

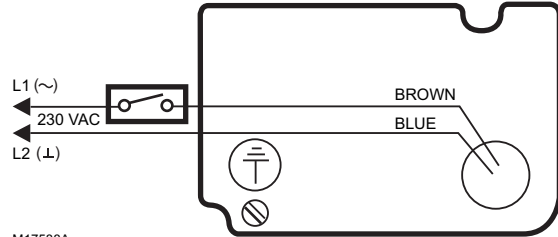
MS4209F, MS4309F, MS4709F, MS4809F, MS8209F and MS8309F

Typical 24 Vac wiring



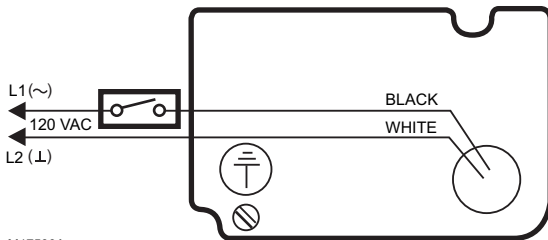
M17585A

Typical 230 Vac Wiring



M17588A

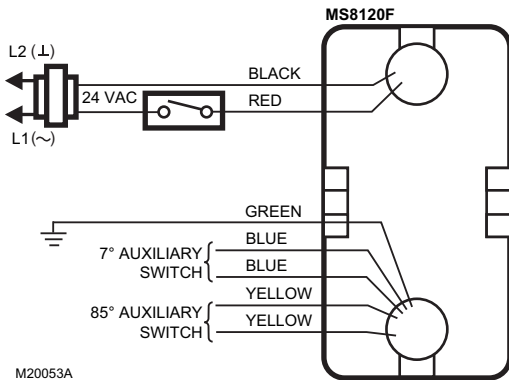
Typical 120 Vac wiring



M17589A

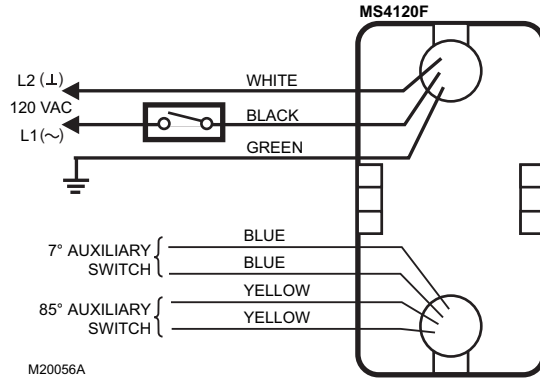
MS4120F, MS4620F, MS8120F, MS4109F, MS4609F and MS8109F

Wiring for 24V Control



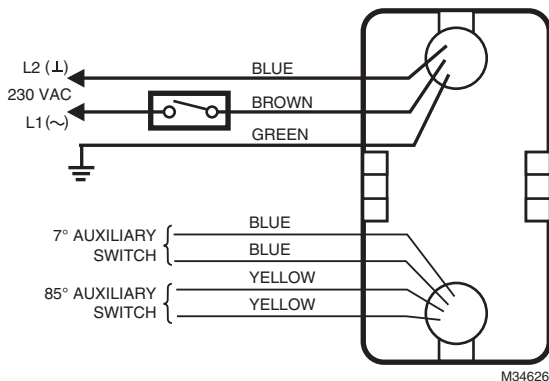
M20053A

Wiring for 120V Control



M20056A



Wiring for 230V Control






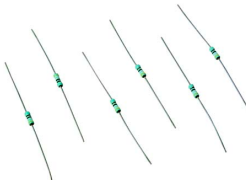
M34626

Accessories - Actuators

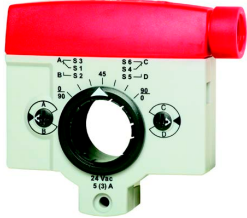
Ball Joints, Push Rod Accessories

	Product Number	Description	Used With
	27518	Crankarm balljoint with 1/4 - 28 UNF male threads, fits 5-16 inch diameter push rods	All Actuators and Dampers
	27520A	Push Rod (5/16 in. dia., 5 in. length)	All Actuators and Dampers
	27520B	Push Rod (5/16 in. dia., 10 in. length)	All Actuators and Dampers
	27520C	Push Rod (5/16 in. dia., 12 in. length)	All Actuators and Dampers
	27520D	Push Rod (5/16 in. dia., 15 in. length)	All Actuators and Dampers
	27520E	Push Rod (5/16 in. dia., 18 in. length)	All Actuators and Dampers
	27520G	Push Rod (5/16 in. dia., 24 in. length)	All Actuators and Dampers
	27520H	Push Rod (5/16 in. dia., 28 in. length)	All Actuators and Dampers
	27520K	Push Rod (5/16 in. dia., 36 in. length)	All Actuators and Dampers
	27520L	Push Rod (5/16 in. dia., 48 in. length)	All Actuators and Dampers
	27520Q	Push Rod (5/16 in. dia., 8 in. length)	All Actuators and Dampers



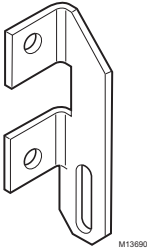
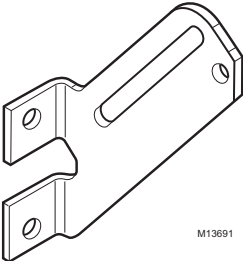

Control, Positioning, Feedback Accessories

	Product Number	Description	Used With
	200976A	Auxiliary Feedback Potentiometer (0 to 500 ohm)	ML6161, ML6174, ML7161, ML7174
	200976C	Auxiliary Feedback Potentiometer (0 to 2000 ohm)	ML6161, ML6174, ML7161, ML7174
	205860	Electronic Remote Minimum Position Potentiometer	Proportional Actuators
	32003532-005	High Temperature Dual Switch Assembly	ML4105, ML8105, ML4115, ML8115, ML4125, ML8125, ML4135, ML8135, MS4209, MS4309, MS4709, MS4809, MS8209, MS8309
	32006306-001	Resistor Kit (500 ohm, converts 4-20mA to 2-10Vdc)	Proportional Actuators

Control, Positioning, Feedback Accessories (cont.)

	Product Number	Description	Used With
	SW2-US	Auxiliary Switch Package (2 adjustable SPDT switches)	MS and MN Series High Torque Actuators (MNXX20 and XX34)

Mounting Accessories

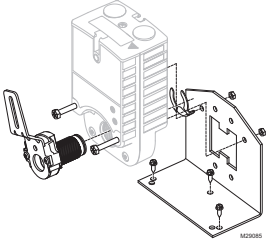
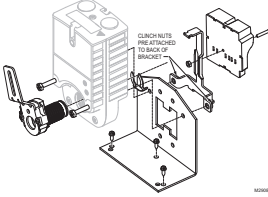
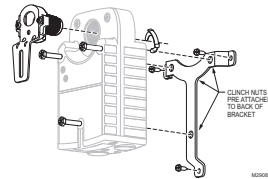
	Product Number	Description	Used With
	205649	Mounting Bracket	ML41x5, ML81x5, MSxx04F, MSxx09F and MSxx20F Actuators
	32007205-001	Direct Coupled Actuator Mounting Bracket	Damper with External Actuator Mounting (i.e., 32007205-005 Kit)
	32007205-002	Damper Blade Drive Lever (Small)	All Actuators and Dampers
	32007205-003	Damper Blade Drive Lever (Large)	All Actuators and Dampers
	32007205-004	Retaining Clip, Damper External Drive Pin	Damper with External Actuator Mounting (i.e., 32007205-005 Kit)

Accessories - Actuators


Mounting Accessories (cont.)

	Product Number	Description	Used With
	32007205-005	Damper External Drive Pin Kit	Damper with External Actuator Mounting
	32007205-006	Damper Axle Coupling	Multi-Section Dampers
	32007205-007	Jumper Bracket	Multi-Section Dampers
	50000407-001	Actuator Tandem Mounting Kit	N20, N34 Actuators; S10, S20 Actuators
	50001194-001	Foot Mounting Kit	MS and MN Series High Torque Actuators (MNXX20 and MNXX34) MSxx10 and MSxx20, but not for MSxx20F
	50006427-001	Flexible Anti-Rotation Bracket	N20, N34 Actuators; S10, S20 Actuators
	STRN-BRKT	Anti-rotation Bracket for S03 and S05 Series Actuators	S03, S05 Actuator

Mounting Accessories (cont.)



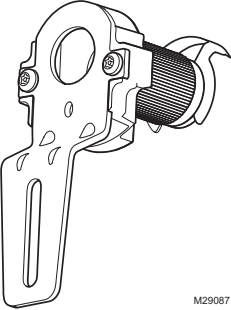
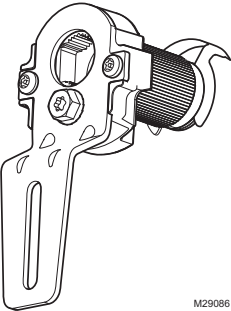
	Product Number	Description	Used With
	STRN-CRK-01	Crank arm kit for S03 and S05 Series Actuators	S03, S05 Actuators (not for use with Diamond actuators)
	STRN-ECONO-01	Economizer Retrofit Kit for S03 and S05 Series Actuators	S03, S05 Actuators (not for use with Diamond actuators)
	STRN-WMK-01	Wall mount kit for S03 and S05 Series Actuators	S03, S05 Actuators (not for use with Diamond actuators)

Rotational Limiters, Position Indicators



	Product Number	Description	Used With
	4074ENJ	Minimum Position Kit	ML6161, ML6174, ML7161, ML7174

Accessories - Actuators




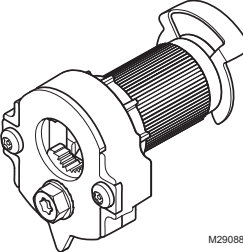
Crankarms

	Product Number	Description	Used With
	205830A	Rotary-to-Linear Kit Used With: 35 and 70 lb-in NSR Actuators	35 and 70 lb-in.NSR
	26026G	Damper Crank Arm, 1/2 in. damper shaft	All Actuators and Damper
 <small>M29087</small>	STRN-CA-01	Non Self-centering Crank Arm for S03 and S05 Series Actuators	S03, S05 Actuators (not for use with Diamond actuators)
 <small>M29086</small>	STRN-CA-02	Self-centering Crank Arm for S03 and S05 Series Actuators	S03; S05 Actuators (not for use with Diamond actuators)

Shaft Adapter Accessories




	Product Number	Description	Used With
	32003167-001	3/8 in. Shaft Adapter	ML6161; ML6174; ML7161; ML7174; ML7999
	32003168-001	Short Shaft Adapter (3/4 in. to 1/2 in.)	All Actuators and Dampers
	32003168-002	Short Shaft Adapter (5/8 in. to 1/2 in.)	All Actuators and Dampers
	32003168-003	Short Shaft Adapter (9/16 in. to 1/2 in.)	All Actuators and Dampers
	32003168-004	Short Shaft Adapter (1/2 in.)	All Actuators and Dampers

Shaft Adapter Accessories (cont.)


	Product Number	Description	Used With
	32004254-001	Self-Centering Shaft Adapter	N20 Actuators
	32004254-002	Self-Centering Shaft Adapter	S10, S20 Actuators
	172092060	Self-Centering Shaft Adapter	N34 Actuators
	4074ENY	3/8 in. Shaft Kit	ML6161, ML6174, ML7161, ML7174
	4074EVK	Short Shaft Kit	ML6161, ML6174, ML7161, ML7174
 <p>M29088</p>	STRN-SCSA	Self-centering Shaft Adapter	S03, S05 Actuators (not for use with Diamond actuators)

Accessories - Actuators



Enclosure Accessories

	Product Number	Description	Used With
	32003036-001	Weather Enclosure	All Actuators
	50005859-001	NEMA 4 Enclosure for Direct Coupled Actuator	ML6161, ML6174, ML7161, ML7174; 150 lb-in. NSR Actuators (ML Series); N20, N34 Actuators; S03, S05, S10, S20 Actuators
	7640QW	Enclosure for Conduit Connection	ML6161, ML6174, ML7161, ML7174

Q7002 Interface Modules

	Product Number	Description	Used With
	Q7002B1009	Transducer, Accepts dc voltage, current or resistive input and provides a voltage or current output	Direct Coupled Proportional Actuators and Modutrol Motors
	Q7002C1007	Transducer, Accepts a pulse-width modulation (PWM) signal and provides a voltage output	Direct Coupled Proportional Actuators and Modutrol Motors

Miscellaneous Accessories

	Product Number	Description	Used With
	32000085-001	Strain Relief Fitting 1/2" x 14 NPT	MS, MN and MVN Series Actuators
	STRN-STRNRLF	Strain Relief Fitting M20 x 1.5	MS and MN Series Actuators

Damper and Linkage Accessories

Product Number	Description	Used With
102546	Ball Joint, 5/16 in.	Damper Linkages
101662A/0021	Motor Mounting Bracket Assembly for Q605	Q605
102931/0021	Adapter arm for less than 90 degree rotation for the Q605	Q605
104643A	Adapter for driving 2 dampers from 1 crank arm	Kit Mounted Motors; Modutrol IV Motors
26025F	Damper Arm, 3/8 in. shaft	—
26026B	Damper Arm, 1/2 in. shaft, 3 in. long	—
7617ACL	Bag Assembly	Q605

Cross Reference - Actuators

Direct Coupled Actuators

Belimo Model	Fail Safe	Torque (lb-in)	Control Signal	Power	Feedback	Switches	Timing (sec)	Honeywell Model	Torque (lb-in)	Control Signal	Power	Feedback	Switches	Timing (sec)
CMB24-3	NSR	18 lb-in	On/Off, Floating	24 Vac/Vdc	—	—	35	ML6161A2009	35 lb-in	On/Off, Floating	24 Vac	—	—	90
CMB120-3	NSR	18 lb-in	On/Off, Floating	100-240 Vac	—	—	35	ML6161A2009	35 lb-in	On/Off, Floating	24 Vac	—	—	90
CMB24-SR-R	NSR	18 lb-in	2-10 Vdc (4-20 mA)	24 Vac/Vdc	2-10 Vdc	—	35	ML7161A2008	35 lb-in	On/Off, Floating	24 Vac	—	—	90
CMB24-SR-L	NSR	18 lb-in	2-10 Vdc (4-20 mA)	24 Vac/Vdc	2-10 Vdc	—	35	ML7161A2008	35 lb-in	On/Off, Floating	24 Vac	—	—	90
LMB24-3-P5-T	NSR	45 lb-in	On/Off, Floating	24 Vac/Vdc	0-5 kOhm	—	95	ML6174A2002 + 200976A	70 lb-in	On/Off, Floating	24 Vac	500 kOhm	—	90
								ML6174A2002 + 200976C	70 lb-in	On/Off, Floating	24 Vac	2 kOhm	—	90
LMB24-3-P10-T	NSR	45 lb-in	On/Off, Floating	24 Vac/Vdc	0-10 kOhm	—	95	ML6174A2002 + 200976A	70 lb-in	On/Off, Floating	24 Vac	500 kOhm	—	90
								ML6174A2002 + 200976C	—	On/Off, Floating	24 Vac	2 kOhm	—	90
LMB24-3	NSR	45 lb-in	On/Off, Floating	24 Vac/Vdc	—	—	95	MN6105A1011	44 lb-in	On/Off, Floating	24 Vac/Vdc	—	—	90
LMB24-3-T	NSR	45 lb-in	On/Off, Floating	24 Vac/Vdc	—	—	95	MN6105A1011	44 lb-in	On/Off, Floating	24 Vac/Vdc	—	—	90
LMB24-3-S	NSR	45 lb-in	On/Off, Floating	24 Vac/Vdc	—	1	95	MN6105A1201	44 lb-in	On/Off, Floating	24 Vac/Vdc	—	2	90
LMB24-SR	NSR	45 lb-in	2-10 Vdc (4-20 mA)	24 Vac/Vdc	2-10 Vdc	—	95	MN7505A2001	44 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
LMX24-SR	NSR	45 lb-in	2-10 Vdc (4-20 mA)	24 Vac/Vdc	2-10 Vdc	—	95	MN7505A2001	44 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
LMB24-SR-T	NSR	45 lb-in	2-10 Vdc (4-20 mA)	24 Vac/Vdc	—	—	95	MN7505A2001	44 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
LMX24-SR-T	NSR	45 lb-in	2-10 Vdc (4-20 mA)	24 Vac/Vdc	—	—	95	MN7505A2001	44 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
LMB24-MFT	NSR	45 lb-in	MFT	24 Vac/Vdc	Variable (0-10 Vdc)	—	150	MN7505A2001	44 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
LMX24-MFT	NSR	45 lb-in	MFT	24 Vac/Vdc	Variable (0-10 Vdc)	—	150	MN7505A2001	44 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
LMX24-MFT	NSR	45 lb-in	MFT	24 Vac/Vdc	Variable (0-10 Vdc)	Add-On	150	MN7505A2209	44 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	2	90
LMCB24-3	NSR	45 lb-in	On/Off, Floating	24 Vac/Vdc	—	—	35	MN6105A1011	44 lb-in	On/Off, Floating	24 Vac/Vdc	—	—	90
LMCB24-3-T	NSR	45 lb-in	On/Off, Floating	24 Vac/Vdc	—	—	35	MN6105A1011	44 lb-in	On/Off, Floating	24 Vac/Vdc	—	—	90
LMX24-3	NSR	45 lb-in	On/Off, Floating	24 Vac/Vdc	—	—	95	MN6105A1011	44 lb-in	On/Off, Floating	24 Vac/Vdc	—	—	90
LMX24-3-T	NSR	45 lb-in	On/Off, Floating	24 Vac/Vdc	—	—	95	MN6105A1011	44 lb-in	On/Off, Floating	24 Vac/Vdc	—	—	90
LMCB24-SR	NSR	45 lb-in	2-10 Vdc (4-20 mA)	24 Vac/Vdc	2-10 Vdc	—	35	MN7505A2001	44 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
LMCB24-SR-T	NSR	45 lb-in	2-10 Vdc (4-20 mA)	24 Vac/Vdc	—	—	35	MN7505A2001	44 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
LMX120-SR	NSR	45 lb-in	2-10 Vdc (4-20 mA)	100-240 Vac	2-10 Vdc	—	95	MN7505A2001	44 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
LMX120-3	NSR	45 lb-in	On/Off, Floating	100-240 Vac	—	—	150	MN6105A1011	44 lb-in	On/Off, Floating	24 Vac/Vdc	—	—	90
LMQX24-MFT	NSR	35 lb-in	MFT	24 Vac/Vdc	Variable (0-10 Vdc)	—	150	ML6161A2009	35 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac	—	—	90
NMB24-3	NSR	90 lb-in	On/Off, Floating	24 Vac/Vdc	—	—	95	MN6110A1003	88 lb-in	On/Off, Floating	24 Vac/Vdc	—	—	90
NMCB24-3	NSR	90 lb-in	On/Off, Floating	24 Vac/Vdc	—	—	45	MN6110A1003	88 lb-in	On/Off, Floating	24 Vac/Vdc	—	—	90
NMX24-3	NSR	90 lb-in	On/Off, Floating	24 Vac/Vdc	—	—	95	MN6110A1003	88 lb-in	On/Off, Floating	24 Vac/Vdc	—	—	90
NMX24-3-T	NSR	90 lb-in	On/Off, Floating	24 Vac/Vdc	—	—	95	MN6110A1003	88 lb-in	On/Off, Floating	24 Vac/Vdc	—	—	90
NMX120-3	NSR	90 lb-in	On/Off, Floating	100-240 Vac	—	—	150	MN6110A1003	88 lb-in	On/Off, Floating	24 Vac/Vdc	—	—	90
NMX120-SR	NSR	90 lb-in	2-10 Vdc (4-20 mA)	100-240 Vac	2-10 Vdc	—	150	MN7510A2001	88 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
NMCX24-MFT	NSR	90 lb-in	MFT	24 Vac/Vdc	Variable (0-10 Vdc)	—	150	MN7510A2001	88 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
NMQX24-MFT	NSR	70 lb-in	MFT	24 Vac/Vdc	Variable (0-10 Vdc)	—	150	ML7174A2001	70 lb-in	(0) 2-10 Vdc	24 Vac/Vdc	—	—	90
NMB24-SR	NSR	90 lb-in	2-10 Vdc (4-20 mA)	24 Vac/Vdc	—	—	95	MN7510A2001	88 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
NMCB24-SR	NSR	90 lb-in	2-10 Vdc (4-20 mA)	24 Vac/Vdc	2-10 Vdc	—	45	MN7510A2001	88 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
NMX24-SR	NSR	90 lb-in	2-10 Vdc (4-20 mA)	24 Vac/Vdc	2-10 Vdc	—	95	MN7510A2001	88 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
NMX24-SR-T	NSR	90 lb-in	2-10 Vdc (4-20 mA)	24 Vac/Vdc	—	—	95	MN7510A2001	88 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
NMB24-MFT	NSR	90 lb-in	MFT	24 Vac/Vdc	Variable (0-10 Vdc)	—	150	MN7510A2001	88 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
NMX24-MFT	NSR	90 lb-in	MFT	24 Vac/Vdc	Variable (0-10 Vdc)	—	150	MN7510A2001	88 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
AMB24-3	NSR	180 lb-in	On/Off, Floating	24 Vac/Vdc	—	—	95	MN6120A1002	175 lb-in	On/Off, Floating	24 Vac/Vdc	—	—	90
AMX24-3	NSR	180 lb-in	On/Off, Floating	24 Vac/Vdc	—	—	95	MN6120A1002	175 lb-in	On/Off, Floating	24 Vac/Vdc	—	—	90
AMX24-3-T	NSR	180 lb-in	On/Off, Floating	24 Vac/Vdc	—	—	95	MN6120A1002	175 lb-in	On/Off, Floating	24 Vac/Vdc	—	—	90
AMB24-3-S	NSR	180 lb-in	On/Off, Floating	24 Vac/Vdc	—	1	95	MN6120A1200	175 lb-in	On/Off, Floating	24 Vac/Vdc	—	2	90
AMB24-SR	NSR	180 lb-in	2-10 Vdc (4-20 mA)	24 Vac/Vdc	2-10 Vdc	—	95	MN7220A2007	175 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
AMX24-SR	NSR	180 lb-in	2-10 Vdc (4-20 mA)	24 Vac/Vdc	2-10 Vdc	—	95	MN7220A2007	175 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
AMX24-SR-T	NSR	180 lb-in	2-10 Vdc (4-20 mA)	24 Vac/Vdc	—	—	95	MN7220A2007	175 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
AMB24-MFT	NSR	180 lb-in	MFT	24 Vac/Vdc	Variable (0-10 Vdc)	—	150	MN7220A2007	175 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
AMX24-MFT	NSR	180 lb-in	MFT	24 Vac/Vdc	Variable (0-10 Vdc)	—	150	MN7220A2007	175 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
AMX120-3	NSR	180 lb-in	On/Off, Floating	100-240 Vac	—	—	95	MN6120A1002	175 lb-in	On/Off, Floating	24 Vac/Vdc	—	—	90
AMX120-SR	NSR	180 lb-in	2-10 Vdc (4-20 mA)	100-240 Vac	2-10 Vdc	—	95	MN6120A1002	175 lb-in	On/Off, Floating	24 Vac/Vdc	(0) 2-10 Vdc	—	90
AMQX24-MFT	NSR	140 lb-in	MFT	24 Vac/Vdc	Variable (0-10 Vdc)	—	150	MN7220A2007	175 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
GMB24-3	NSR	360 lb-in	On/Off, Floating	24 Vac/Vdc	—	—	150	MN6134A1003	300 lb-in	On/Off, Floating	24 Vac/Vdc	—	—	90
GMX24-3	NSR	360 lb-in	On/Off, Floating	24 Vac/Vdc	—	—	150	MN6134A1003	300 lb-in	On/Off, Floating	24 Vac/Vdc	—	—	90

Cross Reference - Actuators

Direct Coupled Actuators

Belimo Model	Fail Safe	Torque (lb-in)	Control Signal	Power	Feedback	Switches	Timing (sec)	Honeywell Model	Torque (lb-in)	Control Signal	Power	Feedback	Switches	Timing (sec)
GMB24-SR	NSR	360 lb-in	2-10 Vdc (4-20 mA)	24 Vac/Vdc	2-10 Vdc	—	150	MN7234A2008	300 lb-in	(0) 2-10 Vdc, (0) 4-20 mA	24 Vac/Vdc	(0) 2-10 Vdc	—	90
GMX24-SR	NSR	360 lb-in	2-10 Vdc (4-20 mA)	24 Vac/Vdc	2-10 Vdc	—	150	MN7234A2008	300 lb-in	(0) 2-10 Vdc, (0) 4-20 mA	24 Vac/Vdc	(0) 2-10 Vdc	—	90
GMB24-MFT	NSR	360 lb-in	On/Off, Floating	24 Vac/Vdc	—	—	150	MN6134A2008	300 lb-in	On/Off, Floating	24 Vac/Vdc	—	—	90
GMX24-MFT	NSR	360 lb-in	MFT	24 Vac/Vdc	Variable (0-10 Vdc)	—	150	MN7234A2008	300 lb-in	(0) 2-10 Vdc, (0) 4-20 mA	24 Vac/Vdc	(0) 2-10 Vdc	—	90
GMX120-3	NSR	360 lb-in	On/Off, Floating	100-240 Vac	—	—	150	MN6134A2008	300 lb-in	On/Off, Floating	24 Vac/Vdc	—	—	90
TFB24	SR	22 lb-in	On/Off	24 Vac/Vdc	—	—	75	MS8103A1030	27 lb-in	Two-Position (SPST)	24 Vac/Vdc	—	—	45
TFB24-S	SR	22 lb-in	On/Off	24 Vac/Vdc	—	1	75	MS8103A1130	27 lb-in	Two-Position (SPST)	24 Vac/Vdc	—	1	45
TFLB24	SR	22 lb-in	On/Off	24 Vac/Vdc	—	—	75	MS8103A1030	27 lb-in	Two-Position (SPST)	24 Vac/Vdc	—	—	45
TFB120	SR	22 lb-in	On/Off	100-240 Vac	—	—	75	MS4103A1030	27 lb-in	Two-Position (SPST)	100-250 Vac	—	—	45
TFB120-S	SR	22 lb-in	On/Off	100-240 Vac	—	1	75	MS4103A1130	27 lb-in	Two-Position (SPST)	100-250 Vac	—	1	45
TFLB120	SR	22 lb-in	On/Off	100-240 Vac	—	—	75	MS4103A1030	27 lb-in	Two-Position (SPST)	100-250 Vac	—	—	45
TFCB120-S	SR	22 lb-in	On/Off	100-240 Vac	—	1	30	MS4103A1130	27 lb-in	Two-Position (SPST)	100-250 Vac	—	1	45
TFB24-SR	SR	22 lb-in	2-10 Vdc (4-20 mA)	24 Vac/Vdc	2-10 Vdc	—	95	MS7103A2021	27 lb-in	(0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
TFB24-SR-S	SR	22 lb-in	2-10 Vdc (4-20 mA)	24 Vac/Vdc	2-10 Vdc	1	95	MS7103A2221	27 lb-in	(0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	2	90
TFB120-SR	SR	22 lb-in	2-10 Vdc (4-20 mA)	100-240 Vac	—	—	95	MS4103A1030	27 lb-in	Two-Position (SPST)	100-250 Vac	—	—	45
TFB24-3	SR	22 lb-in	Floating	24 Vac/Vdc	—	—	95	MS7503A2021	27 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
TFB24-3-S	SR	22 lb-in	Floating	24 Vac/Vdc	—	1	95	MS7503A2221	27 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	2	90
TFB24-MFT	SR	22 lb-in	MFT	24 Vac/Vdc	Variable (0-10 Vdc)	—	95	MS7503A2021	27 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
TFB24-MFT-S	SR	22 lb-in	MFT	24 Vac/Vdc	Variable (0-10 Vdc)	1	95	MS7503A2221	27 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	2	90
TFX24	SR	22 lb-in	On/Off	24 Vac/Vdc	—	—	<75	MS8105W1030	44 lb-in	Two-Position (SPST)	24 Vac/Vdc	—	—	45
TFX24-S	SR	22 lb-in	On/Off	24 Vac/Vdc	—	1	<75	MS8105W1130	44 lb-in	Two-Position (SPST)	24 Vac/Vdc	—	1	45
TFX24-SR	SR	22 lb-in	2-10 Vdc (4-20 mA)	24 Vac/Vdc	2-10 Vdc	—	95	MS7505W2030	44 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
TFX24-SR-S	SR	22 lb-in	2-10 Vdc (4-20 mA)	24 Vac/Vdc	2-10 Vdc	1	95	MS7505W2130	44 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	1	90
TFX24-3	SR	22 lb-in	Floating	24 Vac/Vdc	—	—	95	MS7505W2030	44 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
TFX24-3-S	SR	22 lb-in	Floating	24 Vac/Vdc	—	1	95	MS7505W2130	44 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	1	90
TFX24-MFT	SR	22 lb-in	MFT	24 Vac/Vdc	Variable (0-10 Vdc)	—	150	MS7505W2030	44 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
TFX24-MFT-S	SR	22 lb-in	MFT	24 Vac/Vdc	Variable (0-10 Vdc)	1	150	MS7505W2130	44 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	1	90
LF24-S US	SR	35 lb-in	On/Off	24 Vac/Vdc	—	1	40-75	MS8105A1130	44 lb-in	Two-Position (SPST)	24 Vac/Vdc	—	1	45
LF120 US	SR	35 lb-in	On/Off	120 Vac	—	—	40-75	MS4105A1030	44 lb-in	Two-Position (SPST)	100-250 Vac	—	—	45
LF120-S US	SR	35 lb-in	On/Off	120 Vac	—	1	40-75	MS4105A1130	44 lb-in	Two-Position (SPST)	100-250 Vac	—	1	45
LF230 US	SR	35 lb-in	On/Off	230 Vac	—	—	40-75	MS4105A1030	44 lb-in	Two-Position (SPST)	100-250 Vac	—	—	45
LF230-S US	SR	35 lb-in	On/Off	230 Vac	—	1	40-75	MS4105A1130	44 lb-in	Two-Position (SPST)	100-250 Vac	—	1	45
LF24-3 US	SR	35 lb-in	Modulating	24 Vac/Vdc	—	—	150	MS7505A2030	44 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
LF24-3-S US	SR	35 lb-in	Modulating	24 Vac/Vdc	—	1	150	MS7505A2130	44 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	1	90
LFC24-3-R US	SR	35 lb-in	Floating	24 Vac/Vdc	—	—	90	MS7505A2030	44 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
LFC24-3-S US	SR	35 lb-in	Floating	24 Vac/Vdc	—	1	90	MS7505A2130	44 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	1	90
LF24-SR US	SR	35 lb-in	2-10 Vdc (4-20 mA)	24 Vac/Vdc	2-10 Vdc	—	150	MS7505A2030	44 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
LF24-SR-S US	SR	35 lb-in	2-10 Vdc (4-20 mA)	24 Vac/Vdc	2-10 Vdc	1	150	MS7505A2130	44 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	1	90
LF24-SR-E US	SR	35 lb-in	2-10 Vdc, Built-in minimum position	24 Vac/Vdc	2-10 Vdc	—	150	MS7405A2030	44 lb-in	On/Off, Floating, (0) 2-10 Vdc, Economizer (3 kOhm, 3-Position)	24 Vac/Vdc	(0) 2-10 Vdc	—	90
LF24-MFT US	SR	35 lb-in	MFT	24 Vac/Vdc	2-10 Vdc	—	150	MS7505A2030	44 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
LF24-MFT-S US	SR	35 lb-in	MFT	24 Vac/Vdc	2-10 Vdc	1	150	MS7505A2130	44 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	1	90
LF24-MFT-20 US	SR	35 lb-in	MFT	24 Vac/Vdc	2-10 Vdc	—	150	MS7505A2030	44 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
NFB24	SR	90 lb-in	On/Off	24 Vac/Vdc	—	—	<75	MS8110A1008	88 lb-in	Two-Position (SPST)	24 Vac/Vdc	—	—	45

Cross Reference - Actuators

Direct Coupled Actuators

Belimo Model	Fail Safe	Torque (lb-in)	Control Signal	Power	Feedback	Switches	Timing (sec)	Honeywell Model	Torque (lb-in)	Control Signal	Power	Feedback	Switches	Timing (sec)
NFB24-S	SR	90 lb-in	On/Off	24 Vac/Vdc	—	2	<75	MS8110A1206	88 lb-in	Two-Position (SPST)	24 Vac/Vdc	—	2	45
NFBUP	SR	90 lb-in	On/Off	24-240Vac	—	—	<75	MS41101002	88 lb-in	Two-Position (SPST)	100-250 Vac	—	—	45
NFBUP-S	SR	90 lb-in	On/Off	24-240Vac	—	2	<75	MS4110A1200	88 lb-in	Two-Position (SPST)	100-250 Vac	—	2	45
NFB24-SR	SR	90 lb-in	2-10 Vdc (4-20 mA)	24 Vac/Vdc	2-10 Vdc	—	95	MS7510A2008	88 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
NFB24-SR-S	SR	90 lb-in	2-10 Vdc (4-20 mA)	24 Vac/Vdc	2-10 Vdc	2	95	MS7510A2206	88 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	2	90
NFB24-MFT	SR	90 lb-in	MFT	24 Vac/Vdc	Variable (0-10 Vdc)	—	150	MS7510A2008	88 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
NFB24-MFT-S	SR	90 lb-in	0-135 kOhm	24 Vac/Vdc	Variable (0-10 Vdc)	2	150	MS7510A2206	88 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	2	90
NFX24	SR	90 lb-in	On/Off	24 Vac/Vdc	—	—	<75	MS8110W1008	88 lb-in	Two-Position (SPST)	24 Vac/Vdc	—	—	45
NFX24-S	SR	90 lb-in	On/Off	24 Vac/Vdc	—	2	<75	MS8110W1206	88 lb-in	Two-Position (SPST)	24 Vac/Vdc	—	2	45
NFX24-SR	SR	90 lb-in	2-10 Vdc (4-20 mA)	24 Vac/Vdc	2-10 Vdc	—	95	MS7510W2008	88 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
NFX24-SR-S	SR	90 lb-in	2-10 Vdc (4-20 mA)	24 Vac/Vdc	2-10 Vdc	2	95	MS7510W2206	88 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	2	90
NFX24-MFT	SR	90 lb-in	MFT	24 Vac/Vdc	Variable (0-10 Vdc)	—	150	MS7510W2008	88 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
NFX24-MFT-S	SR	90 lb-in	MFT	24 Vac/Vdc	Variable (0-10 Vdc)	2	150	MS7510W2206	88 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	2	90
AF24 US	SR	133 lb-in	On/Off	24 Vac/Vdc	—	—	150	MS8120A1007	175 lb-in	Two-Position (SPST)	24 Vac/Vdc	—	—	45
AF24-S US	SR	133 lb-in	On/Off	24 Vac/Vdc	—	2	150	MS8120A1205	175 lb-in	Two-Position (SPST)	24 Vac/Vdc	—	2	45
AF120 US	SR	133 lb-in	On/Off	120 Vac	—	—	150	MS4120A1001	175 lb-in	Two-Position (SPST)	100-250 Vac	—	—	45
AF120-S US	SR	133 lb-in	On/Off	120 Vac	—	2	150	MS4120A1209	175 lb-in	Two-Position (SPST)	100-250 Vac	—	2	45
AF230 US	SR	133 lb-in	On/Off	230 Vac	—	—	150	MS4120A1001	175 lb-in	Two-Position (SPST)	100-250 Vac	—	—	45
AF230-S US	SR	133 lb-in	On/Off	230 Vac	—	2	150	MS4120A1209	175 lb-in	Two-Position (SPST)	100-250 Vac	—	2	45
AF24-SR US	SR	133 lb-in	2-10 Vdc (4-20 mA)	24 Vac/Vdc	2-10 Vdc	—	150	MS7520A2007	175 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
AF24-MFT US	SR	133 lb-in	MFT	24 Vac/Vdc	2-10 Vdc	—	150	MS7520A2007	175 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
AF24-MFT-S US	SR	133 lb-in	MFT	24 Vac/Vdc	2-10 Vdc	2	150	MS7520A2205	175 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	2	90
AF24-MFT-S US	SR	133 lb-in	MFT	24 Vac/Vdc	2-10 Vdc	2	150	MS7520H2208	175 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	2	90
AF24-MFT95 US	SR	133 lb-in	0-135 kOhm	24 Vac/Vdc	—	—	150	MS7520A2007 + Q7002B1009	175 lb-in	0-135 kOhm	24 Vac/Vdc	(0) 2-10 Vdc	—	90
AFB24	SR	180 lb-in	On/Off	24 Vac/Vdc	—	—	<75	MS8120A1007	175 lb-in	Two-Position (SPST)	24 Vac/Vdc	—	—	45
AFB24-S	SR	180 lb-in	On/Off	24 Vac/Vdc	—	2	<75	MS8120A1205	175 lb-in	Two-Position (SPST)	24 Vac/Vdc	—	2	45
AFBUP	SR	180 lb-in	On/Off	24-240Vac	—	—	<75	MS4120A1001	175 lb-in	Two-Position (SPST)	100-250 Vac	—	—	45
AFBUP-S	SR	180 lb-in	On/Off	24-240Vac	—	2	<75	MS4120A1209	175 lb-in	Two-Position (SPST)	100-250 Vac	—	2	45
AFB24-SR	SR	180 lb-in	2-10 Vdc (4-20 mA)	24 Vac/Vdc	2-10 Vdc	—	95	MS7520A2007	175 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
AFB24-SR-S	SR	180 lb-in	2-10 Vdc (4-20 mA)	24 Vac/Vdc	2-10 Vdc	2	95	MS7520A2205	175 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	2	90
AFB24-MFT	SR	180 lb-in	MFT	24 Vac/Vdc	Variable (0-10 Vdc)	—	150	MS7520A2007	175 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
AFB24-MFT-S	SR	180 lb-in	MFT	24 Vac/Vdc	Variable (0-10 Vdc)	2	150	MS7520A2205	175 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	2	90
AFB24-MFT95	SR	180 lb-in	0-135 kOhm	24 Vac/Vdc	Variable (0-10 Vdc)	—	150	MS7520A2007 + Q7002B1009	175 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
AFX24	SR	180 lb-in	On/Off	24 Vac/Vdc	—	—	<75	MS8120W1007	175 lb-in	Two-Position (SPST)	24 Vac/Vdc	—	—	45
AFX24-S	SR	180 lb-in	On/Off	24 Vac/Vdc	—	2	<75	MS8120W1205	175 lb-in	Two-Position (SPST)	24 Vac/Vdc	—	2	45
AFX24-SR	SR	180 lb-in	2-10 Vdc (4-20 mA)	24 Vac/Vdc	2-10 Vdc	—	95	MS7520W2007	175 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
AFX24-SR-S	SR	180 lb-in	2-10 Vdc (4-20 mA)	24 Vac/Vdc	2-10 Vdc	2	95	MS7520W2205	175 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	2	90
AFX24MFT	SR	180 lb-in	MFT	24 Vac/Vdc	Variable (0-10 Vdc)	—	150	MS7520W2007	175 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
AFX24-MFT-S	SR	180 lb-in	MFT	24 Vac/Vdc	Variable (0-10 Vdc)	2	150	MS7520W2205	175 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	2	90
AFX24-MFT95	SR	180 lb-in	0-135 kOhm	24 Vac/Vdc	Variable (0-10 Vdc)	—	150	MS7520W2007 + Q7002B1009	175 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90

Belimo Notes: All models described as (0) 2-10 Vdc can be used with a 4-20 mA control input. Shunt a 500 kOhm, 1/2 W resistor across the input at the actuator.

Cross Reference - Actuators

Direct Coupled Actuators

Johnson Model	Fail Safe	Torque (lb-in)	Control Signal	Power	Feedback	Switches	Timing (sec)	Honeywell Model	Torque (lb-in)	Control Signal	Power	Feedback	Switches	Timing (sec)
M9102-AGA-2S	NSR	18 lb-in	Floating	18 to 30 Vac at 50/60 Hz	—	—	30	ML6161A2009	35 lb-in	On/Off, Floating	24 Vac/Vdc	—	—	90
M9102-AGA-3S	NSR	18 lb-in	Floating	18 to 30 Vac at 50/60 Hz	—	—	30	ML6161A2009	35 lb-in	On/Off, Floating	24 Vac/Vdc	—	—	90
M9102-IGA-2S	NSR	18 lb-in	On/Off, Floating	18 to 30 Vac at 50/60 Hz	—	—	30	ML6161A2009	35 lb-in	On/Off, Floating	24 Vac/Vdc	—	—	90
M9102-IGA-3S	NSR	18 lb-in	On/Off, Floating	18 to 30 Vac at 50/60 Hz	—	—	30	ML6161A2009	35 lb-in	On/Off, Floating	24 Vac/Vdc	—	—	90
M9104-AGA-2S	NSR	35 lb-in	Floating	18 to 30 Vac at 50/60 Hz	—	—	60	ML6161A2009	35 lb-in	On/Off, Floating	24 Vac/Vdc	—	—	90
M9104-AGA-3S	NSR	35 lb-in	Floating	18 to 30 Vac at 50/60 Hz	—	—	60	ML6161A2009	35 lb-in	On/Off, Floating	24 Vac/Vdc	—	—	90
M9104-IGA-2S	NSR	35 lb-in	On/Off, Floating	18 to 30 Vac at 50/60 Hz	—	—	60	ML6161A2009	35 lb-in	On/Off, Floating	24 Vac/Vdc	—	—	90
M9104-IGA-3S	NSR	35 lb-in	On/Off, Floating	18 to 30 Vac at 50/60 Hz	—	—	60	ML6161A2009	35 lb-in	On/Off, Floating	24 Vac/Vdc	—	—	90
M9104-GGA-2S	NSR	35 lb-in	(0) 2-10 Vdc, (0) 4-20 mA, Reversible	18 to 30 Vac at 50/60 Hz	(0) 2-10 Vdc	—	60	ML7161A2008 + 200976C	35 lb-in	(0) 2-10 Vdc, (0) 4-20 mA	24 Vac/Vdc	0-2 kOhm	—	90
M9104-GGA-3S	NSR	35 lb-in	(0) 2-10 Vdc, (0) 4-20 mA, Reversible	18 to 30 Vac at 50/60 Hz	(0) 2-10 Vdc	—	60	ML7161A2008 + 200976C	35 lb-in	(0) 2-10 Vdc, (0) 4-20 mA	24 Vac/Vdc	0-2 kOhm	—	90
M9104-AGA-2N	NSR	35 lb-in	Floating	20 to 30 Vac at 50/60 Hz	—	—	90/108 (at 60/50 Hz)	MN6105A1011	44 lb-in	On/Off, Floating	24 Vac/Vdc	—	—	90
M9104-AGS-2N	NSR	35 lb-in	Floating	20 to 30 Vac at 50/60 Hz	—	—	90/108 (at 60/50 Hz)	MN6105A1011	44 lb-in	On/Off, Floating	24 Vac/Vdc	—	—	90
M9106-IGA-2	NSR	53 lb-in & 35 lb-in	On/Off, Floating	20 to 30 Vac at 50/60 Hz	—	—	Selectable: 60, 90, 120, 330, or 660 (at 60 Hz). 72, 108, 144, 396, or 792 (at 50 Hz).	MN6105A1011	44 lb-in	On/Off, Floating	24 Vac/Vdc	—	—	90
M9106-IGC-2	NSR	53 lb-in & 35 lb-in	On/Off, Floating	20 to 30 Vac at 50/60 Hz	—	2	Selectable: 60, 90, 120, 330, or 660 (at 60 Hz). 72, 108, 144, 396, or 792 (at 50 Hz).	MN6105A1201	44 lb-in	On/Off, Floating	24 Vac/Vdc	—	2	90
M9106-AGA-2	NSR	53 lb-in	Floating	20 to 30 Vac at 50/60 Hz	—	—	60/72 (at 60/50 Hz)	MN6110A1003	88 lb-in	On/Off, Floating	24 Vac/Vdc	—	—	90
M9106-AGA2N01	NSR	53 lb-in	Floating	20 to 30 Vac at 50/60 Hz	—	—	60/72 (at 60/50 Hz)	MN6110A1003	88 lb-in	On/Off, Floating	24 Vac/Vdc	—	—	90
M9106-AGA2N02	NSR	53 lb-in	Floating	20 to 30 Vac at 50/60 Hz	—	—	120/144 (at 60/50 Hz)	MN6110A1003	88 lb-in	On/Off, Floating	24 Vac/Vdc	—	—	90
M9106-AGC-2	NSR	53 lb-in	Floating	20 to 30 Vac at 50/60 Hz	—	2	60/72 (at 60/50 Hz)	MN6110A1201	88 lb-in	On/Off, Floating	24 Vac/Vdc	—	2	90
M9106-AGF-2	NSR	53 lb-in	Floating	20 to 30 Vac at 50/60 Hz	0-10 kOhm	—	60/72 (at 60/50 Hz)	ML6174B2019 + 200976C	70 lb-in	On/Off, Floating	24 Vac	0-2 kOhm	—	90
M9106-GGA-2	NSR	53 lb-in	(0) 2-10 Vdc, (0) 4 to 20 mA	20 to 30 Vac at 50/60 Hz	(0) 2-10 Vdc for 90 (1 mA at 10 Vdc). Corresponds to span selection.	—	60/72 (at 60/50 Hz)	MN7510A2001	88 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
M9106-GGC-2	NSR	53 lb-in	(0) 2-10 Vdc, (0) 4 to 20 mA	20 to 30 Vac at 50/60 Hz	(0) 2-10 Vdc for 90 (1 mA at 10 Vdc). Corresponds to span selection.	2	60/72 (at 60/50 Hz)	MN7510A2209	88 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	2	90
M9108-AGA-2	NSR	70 lb-in	On/Off, Floating	20 to 30 Vac at 50/60 Hz	—	—	25-50 for 0-70 lb-in, 30 at 50% load.	MN6110A1003	88 lb-in	On/Off, Floating	24 Vac/Vdc	—	—	90
M9108-AGC-2	NSR	70 lb-in	On/Off, Floating	20 to 30 Vac at 50/60 Hz	—	2	25-50 for 0-70 lb-in, 30 at 50% load.	MN6110A1201	88 lb-in	On/Off, Floating	24 Vac/Vdc	—	2	90

Cross Reference - Actuators

Direct Coupled Actuators

Johnson Model	Fail Safe	Torque (lb-in)	Control Signal	Power	Feedback	Switches	Timing (sec)	Honeywell Model	Torque (lb-in)	Control Signal	Power	Feedback	Switches	Timing (sec)
M9108-AGD-2	NSR	70 lb-in	On/Off, Floating	20 to 30 Vac at 50/60 Hz	0-135 kOhm	—	25-50 for 0-70 lb-in, 30 at 50% load.	ML6174B2019 + 200976A	70 lb-in	On/Off, Floating	24 Vac	0-500 kOhm	—	90
M9108-AGE-2	NSR	70 lb-in	On/Off, Floating	20 to 30 Vac at 50/60 Hz	0-1 kOhm	—	25-50 for 0-70 lb-in, 30 at 50% load.	ML6174B2019 + 200976C	70 lb-in	On/Off, Floating	24 Vac	0-2 kOhm	—	90
M9108-GGA-2	NSR	70 lb-in	0-20 Vdc (selectable zero and span), (0) 4 to 20 mA, Reversible.	20 to 30 Vac at 50/60 Hz	(0) 2-10 Vdc for 90 (1 mA at 10 Vdc). Corresponds to span selection.	—	25-50 for 0-70 lb-in, 30 at 50% load.	MN7510A2001	88 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
M9108-GGC-2	NSR	70 lb-in	0-20 Vdc (selectable zero and span), (0) 4 to 20 mA, Reversible.	20 to 30 Vac at 50/60 Hz	(0) 2-10 Vdc for 90 (1 mA at 10 Vdc). Corresponds to span selection.	2	25-50 for 0-70 lb-in, 30 at 50% load.	MN7510A2209	88 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	2	90
M9108-HGA-2	NSR	70 lb-in	0-20 Vdc (adjustable zero and span), (0) 4 to 20 mA, Reversible.	20 to 30 Vac at 50/60 Hz	(0) 2-10 Vdc for 90 (1 mA at 10 Vdc). Corresponds to span selection.	—	25-50 for 0-70 lb-in, 30 at 50% load.	MN7510A2001	88 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
M9108-HGC-2	NSR	70 lb-in	0-20 Vdc (adjustable zero and span), (0) 4 to 20 mA, Reversible.	20 to 30 Vac at 50/60 Hz	(0) 2-10 Vdc for 90 (1 mA at 10 Vdc). Corresponds to span selection.	2	25-50 for 0-70 lb-in, 30 at 50% load.	MN7510A2209	88 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	2	90
M9109-AGA-2	NSR	80 lb-in	Floating	20 to 30 Vac at 50/60 Hz	—	—	60/72 (at 60/50 Hz)	MN6110A1003	88 lb-in	On/Off, Floating	24 Vac/Vdc	—	—	90
M9109-AGC-2	NSR	80 lb-in	Floating	20 to 30 Vac at 50/60 Hz	—	2	60/72 (at 60/50 Hz)	MN6110A1201	88 lb-in	On/Off, Floating	24 Vac/Vdc	—	2	90
M9109-GGA-2	NSR	80 lb-in	(0) 2-10 Vdc, (0) 4-20 mA, Reversible	20 to 30 Vac at 50/60 Hz	(0) 2-10 Vdc for 90 (1 mA at 10 Vdc). Corresponds to span selection.	—	60/72 (at 60/50 Hz)	MN7510A2001	88 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
M9109-GGC-2	NSR	80 lb-in	(0) 2-10 Vdc, (0) 4-20 mA, Reversible	20 to 30 Vac at 50/60 Hz	(0) 2-10 Vdc for 90 (1 mA at 10 Vdc). Corresponds to span selection.	2	60/72 (at 60/50 Hz)	MN7510A2209	88 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	2	90
M9116-AGA-2	NSR	140 lb-in	On/Off, Floating	20 to 30 Vac at 50/60 Hz	—	—	70-115 for 0-140 lb-in, 80 at 50% load.	MN6120A1002	175 lb-in	On/Off, Floating	24 Vac/Vdc	—	—	90
M9116-AGC-2	NSR	140 lb-in	On/Off, Floating	20 to 30 Vac at 50/60 Hz	—	2	70-115 for 0-140 lb-in, 80 at 50% load.	MN6120A1200	175 lb-in	On/Off, Floating	24 Vac/Vdc	—	2	90
M9116-AGD-2	NSR	140 lb-in	On/Off, Floating	20 to 30 Vac at 50/60 Hz	0-135 kOhm	—	70-115 for 0-140 lb-in, 80 at 50% load.	MN6120A1002	175 lb-in	On/Off, Floating	24 Vac/Vdc	—	—	90
M9116-AGE-2	NSR	140 lb-in	On/Off, Floating	20 to 30 Vac at 50/60 Hz	0-1 kOhm	—	70-115 for 0-140 lb-in, 80 at 50% load.	MN6120A1002	175 lb-in	On/Off, Floating	24 Vac/Vdc	—	—	90
M9116-GGA-2	NSR	140 lb-in	(0) 2-10 Vdc, (0) 4-20 mA, Reversible	20 to 30 Vac at 50/60 Hz	(0) 2-10 Vdc for 90 (1 mA at 10 Vdc). Corresponds to span selection.	—	70-115 for 0-140 lb-in, 80 at 50% load.	MN7220A2007	175 lb-in	(0) 2-10 Vdc, (0) 4-20 mA	24 Vac/Vdc	(0) 2-10 Vdc	—	90
M9116-GGC-2	NSR	140 lb-in	(0) 2-10 Vdc, (0) 4-20 mA, Reversible	20 to 30 Vac at 50/60 Hz	(0) 2-10 Vdc for 90 (1 mA at 10 Vdc). Corresponds to span selection.	2	70-115 for 0-140 lb-in, 80 at 50% load.	MN7220A2205	175 lb-in	(0) 2-10 Vdc, (0) 4-20 mA	24 Vac/Vdc	(0) 2-10 Vdc	2	90
M9116-HGA-2	NSR	140 lb-in & 280 lb-in	(0) 2-10 Vdc, (0) 4-20 mA, Reversible	20 to 30 Vac at 50/60 Hz	(0) 2-10 Vdc for 90 (1 mA at 10 Vdc). Corresponds to span selection.	—	70-115 for 0-140 lb-in, 80 at 50% load.	MN7220A2007	175 lb-in	(0) 2-10 Vdc, (0) 4-20 mA	24 Vac/Vdc	(0) 2-10 Vdc	—	90

Cross Reference - Actuators

Direct Coupled Actuators

Johnson Model	Fail Safe	Torque (lb-in)	Control Signal	Power	Feedback	Switches	Timing (sec)	Honeywell Model	Torque (lb-in)	Control Signal	Power	Feedback	Switches	Timing (sec)
M9116-HGC-2	NSR	140 lb-in & 280 lb-in	(0) 2-10 Vdc, (0) 4-20 mA, Reversible	20 to 30 Vac at 50/60 Hz	(0) 2-10 Vdc for 90 (1 mA at 10 Vdc). Corresponds to span selection.	2	70-115 for 0-140 lb-in, 80 at 50% load.	MN7220A2205	175 lb-in	(0) 2-10 Vdc, (0) 4-20 mA	24 Vac/Vdc	(0) 2-10 Vdc	2	90
M9124-AGA-2	NSR	210 lb-in & 420 lb-in	On/Off, Floating	20 to 30 Vac at 50/60 Hz	—	—	115-175 for 0-210 lb-in, 130 at 50% load.	MN6134A1003	300 lb-in	On/Off, Floating	24 Vac/Vdc	—	—	90
M9124-AGC-2	NSR	210 lb-in	On/Off, Floating	20 to 30 Vac at 50/60 Hz	—	2	115-175 for 0-210 lb-in, 130 at 50% load.	MN6134A1003 + SW2-US	300 lb-in	On/Off, Floating	24 Vac/Vdc	—	2	90
M9124-AGD-2	NSR	210 lb-in	On/Off, Floating	20 to 30 Vac at 50/60 Hz	0-1 35 kOhm	—	115-175 for 0-210 lb-in, 130 at 50% load.	MN6134A1003	300 lb-in	On/Off, Floating	24 Vac/Vdc	—	—	90
M9124-AGE-2	NSR	210 lb-in	On/Off, Floating	20 to 30 Vac at 50/60 Hz	0-1 kOhm	—	115-175 for 0-210 lb-in, 130 at 50% load.	MN6134A1003	300 lb-in	On/Off, Floating	24 Vac/Vdc	—	—	90
M9124-GGA-2	NSR	210 lb-in & 420 lb-in	(0) 2-10 Vdc, (0) 4-20 mA, Reversible	20 to 30 Vac at 50/60 Hz	(0) 2-10 Vdc for 90 (1 mA at 10 Vdc). Corresponds to span selection.	—	115-175 for 0-210 lb-in, 130 at 50% load.	MN7234A2008	300 lb-in	(0) 2-10 Vdc, (0) 4-20 mA	24 Vac/Vdc	(0) 2-10 Vdc	—	90
M9124-GGC-2	NSR	210 lb-in & 420 lb-in	(0) 2-10 Vdc, (0) 4-20 mA, Reversible	20 to 30 Vac at 50/60 Hz	(0) 2-10 Vdc for 90 (1 mA at 10 Vdc). Corresponds to span selection.	2	115-175 for 0-210 lb-in, 130 at 50% load.	MN7234A2008 + SW2-US	300 lb-in	(0) 2-10 Vdc, (0) 4-20 mA	24 Vac/Vdc	(0) 2-10 Vdc	2	90
M9124-HGA-2	NSR	210 lb-in & 420 lb-in	(0) 2-10 Vdc, (0) 4-20 mA, Reversible	20 to 30 Vac at 50/60 Hz	(0) 2-10 Vdc for 90 (1 mA at 10 Vdc). Corresponds to span selection.	—	115-175 for 0-210 lb-in, 130 at 50% load.	MN7234A2008	300 lb-in	(0) 2-10 Vdc, (0) 4-20 mA	24 Vac/Vdc	(0) 2-10 Vdc	—	90
M9124-HGC-2	NSR	210 lb-in & 420 lb-in	(0) 2-10 Vdc, (0) 4-20 mA, Reversible	20 to 30 Vac at 50/60 Hz	(0) 2-10 Vdc for 90 (1 mA at 10 Vdc). Corresponds to span selection.	2	115-175 for 0-210 lb-in, 130 at 50% load.	MN7234A2008 + SW2-US	300 lb-in	(0) 2-10 Vdc, (0) 4-20 mA	24 Vac/Vdc	(0) 2-10 Vdc	2	90
M9132-AGA-2	NSR	280 lb-in	On/Off, Floating	20 to 30 Vac at 50/60 Hz	—	—	115-205 for 0-280 lb-in, 140 at 50% load.	MN6134A1003	300 lb-in	On/Off, Floating	24 Vac/Vdc	—	—	90
M9132-AGC-2	NSR	280 lb-in	On/Off, Floating	20 to 30 Vac at 50/60 Hz	—	2	115-205 for 0-280 lb-in, 140 at 50% load.	MN6134A1003 + SW2-US	300 lb-in	On/Off, Floating	24 Vac/Vdc	—	2	90
M9132-AGE-2	NSR	280 lb-in	On/Off, Floating	20 to 30 Vac at 50/60 Hz	0-1 kOhm	—	115-205 for 0-280 lb-in, 140 at 50% load.	MN6134A1003	300 lb-in	On/Off, Floating	24 Vac/Vdc	—	—	90
M9132-GGA-2	NSR	280 lb-in & 560 lb-in	(0) 2-10 Vdc, (0) 4 to 20 mA, Reversible	20 to 30 Vac at 50/60 Hz	(0) 2-10 Vdc for 90 (1 mA at 10 Vdc). Corresponds to span and stroke limits	—	115-205 for 0-280 lb-in, 140 at 50% load.	MN7234A2008	300 lb-in	(0) 2-10 Vdc, (0) 4-20 mA	24 Vac/Vdc	(0) 2-10 Vdc	—	90
M9132-GGC-2	NSR	280 lb-in & 560 lb-in	(0) 2-10 Vdc, (0) 4 to 20 mA, Reversible	20 to 30 Vac at 50/60 Hz	(0) 2-10 Vdc for 90 (1 mA at 10 Vdc). Corresponds to span and stroke limits	2	115-205 for 0-280 lb-in, 140 at 50% load.	MN7234A2008 + SW2-US	300 lb-in	(0) 2-10 Vdc, (0) 4-20 mA	24 Vac/Vdc	(0) 2-10 Vdc	2	90
M9203-AGA-2	SR	27 lb-in	On/Off, Floating	20 to 30 Vac at 50/60 Hz	—	—	150	MS7503A2021	27 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
M9203-AGB-2	SR	27 lb-in	On/Off, Floating	20 to 30 Vac at 50/60 Hz	—	1	150	MS7503A2221	27 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	2	90
M9203-AGA-2Z	SR	27 lb-in	On/Off, Floating	20 to 30 Vac at 50/60 Hz	—	—	90	MS7503A2021	27 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
M9203-AGB-2Z	SR	27 lb-in	On/Off, Floating	20 to 30 Vac at 50/60 Hz	—	1	90	MS7503A2221	27 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	2	90
M9203-BGA-2	SR	27 lb-in	On/Off	20 to 30 Vac at 50/60 Hz	—	—	< 75	MS8103A1030	27 lb-in	Two-Position (SPST)	24 Vac/Vdc	—	—	45

Cross Reference - Actuators

Direct Coupled Actuators

Johnson Model	Fail Safe	Torque (lb-in)	Control Signal	Power	Feedback	Switches	Timing (sec)	Honeywell Model	Torque (lb-in)	Control Signal	Power	Feedback	Switches	Timing (sec)
M9203-BGB-2	SR	27 lb-in	On/Off	20 to 30 Vac at 50/60 Hz	—	1	< 75	MS8103A1130	27 lb-in	Two-Position (SPST)	24 Vac/Vdc	—	1	45
M9203-BUA-2	SR	27 lb-in	On/Off	85 to 264 Vac at 50/60Hz	—	—	< 75	MS4103A1030	27 lb-in	Two-Position (SPST)	100-250 Vac	—	—	45
M9203-BUB-2	SR	27 lb-in	On/Off	85 to 264 Vac at 50/60Hz	—	1	< 75	MS4103A1130	27 lb-in	Two-Position (SPST)	100-250 Vac	—	1	45
M9203-GGA-2	SR	27 lb-in	(0) 2-10 Vdc, (0) 4-20 mA, Reversible	20 to 30 Vac at 50/60 Hz	(0) 2-10 Vdc	—	150	MS7503A2021	27 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
M9203-GGB-2	SR	27 lb-in	(0) 2-10 Vdc, (0) 4-20 mA, Reversible	20 to 30 Vac at 50/60 Hz	(0) 2-10 Vdc	1	150	MS7503A2221	27 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	2	90
M9203-GGA-2Z	SR	27 lb-in	(0) 2-10 Vdc, (0) 4-20 mA, Reversible	20 to 30 Vac at 50/60 Hz	(0) 2-10 Vdc	—	90	MS7503A2021	27 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
M9203-GGB-2Z	SR	27 lb-in	(0) 2-10 Vdc, (0) 4-20 mA, Reversible	20 to 30 Vac at 50/60 Hz	(0) 2-10 Vdc	1	90	MS7503A2221	27 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	2	90
M9208-AGA-2	SR	70 lb-in	On/Off, Floating	20 to 30 Vac at 50/60 Hz	—	—	150	MS7510A2008	88 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
M9208-AGA-3	SR	70 lb-in	On/Off, Floating	20 to 30 Vac at 50/60 Hz	—	—	150	MS7510A2008	88 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
M9208-AGC-3	SR	70 lb-in	On/Off, Floating	20 to 30 Vac at 50/60 Hz	—	2	150	MS7510A2206	88 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	2	90
M9208-BGA-3	SR	70 lb-in	On/Off	18 to 30 Vac at 50/60 Hz	—	—	< 75	MS8110A1008	88 lb-in	Two-Position (SPST)	24 Vac/Vdc	—	—	45
M9208-BGC-3	SR	70 lb-in	On/Off	18 to 30 Vac at 50/60 Hz	—	2	< 75	MS8110A1206	88 lb-in	Two-Position (SPST)	24 Vac/Vdc	—	2	45
M9208-BAA-3	SR	70 lb-in	On/Off	102 to 132 Vac at 50/60 Hz	—	—	< 75	MS4110A1002	88 lb-in	Two-Position (SPST)	100-250 Vac	—	—	45
M9208-BAC-3	SR	70 lb-in	On/Off	102 to 132 Vac at 50/60 Hz	—	2	< 75	MS4110A1200	88 lb-in	Two-Position (SPST)	100-250 Vac	—	2	45
M9208-BDA-3	SR	70 lb-in	On/Off	198 to 264 Vac at 50/60 Hz	—	—	< 75	MS4110A1002	88 lb-in	Two-Position (SPST)	100-250 Vac	—	—	45
M9208-BDC-3	SR	70 lb-in	On/Off	198 to 264 Vac at 50/60 Hz	—	2	< 75	MS4110A1200	88 lb-in	Two-Position (SPST)	100-250 Vac	—	2	45
M9208-GGA-2	SR	70 lb-in	(0) 2-10 Vdc, (0) 4-20 mA, Reversible	20 to 30 Vac at 50/60 Hz	(0) 2-10 Vdc	—	150	MS7510A2008	88 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
M9208-GGA-3	SR	70 lb-in	(0) 2-10 Vdc, (0) 4-20 mA, Reversible	20 to 30 Vac at 50/60 Hz	(0) 2-10 Vdc	—	150	MS7510A2008	88 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
M9208-GGC-3	SR	70 lb-in	(0) 2-10 Vdc, (0) 4-20 mA, Reversible	20 to 30 Vac at 50/60 Hz	(0) 2-10 Vdc	2	150	MS7510A2206	88 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	2	90
M9210-AGA-3	SR	89 lb-in	On/Off, Floating	20 to 30 Vac at 50/60 Hz	—	—	150	MS7510A2008	88 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
M9210-AGC-3	SR	89 lb-in	On/Off, Floating	20 to 30 Vac at 50/60 Hz	—	2	150	MS7510A2206	88 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	2	90
M9210-BGA-3	SR	89 lb-in	On/Off	20 to 30 Vac at 50/60 Hz	—	—	24 to 57	MS8110A1008	88 lb-in	Two-Position (SPST)	24 Vac/Vdc	—	—	45
M9210-BGC-3	SR	89 lb-in	On/Off	20 to 30 Vac at 50/60 Hz	—	2	24 to 57	MS8110A1206	88 lb-in	Two-Position (SPST)	24 Vac/Vdc	—	2	45
M9210-BAA-3	SR	89 lb-in	On/Off	102 to 132 Vac at 50/60 Hz	—	—	24 to 57	MS4110A1002	88 lb-in	Two-Position (SPST)	100-250 Vac	—	—	45
M9210-BAC-3	SR	89 lb-in	On/Off	102 to 132 Vac at 50/60 Hz	—	2	24 to 57	MS4110A1200	88 lb-in	Two-Position (SPST)	100-250 Vac	—	2	45
M9210-BDA-3	SR	89 lb-in	On/Off	198 to 264 Vac at 50/60 Hz	—	—	24 to 57	MS4110A1002	88 lb-in	Two-Position (SPST)	100-250 Vac	—	—	45

Cross Reference - Actuators

Direct Coupled Actuators

Johnson Model	Fail Safe	Torque (lb-in)	Control Signal	Power	Feedback	Switches	Timing (sec)	Honeywell Model	Torque (lb-in)	Control Signal	Power	Feedback	Switches	Timing (sec)
M9210-BDC-3	SR	89 lb-in	On/Off	198 to 264 Vac at 50/60 Hz	—	2	24 to 57	MS4110A1200	88 lb-in	Two-Position (SPST)	100-250 Vac	—	2	45
M9210-GGA-3	SR	89 lb-in	(0) 2-10 Vdc, (0) 4-20 mA, Reversible	20 to 30 Vac at 50/60 Hz	(0) 2-10 Vdc	—	150	MS7510A2008	88 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
M9210-GGC-3	SR	89 lb-in	(0) 2-10 Vdc, (0) 4-20 mA, Reversible	20 to 30 Vac at 50/60 Hz	(0) 2-10 Vdc	2	150	MS7510A2206	88 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	2	90
M9210-HGA-3	SR	89 lb-in	(0) 2-10 Vdc, (0) 4-20 mA, Reversible	20 to 30 Vac at 50/60 Hz	(0) 2-10 Vdc	—	150	MS7510A2008	88 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
M9210-HGC-3	SR	89 lb-in	(0) 2-10 Vdc, (0) 4-20 mA, Reversible	20 to 30 Vac at 50/60 Hz	(0) 2-10 Vdc	2	150	MS7510A2206	88 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	2	90
M9220-AGA-3	SR	177 lb-in	On/Off, Floating	20 to 30 Vac at 50/60 Hz	—	—	150	MS7520A2007	175 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
M9220-AGC-3	SR	177 lb-in	On/Off, Floating	20 to 30 Vac at 50/60 Hz	—	2	150	MS7520A2205	175 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	2	90
M9220-BGA-3	SR	177 lb-in	On/Off	20 to 30 Vac at 50/60 Hz	—	—	24 to 57	MS8120A1007	175 lb-in	Two-Position (SPST)	24 Vac/Vdc	—	—	45
M9220-BGC-3	SR	177 lb-in	On/Off	20 to 30 Vac at 50/60 Hz	—	2	24 to 57	MS8120A1205	175 lb-in	Two-Position (SPST)	24 Vac/Vdc	—	2	45
M9220-BAA-3	SR	177 lb-in	On/Off	102 to 132 Vac at 50/60 Hz	—	—	24 to 57	MS4120A1001	175 lb-in	Two-Position (SPST)	100-250 Vac	—	—	45
M9220-BAC-3	SR	177 lb-in	On/Off	102 to 132 Vac at 50/60 Hz	—	2	24 to 57	MS4120A1209	175 lb-in	Two-Position (SPST)	100-250 Vac	—	2	45
M9220-BDA-3	SR	177 lb-in	On/Off	198 to 264 Vac at 50/60 Hz	—	—	24 to 57	MS4120A1001	175 lb-in	Two-Position (SPST)	100-250 Vac	—	—	45
M9220-BDC-3	SR	177 lb-in	On/Off	198 to 264 Vac at 50/60 Hz	—	2	24 to 57	MS4120A1209	175 lb-in	Two-Position (SPST)	100-250 Vac	—	2	45
M9220-GGA-3	SR	177 lb-in	(0) 2-10 Vdc, (0) 4-20 mA, Reversible	20 to 30 Vac at 50/60 Hz	(0) 2-10 Vdc	—	150	MS7520A2007	175 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
M9220-GGC-3	SR	177 lb-in	(0) 2-10 Vdc, (0) 4-20 mA, Reversible	20 to 30 Vac at 50/60 Hz	(0) 2-10 Vdc	2	150	MS7520A2205	175 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	2	90
M9220-HGA-3	SR	177 lb-in	(0) 2-10 Vdc, (0) 4-20 mA, Reversible	20 to 30 Vac at 50/60 Hz	(0) 2-10 Vdc	—	150	MS7520A2007	175 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
M9220-HGC-3	SR	177 lb-in	(0) 2-10 Vdc, (0) 4-20 mA, Reversible	20 to 30 Vac at 50/60 Hz	(0) 2-10 Vdc	2	150	MS7520A2205	175 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	2	90

Johnson Notes: All models described as (0) 2-10 Vdc can be used with a 4-20 mA control input. Shunt a 500 kOhm, 1/2 W resistor across the input at the actuator.

Cross Reference - Actuators

Direct Coupled Actuators

Invensys Model	Fail Safe	Torque (lb-in)	Control Signal	Power	Feedback	Switches	Timing (sec)	Honeywell Model	Torque (lb-in)	Control Signal	Power	Feedback	Switches	Timing (sec)
MF41-6043	NSR	35 lb-in	Floating	24 Vac	—	—	< 90	MN6105A1011	44 lb-in	On/Off, Floating	24 Vac/Vdc	—	—	90
MF41-6043-502	NSR	35 lb-in	Floating	24 Vac	—	2	< 90	MN6105A1201	44 lb-in	On/Off, Floating	24 Vac/Vdc	—	2	90
MF41-6043-510	NSR	35 lb-in	Floating	24 Vac	0-1 kOhm	—	< 90	MN7505A2001	44 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
MF41-6083	NSR	70 lb-in	Floating	24 Vac	—	—	< 125	MN6110A1003	88 lb-in	On/Off, Floating	24 Vac/Vdc	—	—	90
MF41-6083-502	NSR	70 lb-in	Floating	24 Vac	—	2	< 125	MN6110A1201	88 lb-in	On/Off, Floating	24 Vac/Vdc	—	2	90
MF41-6083-510	NSR	70 lb-in	Floating	24 Vac	0-1 kOhm	—	< 125	MN7510A2001	88 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
MF41-6153	NSR	133 lb-in	Floating	24 Vac	—	—	< 125	MN6120A1002	175 lb-in	On/Off, Floating	24 Vac/Vdc	—	—	90
MF41-6343	NSR	300 lb-in	Floating	24 Vac	—	—	< 145	MN6134A1003	300 lb-in	On/Off, Floating	24 Vac/Vdc	—	—	90
MF4D-6043-100	NSR	35 lb-in	Floating	24 Vac, 20-30 Vdc	—	—	< 85	MS7505A2030	44 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
MF4D-6083-100	NSR	70 lb-in	Floating	24 Vac, 20-30 Vdc	—	—	< 85	MS7510A2008	88 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
MF4E-60430-100	NSR	35 lb-in	Floating	24 Vac	—	—	90	MN6105A1011	44 lb-in	On/Off, Floating	24 Vac/Vdc	—	—	90
MF4E-60830-100	NSR	70 lb-in	Floating	24 Vac	—	—	90	MN6110A1003	88 lb-in	On/Off, Floating	24 Vac/Vdc	—	—	90
MS41-6043	NSR	35 lb-in	0-10 Vdc	24 Vac	0-10 Vdc	—	< 90	MN7505A2001	44 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
MS41-6043-502	NSR	35 lb-in	0-10 Vdc	24 Vac	0-10 Vdc	2	< 90	MN7505A2209	44 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	2	90
MS41-6043-520	NSR	35 lb-in	0-10 Vdc (adjustable)	24 Vac	0-10 Vdc	—	< 90	MN7505A2001	44 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
MS41-6043-522	NSR	35 lb-in	0-10 Vdc (adjustable)	24 Vac	0-10 Vdc	2	< 90	MN7505A2209	44 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	2	90
MS41-6083	NSR	70 lb-in	0-10 Vdc	24 Vac	0-10 Vdc	—	< 125	MN7510A2001	88 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
MS41-6083-502	NSR	70 lb-in	0-10 Vdc	24 Vac	0-10 Vdc	2	< 125	MN7510A2209	88 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	2	90
MS41-6083-520	NSR	70 lb-in	0-10 Vdc (adjustable)	24 Vac	0-10 Vdc	—	< 125	MN7510A2001	88 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
MS41-6083-522	NSR	70 lb-in	0-10 Vdc (adjustable)	24 Vac	0-10 Vdc	2	< 125	MN7510A2209	88 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	2	90
MS41-6153	NSR	133 lb-in	0-10 Vdc	24 Vac	0-10 Vdc	—	< 125	MN7220A2007	175 lb-in	(0) 2-10 Vdc, (0) 4-20 mA	24 Vac/Vdc	(0) 2-10 Vdc	—	90
MS41-6153-502	NSR	133 lb-in	0-10 Vdc	24 Vac	0-10 Vdc	2	< 125	MN7220A2205	175 lb-in	(0) 2-10 Vdc, (0) 4-20 mA	24 Vac/Vdc	(0) 2-10 Vdc	2	90
MS41-6340	NSR	300 lb-in	2-10 Vdc, 4-20 mA	120 Vac	—	—	< 145	MN7234A2008	300 lb-in	(0) 2-10 Vdc, (0) 4-20 mA	24 Vac/Vdc	(0) 2-10 Vdc	—	90
MS41-6341	NSR	300 lb-in	2-10 Vdc, 4-20 mA	240 Vac	—	—	< 145	MN7234A2008	300 lb-in	(0) 2-10 Vdc, (0) 4-20 mA	24 Vac/Vdc	(0) 2-10 Vdc	—	90
MS41-6343	NSR	300 lb-in	2-10 Vdc, 4-20 mA	24 Vac	—	—	< 145	MN7234A2008	300 lb-in	(0) 2-10 Vdc, (0) 4-20 mA	24 Vac/Vdc	(0) 2-10 Vdc	—	90
MS4D-6043-100	NSR	35 lb-in	2-10 Vdc	24 Vac, 20-30 Vdc	2-10 Vdc	—	< 85	MN7505A2001	44 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
MS4D-6043-150	NSR	35 lb-in	0-10 Vdc	24 Vac, 20-30 Vdc	2-10 Vdc	—	< 85	MN7505A2001	44 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
MS4D-6043-160	NSR	35 lb-in	4-20 mA	24 Vac, 20-30 Vdc	2-10 Vdc	—	< 85	MN7505A2001	44 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
MS4D-6083-100	NSR	70 lb-in	2-10 Vdc	24 Vac, 20-30 Vdc	2-10 Vdc	—	< 85	MN7510A2001	88 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
MS4D-6083-150	NSR	70 lb-in	0-10 Vdc	24 Vac, 20-30 Vdc	2-10 Vdc	—	< 85	MN7510A2001	88 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
MS4D-6083-160	NSR	70 lb-in	4-20 mA	24 Vac, 20-30 Vdc	2-10 Vdc	—	< 85	MN7510A2001	88 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
MS50-H2001	NSR	300 lb-in	1-5 Vdc, 4-20 mA	120 Vac	—	—	145	MN7234A2008	300 lb-in	(0) 2-10 Vdc, (0) 4-20 mA	24 Vac/Vdc	(0) 2-10 Vdc	—	90
MS50-H2101	NSR	300 lb-in	1-5 Vdc, 4-20 mA	240 Vac	—	—	145	MN7234A2008	300 lb-in	(0) 2-10 Vdc, (0) 4-20 mA	24 Vac/Vdc	(0) 2-10 Vdc	—	90
MS50-H2301	NSR	300 lb-in	1-5 Vdc, 4-20 mA	24 Vac	—	—	145	MN7234A2008	300 lb-in	(0) 2-10 Vdc, (0) 4-20 mA	24 Vac/Vdc	(0) 2-10 Vdc	—	90
MA40-7043	SR	35 lb-in	On/Off	24 Vac, 22-30 Vdc	—	—	< 50	MS8105A1030	44 lb-in	Two-Position (SPST)	24 Vac/Vdc	—	—	45
MA40-7043-501	SR	35 lb-in	On/Off	24 Vac, 22-30 Vdc	—	1	< 50	MS8105A1130	44 lb-in	Two-Position (SPST)	24 Vac/Vdc	—	1	45
MA40-7170	SR	150 lb-in	On/Off	120 Vac	—	—	< 145	MS4120A1001	175 lb-in	Two-Position (SPST)	100-250 Vac	—	—	45
MA40-7171	SR	150 lb-in	On/Off	240 Vac	—	—	< 145	MS4120A1001	175 lb-in	Two-Position (SPST)	100-250 Vac	—	—	45
MA40-7173	SR	150 lb-in	On/Off	24 Vac, ±20%	—	—	< 145	MS8120A1007	175 lb-in	Two-Position (SPST)	24 Vac/Vdc	—	—	45
MA41-7073	SR	60 lb-in	On/Off	24 Vac, 22-30 Vdc	—	—	< 80	MS8110A1008	88 lb-in	Two-Position (SPST)	24 Vac/Vdc	—	—	45

Cross Reference - Actuators

Direct Coupled Actuators

Invensys Model	Fail Safe	Torque (lb-in)	Control Signal	Power	Feedback	Switches	Timing (sec)	Honeywell Model	Torque (lb-in)	Control Signal	Power	Feedback	Switches	Timing (sec)
MA41-7073-502	SR	60 lb-in	On/Off	24 Vac, 22-30 Vdc	—	2	< 80	MS8110A1206	88 lb-in	Two-Position (SPST)	24 Vac/Vdc	—	2	45
MA41-7153	SR	133 lb-in	On/Off	24 Vac, 22-30 Vdc	—	—	< 190	MS8120A1007	175 lb-in	Two-Position (SPST)	24 Vac/Vdc	—	—	45
MA41-7153-502	SR	133 lb-in	On/Off	24 Vac, 22-30 Vdc	—	2	< 190	MS8120A1205	175 lb-in	Two-Position (SPST)	24 Vac/Vdc	—	2	45
MA4D-7030-000	SR	30 lb-in	On/Off	120 Vac	—	—	< 56	MS4105A1030	44 lb-in	Two-Position (SPST)	100-250 Vac	—	—	45
MA4D-7031-000	SR	30 lb-in	On/Off	230 Vac	—	—	< 56	MS4105A1030	44 lb-in	Two-Position (SPST)	100-250 Vac	—	—	45
MA4D-7033-100	SR	30 lb-in	On/Off	24 Vac, 20-30 Vdc	—	—	< 56	MS8105A1008	44 lb-in	Two-Position (SPST)	24 Vac/Vdc	—	—	45
MA4D-8030-000	SR	30 lb-in	On/Off	120 Vac	—	—	< 56	MS4105A1030	44 lb-in	Two-Position (SPST)	100-250 Vac	—	—	45
MA4D-8031-000	SR	30 lb-in	On/Off	230 Vac	—	—	< 56	MS4105A1030	44 lb-in	Two-Position (SPST)	100-250 Vac	—	—	45
MA4D-8033-100	SR	30 lb-in	On/Off	24 Vac, 20-30 Vdc	—	—	< 56	MS8105A1008	44 lb-in	Two-Position (SPST)	24 Vac/Vdc	—	—	45
MF40-7043	SR	35 lb-in	Floating	24 Vac, 22-30 Vdc	—	—	< 130	MS7505A2030	44 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
MF40-7043-501	SR	35 lb-in	Floating	24 Vac, 22-30 Vdc	—	1	< 130	MS7505A2130	44 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	1	90
MF40-7173	SR	150 lb-in	Floating	24 Vac, ±20%	—	—	< 145	MS7520A2007	175 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
MF41-7073	SR	60 lb-in	Floating	24 Vac, 22-30 Vdc	—	—	< 195	MS7510A2008	88 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
MF41-7073-502	SR	60 lb-in	Floating	24 Vac, 22-30 Vdc	—	2	< 195	MS7510A2206	88 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	2	90
MF41-7153	SR	133 lb-in	Floating	24 Vac, 22-30 Vdc	—	—	< 190	MS7520A2007	175 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
MF41-7153-502	SR	133 lb-in	Floating	24 Vac, 22-30 Vdc	—	2	< 190	MS7520A2205	175 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	2	90
MF4D-7033-100	SR	30 lb-in	Floating	24 Vac, 20-30 Vdc	2-10 Vdc	—	< 85	MS7505A2008	44 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
MF4D-8033-100	SR	30 lb-in	Floating	24 Vac, 20-30 Vdc	2-10 Vdc	—	< 85	MS7505A2008	44 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
MS40-7043	SR	35 lb-in	2-10 Vdc, 4-20 mA	24 Vac, 22-30 Vdc	2-10 Vdc	—	< 130	MS7505A2030	44 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
MS40-7043-501	SR	35 lb-in	2-10 Vdc, 4-20 mA	24 Vac, 22-30 Vdc	2-10 Vdc	1	< 130	MS7505A2130	44 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	1	90
MS40-7170	SR	150 lb-in	2-10 Vdc, 4-20 mA	120 Vac	—	—	< 145	MS7520A2007	175 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
MS40-7171	SR	150 lb-in	2-10 Vdc, 4-20 mA	240 Vac	—	—	< 145	MS7520A2007	175 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
MS40-7173	SR	150 lb-in	2-10 Vdc, 4-20 mA	24 Vac, ±20%	—	—	< 145	MS7520A2007	175 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
MS41-7073	SR	60 lb-in	2-10 Vdc, 4-20 mA	24 Vac, 22-30 Vdc	2-10 Vdc	—	< 195	MS7510A2008	88 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
MS41-7073-502	SR	60 lb-in	2-10 Vdc, 4-20 mA	24 Vac, 22-30 Vdc	2-10 Vdc	2	< 195	MS7510A2206	88 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	2	90
MS41-7153	SR	133 lb-in	2-10 Vdc, 4-20 mA	24 Vac, 22-30 Vdc	2-10 Vdc	—	< 190	MS7520A2007	175 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
MS41-7153-502	SR	133 lb-in	2-10 Vdc, 4-20 mA	24 Vac, 22-30 Vdc	2-10 Vdc	2	< 190	MS7520A2205	175 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	2	90
MS4D-7033-100	SR	30 lb-in	2-10 Vdc, 4-20 mA	24 Vac, 20-30 Vdc	2-10 Vdc	—	< 85	MS7505A2008	44 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
MS4D-7033-150	SR	30 lb-in	0-10 Vdc, 4-20 mA	24 Vac, 20-30 Vdc	2-10 Vdc	—	< 85	MS7505A2008	44 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
MS4D-7033-160	SR	30 lb-in	4-20 mA	24 Vac, 22-30 Vdc	2-10 Vdc	—	< 85	MS7505A2008	44 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
MS4D-8033-100	SR	30 lb-in	2-10 Vdc, 4-20 mA	24 Vac, 22-30 Vdc	2-10 Vdc	—	< 85	MS7505A2008	44 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
MS4D-8033-150	SR	30 lb-in	0-10 Vdc, 4-20 mA	24 Vac, 22-30 Vdc	2-10 Vdc	—	< 85	MS7505A2008	44 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
MS4D-8033-160	SR	30 lb-in	4-20 mA	24 Vac, 22-30 Vdc	2-10 Vdc	—	< 85	MS7505A2008	44 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
MS50-E2001	SR	150 lb-in	1-5 Vdc, 4-20 mA	120 Vac	—	—	145	MS7520A2007	175 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
MS50-E2101	SR	150 lb-in	1-5 Vdc, 4-20 mA	240 Vac	—	—	145	MS7520A2007	175 lb-in	On/Off	24 Vac/Vdc	(0) 2-10 Vdc	—	90
MS50-E2301	SR	150 lb-in	1-5 Vdc, 4-20 mA	24 Vac	—	—	145	MS7520A2007	175 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90

Invensys Notes: All models described as (0)2-10 Vdc can be used with a 4-20 mA control input. Shunt a 500 kOhm, 1/2 W resistor across the input at the actuator.

Cross Reference - Actuators

Direct Coupled Actuators

Siemens Model	Fail Safe	Torque (lb-in)	Control Signal	Power	Feedback	Switches	Timing (sec)	Honeywell Model	Torque (lb-in)	Control Signal	Power	Feedback	Switches	Timing (sec)
GDE131.1U	NSR	44 lb-in	Floating	24 Vac	—	—	90	MN6105A1011	44 lb-in	On/Off, Floating	24 Vac/Vdc	—	—	90
GDE131.1P	NSR	44 lb-in	Floating	24 Vac	—	—	90	MN6105W1011	44 lb-in	On/Off, Floating	24 Vac/Vdc	—	—	90
GDE161.1P	NSR	44 lb-in	0-10 Vdc	24 Vac	0-1 kOhm	—	90	MN7505A2001	44 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
GDE132.1P	NSR	44 lb-in	Floating	24 Vac	0-1 kOhm	—	90	MN7505A2001	44 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
GDE136.1P	NSR	44 lb-in	Floating	24 Vac	—	2	90	MN6105A1201	44 lb-in	On/Off, Floating	24 Vac/Vdc	—	2	90
GLB131.1P	NSR	88 lb-in	Floating	24 Vac	—	—	125	MN6110A1003	88 lb-in	On/Off, Floating	24 Vac/Vdc	—	—	90
GLB161.1P	NSR	88 lb-in	0-10 Vdc	24 Vac	—	—	125	MN7510A2001	88 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
GLB132.1P	NSR	88 lb-in	Floating	24 Vac	0-1 kOhm	—	125	ML6174A2002 + 200976C	70 lb-in	On/Off, Floating	24 Vac	0-2 kOhm	—	90
GLB136.1P	NSR	88 lb-in	Floating	24 Vac	—	2	125	MN6110A1201	88 lb-in	On/Off, Floating	24 Vac/Vdc	—	2	90
GLB163.1P	NSR	88 lb-in	0-10 Vdc	24 Vac	—	—	125	MN7510A2001	88 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
GLB164.1P	NSR	88 lb-in	0-10 Vdc	24 Vac	—	2	125	MN7510A2209	88 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	2	90
GLB166.1P	NSR	88 lb-in	0-10 Vdc	24 Vac	—	2	125	MN7510A2209	88 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	2	90
GEB131.1U	NSR	132 lb-in	Floating	24 Vac	—	—	125	MN6120A1002	175 lb-in	On/Off, Floating	24 Vac/Vdc	—	—	90
GEB136.1U	NSR	132 lb-in	Floating	24 Vac	—	2	125	MN6120A1200	175 lb-in	On/Off, Floating	24 Vac/Vdc	—	2	90
GEB161.1U	NSR	132 lb-in	0-10 Vdc	24 Vac	—	—	125	MN7220A2007	175 lb-in	(0) 2-10 Vdc, (0) 4-20 mA	24 Vac/Vdc	—	—	90
GBB171.1P	NSR	221 lb-in	On/Off, Floating	24 Vac	—	—	150	MN6120A1002	175 lb-in	On/Off, Floating	24 Vac/Vdc	—	—	90
GBB131.1U	NSR	221 lb-in	Floating	24 Vac	—	—	150	MN6120A1002	175 lb-in	On/Off, Floating	24 Vac/Vdc	—	—	90
GBB136.1U	NSR	221 lb-in	Floating	24 Vac	—	—	150	MN6120A1200	175 lb-in	On/Off, Floating	24 Vac/Vdc	—	—	90
GBB161.1U	NSR	221 lb-in	0-10 Vdc	24 Vac	—	—	150	MN7220A2007	175 lb-in	(0) 2-10 Vdc, (0) 4-20 mA	24 Vac/Vdc	(0) 2-10 Vdc	—	90
GBB166.1U	NSR	221 lb-in	0-10 Vdc	24 Vac	—	2	150	MN7220A2205	175 lb-in	(0) 2-10 Vdc, (0) 4-20 mA	24 Vac/Vdc	(0) 2-10 Vdc	2	90
GBB151.1P	NSR	221 lb-in	4-20 mA	24 Vac	—	—	150	MN7220A2007	175 lb-in	(0) 2-10 Vdc, (0) 4-20 mA	24 Vac/Vdc	(0) 2-10 Vdc	—	90
GBB166.1P	NSR	221 lb-in	0-10 Vdc	24 Vac	—	2	150	MN7220A2205	175 lb-in	(0) 2-10 Vdc, (0) 4-20 mA	24 Vac/Vdc	(0) 2-10 Vdc	2	90
GBB156.1P	NSR	221 lb-in	4-20 mA	24 Vac	—	2	150	MN7220A2205	175 lb-in	(0) 2-10 Vdc, (0) 4-20 mA	24 Vac/Vdc	(0) 2-10 Vdc	2	90
GIB131.1U	NSR	310 lb-in	Floating	24 Vac	—	—	150	MN6134A1003	300 lb-in	On/Off, Floating	24 Vac/Vdc	—	—	90
GIB136.1U	NSR	310 lb-in	Floating	24 Vac	—	2	150	MN6134A1003 + SW2-US	300 lb-in	On/Off, Floating	24 Vac/Vdc	—	2	90
GIB171.1U	NSR	310 lb-in	On/Off, Floating	24 Vac	—	—	150	MN6134A1003	300 lb-in	On/Off, Floating	24 Vac/Vdc	—	—	90
GIB161.1U	NSR	310 lb-in	0-10 Vdc	24 Vac	—	—	150	MN7234A2008	300 lb-in	(0) 2-10 Vdc, (0) 4-20 mA	24 Vac/Vdc	(0) 2-10 Vdc	—	90
GIB151.1U	NSR	310 lb-in	4-20 mA	24 Vac	—	—	150	MN7234A2008	300 lb-in	(0) 2-10 Vdc, (0) 4-20 mA	24 Vac/Vdc	(0) 2-10 Vdc	—	90
GIB166.1U	NSR	310 lb-in	0-10 Vdc	24 Vac	—	2	150	MN7234A2008 + SW-US2	300 lb-in	(0) 2-10 Vdc, (0) 4-20 mA	24 Vac/Vdc	(0) 2-10 Vdc	2	90
GIB156.1U	NSR	310 lb-in	4-20 mA	24 Vac	—	2	150	MN7234A2008 + SW2-US	300 lb-in	(0) 2-10 Vdc, (0) 4-20 mA	24 Vac/Vdc	(0) 2-10 Vdc	2	90
GQD121.1P	SR	20 lb-in	On/Off	24 Vac/dc	—	—	30	MS8103A1030	27 lb-in	Two-Position (SPST)	24 Vac/Vdc	—	—	45
GQD126.1P	SR	20 lb-in	On/Off	24 Vac/dc	—	2	30	MS8103A1130	27 lb-in	Two-Position (SPST)	24 Vac/Vdc	—	1	45
GQD221.1U	SR	20 lb-in	On/Off	120 Vac	—	—	30	MS4103A1030	27 lb-in	Two-Position (SPST)	100-250 Vac	—	—	45
GQD226.1U	SR	20 lb-in	On/Off	120 Vac	—	2	30	MS4103A1130	27 lb-in	Two-Position (SPST)	100-250 Vac	—	—	45
GQD131.1P	SR	20 lb-in	Floating	24 Vac/dc	—	—	30	MS7503A2021	27 lb-in	Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
GQD136.1P	SR	20 lb-in	Floating	24 Vac/dc	—	2	30	MS7503A2221	27 lb-in	Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	2	90
GQD151.1P	SR	20 lb-in	2-10 Vdc	24 Vac/dc	2-10 Vdc	—	30	MS7503A2021	27 lb-in	Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
GQD156.1P	SR	20 lb-in	2-10 Vdc	24 Vac/dc	2-10 Vdc	2	30	MS7503A2221	27 lb-in	Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	2	90
GMA121.1U	SR	62 lb-in	On/Off	24 Vac/dc	—	—	90	MS8110A1008	88 lb-in	Two-Position (SPST)	24 Vac/Vdc	—	—	45
GMA121.1P	SR	62 lb-in	On/Off	24 Vac/dc	—	—	90	MS8110W1008	88 lb-in	Two-Position (SPST)	24 Vac/Vdc	—	—	45
GMA126.1U	SR	62 lb-in	On/Off	24 Vac/dc	—	2	90	MS8110A1206	88 lb-in	Two-Position (SPST)	24 Vac/Vdc	—	2	45
GMA126.1P	SR	62 lb-in	On/Off	24 Vac/dc	—	2	90	MS8110W1206	88 lb-in	Two-Position (SPST)	24 Vac/Vdc	—	2	45
GMA221.1U	SR	62 lb-in	On/Off	120 Vac	—	—	90	MS4110A1002	88 lb-in	Two-Position (SPST)	100-250 Vac	—	—	45
GMA226.1U	SR	62 lb-in	On/Off	120 Vac	—	2	90	MS4110A1200	88 lb-in	Two-Position (SPST)	100-250 Vac	—	2	45
GMA131.1U	SR	62 lb-in	Floating	24 Vac/Vdc	—	—	90	MS7510A2008	88 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
GMA131.1P	SR	62 lb-in	Floating	24 Vac/Vdc	—	—	90	MS7510W2008	88 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90

Cross Reference - Actuators

Direct Coupled Actuators

Siemens Model	Fail Safe	Torque (lb-in)	Control Signal	Power	Feedback	Switches	Timing (sec)	Honeywell Model	Torque (lb-in)	Control Signal	Power	Feedback	Switches	Timing (sec)
GMA132.1U	SR	62 lb-in	Floating	24 Vac/Vdc	0-1 kOhm	—	90	MS7510A2008	88 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
GMA136.1U	SR	62 lb-in	Floating	24 Vac/dc	—	2	90	MS7510A2206	88 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	2	90
GMA151.1U	SR	62 lb-in	2-10 Vdc	24 Vac/Vdc	0-1 kOhm	—	90	MS7510A2008	88 lb-in	(0) 2-10 Vdc, (0) 4-20 mA	24 Vac/Vdc	(0) 2-10 Vdc	—	90
GMA151.1P	SR	62 lb-in	2-10 Vdc	24 Vac/Vdc	0-1 kOhm	—	90	MS7510W2008	88 lb-in	(0) 2-10 Vdc, (0) 4-20 mA	24 Vac/Vdc	(0) 2-10 Vdc	—	90
GMA156.1U	SR	62 lb-in	2-10 Vdc	24 Vac/Vdc	0-1 kOhm	2	90	MS7510A2206	88 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	2	90
GMA156.1P	SR	62 lb-in	2-10 Vdc	24 Vac/Vdc	0-1 kOhm	2	90	MS7510W2206	88 lb-in	(0) 2-10 Vdc, (0) 4-20 mA	24 Vac/Vdc	(0) 2-10 Vdc	2	90
GCA121.1U	SR	160 lb-in	On/Off	24 Vac/dc	—	—	90	MS8120A1007	175 lb-in	Two-Position (SPST)	24 Vac/Vdc	—	—	45
GCA121.1P	SR	160 lb-in	On/Off	24 Vac/dc	—	—	90	MS8120W1007	175 lb-in	Two-Position (SPST)	24 Vac/Vdc	—	—	45
GCA126.1U	SR	160 lb-in	On/Off	24 Vac/dc	—	2	90	MS8120A1205	175 lb-in	Two-Position (SPST)	24 Vac/Vdc	—	2	45
GCA126.1P	SR	160 lb-in	On/Off	24 Vac/dc	—	2	90	MS8120W1205	175 lb-in	Two-Position (SPST)	24 Vac/Vdc	—	2	45
GCA221.1U	SR	160 lb-in	On/Off	120 Vac	—	—	90	MS4120A1001	175 lb-in	Two-Position (SPST)	100-250 Vac	—	—	45
GCA226.1U	SR	160 lb-in	On/Off	120 Vac	—	2	90	MS4120A1209	175 lb-in	Two-Position (SPST)	100-250 Vac	—	2	45
GCA131.1U	SR	160 lb-in	Floating	24 Vac/dc	—	—	90	MS7520A2007	175 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
GCA131.1P	SR	160 lb-in	Floating	24 Vac/dc	—	—	90	MS7520W2007	175 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
GCA136.1U	SR	160 lb-in	Floating	24 Vac/dc	—	2	90	MS7520A2205	175 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	2	90
GCA136.1P	SR	160 lb-in	Floating	24 Vac/dc	—	2	90	MS7520W2205	175 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	2	90
GCA132.1U	SR	160 lb-in	Floating	24 Vac/dc	0-1 kOhm	—	90	MS7520A2007	175 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
GCA132.1P	SR	160 lb-in	Floating	24 Vac/dc	0-1 kOhm	—	90	MS7520W2007	175 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
GCA151.1U	SR	160 lb-in	4-20 mA	24 Vac/dc	—	—	90	MS7520A2007	175 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
GCA151.1P	SR	160 lb-in	4-20 mA	24 Vac/dc	—	—	90	MS7520W2007	175 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
GCA156.1U	SR	160 lb-in	4-20 mA	24 Vac/dc	—	2	90	MS7520A2205	175 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	2	90
GCA156.1P	SR	160 lb-in	4-20 mA	24 Vac/dc	—	2	90	MS7520W2205	175 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	2	90
GCA161.1U	SR	160 lb-in	0-10 Vdc	24 Vac/dc	—	—	90	MS7520A2007	175 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
GCA161.1P	SR	160 lb-in	0-10 Vdc	24 Vac/dc	—	—	90	MS7520W2007	175 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	—	90
GCA166.1U	SR	160 lb-in	0-10 Vdc	24 Vac/dc	—	2	90	MS7520A2205	175 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	2	90
GCA166.1P	SR	160 lb-in	0-10 Vdc	24 Vac/dc	—	2	90	MS7520W2205	175 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	2	90
GCA163.1U	SR	160 lb-in	0-10 Vdc	24 Vac/dc	—	—	90	MS7520H2208	175 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	2	90
GCA164.1U	SR	160 lb-in	0-10 Vdc	24 Vac/dc	—	2	90	MS7520H2208	175 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	2	90
GCA166.1P	SR	160 lb-in	0-10 Vdc	24 Vac/dc	—	2	90	MS7520W2205	175 lb-in	On/Off, Floating, (0) 2-10 Vdc	24 Vac/Vdc	(0) 2-10 Vdc	2	90

Siemens Notes: All models described as (0) 2-10 Vdc can be used with a 4-20 mA control input. Shunt a 500 kOhm, 1/2 W resistor across the input at the actuator.

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Control Valve Applications													
Pipe Size, inches (DN)													
	1/2" DN15	3/4" DN20	1" DN25	1-1/4" DN32	1-1/2" DN40	2" DN50	2-1/2" DN65	3" DN80	4" DN100	5" DN125	6" DN150	8-24" >DN200	
Unitary Equipment	Fan Coil Units	Cartridge globe valves											
		Control ball valves											
		Pressure regulated valves											
	Unit Heaters	Cartridge globe valves											
		Control ball valves											
		Pressure regulated valves											
	Convectors	Control ball valves											
		Cartridge globe valves											
		Pressure regulated valves											
	Radiant Panels	Control ball valves											
Cartridge globe valves													
Pressure regulated valves													
Unit Ventilator	Cartridge globe valves												
	Control ball valves												
	Pressure regulated valves												
Reheat Coils	Cartridge globe valves												
	Control ball valves												
	Pressure regulated valves												
Water Source Heat Pump	Control ball valves												
	Pressure regulated valves												
Blower Coil	Cartridge globe valves												
	Control ball valves												
	Pressure regulated valves												
Air Handling Units	Heating & Cooling Coils	Threaded globe valve											
		Threaded control ball valves											
									Flanged globe valve				
											Flanged ball valve		
	Pressure regulated valves												
Chilled Ceiling	Threaded globe valve												
	Threaded control ball valves												
Humidifiers	Threaded globe valve												
									Flanged globe valve				
Central Plant	Outdoor reset	Threaded globe valve											
		Threaded control ball valves											
										Flanged globe valve			
	Boiler Bypass	Threaded globe valve											
		Threaded control ball valves											
										Flanged globe valve			
											Flanged ball valve		
	Resilient seat butterfly valves												
	Heat reclaim	Threaded globe valve											
		Threaded control ball valves											
	Steam Heat Exchangers	Threaded globe valve											
										Flanged globe valve			
	Greenhouse	Threaded globe valve											
		Threaded control ball valves											
										Flanged globe valve			
										Flanged ball valve			
Resilient seat butterfly valves													
Thermal Storage	Threaded globe valve												
	Threaded control ball valves												
									Flanged globe valve				
Resilient seat butterfly valves													
Chillers	Threaded globe valve												
	Threaded control ball valves												
									Flanged globe valve				
											Flanged ball valve		
Resilient seat butterfly valves													
Pressure regulated valves													
Cooling Towers	Threaded globe valve												
	Threaded control ball valves												
Resilient seat butterfly valves													
Isolation valves	Threaded control ball valves												
									Resilient seat butterfly valves				

Product Selection - Valves

2-Way Control Valves

Attribute	Specification	Unitary	Globe					
		Cartridge Globe	Threaded			Flanged	Pressure-Balanced	
		V58x2	V5011N	V5011F	V5011G	VGF2xS	V5862A3	VGF2xP
Pipe Size	1/2" [DN15]	•	•					
	3/4" [DN20]	•	•					
	1" [DN25]		•				•	
	1-1/4" [DN32]		•				•	
	1-1/2" [DN40]		•				•	
	2" [DN50]		•					
	2-1/2" [DN65]			•	•	•		•
	3" [DN80]			•	•	•		•
	4" [DN100]					•		•
	5" [DN125]					•		•
6" [DN150]					•		•	
Other (maximum size)								
Pipe Fittings	Sweat	•						
	NPT Internal Thread	•	•	•	•		•	
	Inverted Flare							
	ANSI Flange					•		•
Static Pressure	ANSI 125/150		•	•	•	•		•
	ANSI 250/300					•		
	Other	230 psi					230 psi	
Media	Chilled Water	•	•	•	•	•	•	•
	Hot Water	•	•	•	•	•	•	•
	Low Pressure Steam		N1	•	•	•		•
	High Pressure Steam		N2		•	•		•
Flow Capacity, Cv	Multiple ratings per pipe size	•	•	•	•		•	
	One rating/size above 1/2"		•	•	•	•		•
Valve Action	Direct Acting (Stem down to close)		N1, N2	•	•	•	•	•
	Reverse Acting (Stem up to close)	•						
	Rotary N.O.							
	Rotary N.C.							
Flow Characteristic	Equal Percentage	•	•	•		•		•
	Modified Equal Percentage							
	Linear		•		•	•	•	•
Close-off pressure***	High** (100 psid minimum)	•					•	•
	Medium (40 psid minimum)	•						
	Varies with actuator		•	•	•	•		
Maximum Seat Leakage	ANSI Class III (0.10% Cv max.)	0.02%	0.05%			•		
	ANSI Class IV (0.01% Cv max.)						•	•
	Bubble-tight design							
	Other (see product data literature)			0.5%	0.5%			
Rangeability	High (50:1 minimum)	•	•	•	•	•	•	•
	Medium* (15~50:1)							
	Low (under 15:1)							
Trim	Brass, plated brass, bronze			•				
	Brass plug /Stainless seat		N1					
	Stainless Steel		N2			•	•	•
	Resilient materials	•						
In-line Serviceability	Cartridge	•						
	Packing		•	•	•	•	•	•
	Rebuild		•	•	•			
Actuation Options	Electronic Modulating	•	•	•	•	•	•	•
	Tri-state floating	•	•	•	•	•	•	•
	Pulse Width Modulation							
	2-position low voltage	•	•	•	•	•		•
	2-position line voltage		•	•	•	•		•
	Electric Spring Return	•	•	•	•	•	•	•
	Electronic Fail Safe							
Pneumatic, low pressure	•	•	•	•	•		•	

Notes * Best used with supply water reset from outdoor air temperature.
 ** Can dead-head pumps. Use with VFD-controlled pumps with maximum pressure cut-out
 *** Maximum operating differential pressure. Static close-off pressure may be higher. Maximum pressure for quiet service may be less.

Product Selection - Valves

2-Way Control Valves

Attribute	Specification	Control Ball		Pressure-Regulated		Butterfly	
		Threaded	Flanged	Threaded	Wafer Flanged	Resilient Seat	High Performance
		VBN2	VBF2	VRN2	VRW2	VR2	VH2
Pipe Size	1/2" [DN15]	•		•			
	3/4" [DN20]	•		•			
	1" [DN25]	•		•			
	1-1/4" [DN32]	•		•			
	1-1/2" [DN40]	•		•			
	2" [DN50]	•		•		•	•
	2-1/2" [DN65]	•		•	•	•	•
	3" [DN80]	•		•	•	•	•
	4" [DN100]		•		•	•	•
	5" [DN125]		•		•	•	•
6" [DN150]		•		•	•	•	
Other (maximum size)						24" [DN600]	
Pipe Fittings	Sweat						
	NPT Internal Thread	•		•			
	Inverted Flare						
	ANSI Flange		•		•	•	•
Static Pressure	ANSI 125/150		•		•		•
	ANSI 250/300				•		
	Other		360 psi	360 psi		232 psi	
Media	Chilled Water	•	•	•	•	•	•
	Hot Water	•	•	•	•	•	•
	Low Pressure Steam						•
	High Pressure Steam						up to 50 psi
Flow Capacity, Cv	Multiple ratings per pipe size	•	•	x (gpm)	x (gpm)		
	One rating/size above 1/2"					•	•
Valve Action	Direct Acting (Stem down to close)						
	Reverse Acting (Stem up to close)						
	Rotary N.O.	•	•	•	•	•	•
	Rotary N.C.	•	•	•	•	•	•
Flow Characteristic	Equal Percentage			•	•		
	Modified Equal Percentage	•	•			•	•
	Linear			•			
Close-off pressure***	High** (100 psid minimum)	•	•	•	•	•	•
	Medium (40 psid minimum)						
	Varies with actuator						
Maximum Seat Leakage	ANSI Class III (0.10% Cv max.)			•			
	ANSI Class IV (0.01% Cv max.)	•	•				
	Bubble-tight design					•	•
	Other (see product data literature)				< 0.2%		
Rangeability	High (50:1 minimum)	•	•	•	•		•
	Medium* (15~50:1)	•		< 10 gpm			
	Low (under 15:1)					•	
Trim	Brass, plated brass, bronze	•		•			
	Brass plug /Stainless seat						
	Stainless Steel	•	•	•	•	•	•
	Resilient materials			•	•	•	
In-line Serviceability	Cartridge			•	•		
	Packing	•	•	•	•		
	Rebuild		•	Regulator			
Actuation Options	Electronic Modulating	•	•	•	•	•	•
	Tri-state floating	•	•	•	•	•	•
	Pulse Width Modulation						
	2-position low voltage	•	•	•	•	•	•
	2-position line voltage	•	•	•	•	•	•
	Electric Spring Return	•	•	•		2"-2.5"	2"-4"
	Electronic Fail Safe				•	3"-12"	5"-6"
Pneumatic, low pressure							

Notes * Best used with supply water reset from outdoor air temperature.
 ** Can dead-head pumps. Use with VFD-controlled pumps with maximum pressure cut-out
 *** Maximum operating differential pressure. Static close-off pressure may be higher. Maximum pressure for quiet service may be less.

Product Selection - Valves

3-Way Control Valves

Attribute	Specification	Unitary		Globe		Control Ball		Butterfly			
		Cartridge Globe		Threaded	Flanged		Threaded	Flanged	Resilient Seat	High Performance	
		V58x3	V5863A3	V5013N...	VGf3xLD	VGf3xEM	VBN3	VBF3	VR3,4,5	VH3,4,5	VH6,7,8
Pipe Size	1/2" [DN15]	•		•			•				
	3/4" [DN20]	•		•			•				
	1" [DN25]		•	•			•				
	1-1/4" [DN32]		•	•			•				
	1-1/2" [DN40]		•	•			•				
	2" [DN50]			•			•		•	•	•
	2-1/2" [DN65]				•	•	•		•	•	•
	3" [DN80]				•	•			•	•	•
	4" [DN100]				•	•		•	•	•	•
	5" [DN125]				•	•		•	•	•	•
6" [DN150]				•	•		•	•	•	•	
Other (maximum size)									20" [DN500]		
Pipe Fittings	Sweat	•									
	NPT Internal Thread	•	•	•			•				
	Inverted Flare										
Static Pressure	ANSI Flange				•	•		•			•
	ANSI 125/150				•	•		•			
	ANSI 250/300				•	•					
Media	Other	230 psi	230 psi				360 psi		250 psi		
	Chilled Water	•	•	•	•	•	•	•	•	•	•
Flow Capacity, Cv	Hot Water	•	•	•	•	•	•	•	•	•	•
	Multiple ratings per pipe size	•	•	•	•	•	•	•			
Valve Action	One rating/size above 1/2"			•	•	•			•	•	•
	Mixing	•	•	•	•	•	•	•	•	•	•
A-port Flow Characteristic	Diverting				•		•	•	•		•
	Equal Percentage	•		•		•					
	Modified Equal Percentage						•	•	•	•	•
	Linear		•		•						
B-port Flow Characteristic	Quick Open										
	Modified Equal Percentage								•	•	•
	Linear			•	•	•					
	Linear, Reduced Cv	•	•	•	•	•	•	•			
Close-off pressure***	Total Constant Flow	•	•	•	•						
	High (60 psid minimum)	•	•					•	•	•	•
	Medium (30 psid minimum)	•					•		•	•	•
Maximum Seat Leakage**	Varies with actuator			•	•	•					
	ANSI Class III (0.10% Cv max.)	•	•	•	•						
	ANSI Class IV (0.01% Cv max.)						•	A-port	•	•	•
	Bubble-tight design								•	•	•
Rangeability	Other (see product data literature)					A = 0.5%		B-port			
	High (50:1 minimum)	•	•	•	•	•	•				
	Medium* (15~50:1)						•				
Trim	Low (under 15:1)								•	•	•
	Brass, plated brass, bronze		•	•			•				
	Stainless Steel			•	•	•		•			
In-line Serviceability	Resilient materials	•							•	•	•
	Cartridge	•									
	Packing		•	•	•	•	•	•			
Actuation Options	Rebuild			•				•			
	Electronic Modulating	•	•	•	•	•	•	•	•	•	•
	Tri-state floating	•	•	•	•	•	•	•	•	•	•
	Pulse Width Modulation										
	2-position low voltage	•	•	•	•	•	•	•		Limited	
	2-position line voltage			•	•	•	•	•	•	•	•
	Electric Spring Return	•	•	•	•	•	•	•		Limited	
Electronic Fail Safe											
Pneumatic, low pressure	•		•	•	•					Limited	

Notes
 * Best used with supply water reset from outdoor air temperature.
 ** A port specification
 *** A-port maximum operating differential pressure. Static close-off pressure may be higher. Maximum pressure for quiet service may be less.
 **** Stem down to close
 ***** Stem up to close
 "Limited" = not available in large sizes

Product Selection - Valves

Cartridge Globe Valves

For more than 50 years, Honeywell has manufactured the V58 series of premium Cartridge Globe Valves. The compact size and replacement capabilities make it a great choice for controlling modulating unitary equipment.

Valves 1" and larger feature a pressure balanced design with enhanced close-off (levels).

Common Features

- For closed loop HVAC systems with up to 50% glycol, not for use with steam
- Maximum static pressure 235 psi
- Long stroke allows for a wide range of control
- Leakage rate: 0.02% of Cv
- Insert replacement tool allows for the valve cartridge to be replaced or changed without draining the system (½" and ¾" models only)
- Brass body and stainless steel stem
- Threaded plastic valve cover/manual handle allows for manual operation
- Corrosion resistant

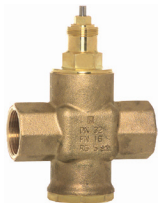


Actuator O.S. Number		Non Fail Safe			
		M6410A1029	M6410A3017	M7410F1000	M7410F3006
Power Supply	Voltage	24 Vac	24 Vac	24 Vac	24 Vac
	Frequency	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz
	Power	0.7 VA	0.7 VA	1.4 VA	1.4 VA
Control	Stem Force (lb.)	40.5	67.5	40.5	67.5
	2-Position SPDT	•	•		
	Floating	•	•		
	0(2)-10 Vdc			DIP Switch	DIP Switch
Fail Safe Action	4-20 mA (external 500 Ohm resistor)			•	•
	Pneumatic Spring Range				
Fail Safe Action		Stay in Place	Stay in Place	Stay in Place	Stay in Place
Reversible Operation	Wiring Change	•	•		
	DIP Switch			•	•
Stroke Timing	Seconds @ 60 Hz (Drive)	125	125	125	125
	Fail Safe				
Manual Override	(Use valve dust cap)	•	•	•	•
Position Indicator		•	•	•	•
Electrical Connection	Cable length, in.	36	36	36	36
	Plenum-rated Cable	•	•	•	•
	Screw terminals				
	1/2 in. flexible conduit hub	•	•	•	•



2-Way

Valve Size (inches)	Pipe Connection Type	Flow Capacity (Cv)	Flow Characteristic	Valve Closes	Valve O.S. Number	Close-off Pressure, psid			
1/2"	f NPT	0.19	Equal%	Stem Down	V5862A2005	232		232	
	Sweat	0.19			V5852A2007	232		232	
	f NPT	0.29			V5862A2013	232		232	
	Sweat	0.29			V5852A2015	232		232	
	f NPT	0.47			V5862A2021	232		232	
	Sweat	0.47			V5852A2023	232		232	
	f NPT	0.74			V5862A2039	232		232	
	Sweat	0.74			V5852A2031	232		232	
	f NPT	1.2			V5862A2047	174		174	
	Sweat	1.2			V5852A2049	174		174	
	f NPT	1.9			V5862A2054	174		174	
	Sweat	1.9			V5852A2056	174		174	
	f NPT	2.9			V5862A2062	58		58	
	Sweat	2.9			V5852A2064	58		58	
1"	f NPT	4.9	Linear	Stem Up	V5862A2070	58		58	
	Sweat	4.9			V5852A2072	58		58	
	f NPT	5.5			V5862A3003		232		232
	f NPT	7.8			V5862A3011		232		232
1-1/4"	f NPT	11	Linear	Stem Up	V5862A3029		232		232
	f NPT	18			V5862A3037		174		174
1-1/2"	f NPT	25	Linear	Stem Up	V5862A3045		145		145



3-Way

Valve Size (inches)	Pipe Connection Type	Flow Capacity (Cv) ¹	Flow Characteristic	Valve Closes	Valve O.S. Number	Close-off Pressure, psid			
1/2"	f NPT	0.29	A-AB Equal%, B-AB Linear	Port A to AB Stem up	V5863A2004	116		116	
	Sweat	0.29			V5853A2006	116		116	
	f NPT	0.47			V5863A2012	116		116	
	Sweat	0.47			V5853A2014	116		116	
	f NPT	0.74			V5863A2020	116		36	
	Sweat	0.74			V5853A2022	116		36	
	f NPT	1.2			V5863A2038	36		36	
	Sweat	1.2			V5853A2030	36		36	
	f NPT	1.9			V5863A2046	34		34	
	Sweat	1.9			V5853A2048	34		34	
3/4"	f NPT	2.9	Linear	Port A to AB Stem up	V5863A1006	34		34	
	Sweat	2.9			V5853A1008	34		34	
	f NPT	4.9			V5863A1014	34		34	
	Sweat	4.9			V5853A1016	34		34	
	f NPT	2.9			V5863A2053	7.25		7.25	
	Sweat	2.9			V5853A2055	7.25		7.25	
	f NPT	4.9			V5863A2061	7.25		7.25	
	Sweat	4.9			V5853A2063	7.25		7.25	
1"	f NPT	5.5	Linear	Port A to AB Stem up	V5863A3002		232		232
	f NPT	7.8			V5863A3010		232		232
	f NPT	11			V5863A3028		232		232
	f NPT	18			V5863A3036		174		174
1-1/2"	f NPT	25	Linear	Port A to AB Stem up	V5863A3044		145		145

¹ B port Cv is 20% less

Product Selection - Valves

Cartridge Globe Valves



Actuator O.S. Number		Fail Safe			
		M6435A1004	M6435A3000	M7435F1001	M7435F3007
Power Supply	Voltage	24 Vac	24 Vac	24 Vac	24 Vac
	Frequency	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz
	Power	10 VA	10 VA	5 VA	5 VA
Control	Stem Force (lb.)	40.5	90	40.5	90
	2-Position SPDT	•	•		
	Floating	•	•		
	0(2)-10 Vdc			DIP Switch	DIP Switch
	4-20 mA (external 500 Ohm resistor)			•	•
Pneumatic Spring Range					
Fail Safe Action		Stem Up	Stem Up	Stem Up	Stem Up
Reversible Operation	Wiring Change	•	•		
	DIP Switch			•	•
Stroke Timing	Seconds @ 60 Hz (Drive)	50	50	50	50
	Fail Safe	10	10	10	10
Manual Override (Use valve dust cap)		•	•	•	•
Position Indicator		•	•	•	•
Electrical Connection	Cable length, in.	—	—	—	—
	Plenum-rated Cable				
	Screw terminals	•	•	•	•
	1/2 in. flexible conduit hub	•	•	•	•

Valve Size (inches)	Pipe Connection Type	Flow Capacity (Cv)	Flow Characteristic	Valve Closes	Valve O.S. Number	Close-off Pressure, psid				Replacement Insert		
2-Way	1/2"	f NPT	Equal%	Stem Down ²	V5862A2005	232		232		0902812		
		Sweat			V5852A2007	232		232		0902812		
		f NPT			V5862A2013	232		232		0902811		
		Sweat			V5852A2015	232		232		0902811		
		f NPT			V5862A2021	232		232		0902810		
		Sweat			V5852A2023	232		232		0902810		
		f NPT			V5862A2039	232		232		0902809		
		Sweat			V5852A2031	232		232		0902809		
		f NPT			V5862A2047	174		174		0902808		
		Sweat			V5852A2049	174		174		0902808		
	3/4"	f NPT	Linear	Stem Up	V5862A2054	174		174		0902807		
		Sweat			V5852A2056	174		174		0902807		
		f NPT			V5862A2062	58		58		0902814		
		Sweat			V5852A2064	58		58		0902814		
		f NPT			V5862A2070	58		58		0902815		
		Sweat			V5852A2072	58		58		0902815		
		1"			f NPT	V5862A3003		232		232		0903827
		f NPT			V5862A3011		232		232		0903827	
		f NPT			V5862A3029		232		232		0903827	
		1-1/4"			f NPT	V5862A3037		174		174		0903828
1-1/2"	f NPT	V5862A3045		145		145		0903829				
3-Way	1/2"	f NPT	A-AB Equal%, B-AB Linear	Port A to AB Stem up	V5863A2004	116		116		0902821		
		Sweat			V5853A2006	116		116		0902821		
		f NPT			V5863A2012	116		116		0902822		
		Sweat			V5853A2014	116		116		0902822		
		f NPT			V5863A2020	36		36		0902823		
		Sweat			V5853A2022	36		36		0902823		
		f NPT			V5863A2038	36		36		0902824		
		Sweat			V5853A2030	36		36		0902824		
		f NPT			V5863A2046	34		34		0902825		
		Sweat			V5853A2048	34		34		0902825		
	3/4"	f NPT	Linear	Port A to AB Stem up	V5863A1006	34		34		0902827		
		Sweat			V5853A1008	34		34		0902827		
		f NPT			V5863A1014	34		34		0902827		
		Sweat			V5853A1016	34		34		0902827		
		f NPT			V5863A2053	7.25		7.25		0902827		
		Sweat			V5853A2055	7.25		7.25		0902827		
		f NPT			V5863A2061	7.25		7.25		0902827		
		Sweat			V5853A2063	7.25		7.25		0902827		
		1"			f NPT	V5863A3002		232		232		0903827
		f NPT			V5863A3010		232		232		0903827	
	1-1/4"	f NPT	V5863A3028		232		232		0903827			
	1-1/2"	f NPT	V5863A3036		174		174		0903828			
			V5863A3044		145		145		0903829			

¹ B port Cv is 20% less

² Fail safe position for 1/2" and 3/4" 2-way is Normally Open with Mx435 spring return actuators. All other valves fail safe closed.

Product Selection - Valves

2-Way Control Ball Valves With Non Spring Return Actuators 1/2"-3"



Example of complete orderable part number: **VBN2A000.38SA+MVN643A0000+C1**
 Control Ball Valve, Female NPT Thread, 2-way, 1/2", CV .38, Stainless Steel trim,
 Standard Profile with MVN643A0000 Actuator, Fail in place and 1 meter cable.

**5-YEAR
 LIMITED
 WARRANTY**

Standard profile provides clearance between valve and actuator for insulation.
 Low profile enables installation of valve and actuator in tight spaces.

If the complete orderable part number is too long for your ordering system, please refer to the Short Order Codes on pg 74 to 95.

Valve Specification		Valve Profile	Standard Profile		Low Profile		Black Bracket	
Valve Size (inches)	Close-off (psi)	Valve Trim	Plated Brass	Stainless Steel	Plated Brass	Stainless Steel	Plated Brass	Stainless Steel
		Cv	Valve Body Model Number					
1/2"	130	0.38	VBN2A000.38PA	VBN2A000.38SA	VBN2A000.38PL	VBN2A000.38SL	VBN2A000.38PX	VBN2A000.38SX
		0.68	VBN2A000.68PA	VBN2A000.68SA	VBN2A000.68PL	VBN2A000.68SL	VBN2A000.68PX	VBN2A000.68SX
		1.3	VBN2A001.30PA	VBN2A001.30SA	VBN2A001.30PL	VBN2A001.30SL	VBN2A001.30PX	VBN2A001.30SX
		2	VBN2A002.00PA	VBN2A002.00SA	VBN2A002.00PL	VBN2A002.00SL	VBN2A002.00PX	VBN2A002.00SX
		2.6	VBN2A002.60PA	VBN2A002.60SA	VBN2A002.60PL	VBN2A002.60SL	VBN2A002.60PX	VBN2A002.60SX
		4.7	VBN2A004.70PA	VBN2A004.70SA	VBN2A004.70PL	VBN2A004.70SL	VBN2A004.70PX	VBN2A004.70SX
		8	VBN2A008.00PA	VBN2A008.00SA	VBN2A008.00PL	VBN2A008.00SL	VBN2A008.00PX	VBN2A008.00SX
		11.7	VBN2A011.70PA	VBN2A011.70SA	VBN2A011.70PL	VBN2A011.70SL	VBN2A011.70PX	VBN2A011.70SX
		0.31	VBN2B000.31PA	VBN2B000.31SA	VBN2B000.31PL	VBN2B000.31SL	VBN2B000.31PX	VBN2B000.31SX
		3/4"	130	0.63	VBN2B000.63PA	VBN2B000.63SA	VBN2B000.63PL	VBN2B000.63SL
1.2	VBN2B001.20PA			VBN2B001.20SA	VBN2B001.20PL	VBN2B001.20SL	VBN2B001.20PX	VBN2B001.20SX
2.5	VBN2B002.50PA			VBN2B002.50SA	VBN2B002.50PL	VBN2B002.50SL	VBN2B002.50PX	VBN2B002.50SX
4.3	VBN2B004.30PA			VBN2B004.30SA	VBN2B004.30PL	VBN2B004.30SL	VBN2B004.30PX	VBN2B004.30SX
7.4	VBN2B007.40PA			VBN2B007.40SA	VBN2B007.40PL	VBN2B007.40SL	VBN2B007.40PX	VBN2B007.40SX
10.1	VBN2B010.10PA			VBN2B010.10SA	VBN2B010.10PL	VBN2B010.10SL	VBN2B010.10PX	VBN2B010.10SX
14.7	VBN2B014.70PA			VBN2B014.70SA	VBN2B014.70PL	VBN2B014.70SL	VBN2B014.70PX	VBN2B014.70SX
29	VBN2B029.00PA			VBN2B029.00SA	VBN2B029.00PL	VBN2B029.00SL	VBN2B029.00PX	VBN2B029.00SX
4.4	VBN2C004.40PA			VBN2C004.40SA	VBN2C004.40PL	VBN2C004.40SL	VBN2C004.40PX	VBN2C004.40SX
1"	100			9	VBN2C009.00PA	VBN2C009.00SA	VBN2C009.00PL	VBN2C009.00SL
		15.3	VBN2C015.30PA	VBN2C015.30SA	VBN2C015.30PL	VBN2C015.30SL	VBN2C015.30PX	VBN2C015.30SX
		26	VBN2C026.00PA	VBN2C026.00SA	VBN2C026.00PL	VBN2C026.00SL	VBN2C026.00PX	VBN2C026.00SX
		44	VBN2C044.00PA	VBN2C044.00SA	VBN2C044.00PL	VBN2C044.00SL	VBN2C044.00PX	VBN2C044.00SX
		54	VBN2C054.00PA	VBN2C054.00SA	VBN2C054.00PL	VBN2C054.00SL	VBN2C054.00PX	VBN2C054.00SX
		4.4	VBN2D004.40PA	VBN2D004.40SA	VBN2D004.40PL	VBN2D004.40SL	VBN2D004.40PX	VBN2D004.40SX
1-1/4"	100	8.3	VBN2D008.30PA	VBN2D008.30SA	VBN2D008.30PL	VBN2D008.30SL	VBN2D008.30PX	VBN2D008.30SX
		14.9	VBN2D014.90PA	VBN2D014.90SA	VBN2D014.90PL	VBN2D014.90SL	VBN2D014.90PX	VBN2D014.90SX
		25	VBN2D025.00PA	VBN2D025.00SA	VBN2D025.00PL	VBN2D025.00SL	VBN2D025.00PX	VBN2D025.00SX
		37	VBN2D037.00PA	VBN2D037.00SA	VBN2D037.00PL	VBN2D037.00SL	VBN2D037.00PX	VBN2D037.00SX
		41	VBN2D041.00PA	VBN2D041.00SA	VBN2D041.00PL	VBN2D041.00SL	VBN2D041.00PX	VBN2D041.00SX
		102	VBN2D102.00PA	VBN2D102.00SA	VBN2D102.00PL	VBN2D102.00SL	VBN2D102.00PX	VBN2D102.00SX
1-1/2"	100	23					VBN2E023.00PX	VBN2E023.00SX
		30					VBN2E030.00PX	VBN2E030.00SX
		41					VBN2E041.00PX	VBN2E041.00SX
		74					VBN2E074.00PX	VBN2E074.00SX
		172					VBN2E172.00PX	VBN2E172.00SX
2"	100	42					VBN2F042.00PX	VBN2F042.00SX
		57					VBN2F057.00PX	VBN2F057.00SX
		71					VBN2F071.00PX	VBN2F071.00SX
		100					VBN2F100.00PX	VBN2F100.00SX
		108					VBN2F108.00PX	VBN2F108.00SX
		210					VBN2F210.00PX	VBN2F210.00SX
		266					VBN2F266.00PX	VBN2F266.00SX
		45					VBN2G045.00PX	VBN2G045.00SX
2-1/2"	100	55					VBN2G055.00PX	VBN2G055.00SX
		72					VBN2G072.00PX	VBN2G072.00SX
		101					VBN2G101.00PX	VBN2G101.00SX
		162					VBN2G162.00PX	VBN2G162.00SX
		202					VBN2G202.00PX	VBN2G202.00SX
		49					VBN2H049.00PX	VBN2H049.00SX
3"	100	63					VBN2H063.00PX	VBN2H063.00SX
		82					VBN2H082.00PX	VBN2H082.00SX
		124					VBN2H124.00PX	VBN2H124.00SX
		145					VBN2H145.00PX	VBN2H145.00SX
								VBN2H145.00PX

Actuator Features				MVN Standard Profile	MVN Low Profile	DCA or DCA w/ switches
Control Signal	Timing	Voltage	Enclosure	Actuator Model Number		
Floating	90 sec.	24 VAC/DC*	NEMA 2	+MVN613A0000	+MVN613L0000	+MN6105A1011 or +MN6105A1201
Fast SPDT	30 sec.			+MVN643A0000	+MVN643L0000	
Modulating	90 sec.			+MVN713A0000	+MVN713L0000	+MN7505A2001 or +MN7505A2209
Accessories	1 meter cable NEMA 3R enclosure			+C1 N/A		N/A +3R

*MVN613 24 VAC only

Product Selection - Valves



2-Way Control Ball Valves With Spring Return Actuators 1/2"-3"

Example of complete orderable part number: **VBN2A000.38SX+MS7103A2024+FSC**
 Control Ball Valve, Female NPT Thread, 2-way, 1/2", CV .38, Black Bracket, Stainless Steel trim with MS7103A2024 Actuator, Fail closed.

**5-YEAR
LIMITED
WARRANTY**

If the complete orderable part number is too long for your ordering system, please refer to the Short Order Codes on pg 74 to 95.

2-Way

Valve Specification		Valve Profile	Black Bracket			
Valve Size (inches)	Close-off (psi)	Valve Trim	Plated Brass	Stainless Steel	Plated Brass	Stainless Steel
		Cv	Valve Body Model Number			
1/2"	130	0.38	VBN2A000.38PX	VBN2A000.38SX	VBN2A000.38PX	VBN2A000.38SX
		0.68	VBN2A000.68PX	VBN2A000.68SX	VBN2A000.68PX	VBN2A000.68SX
		1.3	VBN2A001.30PX	VBN2A001.30SX	VBN2A001.30PX	VBN2A001.30SX
		2	VBN2A002.00PX	VBN2A002.00SX	VBN2A002.00PX	VBN2A002.00SX
		2.6	VBN2A002.60PX	VBN2A002.60SX	VBN2A002.60PX	VBN2A002.60SX
		4.7	VBN2A004.70PX	VBN2A004.70SX	VBN2A004.70PX	VBN2A004.70SX
		8	VBN2A008.00PX	VBN2A008.00SX	VBN2A008.00PX	VBN2A008.00SX
		11.7	VBN2A011.70PX	VBN2A011.70SX	VBN2A011.70PX	VBN2A011.70SX
3/4"	130	0.31	VBN2B000.31PX	VBN2B000.31SX	VBN2B000.31PX	VBN2B000.31SX
		0.63	VBN2B000.63PX	VBN2B000.63SX	VBN2B000.63PX	VBN2B000.63SX
		1.2	VBN2B001.20PX	VBN2B001.20SX	VBN2B001.20PX	VBN2B001.20SX
		2.5	VBN2B002.50PX	VBN2B002.50SX	VBN2B002.50PX	VBN2B002.50SX
		4.3	VBN2B004.30PX	VBN2B004.30SX	VBN2B004.30PX	VBN2B004.30SX
		7.4	VBN2B007.40PX	VBN2B007.40SX	VBN2B007.40PX	VBN2B007.40SX
		10.1	VBN2B010.10PX	VBN2B010.10SX	VBN2B010.10PX	VBN2B010.10SX
		14.7	VBN2B014.70PX	VBN2B014.70SX	VBN2B014.70PX	VBN2B014.70SX
1"	100	4.4	VBN2B029.00PX	VBN2B029.00SX	VBN2B029.00PX	VBN2B029.00SX
		4.4	VBN2C004.40PX	VBN2C004.40SX	VBN2C004.40PX	VBN2C004.40SX
		9	VBN2C009.00PX	VBN2C009.00SX	VBN2C009.00PX	VBN2C009.00SX
		15.3	VBN2C015.30PX	VBN2C015.30SX	VBN2C015.30PX	VBN2C015.30SX
		26	VBN2C026.00PX	VBN2C026.00SX	VBN2C026.00PX	VBN2C026.00SX
		44	VBN2C044.00PX	VBN2C044.00SX	VBN2C044.00PX	VBN2C044.00SX
1-1/4"	100	54	VBN2C054.00PX	VBN2C054.00SX	VBN2C054.00PX	VBN2C054.00SX
		4.4	VBN2D004.40PX	VBN2D004.40SX	VBN2D004.40PX	VBN2D004.40SX
		8.3	VBN2D008.30PX	VBN2D008.30SX	VBN2D008.30PX	VBN2D008.30SX
		14.9	VBN2D014.90PX	VBN2D014.90SX	VBN2D014.90PX	VBN2D014.90SX
		25	VBN2D025.00PX	VBN2D025.00SX	VBN2D025.00PX	VBN2D025.00SX
		37	VBN2D037.00PX	VBN2D037.00SX	VBN2D037.00PX	VBN2D037.00SX
		41	VBN2D041.00PX	VBN2D041.00SX	VBN2D041.00PX	VBN2D041.00SX
		102	VBN2D102.00PX	VBN2D102.00SX	VBN2D102.00PX	VBN2D102.00SX
1-1/2"	100	23			VBN2E023.00PX	VBN2E023.00SX
		30			VBN2E030.00PX	VBN2E030.00SX
		41			VBN2E041.00PX	VBN2E041.00SX
		74			VBN2E074.00PX	VBN2E074.00SX
		172			VBN2E172.00PX	VBN2E172.00SX
2"	100	42			VBN2F042.00PX	VBN2F042.00SX
		57			VBN2F057.00PX	VBN2F057.00SX
		71			VBN2F071.00PX	VBN2F071.00SX
		100			VBN2F100.00PX	VBN2F100.00SX
		108			VBN2F108.00PX	VBN2F108.00SX
		210			VBN2F210.00PX	VBN2F210.00SX
		266		N/A	VBN2F266.00PX	VBN2F266.00SX
		45			VBN2G045.00PX	VBN2G045.00SX
2-1/2"	100	55			VBN2G055.00PX	VBN2G055.00SX
		72			VBN2G072.00PX	VBN2G072.00SX
		101			VBN2G101.00PX	VBN2G101.00SX
		162			VBN2G162.00PX	VBN2G162.00SX
		202			VBN2G202.00PX	VBN2G202.00SX
3"	100	49			VBN2H049.00PX	VBN2H049.00SX
		63			VBN2H063.00PX	VBN2H063.00SX
		82			VBN2H082.00PX	VBN2H082.00SX
		124			VBN2H124.00PX	VBN2H124.00SX
		145			VBN2H145.00PX	VBN2H145.00SX

VALVES

Actuator Features				DCA or DCA w/ switches	DCA or DCA w/ switches
Control Signal	Timing	Voltage	Enclosure	Actuator Model Number	
Modulating	90 sec.	24 VAC/DC	NEMA 2	+MS7103A2024 or +MS7103A2224	
2-position	45 sec.			+MS7505A2030 or +MS7505A2130	
2-position	45 sec.	120 VAC		+MS8105A1030 or +MS8105A1130	
Fail Safe Position	FSO - Fail Safe Open, FSC - Fail Safe Closed			+FSO or +FSC	+FSO or +FSC
Accessories	NEMA 3R enclosure			N/A	+3R

Note: MS7505A2030 and MS7505A2130 are only available with NEMA 3R enclosure on 1/2" - 1-1/4" valves, for NEMA 2 use MS7103A2024 or MS7103A2224. MS7505A2030 and MS7505A2130 are available with or without NEMA 3R enclosure on 1-1/2" - 3" valves.

Product Selection - Valves

3-Way Control Ball Valves With Non Spring Return Actuators 1/2"-2 1/2"



Example of complete orderable part number: **VBN3A000.33PA+MVN613A0000+C1**
 Control Ball Valve, Female NPT Thread, 3-way, 1-1/2", CV .33, Plated Brass trim, with MVN613A0000
 Actuator, Fail in place and 1 meter cable.

**5-YEAR
 LIMITED
 WARRANTY**

Standard profile provides clearance between valve and actuator for insulation.
 Low profile enables installation of valve and actuator in tight spaces.

If the complete orderable part number is too long for your ordering system, please refer to the Short Order Codes on pg 74 to 95.

Valve Specification		Valve Profile	Standard Profile	Low Profile	Black Bracket		
		Valve Trim	Plated Brass	Stainless Steel	Plated Brass		
Valve Size (inches)	Close-off (psi)	Cv	Valve Body Model Number				
1/2"	50	0.33	VBN3A000.33PA	VBN3A000.33PL	VBN3A000.33PX		
		0.59	VBN3A000.59PA	VBN3A000.59PL	VBN3A000.59PX		
		1.0	VBN3A001.00PA	VBN3A001.00PL	VBN3A001.00PX		
		2.4	VBN3A002.40PA	VBN3A002.40PL	VBN3A002.40PX		
		4.3	VBN3A004.30PA	VBN3A004.30PL	VBN3A004.30PX		
		8.0	VBN3A008.00PA	VBN3A008.00PL	VBN3A008.00PX		
		3/4"	50	0.4	VBN3B000.40PA	VBN3B000.40PL	VBN3B000.40PX
				0.66	VBN3B000.66PA	VBN3B000.66PL	VBN3B000.66PX
				1.30	VBN3B001.30PA	VBN3B001.30PL	VBN3B001.30PX
				2.40	VBN3B002.40PA	VBN3B002.40PL	VBN3B002.40PX
3.8	VBN3B003.80PA			VBN3B003.80PL	VBN3B003.80PX		
7.0	VBN3B007.00PA			VBN3B007.00PL	VBN3B007.00PX		
11.0	VBN3B011.00PA			VBN3B011.00PL	VBN3B011.00PX		
1"	50			0.4	VBN3C000.40PA	VBN3C000.40PL	VBN3C000.40PX
				0.65	VBN3C000.65PA	VBN3C000.65PL	VBN3C000.65PX
				1.3	VBN3C001.30PA	VBN3C001.30PL	VBN3C001.30PX
		2.3	VBN3C002.30PA	VBN3C002.30PL	VBN3C002.30PX		
		3.5	VBN3C003.50PA	VBN3C003.50PL	VBN3C003.50PX		
		4.5	VBN3C004.50PA	VBN3C004.50PL	VBN3C004.50PX		
		8.6	VBN3C008.60PA	VBN3C008.60PL	VBN3C008.60PX		
		14.9	VBN3C014.90PA	VBN3C014.90PL	VBN3C014.90PX		
		22	VBN3C022.00PA	VBN3C022.00PL	VBN3C022.00PX		
		31	VBN3C031.00PA	VBN3C031.00PL	VBN3C031.00PX		
1-1/4"	40	4.1	VBN3D004.10PA	VBN3D004.10PL	VBN3D004.10PX		
		8.7	VBN3D008.70PA	VBN3D008.70PL	VBN3D008.70PX		
		12.7	VBN3D012.70PA	VBN3D012.70PL	VBN3D012.70PX		
		19.4	VBN3D019.40PA	VBN3D019.40PL	VBN3D019.40PX		
		27	VBN3D027.00PA	VBN3D027.00PL	VBN3D027.00PX		
1-1/2"	40	34	VBN3D034.00PA	VBN3D034.00PL	VBN3D034.00PX		
		4			VBN3E004.00PX		
		8.3			VBN3E008.30PX		
		13.4			VBN3E013.40PX		
		24			VBN3E024.00PX		
		32			VBN3E032.00PX		
		61			VBN3E061.00PX		
		2"	40	24		N/A	VBN3F024.00PX
				38			VBN3F038.00PX
				57			VBN3F057.00PX
83					VBN3F083.00PX		
109					VBN3F109.00PX		
2-1/2"	40	38			VBN3G038.00PX		
		74			VBN3G074.00PX		
		100			VBN3G100.00PX		

3-Way

Actuator Features				MVN Standard Profile	MVN Low Profile	DCA or DCA w/ switches
Control Signal	Timing	Voltage	Enclosure	Actuator Model Number		
Floating	90 sec.	24 VAC/DC*	NEMA 2	+MVN613A0000	+MVN613L0000	+MN6105A1011 or +MN6105A1201
Fast SPDT	30 sec.			+MVN643A0000	+MVN643L0000	
Modulating	90 sec.			+MVN713A0000	+MVN713L0000	+MN7505A2001 or +MN7505A2209
Accessories	1 meter cable			+C1		N/A
	NEMA 3R enclosure			N/A		+3R

*MVN613 24 VAC only

Product Selection - Valves

3-Way Control Ball Valves With Spring Return Actuators 1/2"-2-1/2"



Example of complete orderable part number: **VBN3E032.00PX+MS8105A1030+FSC**
 Control Ball Valve, Female NPT Thread, 3-way, 1-1/2", CV 32, Black Bracket, Plated Brass trim with MS8105A1030 Actuator,
 Fail closed.

**5-YEAR
 LIMITED
 WARRANTY**

If the complete orderable part number is too long for your ordering system, please refer to the Short Order Codes on pg 74 to 95.

3-Way

Valve Specification		Valve Profile	Black Bracket	
Valve Size (inches)	Close-off (psi)	Valve Trim	Plated Brass	Plated Brass
		Cv	Valve Body Model Number	
1/2"	50	0.33	VBN3A000.33PX	VBN3A000.33PX
		0.59	VBN3A000.59PX	VBN3A000.59PX
		1.0	VBN3A001.00PX	VBN3A001.00PX
		2.4	VBN3A002.40PX	VBN3A002.40PX
		4.3	VBN3A004.30PX	VBN3A004.30PX
		8.0	VBN3A008.00PX	VBN3A008.00PX
3/4"	50	0.4	VBN3B000.40PX	VBN3B000.40PX
		0.66	VBN3B000.66PX	VBN3B000.66PX
		1.30	VBN3B001.30PX	VBN3B001.30PX
		2.40	VBN3B002.40PX	VBN3B002.40PX
		3.8	VBN3B003.80PX	VBN3B003.80PX
		7.0	VBN3B007.00PX	VBN3B007.00PX
1"	50	11.0	VBN3B011.00PX	VBN3B011.00PX
		0.4	VBN3C000.40PX	VBN3C000.40PX
		0.65	VBN3C000.65PX	VBN3C000.65PX
		1.3	VBN3C001.30PX	VBN3C001.30PX
		2.3	VBN3C002.30PX	VBN3C002.30PX
		3.5	VBN3C003.50PX	VBN3C003.50PX
		4.5	VBN3C004.50PX	VBN3C004.50PX
		8.6	VBN3C008.60PX	VBN3C008.60PX
		14.9	VBN3C014.90PX	VBN3C014.90PX
		22	VBN3C022.00PX	VBN3C022.00PX
1-1/4"	40	31	VBN3C031.00PX	VBN3C031.00PX
		4.1	VBN3D004.10PX	VBN3D004.10PX
		8.7	VBN3D008.70PX	VBN3D008.70PX
		12.7	VBN3D012.70PX	VBN3D012.70PX
		19.4	VBN3D019.40PX	VBN3D019.40PX
		27	VBN3D027.00PX	VBN3D027.00PX
1-1/2"	40	34	VBN3D034.00PX	VBN3D034.00PX
		4	N/A	VBN3E004.00PX
		8.3		VBN3E008.30PX
		13.4		VBN3E013.40PX
		24		VBN3E024.00PX
		32		VBN3E032.00PX
2"	40	61		VBN3E061.00PX
		24	VBN3F024.00PX	
		38	VBN3F038.00PX	
		57	VBN3F057.00PX	
2-1/2"	40	83	VBN3F083.00PX	
		109	VBN3F109.00PX	
		38	VBN3G038.00PX	
		74	VBN3G074.00PX	
		100		VBN3G100.00PX

Actuator Features				DCA or DCA w/ switches	DCA or DCA w/ switches
Control Signal	Timing	Voltage	Enclosure	Actuator Model Number	
Modulating	90 sec.	24 VAC/DC	NEMA 2	+MS7103A2024 or +MS7103A2224	+MS7505A2030 or +MS7505A2130
2-position	45 sec.				+MS8105A1030 or +MS8105A1130
2-position	45 sec.	120 VAC			+MS4105A1030 or +MS4105A1130
Fail Safe Position	FSA - A-AB Open FSB - B-AB Open			+FSA or +FSB	+FSA or +FSB
Accessories	NEMA 3R enclosure			N/A	+3R

Note: MS7505A2030 and MS7505A2130 are only available with NEMA 3R enclosure on 1/2" - 1-1/4" valves, for NEMA 2 use MS7103A2024 or MS7103A2224. MS7505A2030 and MS7505A2130 are available with or without NEMA 3R enclosure on 1-1/2" - 2-1/2" valves.

VALVES


Product Selection - Valves

MVN Actuator With Standard Profile, 2-Way NPT Valves 1/2"-1 1/4"

**5-YEAR
LIMITED
WARRANTY**

Common Features

- Max static pressure 360 psi (250°F)
- Medium: Water/glycol solutions up to 50%. Use globe valves for steam control.
- Fluid temperature range: -22 to +250°F
- Spring return actuators field-configurable for A-port normally open or normally closed fail safe.

Actuator Features	Non Fail Safe				Valve Only		
Actuator O.S Number/ Short Order Code	MVN613A0000		MVN613A0000+C1		N/A		
Power Supply	Voltage	24 VAC	24 VAC				
	Frequency	50/60 Hz	50/60 Hz				
	Power	1.5 VA	1.5 VA				
Actuator Torque (lb.-in.)	27		27				
Control	Modulating (0)2-10Vdc						
	Floating	•	•				
	Fast acting SPDT						
Actuator Stroke (degrees)	90° ± 3°		90° ± 3°				
Timing (seconds)	90		90				
Fail Safe Action	Fail in Place		Fail in Place				
Valve Features	Trim	Nickel-Plated Brass	Stainless Steel	Nickel-Plated Brass	Stainless Steel	Nickel-Plated Brass	Stainless Steel

VBN2 (Two-way)

- Equal % flow insert. Largest Cv rating in each valve size is full port, as noted
- Nickel-chrome plated brass or 316 stainless steel ball and stem
- ANSI class IV leakage (0.01% of Cv)



Valve Size (inches)	Close-off Pressure (psid)	Cv	Short Order Codes					
			No Cable		1 Meter Cable		Valve Only	
1/2"	130	0.38	VBN2ABPA1000	VBN2ABSA1000	VBN2ABPA1001	VBN2ABSA1001	VBN2ABPA0000	VBN2ABSA0000
		0.68	VBN2ADPA1000	VBN2ADSA1000	VBN2ADPA1001	VBN2ADSA1001	VBN2ADPA0000	VBN2ADSA0000
		1.3	VBN2AEP A1000	VBN2AES A1000	VBN2AEP A1001	VBN2AES A1001	VBN2AEP A0000	VBN2AES A0000
		2	VBN2AFPA1000	VBN2AFSA1000	VBN2AFPA1001	VBN2AFSA1001	VBN2AFPA0000	VBN2AFSA0000
		2.6	VBN2AGPA1000	VBN2AGSA1000	VBN2AGPA1001	VBN2AGSA1001	VBN2AGPA0000	VBN2AGSA0000
		4.7	VBN2AHP A1000	VBN2AHS A1000	VBN2AHP A1001	VBN2AHS A1001	VBN2AHP A0000	VBN2AHS A0000
		8	VBN2AJPA1000	VBN2AJSA1000	VBN2AJPA1001	VBN2AJSA1001	VBN2AJPA0000	VBN2AJSA0000
		11.7*	VBN2AKPA1000	VBN2AKSA1000	VBN2AKPA1001	VBN2AKSA1001	VBN2AKPA0000	VBN2AKSA0000
3/4"	130	0.31	VBN2BBPA1000	VBN2BBS A1000	VBN2BBPA1001	VBN2BBS A1001	VBN2BBPA0000	VBN2BBS A0000
		0.63	VBN2BDPA1000	VBN2BDS A1000	VBN2BDPA1001	VBN2BDS A1001	VBN2BDPA0000	VBN2BDS A0000
		1.2	VBN2BEP A1000	VBN2BES A1000	VBN2BEP A1001	VBN2BES A1001	VBN2BEP A0000	VBN2BES A0000
		2.5	VBN2BGPA1000	VBN2BGS A1000	VBN2BGPA1001	VBN2BGS A1001	VBN2BGPA0000	VBN2BGS A0000
		4.3	VBN2BHP A1000	VBN2BHS A1000	VBN2BHP A1001	VBN2BHS A1001	VBN2BHP A0000	VBN2BHS A0000
		7.4	VBN2BJPA1000	VBN2BJS A1000	VBN2BJPA1001	VBN2BJS A1001	VBN2BJPA0000	VBN2BJS A0000
		10.1	VBN2BKPA1000	VBN2BKS A1000	VBN2BKPA1001	VBN2BKS A1001	VBN2BKPA0000	VBN2BKS A0000
		14.7*	VBN2BLPA1000	VBN2BLS A1000	VBN2BLPA1001	VBN2BLS A1001	VBN2BLPA0000	VBN2BLS A0000
29*	VBN2BMP A1000	VBN2BMS A1000	VBN2BMP A1001	VBN2BMS A1001	VBN2BMP A0000	VBN2BMS A0000		
1"	100	4.4	VBN2CHPA1000	VBN2CHS A1000	VBN2CHPA1001	VBN2CHS A1001	VBN2CHPA0000	VBN2CHS A0000
		9	VBN2CJPA1000	VBN2CJS A1000	VBN2CJPA1001	VBN2CJS A1001	VBN2CJPA0000	VBN2CJS A0000
		15.3	VBN2CLPA1000	VBN2CLS A1000	VBN2CLPA1001	VBN2CLS A1001	VBN2CLPA0000	VBN2CLS A0000
		26	VBN2CMP A1000	VBN2CMS A1000	VBN2CMP A1001	VBN2CMS A1001	VBN2CMP A0000	VBN2CMS A0000
		44*	VBN2CNPA1000	VBN2CNS A1000	VBN2CNPA1001	VBN2CNS A1001	VBN2CNPA0000	VBN2CNS A0000
54*	VBN2CPPA1000	VBN2CPS A1000	VBN2CPPA1001	VBN2CPS A1001	VBN2CPPA0000	VBN2CPS A0000		
1-1/4"	100	4.4	VBN2DHP A1000	VBN2DHS A1000	VBN2DHP A1001	VBN2DHS A1001	VBN2DHP A0000	VBN2DHS A0000
		8.3	VBN2DJPA1000	VBN2DJS A1000	VBN2DJPA1001	VBN2DJS A1001	VBN2DJPA0000	VBN2DJS A0000
		14.9	VBN2DKPA1000	VBN2DKS A1000	VBN2DKPA1001	VBN2DKS A1001	VBN2DKPA0000	VBN2DKS A0000
		25	VBN2DLP A1000	VBN2DLS A1000	VBN2DLP A1001	VBN2DLS A1001	VBN2DLP A0000	VBN2DLS A0000
		37	VBN2DMP A1000	VBN2DMS A1000	VBN2DMP A1001	VBN2DMS A1001	VBN2DMP A0000	VBN2DMS A0000
		41*	VBN2DNPA1000	VBN2DNS A1000	VBN2DNPA1001	VBN2DNS A1001	VBN2DNPA0000	VBN2DNS A0000
102*	VBN2DSP A1000	VBN2DSS A1000	VBN2DSP A1001	VBN2DSS A1001	VBN2DSP A0000	VBN2DSS A0000		

* Full port ball. No flow characterizing insert.

Product Selection - Valves

MVN Actuator With Standard Profile 2-Way NPT Valves 1/2"-1 1/4"

Actuator Features		Non Fail Safe							
Actuator O.S Number/ Short Order Code		MVN643A0000		MVN643A0000+C1		MVN713A0000		MVN713A0000+C1	
Power Supply	Voltage	24 VAC/DC		24 VAC/DC		24 VAC/DC		24 VAC/DC	
	Frequency	50/60 Hz		50/60 Hz		50/60 Hz		50/60 Hz	
	Power	6 VA		6 VA		5 VA		5 VA	
Actuator Torque	(lb.-in.)	27		27		27		27	
Control	Modulating (0)2-10Vdc					•		•	
	Floating								
	Fast acting SPDT	•		•					
Actuator Stroke (degrees)		90° ± 3°		90° ± 3°		90° ± 3°		90° ± 3°	
Timing	(seconds)	30		30		90		90	
Fail Safe Action		Fail in Place		Fail in Place		Fail in Place		Fail in Place	
Valve Features	Trim	Nickel-Plated Brass	Stainless Steel	Nickel-Plated Brass	Stainless Steel	Nickel-Plated Brass	Stainless Steel	Nickel-Plated Brass	Stainless Steel

Valve Size (inches)	Close-off Pressure (psid)	Cv	Short Order Codes							
			No Cable		1 Meter Cable		No Cable		1 Meter Cable	
1/2"	130	0.38	VBN2ABPA2000	VBN2ABSA2000	VBN2ABPA2001	VBN2ABSA2001	VBN2ABPA3000	VBN2ABSA3000	VBN2ABPA3001	VBN2ABSA3001
		0.68	VBN2ADPA2000	VBN2ADSA2000	VBN2ADPA2001	VBN2ADSA2001	VBN2ADPA3000	VBN2ADSA3000	VBN2ADPA3001	VBN2ADSA3001
		1.3	VBN2AEPa2000	VBN2AESA2000	VBN2AEPa2001	VBN2AESA2001	VBN2AEPa3000	VBN2AESA3000	VBN2AEPa3001	VBN2AESA3001
		2	VBN2AFPA2000	VBN2AFSA2000	VBN2AFPA2001	VBN2AFSA2001	VBN2AFPA3000	VBN2AFSA3000	VBN2AFPA3001	VBN2AFSA3001
		2.6	VBN2AGPA2000	VBN2AGSA2000	VBN2AGPA2001	VBN2AGSA2001	VBN2AGPA3000	VBN2AGSA3000	VBN2AGPA3001	VBN2AGSA3001
		4.7	VBN2AHPA2000	VBN2AHTSA2000	VBN2AHPA2001	VBN2AHTSA2001	VBN2AHPA3000	VBN2AHTSA3000	VBN2AHPA3001	VBN2AHTSA3001
		8	VBN2AJPA2000	VBN2AJSA2000	VBN2AJPA2001	VBN2AJSA2001	VBN2AJPA3000	VBN2AJSA3000	VBN2AJPA3001	VBN2AJSA3001
		11.7*	VBN2AKPA2000	VBN2AKSA2000	VBN2AKPA2001	VBN2AKSA2001	VBN2AKPA3000	VBN2AKSA3000	VBN2AKPA3001	VBN2AKSA3001
3/4"	130	0.31	VBN2BBPA2000	VBN2BBSA2000	VBN2BBPA2001	VBN2BBSA2001	VBN2BBPA3000	VBN2BBSA3000	VBN2BBPA3001	VBN2BBSA3001
		0.63	VBN2BDPA2000	VBN2BDSA2000	VBN2BDPA2001	VBN2BDSA2001	VBN2BDPA3000	VBN2BDSA3000	VBN2BDPA3001	VBN2BDSA3001
		1.2	VBN2BEPa2000	VBN2BESA2000	VBN2BEPa2001	VBN2BESA2001	VBN2BEPa3000	VBN2BESA3000	VBN2BEPa3001	VBN2BESA3001
		2.5	VBN2BGPA2000	VBN2BGSa2000	VBN2BGPA2001	VBN2BGSa2001	VBN2BGPA3000	VBN2BGSa3000	VBN2BGPA3001	VBN2BGSa3001
		4.3	VBN2BHPA2000	VBN2BHSA2000	VBN2BHPA2001	VBN2BHSA2001	VBN2BHPA3000	VBN2BHSA3000	VBN2BHPA3001	VBN2BHSA3001
		7.4	VBN2BJPA2000	VBN2BJSa2000	VBN2BJPA2001	VBN2BJSa2001	VBN2BJPA3000	VBN2BJSa3000	VBN2BJPA3001	VBN2BJSa3001
		10.1	VBN2BKPA2000	VBN2BKSA2000	VBN2BKPA2001	VBN2BKSA2001	VBN2BKPA3000	VBN2BKSA3000	VBN2BKPA3001	VBN2BKSA3001
		14.7*	VBN2BLPA2000	VBN2BLSa2000	VBN2BLPA2001	VBN2BLSa2001	VBN2BLPA3000	VBN2BLSa3000	VBN2BLPA3001	VBN2BLSa3001
29*	VBN2BMPA2000	VBN2BMSa2000	VBN2BMPA2001	VBN2BMSa2001	VBN2BMPA3000	VBN2BMSa3000	VBN2BMPA3001	VBN2BMSa3001		
1"	100	4.4	VBN2CHPA2000	VBN2CHSA2000	VBN2CHPA2001	VBN2CHSA2001	VBN2CHPA3000	VBN2CHSA3000	VBN2CHPA3001	VBN2CHSA3001
		9	VBN2CJPA2000	VBN2CJSA2000	VBN2CJPA2001	VBN2CJSA2001	VBN2CJPA3000	VBN2CJSA3000	VBN2CJPA3001	VBN2CJSA3001
		15.3	VBN2CLPA2000	VBN2CLSA2000	VBN2CLPA2001	VBN2CLSA2001	VBN2CLPA3000	VBN2CLSA3000	VBN2CLPA3001	VBN2CLSA3001
		26	VBN2CMPa2000	VBN2CMSa2000	VBN2CMPa2001	VBN2CMSa2001	VBN2CMPa3000	VBN2CMSa3000	VBN2CMPa3001	VBN2CMSa3001
		44*	VBN2CNPA2000	VBN2CNSA2000	VBN2CNPA2001	VBN2CNSA2001	VBN2CNPA3000	VBN2CNSA3000	VBN2CNPA3001	VBN2CNSA3001
		54*	VBN2CPPa2000	VBN2CPSa2000	VBN2CPPa2001	VBN2CPSa2001	VBN2CPPa3000	VBN2CPSa3000	VBN2CPPa3001	VBN2CPSa3001
1-1/4"	100	4.4	VBN2DHPA2000	VBN2DHSA2000	VBN2DHPA2001	VBN2DHSA2001	VBN2DHPA3000	VBN2DHSA3000	VBN2DHPA3001	VBN2DHSA3001
		8.3	VBN2DJPA2000	VBN2DJSA2000	VBN2DJPA2001	VBN2DJSA2001	VBN2DJPA3000	VBN2DJSA3000	VBN2DJPA3001	VBN2DJSA3001
		14.9	VBN2DKPA2000	VBN2DKSA2000	VBN2DKPA2001	VBN2DKSA2001	VBN2DKPA3000	VBN2DKSA3000	VBN2DKPA3001	VBN2DKSA3001
		25	VBN2DLPA2000	VBN2DLSa2000	VBN2DLPA2001	VBN2DLSa2001	VBN2DLPA3000	VBN2DLSa3000	VBN2DLPA3001	VBN2DLSa3001
		37	VBN2DMPa2000	VBN2DMSa2000	VBN2DMPa2001	VBN2DMSa2001	VBN2DMPa3000	VBN2DMSa3000	VBN2DMPa3001	VBN2DMSa3001
		41*	VBN2DNPA2000	VBN2DNSa2000	VBN2DNPA2001	VBN2DNSa2001	VBN2DNPA3000	VBN2DNSa3000	VBN2DNPA3001	VBN2DNSa3001
		102*	VBN2DSPa2000	VBN2DSSa2000	VBN2DSPa2001	VBN2DSSa2001	VBN2DSPa3000	VBN2DSSa3000	VBN2DSPa3001	VBN2DSSa3001

* Full port ball. No flow characterizing insert.

2-Way

VALVES

Product Selection - Valves


MVN Actuator With Low Profile 2-Way NPT Valves 1/2"-1 1/4"

Common Features

- Max static pressure 360 psi (250°F)
- Medium: Water/glycol solutions up to 50%. Use globe valves for steam control.
- Fluid temperature range: -22 to +250°F
- Spring return actuators field-configurable for A-port normally open or normally closed fail safe.

VBN2 (Two-way)

- Equal % flow insert. Largest Cv rating in each valve size is full port, as noted
- Nickel-chrome plated brass or 316 stainless steel ball and stem
- ANSI class IV leakage (0.01% of Cv)

Actuator Features		Non Fail Safe				Valve Only	
Actuator O.S Number/ Short Order Code		MVN613L0000		MVN613L0000		N/A	
Power Supply	Voltage	24 Vac		24 Vac			
	Frequency	50/60 Hz		50/60 Hz			
	Power	1.5 VA		1.5 VA			
Actuator Torque (lb.-in.)		27		27			
Control	Modulating (0)2-10Vdc						
	Floating	•		•			
	Fast acting SPDT						
Actuator Stroke (degrees)		90° ± 3°		90 ± 3			
Timing (seconds)		90		90			
Fail Safe Action		Fail in Place		Fail in Place			
Valve Features		Trim	Nickel-Plated Brass	Stainless Steel	Nickel-Plated Brass	Stainless Steel	Nickel-Plated Brass

Valve Size (inches)	Close-off Pressure (psid)	Cv	Short Order Codes					
			No Cable		1 Meter Cable		Valve Only	
1/2"	130	0.38	VBN2ABPL1000	VBN2ABSL1000	VBN2ABPL1001	VBN2ABSL1001	VBN2ABPL0000	VBN2ABSL0000
		0.68	VBN2ADPL1000	VBN2ADSL1000	VBN2ADPL1001	VBN2ADSL1001	VBN2ADPL0000	VBN2ADSL0000
		1.3	VBN2AEPL1000	VBN2AESL1000	VBN2AEPL1001	VBN2AESL1001	VBN2AEPL0000	VBN2AESL0000
		2	VBN2AFPL1000	VBN2AFSL1000	VBN2AFPL1001	VBN2AFSL1001	VBN2AFPL0000	VBN2AFSL0000
		2.6	VBN2AGPL1000	VBN2AGSL1000	VBN2AGPL1001	VBN2AGSL1001	VBN2AGPL0000	VBN2AGSL0000
		4.7	VBN2AHPL1000	VBN2AHSL1000	VBN2AHPL1001	VBN2AHSL1001	VBN2AHPL0000	VBN2AHSL0000
		8	VBN2AJPL1000	VBN2AJSL1000	VBN2AJPL1001	VBN2AJSL1001	VBN2AJPL0000	VBN2AJSL0000
		11.7*	VBN2AKPL1000	VBN2AKSL1000	VBN2AKPL1001	VBN2AKSL1001	VBN2AKPL0000	VBN2AKSL0000
3/4"	130	0.31	VBN2BBPL1000	VBN2BBSL1000	VBN2BBPL1001	VBN2BBSL1001	VBN2BBPL0000	VBN2BBSL0000
		0.63	VBN2BDPL1000	VBN2BDSL1000	VBN2BDPL1001	VBN2BDSL1001	VBN2BDPL0000	VBN2BDSL0000
		1.2	VBN2BEPL1000	VBN2BESL1000	VBN2BEPL1001	VBN2BESL1001	VBN2BEPL0000	VBN2BESL0000
		2.5	VBN2BGPL1000	VBN2BGPL1000	VBN2BGPL1001	VBN2BGPL1001	VBN2BGPL0000	VBN2BGPL0000
		4.3	VBN2BHPL1000	VBN2BHSL1000	VBN2BHPL1001	VBN2BHSL1001	VBN2BHPL0000	VBN2BHSL0000
		7.4	VBN2BJPL1000	VBN2BJS�1000	VBN2BJPL1001	VBN2BJS�1001	VBN2BJPL0000	VBN2BJS�0000
		10.1	VBN2BKPL1000	VBN2BKSL1000	VBN2BKPL1001	VBN2BKSL1001	VBN2BKPL0000	VBN2BKSL0000
		14.7*	VBN2BLPL1000	VBN2BLSL1000	VBN2BLPL1001	VBN2BLSL1001	VBN2BLPL0000	VBN2BLSL0000
29*	VBN2BMPL1000	VBN2BMSL1000	VBN2BMPL1001	VBN2BMSL1001	VBN2BMPL0000	VBN2BMSL0000		
1"	100	4.4	VBN2CHPL1000	VBN2CHSL1000	VBN2CHPL1001	VBN2CHSL1001	VBN2CHPL0000	VBN2CHSL0000
		9	VBN2CJPL1000	VBN2CJSL1000	VBN2CJPL1001	VBN2CJSL1001	VBN2CJPL0000	VBN2CJSL0000
		15.3	VBN2CLPL1000	VBN2CLSL1000	VBN2CLPL1001	VBN2CLSL1001	VBN2CLPL0000	VBN2CLSL0000
		26	VBN2CMPL1000	VBN2CMSL1000	VBN2CMPL1001	VBN2CMSL1001	VBN2CMPL0000	VBN2CMSL0000
		44*	VBN2CNPL1000	VBN2CNSL1000	VBN2CNPL1001	VBN2CNSL1001	VBN2CNPL0000	VBN2CNSL0000
		54*	VBN2CPPL1000	VBN2CPSL1000	VBN2CPPL1001	VBN2CPSL1001	VBN2CPPL0000	VBN2CPSL0000
1-1/4"	100	4.4	VBN2DHPL1000	VBN2DHSL1000	VBN2DHPL1001	VBN2DHSL1001	VBN2DHPL0000	VBN2DHSL0000
		8.3	VBN2DJPL1000	VBN2DJS�1000	VBN2DJPL1001	VBN2DJS�1001	VBN2DJPL0000	VBN2DJS�0000
		14.9	VBN2DKPL1000	VBN2DKSL1000	VBN2DKPL1001	VBN2DKSL1001	VBN2DKPL0000	VBN2DKSL0000
		25	VBN2DLPL1000	VBN2DLSL1000	VBN2DLPL1001	VBN2DLSL1001	VBN2DLPL0000	VBN2DLSL0000
		37	VBN2DMPL1000	VBN2DMSL1000	VBN2DMPL1001	VBN2DMSL1001	VBN2DMPL0000	VBN2DMSL0000
		41*	VBN2DNPL1000	VBN2DNSL1000	VBN2DNPL1001	VBN2DNSL1001	VBN2DNPL0000	VBN2DNSL0000
		102*	VBN2DSPL1000	VBN2DSSL1000	VBN2DSPL1001	VBN2DSSL1001	VBN2DSPL0000	VBN2DSSL0000

* Full port ball. No flow characterizing insert.



Product Selection - Valves

MVN Actuator With Low Profile 2-Way NPT Valves 1/2"-1 1/4"

Actuator Features		Non Fail Safe							
Actuator O.S Number/ Short Order Code		MVN643L0000		MVN643L0000+C1		MVN713L0000		MVN713L0000+C1	
Power Supply	Voltage	24 VAC/DC		24 VAC/DC		24 VAC/DC		24 VAC/DC	
	Frequency	50/60 Hz		50/60 Hz		50/60 Hz		50/60 Hz	
	Power	6 VA		6 VA		5 VA		5 VA	
Actuator Torque	(lb.-in.)	27		27		27		27	
Control	Modulating (0)2-10Vdc					•		•	
	Floating								
	Fast acting SPDT	•		•					
Actuator Stroke (degrees)		90° ± 3°		90° ± 3°		90° ± 3°		90° ± 3°	
Timing	(seconds)	30		30		90		90	
Fail Safe Action		Fail in Place		Fail in Place		Fail in Place		Fail in Place	
Valve Features	Trim	Nickel-Plated Brass	Stainless Steel	Nickel-Plated Brass	Stainless Steel	Nickel-Plated Brass	Stainless Steel	Nickel-Plated Brass	Stainless Steel

Valve Size (inches)	Close-off Pressure (psid)	Cv	Short Order Codes							
			No Cable		1 Meter Cable		No Cable		1 Meter Cable	
1/2"	130	0.38	VBN2ABPL2000	VBN2ABSL2000	VBN2ABPL2001	VBN2ABSL2001	VBN2ABPL3000	VBN2ABSL3000	VBN2ABPL3001	VBN2ABSL3001
		0.68	VBN2ADPL2000	VBN2ADSL2000	VBN2ADPL2001	VBN2ADSL2001	VBN2ADPL3000	VBN2ADSL3000	VBN2ADPL3001	VBN2ADSL3001
		1.3	VBN2AEPL2000	VBN2AESL2000	VBN2AEPL2001	VBN2AESL2001	VBN2AEPL3000	VBN2AESL3000	VBN2AEPL3001	VBN2AESL3001
		2	VBN2AFPL2000	VBN2AFSL2000	VBN2AFPL2001	VBN2AFSL2001	VBN2AFPL3000	VBN2AFSL3000	VBN2AFPL3001	VBN2AFSL3001
		2.6	VBN2AGPL2000	VBN2AGSL2000	VBN2AGPL2001	VBN2AGSL2001	VBN2AGPL3000	VBN2AGSL3000	VBN2AGPL3001	VBN2AGSL3001
		4.7	VBN2AHPL2000	VBN2AHSL2000	VBN2AHPL2001	VBN2AHSL2001	VBN2AHPL3000	VBN2AHSL3000	VBN2AHPL3001	VBN2AHSL3001
		8	VBN2AJPL2000	VBN2AJSL2000	VBN2AJPL2001	VBN2AJSL2001	VBN2AJPL3000	VBN2AJSL3000	VBN2AJPL3001	VBN2AJSL3001
		11.7*	VBN2AKPL2000	VBN2AKSL2000	VBN2AKPL2001	VBN2AKSL2001	VBN2AKPL3000	VBN2AKSL3000	VBN2AKPL3001	VBN2AKSL3001
3/4"	130	0.31	VBN2BBPL2000	VBN2BBSL2000	VBN2BBPL2001	VBN2BBSL2001	VBN2BBPL3000	VBN2BBSL3000	VBN2BBPL3001	VBN2BBSL3001
		0.63	VBN2BDPL2000	VBN2BDSL2000	VBN2BDPL2001	VBN2BDSL2001	VBN2BDPL3000	VBN2BDSL3000	VBN2BDPL3001	VBN2BDSL3001
		1.2	VBN2BEPL2000	VBN2BESL2000	VBN2BEPL2001	VBN2BESL2001	VBN2BEPL3000	VBN2BESL3000	VBN2BEPL3001	VBN2BESL3001
		2.5	VBN2BGPL2000	VBN2BGS�2000	VBN2BGPL2001	VBN2BGS�2001	VBN2BGPL3000	VBN2BGS�3000	VBN2BGPL3001	VBN2BGS�3001
		4.3	VBN2BHPL2000	VBN2BHSL2000	VBN2BHPL2001	VBN2BHSL2001	VBN2BHPL3000	VBN2BHSL3000	VBN2BHPL3001	VBN2BHSL3001
		7.4	VBN2BJPL2000	VBN2BJS�2000	VBN2BJPL2001	VBN2BJS�2001	VBN2BJPL3000	VBN2BJS�3000	VBN2BJPL3001	VBN2BJS�3001
		10.1	VBN2BKPL2000	VBN2BKSL2000	VBN2BKPL2001	VBN2BKSL2001	VBN2BKPL3000	VBN2BKSL3000	VBN2BKPL3001	VBN2BKSL3001
		14.7*	VBN2BLPL2000	VBN2BLSL2000	VBN2BLPL2001	VBN2BLSL2001	VBN2BLPL3000	VBN2BLSL3000	VBN2BLPL3001	VBN2BLSL3001
29*	VBN2BMPL2000	VBN2BMSL2000	VBN2BMPL2001	VBN2BMSL2001	VBN2BMPL3000	VBN2BMSL3000	VBN2BMPL3001	VBN2BMSL3001		
1"	100	4.4	VBN2CHPL2000	VBN2CHSL2000	VBN2CHPL2001	VBN2CHSL2001	VBN2CHPL3000	VBN2CHSL3000	VBN2CHPL3001	VBN2CHSL3001
		9	VBN2CJPL2000	VBN2CJS�2000	VBN2CJPL2001	VBN2CJS�2001	VBN2CJPL3000	VBN2CJS�3000	VBN2CJPL3001	VBN2CJS�3001
		15.3	VBN2CLPL2000	VBN2CLS�2000	VBN2CLPL2001	VBN2CLS�2001	VBN2CLPL3000	VBN2CLS�3000	VBN2CLPL3001	VBN2CLS�3001
		26	VBN2CMPL2000	VBN2CMSL2000	VBN2CMPL2001	VBN2CMSL2001	VBN2CMPL3000	VBN2CMSL3000	VBN2CMPL3001	VBN2CMSL3001
		44*	VBN2CNPL2000	VBN2CNSL2000	VBN2CNPL2001	VBN2CNSL2001	VBN2CNPL3000	VBN2CNSL3000	VBN2CNPL3001	VBN2CNSL3001
		54*	VBN2CPPL2000	VBN2CPSL2000	VBN2CPPL2001	VBN2CPSL2001	VBN2CPPL3000	VBN2CPSL3000	VBN2CPPL3001	VBN2CPSL3001
1-1/4"	100	4.4	VBN2DHPL2000	VBN2DHSL2000	VBN2DHPL2001	VBN2DHSL2001	VBN2DHPL3000	VBN2DHSL3000	VBN2DHPL3001	VBN2DHSL3001
		8.3	VBN2DJPL2000	VBN2DJS�2000	VBN2DJPL2001	VBN2DJS�2001	VBN2DJPL3000	VBN2DJS�3000	VBN2DJPL3001	VBN2DJS�3001
		14.9	VBN2DKPL2000	VBN2DKSL2000	VBN2DKPL2001	VBN2DKSL2001	VBN2DKPL3000	VBN2DKSL3000	VBN2DKPL3001	VBN2DKSL3001
		25	VBN2DLPL2000	VBN2DLSL2000	VBN2DLPL2001	VBN2DLSL2001	VBN2DLPL3000	VBN2DLSL3000	VBN2DLPL3001	VBN2DLSL3001
		37	VBN2DMPL2000	VBN2DMSL2000	VBN2DMPL2001	VBN2DMSL2001	VBN2DMPL3000	VBN2DMSL3000	VBN2DMPL3001	VBN2DMSL3001
		41*	VBN2DNPL2000	VBN2DNSL2000	VBN2DNPL2001	VBN2DNSL2001	VBN2DNPL3000	VBN2DNSL3000	VBN2DNPL3001	VBN2DNSL3001
		102*	VBN2DSPL2000	VBN2DSSL2000	VBN2DSPL2001	VBN2DSSL2001	VBN2DSPL3000	VBN2DSSL3000	VBN2DSPL3001	VBN2DSSL3001

* Full port ball. No flow characterizing insert.

2-Way

VALVES

Product Selection - Valves

MVN Actuator With Standard Profile 3-Way NPT Valves 1/2"-1 1/4"

Common Features

- Max static pressure 360 psi (250°F)
- Medium: Water/glycol solutions up to 50%. Use globe valves for steam control.
- Fluid temperature range: -22 to +250°F
- Spring return actuators field-configurable for A-port normally open or normally closed fail safe.

Valve Features

- Equal % flow insert. Largest Cv rating in each valve size is full port, as noted
- Nickel-chrome plated brass or 316 stainless steel ball and stem
- ANSI class IV leakage (0.01% of Cv)



3-Way


Actuator Features		Non Fail Safe						Valve Only
Actuator O.S Number/ Short Order Code	MVN613A0000	MVN613A0000+C1	MVN643A0000	MVN643A0000+C1	MVN713A0000	MVN713A0000+C1	N/A	
Power Supply	Voltage	24 Vac	24 Vac	24 Vac	24 Vac	24 Vac	24 Vac	
	Frequency	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz	
	Power	1.5 VA	1.5 VA	6 VA	6 VA	5 VA	5 VA	
Actuator Torque	(lb.-in.)	27	27	27	27	27	27	
Control	Modulating (0)2-10Vdc					•	•	
	Floating	•	•					
	Fast acting SPDT			•	•			
Actuator Stroke (degrees)		90 ±3	90 ±3	90 ±3	90 ±3	90 ±3	90 ±3	
Timing	(seconds)	90	90	30	30	90	90	
Fail Safe Action		Fail in Place	Fail in Place	Fail in Place	Fail in Place	Fail in Place	Fail in Place	
Valve Features	Trim	Nickel-Plated Brass	Nickel-Plated Brass	Nickel-Plated Brass	Nickel-Plated Brass	Nickel-Plated Brass	Nickel-Plated Brass	

Valve Size (inches)	Close-off Pressure (psid)	Cv	Short Order Codes							
			No Cable	1 Meter Cable	No Cable	1 Meter Cable	No Cable	1 Meter Cable	Valve Only	
1/2"	50	0.33	VBN3ABPA1000	VBN3ABPA1001	VBN3ABPA2000	VBN3ABPA2001	VBN3ABPA3000	VBN3ABPA3001	VBN3ABPA0000	
		0.59	VBN3ACPA1000	VBN3ACPA1001	VBN3ACPA2000	VBN3ACPA2001	VBN3ACPA3000	VBN3ACPA3001	VBN3ACPA0000	
		1	VBN3AEPa1000	VBN3AEPa1001	VBN3AEPa2000	VBN3AEPa2001	VBN3AEPa3000	VBN3AEPa3001	VBN3AEPa0000	
		2.4	VBN3AFPA1000	VBN3AFPA1001	VBN3AFPA2000	VBN3AFPA2001	VBN3AFPA3000	VBN3AFPA3001	VBN3AFPA0000	
		4.3	VBN3AHPA1000	VBN3AHPA1001	VBN3AHPA2000	VBN3AHPA2001	VBN3AHPA3000	VBN3AHPA3001	VBN3AHPA0000	
		8*	VBN3AJPA1000	VBN3AJPA1001	VBN3AJPA2000	VBN3AJPA2001	VBN3AJPA3000	VBN3AJPA3001	VBN3AJPA0000	
3/4"	50	0.4	VBN3BCPA1000	VBN3BCPA1001	VBN3BCPA2000	VBN3BCPA2001	VBN3BCPA3000	VBN3BCPA3001	VBN3BCPA0000	
		0.66	VBN3BDPA1000	VBN3BDPA1001	VBN3BDPA2000	VBN3BDPA2001	VBN3BDPA3000	VBN3BDPA3001	VBN3BDPA0000	
		1.3	VBN3BEPA1000	VBN3BEPA1001	VBN3BEPA2000	VBN3BEPA2001	VBN3BEPA3000	VBN3BEPA3001	VBN3BEPA0000	
		2.4	VBN3BFPA1000	VBN3BFPA1001	VBN3BFPA2000	VBN3BFPA2001	VBN3BFPA3000	VBN3BFPA3001	VBN3BFPA0000	
		3.8	VBN3BGPA1000	VBN3BGPA1001	VBN3BGPA2000	VBN3BGPA2001	VBN3BGPA3000	VBN3BGPA3001	VBN3BGPA0000	
		7	VBN3BJPA1000	VBN3BJPA1001	VBN3BJPA2000	VBN3BJPA2001	VBN3BJPA3000	VBN3BJPA3001	VBN3BJPA0000	
1"	50	11*	VBN3BKPA1000	VBN3BKPA1001	VBN3BKPA2000	VBN3BKPA2001	VBN3BKPA3000	VBN3BKPA3001	VBN3BKPA0000	
		0.4	VBN3CCPA1000	VBN3CCPA1001	VBN3CCPA2000	VBN3CCPA2001	VBN3CCPA3000	VBN3CCPA3001	VBN3CCPA0000	
		0.65	VBN3CDPA1000	VBN3CDPA1001	VBN3CDPA2000	VBN3CDPA2001	VBN3CDPA3000	VBN3CDPA3001	VBN3CDPA0000	
		1.3	VBN3CEPA1000	VBN3CEPA1001	VBN3CEPA2000	VBN3CEPA2001	VBN3CEPA3000	VBN3CEPA3001	VBN3CEPA0000	
		2.3	VBN3CFPA1000	VBN3CFPA1001	VBN3CFPA2000	VBN3CFPA2001	VBN3CFPA3000	VBN3CFPA3001	VBN3CFPA0000	
		3.5	VBN3CGPA1000	VBN3CGPA1001	VBN3CGPA2000	VBN3CGPA2001	VBN3CGPA3000	VBN3CGPA3001	VBN3CGPA0000	
		4.5	VBN3CHPA1000	VBN3CHPA1001	VBN3CHPA2000	VBN3CHPA2001	VBN3CHPA3000	VBN3CHPA3001	VBN3CHPA0000	
		8.6	VBN3CJPA1000	VBN3CJPA1001	VBN3CJPA2000	VBN3CJPA2001	VBN3CJPA3000	VBN3CJPA3001	VBN3CJPA0000	
		14.9	VBN3CKPA1000	VBN3CKPA1001	VBN3CKPA2000	VBN3CKPA2001	VBN3CKPA3000	VBN3CKPA3001	VBN3CKPA0000	
22*	VBN3CLPA1000	VBN3CLPA1001	VBN3CLPA2000	VBN3CLPA2001	VBN3CLPA3000	VBN3CLPA3001	VBN3CLPA0000			
31*	VBN3CMPA1000	VBN3CMPA1001	VBN3CMPA2000	VBN3CMPA2001	VBN3CMPA3000	VBN3CMPA3001	VBN3CMPA0000			
1-1/4"	40	4.1	VBN3DHPA1000	VBN3DHPA1001	VBN3DHPA2000	VBN3DHPA2001	VBN3DHPA3000	VBN3DHPA3001	VBN3DHPA0000	
		8.7	VBN3DJPA1000	VBN3DJPA1001	VBN3DJPA2000	VBN3DJPA2001	VBN3DJPA3000	VBN3DJPA3001	VBN3DJPA0000	
		12.7	VBN3DKPA1000	VBN3DKPA1001	VBN3DKPA2000	VBN3DKPA2001	VBN3DKPA3000	VBN3DKPA3001	VBN3DKPA0000	
		19.4*	VBN3DLPA1000	VBN3DLPA1001	VBN3DLPA2000	VBN3DLPA2001	VBN3DLPA3000	VBN3DLPA3001	VBN3DLPA0000	
		27	VBN3DMPA1000	VBN3DMPA1001	VBN3DMPA2000	VBN3DMPA2001	VBN3DMPA3000	VBN3DMPA3001	VBN3DMPA0000	
		34*	VBN3DNPA1000	VBN3DNPA1001	VBN3DNPA2000	VBN3DNPA2001	VBN3DNPA3000	VBN3DNPA3001	VBN3DNPA0000	

* Full port ball. No flow characterizing insert.

Product Selection - Valves

MVN Actuator With Low Profile 3-Way NPT Valves 1/2"-1 1/4"

Actuator Features		Non Fail Safe						Valve Only
Actuator O.S Number/ Short Order Code		MVN613L0000	MVN613L0000+C1	MVN643L0000	MVN643L0000+C1	MVN713L0000	MVN713L0000+C1	N/A
Power Supply	Voltage	24 VAC	24 VAC	24 VAC/DC	24VAC/DC	24 VAC/DC	24 VAC/DC	
	Frequency	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz	
	Power	1.5 VA	1.5 VA	6 VA	6 VA	5 VA	5 VA	
Actuator Torque	(lb.-in.)	27	27	27	27	27	27	
Control	Modulating (0)2-10Vdc					•	•	
	Floating	•	•					
	Fast acting SPDT			•	•			
Actuator Stroke (degrees)		90° ± 3°	90° ± 3°	90° ± 3°	90° ± 3°	90° ± 3°	90° ± 3°	
Timing	(seconds)	90	90	30	30	90	90	
Fail Safe Action		Fail in Place	Fail in Place	Fail in Place	Fail in Place	Fail in Place	Fail in Place	
Valve Features	Trim	Nickel-Plated Brass	Nickel-Plated Brass	Nickel-Plated Brass	Nickel-Plated Brass	Nickel-Plated Brass	Nickel-Plated Brass	Nickel-Plated Brass

3-Way

Valve Size (inches)	Close-off Pressure (psid)	Cv	Short Order Codes								
			No Cable		1 Meter Cable		No Cable		1 Meter Cable		Valve Only
1/2"	50	0.33	VBN3ABPL1000	VBN3ABPL1001	VBN3ABPL2000	VBN3ABPL2001	VBN3ABPL3000	VBN3ABPL3001	VBN3ABPL0000		
		0.59	VBN3ACPL1000	VBN3ACPL1001	VBN3ACPL2000	VBN3ACPL2001	VBN3ACPL3000	VBN3ACPL3001	VBN3ACPL0000		
		1	VBN3AEPL1000	VBN3AEPL1001	VBN3AEPL2000	VBN3AEPL2001	VBN3AEPL3000	VBN3AEPL3001	VBN3AEPL0000		
		2.4	VBN3AFPL1000	VBN3AFPL1001	VBN3AFPL2000	VBN3AFPL2001	VBN3AFPL3000	VBN3AFPL3001	VBN3AFPL0000		
		4.3	VBN3AHPL1000	VBN3AHPL1001	VBN3AHPL2000	VBN3AHPL2001	VBN3AHPL3000	VBN3AHPL3001	VBN3AHPL0000		
		8*	VBN3AJPL1000	VBN3AJPL1001	VBN3AJPL2000	VBN3AJPL2001	VBN3AJPL3000	VBN3AJPL3001	VBN3AJPL0000		
3/4"	50	0.4	VBN3BCPL1000	VBN3BCPL1001	VBN3BCPL2000	VBN3BCPL2001	VBN3BCPL3000	VBN3BCPL3001	VBN3BCPL0000		
		0.66	VBN3BDPL1000	VBN3BDPL1001	VBN3BDPL2000	VBN3BDPL2001	VBN3BDPL3000	VBN3BDPL3001	VBN3BDPL0000		
		1.3	VBN3BEPL1000	VBN3BEPL1001	VBN3BEPL2000	VBN3BEPL2001	VBN3BEPL3000	VBN3BEPL3001	VBN3BEPL0000		
		2.4	VBN3BFPL1000	VBN3BFPL1001	VBN3BFPL2000	VBN3BFPL2001	VBN3BFPL3000	VBN3BFPL3001	VBN3BFPL0000		
		3.8	VBN3BGPL1000	VBN3BGPL1001	VBN3BGPL2000	VBN3BGPL2001	VBN3BGPL3000	VBN3BGPL3001	VBN3BGPL0000		
		7	VBN3BJPL1000	VBN3BJPL1001	VBN3BJPL2000	VBN3BJPL2001	VBN3BJPL3000	VBN3BJPL3001	VBN3BJPL0000		
		11*	VBN3BKPL1000	VBN3BKPL1001	VBN3BKPL2000	VBN3BKPL2001	VBN3BKPL3000	VBN3BKPL3001	VBN3BKPL0000		
1"	50	0.4	VBN3CCPL1000	VBN3CCPL1001	VBN3CCPL2000	VBN3CCPL2001	VBN3CCPL3000	VBN3CCPL3001	VBN3CCPL0000		
		0.65	VBN3CDPL1000	VBN3CDPL1001	VBN3CDPL2000	VBN3CDPL2001	VBN3CDPL3000	VBN3CDPL3001	VBN3CDPL0000		
		1.3	VBN3CEPL1000	VBN3CEPL1001	VBN3CEPL2000	VBN3CEPL2001	VBN3CEPL3000	VBN3CEPL3001	VBN3CEPL0000		
		2.3	VBN3CFPL1000	VBN3CFPL1001	VBN3CFPL2000	VBN3CFPL2001	VBN3CFPL3000	VBN3CFPL3001	VBN3CFPL0000		
		3.5	VBN3CGPL1000	VBN3CGPL1001	VBN3CGPL2000	VBN3CGPL2001	VBN3CGPL3000	VBN3CGPL3001	VBN3CGPL0000		
		4.5	VBN3CHPL1000	VBN3CHPL1001	VBN3CHPL2000	VBN3CHPL2001	VBN3CHPL3000	VBN3CHPL3001	VBN3CHPL0000		
		8.6	VBN3CJPL1000	VBN3CJPL1001	VBN3CJPL2000	VBN3CJPL2001	VBN3CJPL3000	VBN3CJPL3001	VBN3CJPL0000		
		14.9	VBN3CKPL1000	VBN3CKPL1001	VBN3CKPL2000	VBN3CKPL2001	VBN3CKPL3000	VBN3CKPL3001	VBN3CKPL0000		
		22*	VBN3CLPL1000	VBN3CLPL1001	VBN3CLPL2000	VBN3CLPL2001	VBN3CLPL3000	VBN3CLPL3001	VBN3CLPL0000		
		31*	VBN3CMPL1000	VBN3CMPL1001	VBN3CMPL2000	VBN3CMPL2001	VBN3CMPL3000	VBN3CMPL3001	VBN3CMPL0000		
1-1/4"	40	4.1	VBN3DHPL1000	VBN3DHPL1001	VBN3DHPL2000	VBN3DHPL2001	VBN3DHPL3000	VBN3DHPL3001	VBN3DHPL0000		
		8.7	VBN3DJPL1000	VBN3DJPL1001	VBN3DJPL2000	VBN3DJPL2001	VBN3DJPL3000	VBN3DJPL3001	VBN3DJPL0000		
		12.7	VBN3DKPL1000	VBN3DKPL1001	VBN3DKPL2000	VBN3DKPL2001	VBN3DKPL3000	VBN3DKPL3001	VBN3DKPL0000		
		19.4*	VBN3DLPL1000	VBN3DLPL1001	VBN3DLPL2000	VBN3DLPL2001	VBN3DLPL3000	VBN3DLPL3001	VBN3DLPL0000		
		27	VBN3DMPL1000	VBN3DMPL1001	VBN3DMPL2000	VBN3DMPL2001	VBN3DMPL3000	VBN3DMPL3001	VBN3DMPL0000		
		34*	VBN3DNPL1000	VBN3DNPL1001	VBN3DNPL2000	VBN3DNPL2001	VBN3DNPL3000	VBN3DNPL3001	VBN3DNPL0000		

* Full port ball. No flow characterizing insert.

VALVES

Product Selection - Valves

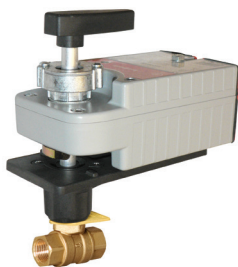
2-Way NPT Valves 1/2" - 3", NEMA 2

Common Features

- Max static pressure 360 psi (250°F)
- Medium: Water/glycol solutions up to 50%.
Use globe valves for steam control.
- Fluid temperature range: -22 to +250°F
- Spring return actuators field-configurable for A-port normally open or normally closed fail safe.

VBN2 (Two-way)

- Equal % flow insert. Largest Cv rating in each valve size is full port, as noted
- Nickel-chrome plated brass or 316 stainless steel ball and stem
- ANSI class IV leakage (0.01% of Cv)



2-Way

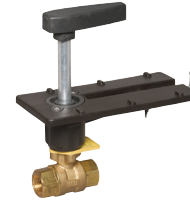
Actuator Features			Non Fail Safe				
Actuator O.S. Number			MN6105A1011		MN6105A1201		
Power Supply	Voltage		24 VAC/DC		24 VAC/DC		
	Frequency		50 / 60 Hz		50 / 60 Hz		
Actuator Torque	Power		5 VA		5 VA		
	(lb.-in.)		44		44		
Control	(0)2-10 Vdc						
	4-20 mA (external 500 Ohm Resistor)						
Actuator Stroke	Floating		•		•		
	Two-Position SPDT		•		•		
	Two-Position SPST						
Actuator Stroke	(degrees)		95° ± 3°		95° ± 3°		
Timing	(drive/spring return, seconds)		90		90		
Aux Switch			0		2		
Feedback	2-10 Vdc Built In		-		-		
Fail Safe Action			Stay in Place		Stay in Place		
Normal Position (no signal)			Stay in Place		Stay in Place		
Valve Features			Trim	Nickel-Plated Brass	Stainless Steel	Nickel-Plated Brass	Stainless Steel
Valve Size (inches)	Close-off Pressure (psid)	Cv	Short Order Codes				
1/2"	130	0.38	VBN2ABPX4000	VBN2ABSX4000	VBN2ABPXC000	VBN2ABSXC000	
		0.68	VBN2ADPX4000	VBN2ADSX4000	VBN2ADPXC000	VBN2ADSXC000	
		1.3	VBN2AEPX4000	VBN2AESX4000	VBN2AEPXC000	VBN2AESXC000	
		2	VBN2AFPX4000	VBN2AFSX4000	VBN2AFPXC000	VBN2AFSXC000	
		2.6	VBN2AGPX4000	VBN2AGSX4000	VBN2AGPXC000	VBN2AGSXC000	
		4.7	VBN2AHPX4000	VBN2AHSX4000	VBN2AHPXC000	VBN2AHSXC000	
		8	VBN2AJPX4000	VBN2AJSX4000	VBN2AJPXC000	VBN2AJSXC000	
		11.7*	VBN2AKPX4000	VBN2AKSX4000	VBN2AKPXC000	VBN2AKSXC000	
3/4"	130	0.31	VBN2BBPX4000	VBN2BBSX4000	VBN2BBPXC000	VBN2BBSXC000	
		0.63	VBN2BDPX4000	VBN2BDSX4000	VBN2BDPXC000	VBN2BDSXC000	
		1.2	VBN2BEPX4000	VBN2BESX4000	VBN2BEPXC000	VBN2BESXC000	
		2.5	VBN2BGPX4000	VBN2BGSX4000	VBN2BGPXC000	VBN2BGSXC000	
		4.3	VBN2BHPX4000	VBN2BHSX4000	VBN2BHPXC000	VBN2BHSXC000	
		7.4	VBN2BJPX4000	VBN2BJSX4000	VBN2BJPXC000	VBN2BJSXC000	
		10.1	VBN2BKPX4000	VBN2BKSX4000	VBN2BKPXC000	VBN2BKSXC000	
		14.7*	VBN2BLPX4000	VBN2BLSX4000	VBN2BLPXC000	VBN2BLSXC000	
29*	VBN2BMPX4000	VBN2BMSX4000	VBN2BMPXC000	VBN2BMSXC000			
1"	100	4.4	VBN2CHPX4000	VBN2CHSX4000	VBN2CHPXC000	VBN2CHSXC000	
		9	VBN2CJPX4000	VBN2CJSX4000	VBN2CJPXC000	VBN2CJSXC000	
		15.3	VBN2CLPX4000	VBN2CLSX4000	VBN2CLPXC000	VBN2CLSXC000	
		26	VBN2CMPX4000	VBN2CMSX4000	VBN2CMPXC000	VBN2CMSXC000	
		44*	VBN2CNPX4000	VBN2CNSX4000	VBN2CNPXC000	VBN2CNSXC000	
		54*	VBN2CPPX4000	VBN2CPSX4000	VBN2CPPXC000	VBN2CPSXC000	
1-1/4"	100	4.4	VBN2DHPX4000	VBN2DHSX4000	VBN2DHPXC000	VBN2DHSXC000	
		8.3	VBN2DJPX4000	VBN2DJSX4000	VBN2DJPXC000	VBN2DJSXC000	
		14.9	VBN2DKPX4000	VBN2DKSX4000	VBN2DKPXC000	VBN2DKSXC000	
		25	VBN2DLPX4000	VBN2DLSX4000	VBN2DLPXC000	VBN2DLSXC000	
		37	VBN2DMPX4000	VBN2DMSX4000	VBN2DMPXC000	VBN2DMSXC000	
		41*	VBN2DNPX4000	VBN2DNSX4000	VBN2DNPXC000	VBN2DNSXC000	
		102*	VBN2DSPX4000	VBN2DSSX4000	VBN2DSPXC000	VBN2DSSXC000	
		23	VBN2ELPX4000	VBN2ELSX4000	VBN2ELPXC000	VBN2ELSXC000	
1-1/2"	100	30	VBN2EMPX4000	VBN2EMSX4000	VBN2EMPXC000	VBN2EMSXC000	
		41	VBN2ENPX4000	VBN2ENSX4000	VBN2ENPXC000	VBN2ENSXC000	
		74*	VBN2ERPX4000	VBN2ERSX4000	VBN2ERPXC000	VBN2ERSXC000	
		172*	VBN2E1PX4000	VBN2E1SX4000	VBN2E1PXC000	VBN2E1SXC000	
2"	100	42	VBN2FNPX4000	VBN2FNSX4000	VBN2FNPXC000	VBN2FNSXC000	
		57	VBN2FPPX4000	VBN2FPSX4000	VBN2FPPXC000	VBN2FPSXC000	
		71	VBN2FRPX4000	VBN2FRSX4000	VBN2FRPXC000	VBN2FRSXC000	
		100	VBN2FSPX4000	VBN2FSSX4000	VBN2FSPXC000	VBN2FSSXC000	
		108*	VBN2FTPX4000	VBN2FTSX4000	VBN2FTPXC000	VBN2FTSXC000	
		210	VBN2F1PX4000	VBN2F1SX4000	VBN2F1PXC000	VBN2F1SXC000	
2-1/2"	100	266*	VBN2F2PX4000	VBN2F2SX4000	VBN2F2PXC000	VBN2F2SXC000	
		45	VBN2GNPX4000	VBN2GNSX4000	VBN2GNPXC000	VBN2GNSXC000	
		55	VBN2GPPX4000	VBN2GPSX4000	VBN2GPPXC000	VBN2GPSXC000	
		72	VBN2GRPX4000	VBN2GRSX4000	VBN2GRPXC000	VBN2GRSXC000	
		101	VBN2GSPX4000	VBN2GSSX4000	VBN2GSPXC000	VBN2GSSXC000	
		162	VBN2GUPX4000	VBN2GUSX4000	VBN2GUPXC000	VBN2GUSXC000	
3"	100	202*	VBN2G1PX4000	VBN2G1SX4000	VBN2G1PXC000	VBN2G1SXC000	
		49	VBN2HNPX4000	VBN2HNSX4000	VBN2HNPXC000	VBN2HNSXC000	
		63	VBN2HPPX4000	VBN2HPSX4000	VBN2HPPXC000	VBN2HPSXC000	
		82	VBN2HRPX4000	VBN2HRSX4000	VBN2HRPXC000	VBN2HRSXC000	
		124	VBN2HTPX4000	VBN2HTSX4000	VBN2HTPXC000	VBN2HTSXC000	
145*	VBN2HUPX4000	VBN2HUSX4000	VBN2HUPXC000	VBN2HUSXC000			

* Full port ball. No flow characterizing insert.

Product Selection - Valves

2-Way NPT Valves 1/2" - 3", NEMA 2

Actuator Features			Non Fail Safe				Valve Only		
Actuator O.S. Number			MN7505A2001		MN7505A2209		N/A		
Power Supply			24 VAC/DC		24 VAC/DC				
Voltage			24 VAC/DC		24 VAC/DC				
Frequency			50 / 60 Hz		50 / 60 Hz				
Power			5 VA		5 VA				
Actuator Torque (lb.-in.)			44		44				
Control			•		•				
(0)2-10 Vdc			•		•				
4-20 mA (external 500 Ohm Resistor)			•		•				
Floating			•		•				
Two-Position SPDT			•		•				
Two-Position SPST			•		•				
Actuator Stroke (degrees)			95° ± 3°		95° ± 3°				
Timing (drive/spring return, seconds)			90		90				
Aux Switch 2 x SPDT Add-on			0		2				
Feedback 2-10 Vdc Built In			•		•				
Fail Safe Action			Stay in Place		Stay in Place				
Normal Position (no signal)			Closed		Closed				
Valve Features			Trim	Nickel-Plated Brass	Stainless Steel	Nickel-Plated Brass	Stainless Steel	Nickel-Plated Brass	Stainless Steel
Valve Size (inches)	Close-off Pressure (psid)	Cv	Short Order Codes						
1/2"	130	0.38	VBN2ABPX5000	VBN2ABSX5000	VBN2ABPX0000	VBN2ABSX0000	VBN2ABPX0000	VBN2ABSX0000	
		0.68	VBN2ADPX5000	VBN2ADSX5000	VBN2ADPX0000	VBN2ADSX0000	VBN2ADPX0000	VBN2ADSX0000	
		1.3	VBN2AEPX5000	VBN2AESX5000	VBN2AEPX0000	VBN2AESX0000	VBN2AEPX0000	VBN2AESX0000	
		2	VBN2AFPX5000	VBN2AFSX5000	VBN2AFPX0000	VBN2AFSX0000	VBN2AFPX0000	VBN2AFSX0000	
		2.6	VBN2AGPX5000	VBN2AGSX5000	VBN2AGPX0000	VBN2AGSX0000	VBN2AGPX0000	VBN2AGSX0000	
		4.7	VBN2AHPX5000	VBN2AHSX5000	VBN2AHPX0000	VBN2AHSX0000	VBN2AHPX0000	VBN2AHSX0000	
		8	VBN2AJPX5000	VBN2AJSX5000	VBN2AJPX0000	VBN2AJSX0000	VBN2AJPX0000	VBN2AJSX0000	
3/4"	130	11.7*	VBN2AKPX5000	VBN2AKSX5000	VBN2AKPX0000	VBN2AKSX0000	VBN2AKPX0000	VBN2AKSX0000	
		0.31	VBN2BBPX5000	VBN2BBSX5000	VBN2BBPX0000	VBN2BBSX0000	VBN2BBPX0000	VBN2BBSX0000	
		0.63	VBN2BDPX5000	VBN2BDSX5000	VBN2BDPX0000	VBN2BDSX0000	VBN2BDPX0000	VBN2BDSX0000	
		1.2	VBN2BEPX5000	VBN2BESX5000	VBN2BEPX0000	VBN2BESX0000	VBN2BEPX0000	VBN2BESX0000	
		2.5	VBN2BGPX5000	VBN2BGSX5000	VBN2BGPX0000	VBN2BGSX0000	VBN2BGPX0000	VBN2BGSX0000	
		4.3	VBN2BHPX5000	VBN2BHSX5000	VBN2BHPX0000	VBN2BHSX0000	VBN2BHPX0000	VBN2BHSX0000	
		7.4	VBN2BJPX5000	VBN2BJSX5000	VBN2BJPX0000	VBN2BJSX0000	VBN2BJPX0000	VBN2BJSX0000	
1"	100	10.1	VBN2BKPX5000	VBN2BKSX5000	VBN2BKPX0000	VBN2BKSX0000	VBN2BKPX0000	VBN2BKSX0000	
		14.7*	VBN2BLPX5000	VBN2BLSX5000	VBN2BLPX0000	VBN2BLSX0000	VBN2BLPX0000	VBN2BLSX0000	
		29*	VBN2BMPX5000	VBN2BMSX5000	VBN2BMPX0000	VBN2BMSX0000	VBN2BMPX0000	VBN2BMSX0000	
		4.4	VBN2CHPX5000	VBN2CHSX5000	VBN2CHPX0000	VBN2CHSX0000	VBN2CHPX0000	VBN2CHSX0000	
		9	VBN2CJPX5000	VBN2CJSX5000	VBN2CJPX0000	VBN2CJSX0000	VBN2CJPX0000	VBN2CJSX0000	
		15.3	VBN2CLPX5000	VBN2CLSX5000	VBN2CLPX0000	VBN2CLSX0000	VBN2CLPX0000	VBN2CLSX0000	
		26	VBN2CMPX5000	VBN2CMSX5000	VBN2CMPX0000	VBN2CMSX0000	VBN2CMPX0000	VBN2CMSX0000	
1-1/4"	100	44*	VBN2CNPX5000	VBN2CNSX5000	VBN2CNPX0000	VBN2CNSX0000	VBN2CNPX0000	VBN2CNSX0000	
		54*	VBN2CPPX5000	VBN2CPSX5000	VBN2CPPX0000	VBN2CPSX0000	VBN2CPPX0000	VBN2CPSX0000	
		4.4	VBN2DHPX5000	VBN2DHSX5000	VBN2DHPX0000	VBN2DHSX0000	VBN2DHPX0000	VBN2DHSX0000	
		8.3	VBN2DJPX5000	VBN2DJSX5000	VBN2DJPX0000	VBN2DJSX0000	VBN2DJPX0000	VBN2DJSX0000	
		14.9	VBN2DKPX5000	VBN2DKSX5000	VBN2DKPX0000	VBN2DKSX0000	VBN2DKPX0000	VBN2DKSX0000	
		25	VBN2DLPX5000	VBN2DLSX5000	VBN2DLPX0000	VBN2DLSX0000	VBN2DLPX0000	VBN2DLSX0000	
		37	VBN2DMPX5000	VBN2DMSX5000	VBN2DMPX0000	VBN2DMSX0000	VBN2DMPX0000	VBN2DMSX0000	
1-1/2"	100	41	VBN2DNPX5000	VBN2DNSX5000	VBN2DNPX0000	VBN2DNSX0000	VBN2DNPX0000	VBN2DNSX0000	
		102*	VBN2DSPX5000	VBN2DSSX5000	VBN2DSPX0000	VBN2DSSX0000	VBN2DSPX0000	VBN2DSSX0000	
		23	VBN2ELPX5000	VBN2ELSX5000	VBN2ELPX0000	VBN2ELSX0000	VBN2ELPX0000	VBN2ELSX0000	
		30	VBN2EMPX5000	VBN2EMSX5000	VBN2EMPX0000	VBN2EMSX0000	VBN2EMPX0000	VBN2EMSX0000	
		41	VBN2ENPX5000	VBN2ENSX5000	VBN2ENPX0000	VBN2ENSX0000	VBN2ENPX0000	VBN2ENSX0000	
		74*	VBN2ERPX5000	VBN2ERSX5000	VBN2ERPX0000	VBN2ERSX0000	VBN2ERPX0000	VBN2ERSX0000	
		172*	VBN2E1PX5000	VBN2E1SX5000	VBN2E1PX0000	VBN2E1SX0000	VBN2E1PX0000	VBN2E1SX0000	
2"	100	42	VBN2FNPX5000	VBN2FNSX5000	VBN2FNPX0000	VBN2FNSX0000	VBN2FNPX0000	VBN2FNSX0000	
		57	VBN2FPPX5000	VBN2FPSX5000	VBN2FPPX0000	VBN2FPSX0000	VBN2FPPX0000	VBN2FPSX0000	
		71	VBN2FRPX5000	VBN2FRSX5000	VBN2FRPX0000	VBN2FRSX0000	VBN2FRPX0000	VBN2FRSX0000	
		100	VBN2FSPX5000	VBN2FSSX5000	VBN2FSPX0000	VBN2FSSX0000	VBN2FSPX0000	VBN2FSSX0000	
		108*	VBN2FTPX5000	VBN2FTSX5000	VBN2FTPX0000	VBN2FTSX0000	VBN2FTPX0000	VBN2FTSX0000	
		210	VBN2F1PX5000	VBN2F1SX5000	VBN2F1PX0000	VBN2F1SX0000	VBN2F1PX0000	VBN2F1SX0000	
		266*	VBN2F2PX5000	VBN2F2SX5000	VBN2F2PX0000	VBN2F2SX0000	VBN2F2PX0000	VBN2F2SX0000	
2-1/2"	100	45	VBN2GNPX5000	VBN2GNSX5000	VBN2GNPX0000	VBN2GNSX0000	VBN2GNPX0000	VBN2GNSX0000	
		55	VBN2GPPX5000	VBN2GPSX5000	VBN2GPPX0000	VBN2GPSX0000	VBN2GPPX0000	VBN2GPSX0000	
		72	VBN2GRPX5000	VBN2GRSX5000	VBN2GRPX0000	VBN2GRSX0000	VBN2GRPX0000	VBN2GRSX0000	
		101	VBN2GSPX5000	VBN2GSSX5000	VBN2GSPX0000	VBN2GSSX0000	VBN2GSPX0000	VBN2GSSX0000	
		162	VBN2GUPX5000	VBN2GUSX5000	VBN2GUPX0000	VBN2GUSX0000	VBN2GUPX0000	VBN2GUSX0000	
		202*	VBN2G1PX5000	VBN2G1SX5000	VBN2G1PX0000	VBN2G1SX0000	VBN2G1PX0000	VBN2G1SX0000	
3"	100	49	VBN2HNPX5000	VBN2HNSX5000	VBN2HNPX0000	VBN2HNSX0000	VBN2HNPX0000	VBN2HNSX0000	
		63	VBN2HPPX5000	VBN2HPSX5000	VBN2HPPX0000	VBN2HPSX0000	VBN2HPPX0000	VBN2HPSX0000	
		82	VBN2HRPX5000	VBN2HRSX5000	VBN2HRPX0000	VBN2HRSX0000	VBN2HRPX0000	VBN2HRSX0000	
		124	VBN2HTPX5000	VBN2HTSX5000	VBN2HTPX0000	VBN2HTSX0000	VBN2HTPX0000	VBN2HTSX0000	
		145*	VBN2HUPX5000	VBN2HUSX5000	VBN2HUPX0000	VBN2HUSX0000	VBN2HUPX0000	VBN2HUSX0000	



2-Way

VALVES

* Full port ball. No flow characterizing insert.

Product Selection - Valves

2-Way NPT Valves 1/2"- 1 1/4", NEMA 2

Actuator Features			Fail Safe								
Actuator O.S. Number			MS7103A2024				MS7103A2224				
Power Supply			24 VAC/DC				24 VAC/DC				
Voltage			24 VAC/DC				24 VAC/DC				
Frequency			50 / 60 Hz				50 / 60 Hz				
Power			4 VA				4 VA				
Actuator Torque (lb.-in.)			27				27				
Control (0)2-10 Vdc			•				•				
4-20 mA (external 500 Ohm Resistor)			•				•				
Floating											
Two-Position SPDT											
Two-Position SPST											
Actuator Stroke (degrees)			95° ± 3°				95° ± 3°				
Timing (drive/spring return, seconds)			90 / 25				90 / 25				
Aux Switch			0				2				
Feedback 2-10 Vdc Built In			•				•				
Fail Safe Action			Closed		Open		Closed		Open		
Normal Position (no signal)			Closed		Open		Closed		Open		
Valve Features			Trim	Nickel-Plated Brass	Stainless Steel	Nickel-Plated Brass	Stainless Steel	Nickel-Plated Brass	Stainless Steel	Nickel-Plated Brass	Stainless Steel
Valve Size (inches)	Close-off Pressure (psid)	Cv	Short Order Codes								
1/2"	130	0.38	VBN2ABPXE201	VBN2ABSXE201	VBN2ABPXE101	VBN2ABSXE101	VBN2ABPXF201	VBN2ABSXF201	VBN2ABPXF101	VBN2ABSXF101	
		0.68	VBN2ADPXE201	VBN2ADSXE201	VBN2ADPXE101	VBN2ADSXE101	VBN2ADPXF201	VBN2ADSXF201	VBN2ADPXF101	VBN2ADSXF101	
		1.3	VBN2AEPXE201	VBN2AESXE201	VBN2AEPXE101	VBN2AESXE101	VBN2AEPXF201	VBN2AESXF201	VBN2AEPXF101	VBN2AESXF101	
		2	VBN2AFPXE201	VBN2AFSXE201	VBN2AFPXE101	VBN2AFSXE101	VBN2AFPXF201	VBN2AFSXF201	VBN2AFPXF101	VBN2AFSXF101	
		2.6	VBN2AGPXE201	VBN2AGSXE201	VBN2AGPXE101	VBN2AGSXE101	VBN2AGPXF201	VBN2AGSXF201	VBN2AGPXF101	VBN2AGSXF101	
		4.7	VBN2AHPXE201	VBN2AHSXE201	VBN2AHPXE101	VBN2AHSXE101	VBN2AHPXF201	VBN2AHSXF201	VBN2AHPXF101	VBN2AHSXF101	
		8	VBN2AJPXE201	VBN2AJSXE201	VBN2AJPXE101	VBN2AJSXE101	VBN2AJPF201	VBN2AJSXF201	VBN2AJPF101	VBN2AJSXF101	
11.7*	VBN2AKPXE201	VBN2AKSXE201	VBN2AKPXE101	VBN2AKSXE101	VBN2AKPXF201	VBN2AKSXF201	VBN2AKPXF101	VBN2AKSXF101			
3/4"	130	0.31	VBN2BBPXE201	VBN2BBSXE201	VBN2BBPXE101	VBN2BBSXE101	VBN2BBPXF201	VBN2BBSXF201	VBN2BBPXF101	VBN2BBSXF101	
		0.63	VBN2BDPXE201	VBN2BDSXE201	VBN2BDPXE101	VBN2BDSXE101	VBN2BDPXF201	VBN2BDSXF201	VBN2BDPXF101	VBN2BDSXF101	
		1.2	VBN2BEPXE201	VBN2BESXE201	VBN2BEPXE101	VBN2BESXE101	VBN2BEPXF201	VBN2BESXF201	VBN2BEPXF101	VBN2BESXF101	
		2.5	VBN2BGPXE201	VBN2BGSXE201	VBN2BGPXE101	VBN2BGSXE101	VBN2BGPXF201	VBN2BGSXF201	VBN2BGPXF101	VBN2BGSXF101	
		4.3	VBN2BHPXE201	VBN2BHSXE201	VBN2BHPXE101	VBN2BHSXE101	VBN2BHPXF201	VBN2BHSXF201	VBN2BHPXF101	VBN2BHSXF101	
		7.4	VBN2BJPXE201	VBN2BJSXE201	VBN2BJPXE101	VBN2BJSXE101	VBN2BJPF201	VBN2BJSXF201	VBN2BJPF101	VBN2BJSXF101	
		10.1	VBN2BKPXE201	VBN2BKSXE201	VBN2BKPXE101	VBN2BKSXE101	VBN2BKPF201	VBN2BKSXF201	VBN2BKPF101	VBN2BKSXF101	
14.7*	VBN2BLPXE201	VBN2BLSXE201	VBN2BLPXE101	VBN2BLSXE101	VBN2BLPF201	VBN2BLSXF201	VBN2BLPF101	VBN2BLSXF101			
29*	VBN2BMPXE201	VBN2BMSXE201	VBN2BMPXE101	VBN2BMSXE101	VBN2BMPXF201	VBN2BMSXF201	VBN2BMPXF101	VBN2BMSXF101			
1"	100	4.4	VBN2CHPXE201	VBN2CHSXE201	VBN2CHPXE101	VBN2CHSXE101	VBN2CHPXF201	VBN2CHSXF201	VBN2CHPXF101	VBN2CHSXF101	
		9	VBN2CJPXE201	VBN2CJSXE201	VBN2CJPXE101	VBN2CJSXE101	VBN2CJPF201	VBN2CJSXF201	VBN2CJPF101	VBN2CJSXF101	
		15.3	VBN2CLPXE201	VBN2CLSXE201	VBN2CLPXE101	VBN2CLSXE101	VBN2CLPXF201	VBN2CLSXF201	VBN2CLPXF101	VBN2CLSXF101	
		26	VBN2CMPXE201	VBN2CMSXE201	VBN2CMPXE101	VBN2CMSXE101	VBN2CMPXF201	VBN2CMSXF201	VBN2CMPXF101	VBN2CMSXF101	
		44*	VBN2CNPXE201	VBN2CNSXE201	VBN2CNPXE101	VBN2CNSXE101	VBN2CNPXF201	VBN2CNSXF201	VBN2CNPXF101	VBN2CNSXF101	
54*	VBN2CPPXE201	VBN2CPSXE201	VBN2CPPXE101	VBN2CPSXE101	VBN2CPPXF201	VBN2CPSXF201	VBN2CPPXF101	VBN2CPSXF101			
1-1/4"	100	4.4	VBN2DHPXE201	VBN2DHSXE201	VBN2DHPXE101	VBN2DHSXE101	VBN2DHPXF201	VBN2DHSXF201	VBN2DHPXF101	VBN2DHSXF101	
		8.3	VBN2DJPXE201	VBN2DJSXE201	VBN2DJPXE101	VBN2DJSXE101	VBN2DJPF201	VBN2DJSXF201	VBN2DJPF101	VBN2DJSXF101	
		14.9	VBN2DKPXE201	VBN2DKSXE201	VBN2DKPXE101	VBN2DKSXE101	VBN2DKPXF201	VBN2DKSXF201	VBN2DKPXF101	VBN2DKSXF101	
		25	VBN2DLPXE201	VBN2DLSXE201	VBN2DLPXE101	VBN2DLSXE101	VBN2DLPXF201	VBN2DLSXF201	VBN2DLPXF101	VBN2DLSXF101	
		37	VBN2DMPXE201	VBN2DMSXE201	VBN2DMPXE101	VBN2DMSXE101	VBN2DMPXF201	VBN2DMSXF201	VBN2DMPXF101	VBN2DMSXF101	
		41*	VBN2DNPXE201	VBN2DNSXE201	VBN2DNPXE101	VBN2DNSXE101	VBN2DNPF201	VBN2DNSXF201	VBN2DNPF101	VBN2DNSXF101	
102*	VBN2DSPXE201	VBN2DSSXE201	VBN2DSPXE101	VBN2DSSXE101	VBN2DSPXF201	VBN2DSSXF201	VBN2DSPXF101	VBN2DSSXF101			

* Full port ball. No flow characterizing insert.

Product Selection - Valves

2-Way NPT Valves 1½" - 3", NEMA 2

Actuator Features			Fail Safe								
Actuator O.S. Number			MS7505A2030				MS7505A2130				
Power Supply	Voltage		24 VAC/DC				24 VAC/DC				
	Frequency		50 / 60 Hz				50 / 60 Hz				
	Power		6 VA				6 VA				
Actuator Torque	(lb.-in.)		44				44				
Control	(0)2-10 Vdc		•				•				
	4-20 mA (external 500 Ohm Resistor)		•				•				
	Floating		•				•				
	Two-Position SPDT		•				•				
	Two-Position SPST		•				•				
Actuator Stroke	(degrees)		95° ± 3°				95° ± 3°				
Timing	(drive/spring return, seconds)		90 / 25				90 / 25				
Aux Switch			0				1				
Feedback	2-10 Vdc Built In		•				•				
Fail Safe Action			Closed		Open		Closed		Open		
Normal Position (no signal)			Closed		Open		Closed		Open		
Valve Features			Trim	Nickel-Plated Brass	Stainless Steel	Nickel-Plated Brass	Stainless Steel	Nickel-Plated Brass	Stainless Steel	Nickel-Plated Brass	Stainless Steel
Valve Size (inches)	Close-off Pressure (psid)	Cv	Short Order Codes								
1-1/2"	100	23	VBN2ELPX6200	VBN2ELSX6200	VBN2ELPX6100	VBN2ELSX6100	VBN2ELPXB200	VBN2ELSXB200	VBN2ELPXB100	VBN2ELSXB100	
		30	VBN2EMPX6200	VBN2EMSX6200	VBN2EMPX6100	VBN2EMSX6100	VBN2EMPXB200	VBN2EMSXB200	VBN2EMPXB100	VBN2EMSXB100	
		41	VBN2ENPX6200	VBN2ENSX6200	VBN2ENPX6100	VBN2ENSX6100	VBN2ENPXB200	VBN2ENSXB200	VBN2ENPXB100	VBN2ENSXB100	
		74*	VBN2ERPX6200	VBN2ERSX6200	VBN2ERPX6100	VBN2ERSX6100	VBN2ERPXB200	VBN2ERSXB200	VBN2ERPXB100	VBN2ERSXB100	
		172*	VBN2E1PX6200	VBN2E1SX6200	VBN2E1PX6100	VBN2E1SX6100	VBN2E1PXB200	VBN2E1SXB200	VBN2E1PXB100	VBN2E1SXB100	
2"	100	42	VBN2FNPX6200	VBN2FNSX6200	VBN2FNPX6100	VBN2FNSX6100	VBN2FNXPB200	VBN2FNSXB200	VBN2FNXPB100	VBN2FNSXB100	
		57	VBN2FPPX6200	VBN2FPSX6200	VBN2FPPX6100	VBN2FPSX6100	VBN2FPPXB200	VBN2FPSXB200	VBN2FPPXB100	VBN2FPSXB100	
		71	VBN2FRPX6200	VBN2FRSX6200	VBN2FRPX6100	VBN2FRSX6100	VBN2FRPXB200	VBN2FRSXB200	VBN2FRPXB100	VBN2FRSXB100	
		100	VBN2FSPX6200	VBN2FSSX6200	VBN2FSPX6100	VBN2FSSX6100	VBN2FSPXB200	VBN2FSSXB200	VBN2FSPXB100	VBN2FSSXB100	
		108*	VBN2FTPX6200	VBN2FTSX6200	VBN2FTPX6100	VBN2FTSX6100	VBN2FTPXB200	VBN2FTSXB200	VBN2FTPXB100	VBN2FTSXB100	
		210	VBN2F1PX6200	VBN2F1SX6200	VBN2F1PX6100	VBN2F1SX6100	VBN2F1PXB200	VBN2F1SXB200	VBN2F1PXB100	VBN2F1SXB100	
		266*	VBN2F2PX6200	VBN2F2SX6200	VBN2F2PX6100	VBN2F2SX6100	VBN2F2PXB200	VBN2F2SXB200	VBN2F2PXB100	VBN2F2SXB100	
2-1/2"	100	45	VBN2GNPX6200	VBN2GNSX6200	VBN2GNPX6100	VBN2GNSX6100	VBN2GNXPB200	VBN2GNSXB200	VBN2GNXPB100	VBN2GNSXB100	
		55	VBN2GPPX6200	VBN2GPSX6200	VBN2GPPX6100	VBN2GPSX6100	VBN2GPPXB200	VBN2GPSXB200	VBN2GPPXB100	VBN2GPSXB100	
		72	VBN2GRPX6200	VBN2GRSX6200	VBN2GRPX6100	VBN2GRSX6100	VBN2GRPXB200	VBN2GRSXB200	VBN2GRPXB100	VBN2GRSXB100	
		101	VBN2GSPX6200	VBN2GSSX6200	VBN2GSPX6100	VBN2GSSX6100	VBN2GSPXB200	VBN2GSSXB200	VBN2GSPXB100	VBN2GSSXB100	
		162	VBN2GUPX6200	VBN2GUSX6200	VBN2GUPX6100	VBN2GUSX6100	VBN2GUPXB200	VBN2GUSXB200	VBN2GUPXB100	VBN2GUSXB100	
3	100	202*	VBN2G1PX6200	VBN2G1SX6200	VBN2G1PX6100	VBN2G1SX6100	VBN2G1PXB200	VBN2G1SXB200	VBN2G1PXB100	VBN2G1SXB100	
		49	VBN2HNXP6200	VBN2HNSX6200	VBN2HNXP6100	VBN2HNSX6100	VBN2HNXPB200	VBN2HNSXB200	VBN2HNXPB100	VBN2HNSXB100	
		63	VBN2HPPX6200	VBN2HPSX6200	VBN2HPPX6100	VBN2HPSX6100	VBN2HPPXB200	VBN2HPSXB200	VBN2HPPXB100	VBN2HPSXB100	
		82	VBN2HRPX6200	VBN2HRSX6200	VBN2HRPX6100	VBN2HRSX6100	VBN2HRPXB200	VBN2HRSXB200	VBN2HRPXB100	VBN2HRSXB100	
		124	VBN2HTPX6200	VBN2HTSX6200	VBN2HTPX6100	VBN2HTSX6100	VBN2HTPXB200	VBN2HTSXB200	VBN2HTPXB100	VBN2HTSXB100	
		145*	VBN2HUPX6200	VBN2HUSX6200	VBN2HUPX6100	VBN2HUSX6100	VBN2HUPXB200	VBN2HUSXB200	VBN2HUPXB100	VBN2HUSXB100	

* Full port ball. No flow characterizing insert.

2-Way

VALVES

Product Selection - Valves

2-Way NPT Valves 1/2" - 3", NEMA 2

Actuator Features			Fail Safe							
Actuator O.S. Number	MS8105A1030				MS8105A1130					
Power Supply	Voltage	24 VAC/DC				24 VAC/DC				
	Frequency	50 / 60 Hz				50 / 60 Hz				
Actuator Torque	Power	6 VA				6 VA				
	(lb.-in.)	44				44				
Control	(0)2-10 Vdc									
4-20 mA (external 500 Ohm Resistor)										
Floating										
Two-Position SPDT										
Two-Position SPST			•							
Actuator Stroke	(degrees)		95° ± 3°				95° ± 3°			
Timing	(drive/spring return, seconds)		45 / 25				45 / 25			
Aux Switch			0				1			
Feedback	2-10 Vdc Built In									
Fail Safe Action			Closed		Open		Closed		Open	
Normal Position (no signal)			Closed		Open		Closed		Open	
Valve Features	Trim	Nickel-Plated Brass	Stainless Steel	Nickel-Plated Brass	Stainless Steel	Nickel-Plated Brass	Stainless Steel	Nickel-Plated Brass	Stainless Steel	
Valve Size (inches)	Close-off Pressure (psid)	Cv	Short Order Codes							
1/2"	130	0.38	VBN2ABPX7200	VBN2ABSX7200	VBN2ABPX7100	VBN2ABSX7100	VBN2ABPX200	VBN2ABSXA200	VBN2ABPX100	VBN2ABSXA100
		1.68	VBN2ADPX7200	VBN2ADSX7200	VBN2ADPX7100	VBN2ADSX7100	VBN2ADPX200	VBN2ADSXA200	VBN2ADPX100	VBN2ADSXA100
		0.63	VBN2AEPX7200	VBN2AESX7200	VBN2AEPX7100	VBN2AESX7100	VBN2AEPX200	VBN2AESXA200	VBN2AEPX100	VBN2AESXA100
		2	VBN2AFPX7200	VBN2AFSX7200	VBN2AFPX7100	VBN2AFSX7100	VBN2AFPX200	VBN2AFSXA200	VBN2AFPX100	VBN2AFSXA100
		2.6	VBN2AGPX7200	VBN2AGSX7200	VBN2AGPX7100	VBN2AGSX7100	VBN2AGPX200	VBN2AGSXA200	VBN2AGPX100	VBN2AGSXA100
		4.7	VBN2AHPX7200	VBN2AHSX7200	VBN2AHPX7100	VBN2AHSX7100	VBN2AHPX200	VBN2AHSXA200	VBN2AHPX100	VBN2AHSXA100
		8	VBN2AJPX7200	VBN2AJSX7200	VBN2AJPX7100	VBN2AJSX7100	VBN2AJPX200	VBN2AJSXA200	VBN2AJPX100	VBN2AJSXA100
3/4"	130	11.7*	VBN2AKPX7200	VBN2AKSX7200	VBN2AKPX7100	VBN2AKSX7100	VBN2AKPX200	VBN2AKSXA200	VBN2AKPX100	VBN2AKSXA100
		0.31	VBN2BBPX7200	VBN2BBSX7200	VBN2BBPX7100	VBN2BBSX7100	VBN2BBPX200	VBN2BBSXA200	VBN2BBPX100	VBN2BBSXA100
		0.63	VBN2BDPX7200	VBN2BDSX7200	VBN2BDPX7100	VBN2BDSX7100	VBN2BDPX200	VBN2BDSXA200	VBN2BDPX100	VBN2BDSXA100
		1.2	VBN2BEPX7200	VBN2BESX7200	VBN2BEPX7100	VBN2BESX7100	VBN2BEPX200	VBN2BESXA200	VBN2BEPX100	VBN2BESXA100
		2.5	VBN2BGPX7200	VBN2BGSX7200	VBN2BGPX7100	VBN2BGSX7100	VBN2BGPX200	VBN2BGSXA200	VBN2BGPX100	VBN2BGSXA100
		4.3	VBN2BHPX7200	VBN2BHSX7200	VBN2BHPX7100	VBN2BHSX7100	VBN2BHPX200	VBN2BHSXA200	VBN2BHPX100	VBN2BHSXA100
		7.4	VBN2BJPX7200	VBN2BJSX7200	VBN2BJPX7100	VBN2BJSX7100	VBN2BJPX200	VBN2BJSXA200	VBN2BJPX100	VBN2BJSXA100
1"	100	10.1	VBN2BKPX7200	VBN2BKSX7200	VBN2BKPX7100	VBN2BKSX7100	VBN2BKPX200	VBN2BKSXA200	VBN2BKPX100	VBN2BKSXA100
		14.7*	VBN2BLPX7200	VBN2BLSX7200	VBN2BLPX7100	VBN2BLSX7100	VBN2BLPX200	VBN2BLSXA200	VBN2BLPX100	VBN2BLSXA100
		29*	VBN2BMPX7200	VBN2BMSX7200	VBN2BMPX7100	VBN2BMSX7100	VBN2BMPX200	VBN2BMSXA200	VBN2BMPX100	VBN2BMSXA100
		4.4	VBN2CHPX7200	VBN2CHSX7200	VBN2CHPX7100	VBN2CHSX7100	VBN2CHPX200	VBN2CHSXA200	VBN2CHPX100	VBN2CHSXA100
		9	VBN2CJPX7200	VBN2CJSX7200	VBN2CJPX7100	VBN2CJSX7100	VBN2CJPX200	VBN2CJSXA200	VBN2CJPX100	VBN2CJSXA100
		15.3	VBN2CLPX7200	VBN2CLSX7200	VBN2CLPX7100	VBN2CLSX7100	VBN2CLPX200	VBN2CLSXA200	VBN2CLPX100	VBN2CLSXA100
		26	VBN2CMPX7200	VBN2CMSX7200	VBN2CMPX7100	VBN2CMSX7100	VBN2CMPX200	VBN2CMSXA200	VBN2CMPX100	VBN2CMSXA100
1-1/4"	100	44*	VBN2CNPX7200	VBN2CNSX7200	VBN2CNPX7100	VBN2CNSX7100	VBN2CNPX200	VBN2CNSXA200	VBN2CNPX100	VBN2CNSXA100
		54*	VBN2CPPX7200	VBN2CPSX7200	VBN2CPPX7100	VBN2CPSX7100	VBN2CPPX200	VBN2CPSXA200	VBN2CPPX100	VBN2CPSXA100
		4.4	VBN2DHPX7200	VBN2DHSX7200	VBN2DHPX7100	VBN2DHSX7100	VBN2DHPX200	VBN2DHSXA200	VBN2DHPX100	VBN2DHSXA100
		8.3	VBN2DJPX7200	VBN2DJSX7200	VBN2DJPX7100	VBN2DJSX7100	VBN2DJPX200	VBN2DJSXA200	VBN2DJPX100	VBN2DJSXA100
		14.9	VBN2DKPX7200	VBN2DKSX7200	VBN2DKPX7100	VBN2DKSX7100	VBN2DKPX200	VBN2DKSXA200	VBN2DKPX100	VBN2DKSXA100
		25	VBN2DLPX7200	VBN2DLSX7200	VBN2DLPX7100	VBN2DLSX7100	VBN2DLPX200	VBN2DLSXA200	VBN2DLPX100	VBN2DLSXA100
		37	VBN2DMPX7200	VBN2DMSX7200	VBN2DMPX7100	VBN2DMSX7100	VBN2DMPX200	VBN2DMSXA200	VBN2DMPX100	VBN2DMSXA100
1-1/2"	100	41*	VBN2DNPX7200	VBN2DNSX7200	VBN2DNPX7100	VBN2DNSX7100	VBN2DNPX200	VBN2DNSXA200	VBN2DNPX100	VBN2DNSXA100
		102*	VBN2DSPX7200	VBN2DSSX7200	VBN2DSPX7100	VBN2DSSX7100	VBN2DSPX200	VBN2DSSXA200	VBN2DSPX100	VBN2DSSXA100
		23	VBN2ELPX7200	VBN2ELSX7200	VBN2ELPX7100	VBN2ELSX7100	VBN2ELPX200	VBN2ELSXA200	VBN2ELPX100	VBN2ELSXA100
		30	VBN2EMPX7200	VBN2EMSX7200	VBN2EMPX7100	VBN2EMSX7100	VBN2EMPX200	VBN2EMSXA200	VBN2EMPX100	VBN2EMSXA100
		41	VBN2ENPX7200	VBN2ENSX7200	VBN2ENPX7100	VBN2ENSX7100	VBN2ENPX200	VBN2ENSXA200	VBN2ENPX100	VBN2ENSXA100
		74*	VBN2ERPX7200	VBN2ERSX7200	VBN2ERPX7100	VBN2ERSX7100	VBN2ERPX200	VBN2ERSXA200	VBN2ERPX100	VBN2ERSXA100
		172*	VBN2E1PX7200	VBN2E1SX7200	VBN2E1PX7100	VBN2E1SX7100	VBN2E1PX200	VBN2E1SXA200	VBN2E1PX100	VBN2E1SXA100
2"	100	42	VBN2FNPX7200	VBN2FNSX7200	VBN2FNPX7100	VBN2FNSX7100	VBN2FNPX200	VBN2FNSXA200	VBN2FNPX100	VBN2FNSXA100
		57	VBN2FPPX7200	VBN2FPSX7200	VBN2FPPX7100	VBN2FPSX7100	VBN2FPPX200	VBN2FPSXA200	VBN2FPPX100	VBN2FPSXA100
		71	VBN2FRPX7200	VBN2FRSX7200	VBN2FRPX7100	VBN2FRSX7100	VBN2FRPX200	VBN2FRSXA200	VBN2FRPX100	VBN2FRSXA100
		100	VBN2FSPX7200	VBN2FSSX7200	VBN2FSPX7100	VBN2FSSX7100	VBN2FSPX200	VBN2FSSXA200	VBN2FSPX100	VBN2FSSXA100
		108*	VBN2FTPX7200	VBN2FTSX7200	VBN2FTPX7100	VBN2FTSX7100	VBN2FTPX200	VBN2FTSXA200	VBN2FTPX100	VBN2FTSXA100
		210	VBN2F1PX7200	VBN2F1SX7200	VBN2F1PX7100	VBN2F1SX7100	VBN2F1PX200	VBN2F1SXA200	VBN2F1PX100	VBN2F1SXA100
		266*	VBN2F2PX7200	VBN2F2SX7200	VBN2F2PX7100	VBN2F2SX7100	VBN2F2PX200	VBN2F2SXA200	VBN2F2PX100	VBN2F2SXA100
2-1/2"	100	45	VBN2GNPX7200	VBN2GNSX7200	VBN2GNPX7100	VBN2GNSX7100	VBN2GNPX200	VBN2GNSXA200	VBN2GNPX100	VBN2GNSXA100
		55	VBN2GPPX7200	VBN2GPSX7200	VBN2GPPX7100	VBN2GPSX7100	VBN2GPPX200	VBN2GPSXA200	VBN2GPPX100	VBN2GPSXA100
		72	VBN2GRPX7200	VBN2GRSX7200	VBN2GRPX7100	VBN2GRSX7100	VBN2GRPX200	VBN2GRSXA200	VBN2GRPX100	VBN2GRSXA100
		101	VBN2GSPX7200	VBN2GSSX7200	VBN2GSPX7100	VBN2GSSX7100	VBN2GSPX200	VBN2GSSXA200	VBN2GSPX100	VBN2GSSXA100
		162	VBN2GUPX7200	VBN2GUSX7200	VBN2GUPX7100	VBN2GUSX7100	VBN2GUPX200	VBN2GUSXA200	VBN2GUPX100	VBN2GUSXA100
		202*	VBN2G1PX7200	VBN2G1SX7200	VBN2G1PX7100	VBN2G1SX7100	VBN2G1PX200	VBN2G1SXA200	VBN2G1PX100	VBN2G1SXA100
		49	VBN2HNPX7200	VBN2HNSX7200	VBN2HNPX7100	VBN2HNSX7100	VBN2HNPX200	VBN2HNSXA200	VBN2HNPX100	VBN2HNSXA100
3"	100	63	VBN2HPPX7200	VBN2HPSX7200	VBN2HPPX7100	VBN2HPSX7100	VBN2HPPX200	VBN2HPSXA200	VBN2HPPX100	VBN2HPSXA100
		82	VBN2HRPX7200	VBN2HRSX7200	VBN2HRPX7100	VBN2HRSX7100	VBN2HRPX200	VBN2HRSXA200	VBN2HRPX100	VBN2HRSXA100
		124	VBN2HTPX7200	VBN2HTSX7200	VBN2HTPX7100	VBN2HTSX7100	VBN2HTPX200	VBN2HTSXA200	VBN2HTPX100	VBN2HTSXA100
		145*	VBN2HUPX7200	VBN2HUSX7200	VBN2HUPX7100	VBN2HUSX7100	VBN2HUPX200	VBN2HUSXA200	VBN2HUPX100	VBN2HUSXA100

* Full port ball. No flow characterizing insert.

Product Selection - Valves

2-Way NPT Valves 1/2" - 3", NEMA 2

Actuator Features			Fail Safe							
Actuator O.S. Number			MS4105A1030				MS4105A1130			
Power Supply			100-250 VAC				100-250 VAC			
Voltage			50 / 60 Hz				50 / 60 Hz			
Frequency			6 VA				6 VA			
Power			44				44			
Actuator Torque (lb.-in.)			(0)2-10 Vdc				(0)2-10 Vdc			
Control			4-20 mA (external 500 Ohm Resistor)				4-20 mA (external 500 Ohm Resistor)			
Floating			Two-Position SPDT				Two-Position SPDT			
Two-Position SPDT			Two-Position SPST				Two-Position SPST			
Two-Position SPST			95° ± 3°				95° ± 3°			
Actuator Stroke (degrees)			45 / 25				45 / 25			
Timing (drive/spring return, seconds)			0				1			
Aux Switch			Closed				Open			
Fail Safe Action			Open				Closed			
Normal Position (no signal)			Open				Closed			
Valve Features			Nickel-Plated Brass		Stainless Steel		Nickel-Plated Brass		Stainless Steel	
Trim			Nickel-Plated Brass		Stainless Steel		Nickel-Plated Brass		Stainless Steel	
Valve Size (inches)	Close-off Pressure (psid)	Cv	Short Order Codes							
1/2"	130	0.38	VBN2ABPX8200	VBN2ABSX8200	VBN2ABPX8100	VBN2ABSX8100	VBN2ABPX9200	VBN2ABSX9200	VBN2ABPX9100	VBN2ABSX9100
		0.68	VBN2ADPX8200	VBN2ADSX8200	VBN2ADPX8100	VBN2ADSX8100	VBN2ADPX9200	VBN2ADSX9200	VBN2ADPX9100	VBN2ADSX9100
		1.3	VBN2AEPX8200	VBN2AESX8200	VBN2AEPX8100	VBN2AESX8100	VBN2AEPX9200	VBN2AESX9200	VBN2AEPX9100	VBN2AESX9100
		2	VBN2AFPX8200	VBN2AFSX8200	VBN2AFPX8100	VBN2AFSX8100	VBN2AFPX9200	VBN2AFSX9200	VBN2AFPX9100	VBN2AFSX9100
		2.6	VBN2AGPX8200	VBN2AGSX8200	VBN2AGPX8100	VBN2AGSX8100	VBN2AGPX9200	VBN2AGSX9200	VBN2AGPX9100	VBN2AGSX9100
		4.7	VBN2AHPX8200	VBN2AHSX8200	VBN2AHPX8100	VBN2AHSX8100	VBN2AHPX9200	VBN2AHSX9200	VBN2AHPX9100	VBN2AHSX9100
		8	VBN2AJPX8200	VBN2AJSX8200	VBN2AJPX8100	VBN2AJSX8100	VBN2AJPX9200	VBN2AJSX9200	VBN2AJPX9100	VBN2AJSX9100
		11.7*	VBN2AKPX8200	VBN2AKSX8200	VBN2AKPX8100	VBN2AKSX8100	VBN2AKPX9200	VBN2AKSX9200	VBN2AKPX9100	VBN2AKSX9100
3/4"	130	0.31	VBN2BBPX8200	VBN2BBSX8200	VBN2BBPX8100	VBN2BBSX8100	VBN2BBPX9200	VBN2BBSX9200	VBN2BBPX9100	VBN2BBSX9100
		0.63	VBN2BDPX8200	VBN2BDSX8200	VBN2BDPX8100	VBN2BDSX8100	VBN2BDPX9200	VBN2BDSX9200	VBN2BDPX9100	VBN2BDSX9100
		1.2	VBN2BEPX8200	VBN2BESX8200	VBN2BEPX8100	VBN2BESX8100	VBN2BEPX9200	VBN2BESX9200	VBN2BEPX9100	VBN2BESX9100
		2.5	VBN2BGPX8200	VBN2BGSX8200	VBN2BGPX8100	VBN2BGSX8100	VBN2BGPX9200	VBN2BGSX9200	VBN2BGPX9100	VBN2BGSX9100
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		10.1	VBN2BKPX8200	VBN2BKSX8200	VBN2BKPX8100	VBN2BKSX8100	VBN2BKPX9200	VBN2BKSX9200	VBN2BKPX9100	VBN2BKSX9100
		14.7*	VBN2BLPX8200	VBN2BLSX8200	VBN2BLPX8100	VBN2BLSX8100	VBN2BLPX9200	VBN2BLSX9200	VBN2BLPX9100	VBN2BLSX9100
29*	VBN2BMPX8200	VBN2BMSX8200	VBN2BMPX8100	VBN2BMSX8100	VBN2BMPX9200	VBN2BMSX9200	VBN2BMPX9100	VBN2BMSX9100		
1"	100	4.4	VBN2CHPX8200	VBN2CHSX8200	VBN2CHPX8100	VBN2CHSX8100	VBN2CHPX9200	VBN2CHSX9200	VBN2CHPX9100	VBN2CHSX9100
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		15.3	VBN2CLPX8200	VBN2CLSX8200	VBN2CLPX8100	VBN2CLSX8100	VBN2CLPX9200	VBN2CLSX9200	VBN2CLPX9100	VBN2CLSX9100
		26	VBN2CMPX8200	VBN2CMSX8200	VBN2CMPX8100	VBN2CMSX8100	VBN2CMPX9200	VBN2CMSX9200	VBN2CMPX9100	VBN2CMSX9100
		44*	VBN2CNPX8200	VBN2CNSX8200	VBN2CNPX8100	VBN2CNSX8100	VBN2CNPX9200	VBN2CNSX9200	VBN2CNPX9100	VBN2CNSX9100
		54*	VBN2CPPX8200	VBN2CPSX8200	VBN2CPPX8100	VBN2CPSX8100	VBN2CPPX9200	VBN2CPSX9200	VBN2CPPX9100	VBN2CPSX9100
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		41*	VBN2DNPX8200	VBN2DNSX8200	VBN2DNPX8100	VBN2DNSX8100	VBN2DNPX9200	VBN2DNSX9200	VBN2DNPX9100	VBN2DNSX9100
1-1/2"	100	102*	VBN2DSPX8200	VBN2DSSX8200	VBN2DSPX8100	VBN2DSSX8100	VBN2DSPX9200	VBN2DSSX9200	VBN2DSPX9100	VBN2DSSX9100
		23	VBN2ELPX8200	VBN2ELSX8200	VBN2ELPX8100	VBN2ELSX8100	VBN2ELPX9200	VBN2ELSX9200	VBN2ELPX9100	VBN2ELSX9100
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		41	VBN2ENPX8200	VBN2ENSX8200	VBN2ENPX8100	VBN2ENSX8100	VBN2ENPX9200	VBN2ENSX9200	VBN2ENPX9100	VBN2ENSX9100
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2-1/2"	100	266*	VBN2F2PX8200	VBN2F2SX8200	VBN2F2PX8100	VBN2F2SX8100	VBN2F2PX9200	VBN2F2SX9200	VBN2F2PX9100	VBN2F2SX9100
		45	VBN2GNPX8200	VBN2GNSX8200	VBN2GNPX8100	VBN2GNSX8100	VBN2GNPX9200	VBN2GNSX9200	VBN2GNPX9100	VBN2GNSX9100
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		101	VBN2GSPX8200	VBN2GSSX8200	VBN2GSPX8100	VBN2GSSX8100	VBN2GSPX9200	VBN2GSSX9200	VBN2GSPX9100	VBN2GSSX9100
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		49	VBN2HNPX8200	VBN2HNSX8200	VBN2HNPX8100	VBN2HNSX8100	VBN2HNPX9200	VBN2HNSX9200	VBN2HNPX9100	VBN2HNSX9100
		63	VBN2HPPX8200	VBN2HPSX8200	VBN2HPPX8100	VBN2HPSX8100	VBN2HPPX9200	VBN2HPSX9200	VBN2HPPX9100	VBN2HPSX9100
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		124	VBN2HTPX8200	VBN2HTSX8200	VBN2HTPX8100	VBN2HTSX8100	VBN2HTPX9200	VBN2HTSX9200	VBN2HTPX9100	VBN2HTSX9100
		145*	VBN2HUPX8200	VBN2HUSX8200	VBN2HUPX8100	VBN2HUSX8100	VBN2HUPX9200	VBN2HUSX9200	VBN2HUPX9100	VBN2HUSX9100

* Full port ball. No flow characterizing insert.

VALVES

Product Selection - Valves

2-Way NPT Valves 1/2" - 3", NEMA 3R

Actuator Features			Non Fail Safe								
Actuator O.S. Number			MN6105A1011		MN6105A1201		MN7505A2001		MN7505A2209		
Power Supply			24 VAC/DC		24 VAC/DC		24 VAC/DC		24 VAC/DC		
Voltage			24 VAC/DC		24 VAC/DC		24 VAC/DC		24 VAC/DC		
Frequency			50 / 60 Hz		50 / 60 Hz		50 / 60 Hz		50 / 60 Hz		
Power			5 VA		5 VA		5 VA		5 VA		
Actuator Torque (lb.-in.)			44		44		44		44		
Control							•		•		
(0)-10 Vdc							•		•		
4-20 mA (external 500 Ohm Resistor)							•		•		
Floating			•		•		•		•		
Two-Position SPDT			•		•		•		•		
Two-Position SPST							•		•		
Actuator Stroke (degrees)			95° ± 3°		95° ± 3°		95° ± 3°		95° ± 3°		
Timing (drive/spring return, seconds)			90		90		90		90		
Aux Switch			0		2		0		2		
Feedback 2-10 Vdc Built In			-		-		•		•		
Fail Safe Action			Stay in Place		Stay in Place		Stay in Place		Stay in Place		
Normal Position (no signal)			Stay in Place		Stay in Place		Closed		Closed		
Valve Features			Trim	Nickel-Plated Brass	Stainless Steel	Nickel-Plated Brass	Stainless Steel	Nickel-Plated Brass	Stainless Steel	Nickel-Plated Brass	Stainless Steel
Valve Size (inches)	Close-off Pressure (psid)	Cv	Short Order Codes								
1/2"	130	0.38	VBN2ABPX4002	VBN2ABSX4002	VBN2ABPX0002	VBN2ABSXC002	VBN2ABPX5002	VBN2ABSX5002	VBN2ABPX0002	VBN2ABSX0002	
		0.68	VBN2ADPX4002	VBN2ADXS4002	VBN2ADPX0002	VBN2ADXSXC002	VBN2ADPX5002	VBN2ADXS5002	VBN2ADPX0002	VBN2ADXS0002	
		1.3	VBN2AEPX4002	VBN2AESX4002	VBN2AEPX0002	VBN2AESXC002	VBN2AEPX5002	VBN2AESX5002	VBN2AEPX0002	VBN2AESX0002	
		2	VBN2AFPX4002	VBN2AFSX4002	VBN2AFPX0002	VBN2AFSXC002	VBN2AFPX5002	VBN2AFSX5002	VBN2AFPX0002	VBN2AFSX0002	
		2.6	VBN2AGPX4002	VBN2AGSX4002	VBN2AGPX0002	VBN2AGSXC002	VBN2AGPX5002	VBN2AGSX5002	VBN2AGPX0002	VBN2AGSX0002	
		4.7	VBN2AHPX4002	VBN2AHSX4002	VBN2AHPX0002	VBN2AHSXC002	VBN2AHPX5002	VBN2AHSX5002	VBN2AHPX0002	VBN2AHSX0002	
		8	VBN2AJPX4002	VBN2AJXS4002	VBN2AJPX0002	VBN2AJXSXC002	VBN2AJPX5002	VBN2AJXS5002	VBN2AJPX0002	VBN2AJXS0002	
3/4"	130	11.7*	VBN2AKPX4002	VBN2AKSX4002	VBN2AKPX0002	VBN2AKSXC002	VBN2AKPX5002	VBN2AKSX5002	VBN2AKPX0002	VBN2AKSX0002	
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		1.2	VBN2BEPX4002	VBN2BESX4002	VBN2BEPX0002	VBN2BESXC002	VBN2BEPX5002	VBN2BESX5002	VBN2BEPX0002	VBN2BESX0002	
		2.5	VBN2BGPX4002	VBN2BGSX4002	VBN2BGPX0002	VBN2BGSXC002	VBN2BGPX5002	VBN2BGSX5002	VBN2BGPX0002	VBN2BGSX0002	
		4.3	VBN2BHPX4002	VBN2BHSX4002	VBN2BHPX0002	VBN2BHSXC002	VBN2BHPX5002	VBN2BHSX5002	VBN2BHPX0002	VBN2BHSX0002	
		7.4	VBN2BJPX4002	VBN2BJSX4002	VBN2BJPX0002	VBN2BJSXC002	VBN2BJPX5002	VBN2BJSX5002	VBN2BJPX0002	VBN2BJSX0002	
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		14.7*	VBN2BLPX4002	VBN2BLSX4002	VBN2BLPX0002	VBN2BLSXC002	VBN2BLPX5002	VBN2BLSX5002	VBN2BLPX0002	VBN2BLSX0002	
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		4.4	VBN2CHPX4002	VBN2CHSX4002	VBN2CHPX0002	VBN2CHSXC002	VBN2CHPX5002	VBN2CHSX5002	VBN2CHPX0002	VBN2CHSX0002	
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		15.3	VBN2CLPX4002	VBN2CLSX4002	VBN2CLPX0002	VBN2CLSXC002	VBN2CLPX5002	VBN2CLSX5002	VBN2CLPX0002	VBN2CLSX0002	
		26	VBN2CMPX4002	VBN2CMSX4002	VBN2CMPX0002	VBN2CMSXC002	VBN2CMPX5002	VBN2CMSX5002	VBN2CMPX0002	VBN2CMSX0002	
1-1/4"	100	44*	VBN2CNPX4002	VBN2CNSX4002	VBN2CNPX0002	VBN2CNSXC002	VBN2CNPX5002	VBN2CNSX5002	VBN2CNPX0002	VBN2CNSX0002	
		54*	VBN2CPPX4002	VBN2CPSX4002	VBN2CPPX0002	VBN2CPSXC002	VBN2CPPX5002	VBN2CPSX5002	VBN2CPPX0002	VBN2CPSX0002	
		4.4	VBN2DHPX4002	VBN2DHSX4002	VBN2DHPX0002	VBN2DHSXC002	VBN2DHPX5002	VBN2DHSX5002	VBN2DHPX0002	VBN2DHSX0002	
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		14.9	VBN2DKPX4002	VBN2DKSX4002	VBN2DKPX0002	VBN2DKSXC002	VBN2DKPX5002	VBN2DKSX5002	VBN2DKPX0002	VBN2DKSX0002	
		25	VBN2DLPX4002	VBN2DLSX4002	VBN2DLPX0002	VBN2DLSXC002	VBN2DLPX5002	VBN2DLSX5002	VBN2DLPX0002	VBN2DLSX0002	
		37	VBN2DMPX4002	VBN2DMSX4002	VBN2DMPX0002	VBN2DMSXC002	VBN2DMPX5002	VBN2DMSX5002	VBN2DMPX0002	VBN2DMSX0002	
1-1/2"	100	41*	VBN2DNPX4002	VBN2DNSX4002	VBN2DNPX0002	VBN2DNSXC002	VBN2DNPX5002	VBN2DNSX5002	VBN2DNPX0002	VBN2DNSX0002	
		102*	VBN2DSPX4002	VBN2DSSX4002	VBN2DSPX0002	VBN2DSSXC002	VBN2DSPX5002	VBN2DSSX5002	VBN2DSPX0002	VBN2DSSX0002	
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		74*	VBN2ERPX4002	VBN2ERSX4002	VBN2ERPX0002	VBN2ERSXC002	VBN2ERPX5002	VBN2ERSX5002	VBN2ERPX0002	VBN2ERSX0002	
		172*	VBN2E1PX4002	VBN2E1SX4002	VBN2E1PX0002	VBN2E1SXC002	VBN2E1PX5002	VBN2E1SX5002	VBN2E1PX0002	VBN2E1SX0002	
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		100	VBN2FSPX4002	VBN2FSSX4002	VBN2FSPX0002	VBN2FSSXC002	VBN2FSPX5002	VBN2FSSX5002	VBN2FSPX0002	VBN2FSSX0002	
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		210	VBN2F1PX4002	VBN2F1SX4002	VBN2F1PX0002	VBN2F1SXC002	VBN2F1PX5002	VBN2F1SX5002	VBN2F1PX0002	VBN2F1SX0002	
		266*	VBN2F2PX4002	VBN2F2SX4002	VBN2F2PX0002	VBN2F2SXC002	VBN2F2PX5002	VBN2F2SX5002	VBN2F2PX0002	VBN2F2SX0002	
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		162	VBN2GUPX4002	VBN2GUSX4002	VBN2GUPX0002	VBN2GUSXC002	VBN2GUPX5002	VBN2GUSX5002	VBN2GUPX0002	VBN2GUSX0002	
		202*	VBN2G1PX4002	VBN2G1SX4002	VBN2G1PX0002	VBN2G1SXC002	VBN2G1PX5002	VBN2G1SX5002	VBN2G1PX0002	VBN2G1SX0002	
		49	VBN2HNPX4002	VBN2HNSX4002	VBN2HNPX0002	VBN2HNSXC002	VBN2HNPX5002	VBN2HNSX5002	VBN2HNPX0002	VBN2HNSX0002	
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		124	VBN2HTPX4002	VBN2HTSX4002	VBN2HTPX0002	VBN2HTSXC002	VBN2HTPX5002	VBN2HTSX5002	VBN2HTPX0002	VBN2HTSX0002	
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* Full port ball. No flow characterizing insert.

Product Selection - Valves

2-Way NPT Valves 1/2" - 3", NEMA 3R

Actuator Features			Fail Safe								
Actuator O.S. Number			MS7505A2030				MS7505A2130				
Power Supply	Voltage	24 VAC/DC									
	Frequency	50 / 60 Hz									
Actuator Torque	Power	6 VA									
	(lb. -in.)	44									
Control	(0)2-10 Vdc	•									
	4-20 mA (external 500 Ohm Resistor)	•									
	Floating	•									
	Two-Position SPDT	•									
	Two-Position SPST	•									
Actuator Stroke (degrees)		95° ± 3°				95° ± 3°					
Timing (drive/spring return, seconds)		90 / 25				90 / 25					
Aux Switch		0				1					
Feedback 2-10 Vdc Built In		•									
Fail Safe Action			Closed				Open				
Normal Position (no signal)			Closed				Open				
Valve Features			Trim	Nickel-Plated Brass	Stainless Steel	Nickel-Plated Brass	Stainless Steel	Nickel-Plated Brass	Stainless Steel	Nickel-Plated Brass	Stainless Steel
Valve Size (inches)	Close-off Pressure (psid)	Cv	Short Order Codes								
1/2"	130	0.38	VBN2ABPX6202	VBN2ABSX6202	VBN2ABPX6102	VBN2ABSX6102	VBN2ABPX6202	VBN2ABSX6202	VBN2ABPX6102	VBN2ABSX6102	
		0.68	VBN2ADPX6202	VBN2ADSX6202	VBN2ADPX6102	VBN2ADSX6102	VBN2ADPX6202	VBN2ADSX6202	VBN2ADPX6102	VBN2ADSX6102	
		1.3	VBN2AEPX6202	VBN2AESX6202	VBN2AEPX6102	VBN2AESX6102	VBN2AEPX6202	VBN2AESX6202	VBN2AEPX6102	VBN2AESX6102	
		2	VBN2AFPX6202	VBN2AFSX6202	VBN2AFPX6102	VBN2AFSX6102	VBN2AFPX6202	VBN2AFSX6202	VBN2AFPX6102	VBN2AFSX6102	
		2.6	VBN2AGPX6202	VBN2AGSX6202	VBN2AGPX6102	VBN2AGSX6102	VBN2AGPX6202	VBN2AGSX6202	VBN2AGPX6102	VBN2AGSX6102	
		4.7	VBN2AHPX6202	VBN2AHSX6202	VBN2AHPX6102	VBN2AHSX6102	VBN2AHPX6202	VBN2AHSX6202	VBN2AHPX6102	VBN2AHSX6102	
		8	VBN2AJPX6202	VBN2AJSX6202	VBN2AJPX6102	VBN2AJSX6102	VBN2AJPX6202	VBN2AJSX6202	VBN2AJPX6102	VBN2AJSX6102	
		11.7*	VBN2AKPX6202	VBN2AKSX6202	VBN2AKPX6102	VBN2AKSX6102	VBN2AKPX6202	VBN2AKSX6202	VBN2AKPX6102	VBN2AKSX6102	
3/4"	130	0.31	VBN2BBPX6202	VBN2BBSX6202	VBN2BBPX6102	VBN2BBSX6102	VBN2BBPX6202	VBN2BBSX6202	VBN2BBPX6102	VBN2BBSX6102	
		0.63	VBN2BDPX6202	VBN2BDSX6202	VBN2BDPX6102	VBN2BDSX6102	VBN2BDPX6202	VBN2BDSX6202	VBN2BDPX6102	VBN2BDSX6102	
		1.2	VBN2BEPX6202	VBN2BESX6202	VBN2BEPX6102	VBN2BESX6102	VBN2BEPX6202	VBN2BESX6202	VBN2BEPX6102	VBN2BESX6102	
		2.5	VBN2BGPX6202	VBN2BGSX6202	VBN2BGPX6102	VBN2BGSX6102	VBN2BGPX6202	VBN2BGSX6202	VBN2BGPX6102	VBN2BGSX6102	
		4.3	VBN2BHPX6202	VBN2BHSX6202	VBN2BHPX6102	VBN2BHSX6102	VBN2BHPX6202	VBN2BHSX6202	VBN2BHPX6102	VBN2BHSX6102	
		7.4	VBN2BJPX6202	VBN2BJSX6202	VBN2BJPX6102	VBN2BJSX6102	VBN2BJPX6202	VBN2BJSX6202	VBN2BJPX6102	VBN2BJSX6102	
		10.1	VBN2BKPX6202	VBN2BKSX6202	VBN2BKPX6102	VBN2BKSX6102	VBN2BKPX6202	VBN2BKSX6202	VBN2BKPX6102	VBN2BKSX6102	
		14.7*	VBN2BLPX6202	VBN2BLSX6202	VBN2BLPX6102	VBN2BLSX6102	VBN2BLPX6202	VBN2BLSX6202	VBN2BLPX6102	VBN2BLSX6102	
1"	100	29*	VBN2BMPX6202	VBN2BMSX6202	VBN2BMPX6102	VBN2BMSX6102	VBN2BMPX6202	VBN2BMSX6202	VBN2BMPX6102	VBN2BMSX6102	
		4.4	VBN2CHPX6202	VBN2CHSX6202	VBN2CHPX6102	VBN2CHSX6102	VBN2CHPX6202	VBN2CHSX6202	VBN2CHPX6102	VBN2CHSX6102	
		9	VBN2CJJPX6202	VBN2CJSX6202	VBN2CJJPX6102	VBN2CJSX6102	VBN2CJJPX6202	VBN2CJSX6202	VBN2CJJPX6102	VBN2CJSX6102	
		15.3	VBN2CLPX6202	VBN2CLSX6202	VBN2CLPX6102	VBN2CLSX6102	VBN2CLPX6202	VBN2CLSX6202	VBN2CLPX6102	VBN2CLSX6102	
		26	VBN2CMPX6202	VBN2CMSX6202	VBN2CMPX6102	VBN2CMSX6102	VBN2CMPX6202	VBN2CMSX6202	VBN2CMPX6102	VBN2CMSX6102	
		44*	VBN2CNPX6202	VBN2CNSX6202	VBN2CNPX6102	VBN2CNSX6102	VBN2CNPX6202	VBN2CNSX6202	VBN2CNPX6102	VBN2CNSX6102	
		54*	VBN2CPPX6202	VBN2CPSX6202	VBN2CPPX6102	VBN2CPSX6102	VBN2CPPX6202	VBN2CPSX6202	VBN2CPPX6102	VBN2CPSX6102	
		4.4	VBN2DHPX6202	VBN2DHSX6202	VBN2DHPX6102	VBN2DHSX6102	VBN2DHPX6202	VBN2DHSX6202	VBN2DHPX6102	VBN2DHSX6102	
1-1/4"	100	8.3	VBN2DJPX6202	VBN2DJSX6202	VBN2DJPX6102	VBN2DJSX6102	VBN2DJPX6202	VBN2DJSX6202	VBN2DJPX6102	VBN2DJSX6102	
		14.9	VBN2DKPX6202	VBN2DKSX6202	VBN2DKPX6102	VBN2DKSX6102	VBN2DKPX6202	VBN2DKSX6202	VBN2DKPX6102	VBN2DKSX6102	
		25	VBN2DLPX6202	VBN2DLSX6202	VBN2DLPX6102	VBN2DLSX6102	VBN2DLPX6202	VBN2DLSX6202	VBN2DLPX6102	VBN2DLSX6102	
		37	VBN2DMPX6202	VBN2DMSX6202	VBN2DMPX6102	VBN2DMSX6102	VBN2DMPX6202	VBN2DMSX6202	VBN2DMPX6102	VBN2DMSX6102	
		41*	VBN2DNPX6202	VBN2DNSX6202	VBN2DNPX6102	VBN2DNSX6102	VBN2DNPX6202	VBN2DNSX6202	VBN2DNPX6102	VBN2DNSX6102	
		102*	VBN2DSPX6202	VBN2DSSX6202	VBN2DSPX6102	VBN2DSSX6102	VBN2DSPX6202	VBN2DSSX6202	VBN2DSPX6102	VBN2DSSX6102	
		23	VBN2ELPX6202	VBN2ELSX6202	VBN2ELPX6102	VBN2ELSX6102	VBN2ELPX6202	VBN2ELSX6202	VBN2ELPX6102	VBN2ELSX6102	
		30	VBN2EMPX6202	VBN2EMSX6202	VBN2EMPX6102	VBN2EMSX6102	VBN2EMPX6202	VBN2EMSX6202	VBN2EMPX6102	VBN2EMSX6102	
1-1/2"	100	41	VBN2ENPX6202	VBN2ENSX6202	VBN2ENPX6102	VBN2ENSX6102	VBN2ENPX6202	VBN2ENSX6202	VBN2ENPX6102	VBN2ENSX6102	
		74*	VBN2ERPX6202	VBN2ERSX6202	VBN2ERPX6102	VBN2ERSX6102	VBN2ERPX6202	VBN2ERSX6202	VBN2ERPX6102	VBN2ERSX6102	
		172*	VBN2E1PX6202	VBN2E1SX6202	VBN2E1PX6102	VBN2E1SX6102	VBN2E1PX6202	VBN2E1SX6202	VBN2E1PX6102	VBN2E1SX6102	
		42	VBN2FNPX6202	VBN2FNSX6202	VBN2FNPX6102	VBN2FNSX6102	VBN2FNPX6202	VBN2FNSX6202	VBN2FNPX6102	VBN2FNSX6102	
		57	VBN2FPPX6202	VBN2FPSX6202	VBN2FPPX6102	VBN2FPSX6102	VBN2FPPX6202	VBN2FPSX6202	VBN2FPPX6102	VBN2FPSX6102	
		71	VBN2FRPX6202	VBN2FRSX6202	VBN2FRPX6102	VBN2FRSX6102	VBN2FRPX6202	VBN2FRSX6202	VBN2FRPX6102	VBN2FRSX6102	
		100	VBN2FSPX6202	VBN2FSSX6202	VBN2FSPX6102	VBN2FSSX6102	VBN2FSPX6202	VBN2FSSX6202	VBN2FSPX6102	VBN2FSSX6102	
		108*	VBN2FTPX6202	VBN2FTSX6202	VBN2FTPX6102	VBN2FTSX6102	VBN2FTPX6202	VBN2FTSX6202	VBN2FTPX6102	VBN2FTSX6102	
2"	100	210	VBN2F1PX6202	VBN2F1SX6202	VBN2F1PX6102	VBN2F1SX6102	VBN2F1PX6202	VBN2F1SX6202	VBN2F1PX6102	VBN2F1SX6102	
		266*	VBN2F2PX6202	VBN2F2SX6202	VBN2F2PX6102	VBN2F2SX6102	VBN2F2PX6202	VBN2F2SX6202	VBN2F2PX6102	VBN2F2SX6102	
		45	VBN2GNPX6202	VBN2GNSX6202	VBN2GNPX6102	VBN2GNSX6102	VBN2GNPX6202	VBN2GNSX6202	VBN2GNPX6102	VBN2GNSX6102	
		55	VBN2GPPX6202	VBN2GPSX6202	VBN2GPPX6102	VBN2GPSX6102	VBN2GPPX6202	VBN2GPSX6202	VBN2GPPX6102	VBN2GPSX6102	
		72	VBN2GRPX6202	VBN2GRSX6202	VBN2GRPX6102	VBN2GRSX6102	VBN2GRPX6202	VBN2GRSX6202	VBN2GRPX6102	VBN2GRSX6102	
		101	VBN2GSPX6202	VBN2GSSX6202	VBN2GSPX6102	VBN2GSSX6102	VBN2GSPX6202	VBN2GSSX6202	VBN2GSPX6102	VBN2GSSX6102	
		162	VBN2GUPX6202	VBN2GUSX6202	VBN2GUPX6102	VBN2GUSX6102	VBN2GUPX6202	VBN2GUSX6202	VBN2GUPX6102	VBN2GUSX6102	
		202*	VBN2G1PX6202	VBN2G1SX6202	VBN2G1PX6102	VBN2G1SX6102	VBN2G1PX6202	VBN2G1SX6202	VBN2G1PX6102	VBN2G1SX6102	
3"	100	49	VBN2HNPX6202	VBN2HNSX6202	VBN2HNPX6102	VBN2HNSX6102	VBN2HNPX6202	VBN2HNSX6202	VBN2HNPX6102	VBN2HNSX6102	
		63	VBN2HPPX6202	VBN2HPSX6202	VBN2HPPX6102	VBN2HPSX6102	VBN2HPPX6202	VBN2HPSX6202	VBN2HPPX6102	VBN2HPSX6102	
		82	VBN2HRPX6202	VBN2HRSX6202	VBN2HRPX6102	VBN2HRSX6102	VBN2HRPX6202	VBN2HRSX6202	VBN2HRPX6102	VBN2HRSX6102	
		124	VBN2HTPX6202	VBN2HTSX6202	VBN2HTPX6102	VBN2HTSX6102	VBN2HTPX6202	VBN2HTSX6202	VBN2HTPX6102	VBN2HTSX6102	
		145*	VBN2HUPX6202	VBN2HUSX6202	VBN2HUPX6102	VBN2HUSX6102	VBN2HUPX6202	VBN2HUSX6202	VBN2HUPX6102	VBN2HUSX6102	

* Full port ball. No flow characterizing insert.

VALVES

Product Selection - Valves

2-Way NPT Valves 1/2" - 3", NEMA 3R

Actuator Features			Fail Safe								
Actuator O.S. Number	MS8105A1030				MS8105A1130						
Power Supply	Voltage	24 VAC/DC				24 VAC/DC					
	Frequency	50 / 60 Hz				50 / 60 Hz					
Actuator Torque	Power	6 VA				6 VA					
	(lb.-in.)	44				44					
Control	(0)-10 Vdc										
	4-20 mA (external 500 Ohm Resistor)										
Floating											
Two-Position SPDT											
Two-Position SPST			•				•				
Actuator Stroke	(degrees)	95° ± 3°				95° ± 3°					
Timing	(drive/spring return, seconds)	45 / 25				45 / 25					
Aux Switch		0				1					
Feedback	2-10 Vdc Built In										
Fail Safe Action		Closed				Open					
Normal Position (no signal)		Closed				Open					
Valve Features			Trim	Nickel-Plated Brass	Stainless Steel	Nickel-Plated Brass	Stainless Steel	Nickel-Plated Brass	Stainless Steel	Nickel-Plated Brass	Stainless Steel
Valve Size (Inches)	Close-off Pressure (psid)	Cv	Short Order Codes								
1/2"	130	0.38	VBN2ABPX7202	VBN2ABSX7202	VBN2ABPX7102	VBN2ABSX7102	VBN2ABPX202	VBN2ABSXA202	VBN2ABPX102	VBN2ABSXA102	
		0.68	VBN2ADPX7202	VBN2ADSX7202	VBN2ADPX7102	VBN2ADSX7102	VBN2ADPX202	VBN2ADSXA202	VBN2ADPX102	VBN2ADSXA102	
		1.3	VBN2AEPX7202	VBN2AESX7202	VBN2AEPX7102	VBN2AESX7102	VBN2AEPX202	VBN2AESXA202	VBN2AEPX102	VBN2AESXA102	
		2	VBN2AFPX7202	VBN2AFSX7202	VBN2AFPX7102	VBN2AFSX7102	VBN2AFPX202	VBN2AFSXA202	VBN2AFPX102	VBN2AFSXA102	
		2.6	VBN2AGPX7202	VBN2AGSX7202	VBN2AGPX7102	VBN2AGSX7102	VBN2AGPX202	VBN2AGSXA202	VBN2AGPX102	VBN2AGSXA102	
		4.7	VBN2AHPX7202	VBN2AHSX7202	VBN2AHPX7102	VBN2AHSX7102	VBN2AHPX202	VBN2AHSXA202	VBN2AHPX102	VBN2AHSXA102	
		8	VBN2AJPX7202	VBN2AJSX7202	VBN2AJPX7102	VBN2AJSX7102	VBN2AJPX202	VBN2AJSXA202	VBN2AJPX102	VBN2AJSXA102	
11.7*	VBN2AKPX7202	VBN2AKSX7202	VBN2AKPX7102	VBN2AKSX7102	VBN2AKPX202	VBN2AKSXA202	VBN2AKPX102	VBN2AKSXA102			
3/4"	130	0.31	VBN2BBPX7202	VBN2BBSX7202	VBN2BBPX7102	VBN2BBSX7102	VBN2BBPX202	VBN2BBSXA202	VBN2BBPX102	VBN2BBSXA102	
		0.63	VBN2BDPX7202	VBN2BDSX7202	VBN2BDPX7102	VBN2BDSX7102	VBN2BDPX202	VBN2BDSXA202	VBN2BDPX102	VBN2BDSXA102	
		1.2	VBN2BEPX7202	VBN2BESX7202	VBN2BEPX7102	VBN2BESX7102	VBN2BEPX202	VBN2BESXA202	VBN2BEPX102	VBN2BESXA102	
		2.5	VBN2BGPX7202	VBN2BGSX7202	VBN2BGPX7102	VBN2BGSX7102	VBN2BGPX202	VBN2BGSXA202	VBN2BGPX102	VBN2BGSXA102	
		4.3	VBN2BHPX7202	VBN2BHSX7202	VBN2BHPX7102	VBN2BHSX7102	VBN2BHPX202	VBN2BHSXA202	VBN2BHPX102	VBN2BHSXA102	
		7.4	VBN2BJPX7202	VBN2BJSX7202	VBN2BJPX7102	VBN2BJSX7102	VBN2BJPX202	VBN2BJSXA202	VBN2BJPX102	VBN2BJSXA102	
		10.1	VBN2BKPX7202	VBN2BKSX7202	VBN2BKPX7102	VBN2BKSX7102	VBN2BKPX202	VBN2BKSXA202	VBN2BKPX102	VBN2BKSXA102	
14.7*	VBN2BLPX7202	VBN2BLSX7202	VBN2BLPX7102	VBN2BLSX7102	VBN2BLPX202	VBN2BLSXA202	VBN2BLPX102	VBN2BLSXA102			
29*	VBN2BMPX7202	VBN2BMSX7202	VBN2BMPX7102	VBN2BMSX7102	VBN2BMPX202	VBN2BMSXA202	VBN2BMPX102	VBN2BMSXA102			
1"	100	4.4	VBN2CHPX7202	VBN2CHSX7202	VBN2CHPX7102	VBN2CHSX7102	VBN2CHPX202	VBN2CHSXA202	VBN2CHPX102	VBN2CHSXA102	
		9	VBN2CJPX7202	VBN2CJSX7202	VBN2CJPX7102	VBN2CJSX7102	VBN2CJPX202	VBN2CJSXA202	VBN2CJPX102	VBN2CJSXA102	
		15.3	VBN2CLPX7202	VBN2CLSX7202	VBN2CLPX7102	VBN2CLSX7102	VBN2CLPX202	VBN2CLSXA202	VBN2CLPX102	VBN2CLSXA102	
		26	VBN2CMPX7202	VBN2CMSX7202	VBN2CMPX7102	VBN2CMSX7102	VBN2CMPX202	VBN2CMSXA202	VBN2CMPX102	VBN2CMSXA102	
		44*	VBN2CNPX7202	VBN2CNSX7202	VBN2CNPX7102	VBN2CNSX7102	VBN2CNPX202	VBN2CNSXA202	VBN2CNPX102	VBN2CNSXA102	
54*	VBN2CPPX7202	VBN2CPSX7202	VBN2CPPX7102	VBN2CPSX7102	VBN2CPPX202	VBN2CPSXA202	VBN2CPPX102	VBN2CPSXA102			
1-1/4"	100	4.4	VBN2DHPX7202	VBN2DHSX7202	VBN2DHPX7102	VBN2DHSX7102	VBN2DHPX202	VBN2DHSXA202	VBN2DHPX102	VBN2DHSXA102	
		8.3	VBN2DJPX7202	VBN2DJSX7202	VBN2DJPX7102	VBN2DJSX7102	VBN2DJPX202	VBN2DJSXA202	VBN2DJPX102	VBN2DJSXA102	
		14.9	VBN2DKPX7202	VBN2DKSX7202	VBN2DKPX7102	VBN2DKSX7102	VBN2DKPX202	VBN2DKSXA202	VBN2DKPX102	VBN2DKSXA102	
		25	VBN2DLPX7202	VBN2DLSX7202	VBN2DLPX7102	VBN2DLSX7102	VBN2DLPX202	VBN2DLSXA202	VBN2DLPX102	VBN2DLSXA102	
		37	VBN2DMPX7202	VBN2DMSX7202	VBN2DMPX7102	VBN2DMSX7102	VBN2DMPX202	VBN2DMSXA202	VBN2DMPX102	VBN2DMSXA102	
		41*	VBN2DNPX7202	VBN2DNSX7202	VBN2DNPX7102	VBN2DNSX7102	VBN2DNPX202	VBN2DNSXA202	VBN2DNPX102	VBN2DNSXA102	
		102*	VBN2DSPX7202	VBN2DSSX7202	VBN2DSPX7102	VBN2DSSX7102	VBN2DSPX202	VBN2DSSXA202	VBN2DSPX102	VBN2DSSXA102	
1-1/2"	100	23	VBN2ELPX7202	VBN2ELSX7202	VBN2ELPX7102	VBN2ELSX7102	VBN2ELPX202	VBN2ELSXA202	VBN2ELPX102	VBN2ELSXA102	
		30	VBN2EMPX7202	VBN2EMSX7202	VBN2EMPX7102	VBN2EMSX7102	VBN2EMPX202	VBN2EMSXA202	VBN2EMPX102	VBN2EMSXA102	
		41	VBN2ENPX7202	VBN2ENSX7202	VBN2ENPX7102	VBN2ENSX7102	VBN2ENPX202	VBN2ENSXA202	VBN2ENPX102	VBN2ENSXA102	
		74*	VBN2ERPX7202	VBN2ERSX7202	VBN2ERPX7102	VBN2ERSX7102	VBN2ERPX202	VBN2ERSXA202	VBN2ERPX102	VBN2ERSXA102	
		172*	VBN2E1PX7202	VBN2E1SX7202	VBN2E1PX7102	VBN2E1SX7102	VBN2E1PX202	VBN2E1SXA202	VBN2E1PX102	VBN2E1SXA102	
2"	100	42	VBN2FNPX7202	VBN2FNSX7202	VBN2FNPX7102	VBN2FNSX7102	VBN2FNPX202	VBN2FNSXA202	VBN2FNPX102	VBN2FNSXA102	
		57	VBN2FPPX7202	VBN2FPSX7202	VBN2FPPX7102	VBN2FPSX7102	VBN2FPPX202	VBN2FPSXA202	VBN2FPPX102	VBN2FPSXA102	
		71	VBN2FRPX7202	VBN2FRSX7202	VBN2FRPX7102	VBN2FRSX7102	VBN2FRPX202	VBN2FRSXA202	VBN2FRPX102	VBN2FRSXA102	
		100	VBN2FSPX7202	VBN2FSSX7202	VBN2FSPX7102	VBN2FSSX7102	VBN2FSPX202	VBN2FSSXA202	VBN2FSPX102	VBN2FSSXA102	
		108*	VBN2FTPX7202	VBN2FTSX7202	VBN2FTPX7102	VBN2FTSX7102	VBN2FTPX202	VBN2FTSXA202	VBN2FTPX102	VBN2FTSXA102	
		210	VBN2F1PX7202	VBN2F1SX7202	VBN2F1PX7102	VBN2F1SX7102	VBN2F1PX202	VBN2F1SXA202	VBN2F1PX102	VBN2F1SXA102	
		266*	VBN2F2PX7202	VBN2F2SX7202	VBN2F2PX7102	VBN2F2SX7102	VBN2F2PX202	VBN2F2SXA202	VBN2F2PX102	VBN2F2SXA102	
2-1/2"	100	45	VBN2GNPX7202	VBN2GNSX7202	VBN2GNPX7102	VBN2GNSX7102	VBN2GNPX202	VBN2GNSXA202	VBN2GNPX102	VBN2GNSXA102	
		55	VBN2GPPX7202	VBN2GPSX7202	VBN2GPPX7102	VBN2GPSX7102	VBN2GPPX202	VBN2GPSXA202	VBN2GPPX102	VBN2GPSXA102	
		72	VBN2GRPX7202	VBN2GRSX7202	VBN2GRPX7102	VBN2GRSX7102	VBN2GRPX202	VBN2GRSXA202	VBN2GRPX102	VBN2GRSXA102	
		101	VBN2GSPX7202	VBN2GSSX7202	VBN2GSPX7102	VBN2GSSX7102	VBN2GSPX202	VBN2GSSXA202	VBN2GSPX102	VBN2GSSXA102	
		162	VBN2GUPX7202	VBN2GUSX7202	VBN2GUPX7102	VBN2GUSX7102	VBN2GUPX202	VBN2GUSXA202	VBN2GUPX102	VBN2GUSXA102	
		202*	VBN2G1PX7202	VBN2G1SX7202	VBN2G1PX7102	VBN2G1SX7102	VBN2G1PX202	VBN2G1SXA202	VBN2G1PX102	VBN2G1SXA102	
3"	100	49	VBN2HNPX7202	VBN2HNSX7202	VBN2HNPX7102	VBN2HNSX7102	VBN2HNPX202	VBN2HNSXA202	VBN2HNPX102	VBN2HNSXA102	
		63	VBN2HPPX7202	VBN2HPSX7202	VBN2HPPX7102	VBN2HPSX7102	VBN2HPPX202	VBN2HPSXA202	VBN2HPPX102	VBN2HPSXA102	
		82	VBN2HRPX7202	VBN2HRSX7202	VBN2HRPX7102	VBN2HRSX7102	VBN2HRPX202	VBN2HRSXA202	VBN2HRPX102	VBN2HRSXA102	
		124	VBN2HTPX7202	VBN2HTSX7202	VBN2HTPX7102	VBN2HTSX7102	VBN2HTPX202	VBN2HTSXA202	VBN2HTPX102	VBN2HTSXA102	
		145*	VBN2HUPX7202	VBN2HUSX7202	VBN2HUPX7102	VBN2HUSX7102	VBN2HUPX202	VBN2HUSXA202	VBN2HUPX102	VBN2HUSXA102	

* Full port ball. No flow characterizing insert.

Product Selection - Valves

2-Way NPT Valves 1/2" - 3", NEMA 3R

Actuator Features			Fail Safe								
Actuator O.S. Number			MS4105A1030				MS4105A1130				
Power Supply			100-250 VAC				100-250 VAC				
Voltage			100-250 VAC				100-250 VAC				
Frequency			50 / 60 Hz				50 / 60 Hz				
Power			6 VA				6 VA				
Actuator Torque (lb.-in.)			44				44				
Control			(0)-10 Vdc				(0)-10 Vdc				
4-20 mA (external 500 Ohm Resistor)											
Floating											
Two-Position SPDT											
Two-Position SPST			•				•				
Actuator Stroke (degrees)			95° ± 3°				95° ± 3°				
Timing (drive/spring return, seconds)			45 / 25				45 / 25				
Aux Switch			0				1				
Feedback			2-10 Vdc Built In								
Fail Safe Action			Closed		Open		Closed		Open		
Normal Position (no signal)			Closed		Open		Closed		Open		
Valve Features			Trim	Nickel-Plated Brass	Stainless Steel	Nickel-Plated Brass	Stainless Steel	Nickel-Plated Brass	Stainless Steel	Nickel-Plated Brass	Stainless Steel
Valve Size (inches)	Close-off Pressure (psid)	Cv	Short Order Codes								
1/2"	130	0.38	VBN2ABPX8202	VBN2ABSX8202	VBN2ABPX8102	VBN2ABSX8102	VBN2ABPX9202	VBN2ABSX9202	VBN2ABPX9102	VBN2ABSX9102	
		0.68	VBN2ADPX8202	VBN2ADSX8202	VBN2ADPX8102	VBN2ADSX8102	VBN2ADPX9202	VBN2ADSX9202	VBN2ADPX9102	VBN2ADSX9102	
		1.3	VBN2AEPX8202	VBN2AESX8202	VBN2AEPX8102	VBN2AESX8102	VBN2AEPX9202	VBN2AESX9202	VBN2AEPX9102	VBN2AESX9102	
		2	VBN2AFPX8202	VBN2AFSX8202	VBN2AFPX8102	VBN2AFSX8102	VBN2AFPX9202	VBN2AFSX9202	VBN2AFPX9102	VBN2AFSX9102	
		2.6	VBN2AGPX8202	VBN2AGSX8202	VBN2AGPX8102	VBN2AGSX8102	VBN2AGPX9202	VBN2AGSX9202	VBN2AGPX9102	VBN2AGSX9102	
		4.7	VBN2AHPX8202	VBN2AHSX8202	VBN2AHPX8102	VBN2AHSX8102	VBN2AHPX9202	VBN2AHSX9202	VBN2AHPX9102	VBN2AHSX9102	
		8	VBN2AJPX8202	VBN2AJSX8202	VBN2AJPX8102	VBN2AJSX8102	VBN2AJPX9202	VBN2AJSX9202	VBN2AJPX9102	VBN2AJSX9102	
3/4"	130	11.7*	VBN2AKPX8202	VBN2AKSX8202	VBN2AKPX8102	VBN2AKSX8102	VBN2AKPX9202	VBN2AKSX9202	VBN2AKPX9102	VBN2AKSX9102	
		0.31	VBN2BBPX8202	VBN2BBSX8202	VBN2BBPX8102	VBN2BBSX8102	VBN2BBPX9202	VBN2BBSX9202	VBN2BBPX9102	VBN2BBSX9102	
		0.63	VBN2BDPX8202	VBN2BDSX8202	VBN2BDPX8102	VBN2BDSX8102	VBN2BDPX9202	VBN2BDSX9202	VBN2BDPX9102	VBN2BDSX9102	
		1.2	VBN2BEPX8202	VBN2BESX8202	VBN2BEPX8102	VBN2BESX8102	VBN2BEPX9202	VBN2BESX9202	VBN2BEPX9102	VBN2BESX9102	
		2.5	VBN2BGPX8202	VBN2BGSX8202	VBN2BGPX8102	VBN2BGSX8102	VBN2BGPX9202	VBN2BGSX9202	VBN2BGPX9102	VBN2BGSX9102	
		4.3	VBN2BHPX8202	VBN2BHSX8202	VBN2BHPX8102	VBN2BHSX8102	VBN2BHPX9202	VBN2BHSX9202	VBN2BHPX9102	VBN2BHSX9102	
		7.4	VBN2BJPX8202	VBN2BJSX8202	VBN2BJPX8102	VBN2BJSX8102	VBN2BJPX9202	VBN2BJSX9202	VBN2BJPX9102	VBN2BJSX9102	
1"	100	10.1	VBN2BKPX8202	VBN2BKSX8202	VBN2BKPX8102	VBN2BKSX8102	VBN2BKPX9202	VBN2BKSX9202	VBN2BKPX9102	VBN2BKSX9102	
		14.7*	VBN2BLPX8202	VBN2BLSX8202	VBN2BLPX8102	VBN2BLSX8102	VBN2BLPX9202	VBN2BLSX9202	VBN2BLPX9102	VBN2BLSX9102	
		29*	VBN2BMPX8202	VBN2BMSX8202	VBN2BMPX8102	VBN2BMSX8102	VBN2BMPX9202	VBN2BMSX9202	VBN2BMPX9102	VBN2BMSX9102	
		4.4	VBN2CHPX8202	VBN2CHSX8202	VBN2CHPX8102	VBN2CHSX8102	VBN2CHPX9202	VBN2CHSX9202	VBN2CHPX9102	VBN2CHSX9102	
		9	VBN2CJJPX8202	VBN2CJSX8202	VBN2CJJPX8102	VBN2CJSX8102	VBN2CJJPX9202	VBN2CJSX9202	VBN2CJJPX9102	VBN2CJSX9102	
		15.3	VBN2CLPX8202	VBN2CLSX8202	VBN2CLPX8102	VBN2CLSX8102	VBN2CLPX9202	VBN2CLSX9202	VBN2CLPX9102	VBN2CLSX9102	
		26	VBN2CMPX8202	VBN2CMSX8202	VBN2CMPX8102	VBN2CMSX8102	VBN2CMPX9202	VBN2CMSX9202	VBN2CMPX9102	VBN2CMSX9102	
1-1/4"	100	44*	VBN2CNPX8202	VBN2CNSX8202	VBN2CNPX8102	VBN2CNSX8102	VBN2CNPX9202	VBN2CNSX9202	VBN2CNPX9102	VBN2CNSX9102	
		54*	VBN2CPPX8202	VBN2CPSX8202	VBN2CPPX8102	VBN2CPSX8102	VBN2CPPX9202	VBN2CPSX9202	VBN2CPPX9102	VBN2CPSX9102	
		4.4	VBN2DHPX8202	VBN2DHSX8202	VBN2DHPX8102	VBN2DHSX8102	VBN2DHPX9202	VBN2DHSX9202	VBN2DHPX9102	VBN2DHSX9102	
		8.3	VBN2DJPX8202	VBN2DJSX8202	VBN2DJPX8102	VBN2DJSX8102	VBN2DJPX9202	VBN2DJSX9202	VBN2DJPX9102	VBN2DJSX9102	
		14.9	VBN2DKPX8202	VBN2DKSX8202	VBN2DKPX8102	VBN2DKSX8102	VBN2DKPX9202	VBN2DKSX9202	VBN2DKPX9102	VBN2DKSX9102	
		25	VBN2DLPX8202	VBN2DLSX8202	VBN2DLPX8102	VBN2DLSX8102	VBN2DLPX9202	VBN2DLSX9202	VBN2DLPX9102	VBN2DLSX9102	
		37	VBN2DMPX8202	VBN2DMSX8202	VBN2DMPX8102	VBN2DMSX8102	VBN2DMPX9202	VBN2DMSX9202	VBN2DMPX9102	VBN2DMSX9102	
1-1/2"	100	41*	VBN2DNPX8202	VBN2DNSX8202	VBN2DNPX8102	VBN2DNSX8102	VBN2DNPX9202	VBN2DNSX9202	VBN2DNPX9102	VBN2DNSX9102	
		102*	VBN2DSPX8202	VBN2DSSX8202	VBN2DSPX8102	VBN2DSSX8102	VBN2DSPX9202	VBN2DSSX9202	VBN2DSPX9102	VBN2DSSX9102	
		23	VBN2ELPX8202	VBN2ELSX8202	VBN2ELPX8102	VBN2ELSX8102	VBN2ELPX9202	VBN2ELSX9202	VBN2ELPX9102	VBN2ELSX9102	
		30	VBN2EMPX8202	VBN2EMSX8202	VBN2EMPX8102	VBN2EMSX8102	VBN2EMPX9202	VBN2EMSX9202	VBN2EMPX9102	VBN2EMSX9102	
		41	VBN2ENPX8202	VBN2ENSX8202	VBN2ENPX8102	VBN2ENSX8102	VBN2ENPX9202	VBN2ENSX9202	VBN2ENPX9102	VBN2ENSX9102	
		74*	VBN2ERPX8202	VBN2ERSX8202	VBN2ERPX8102	VBN2ERSX8102	VBN2ERPX9202	VBN2ERSX9202	VBN2ERPX9102	VBN2ERSX9102	
		172*	VBN2E1PX8202	VBN2E1SX8202	VBN2E1PX8102	VBN2E1SX8102	VBN2E1PX9202	VBN2E1SX9202	VBN2E1PX9102	VBN2E1SX9102	
2"	100	42	VBN2FNPX8202	VBN2FNSX8202	VBN2FNPX8102	VBN2FNSX8102	VBN2FNPX9202	VBN2FNSX9202	VBN2FNPX9102	VBN2FNSX9102	
		57	VBN2FPPX8202	VBN2FPSX8202	VBN2FPPX8102	VBN2FPSX8102	VBN2FPPX9202	VBN2FPSX9202	VBN2FPPX9102	VBN2FPSX9102	
		71	VBN2FRPX8202	VBN2FRSX8202	VBN2FRPX8102	VBN2FRSX8102	VBN2FRPX9202	VBN2FRSX9202	VBN2FRPX9102	VBN2FRSX9102	
		100	VBN2FSPX8202	VBN2FSSX8202	VBN2FSPX8102	VBN2FSSX8102	VBN2FSPX9202	VBN2FSSX9202	VBN2FSPX9102	VBN2FSSX9102	
		108*	VBN2FTPX8202	VBN2FTSX8202	VBN2FTPX8102	VBN2FTSX8102	VBN2FTPX9202	VBN2FTSX9202	VBN2FTPX9102	VBN2FTSX9102	
		210	VBN2F1PX8202	VBN2F1SX8202	VBN2F1PX8102	VBN2F1SX8102	VBN2F1PX9202	VBN2F1SX9202	VBN2F1PX9102	VBN2F1SX9102	
		266*	VBN2F2PX8202	VBN2F2SX8202	VBN2F2PX8102	VBN2F2SX8102	VBN2F2PX9202	VBN2F2SX9202	VBN2F2PX9102	VBN2F2SX9102	
2-1/2"	100	45	VBN2GNPX8202	VBN2GNSX8202	VBN2GNPX8102	VBN2GNSX8102	VBN2GNPX9202	VBN2GNSX9202	VBN2GNPX9102	VBN2GNSX9102	
		55	VBN2GPPX8202	VBN2GPPX8202	VBN2GPPX8102	VBN2GPPX8102	VBN2GPPX9202	VBN2GPPX9202	VBN2GPPX9102	VBN2GPPX9102	
		72	VBN2GRPX8202	VBN2GRSX8202	VBN2GRPX8102	VBN2GRSX8102	VBN2GRPX9202	VBN2GRSX9202	VBN2GRPX9102	VBN2GRSX9102	
		101	VBN2GSPX8202	VBN2GSSX8202	VBN2GSPX8102	VBN2GSSX8102	VBN2GSPX9202	VBN2GSSX9202	VBN2GSPX9102	VBN2GSSX9102	
		162	VBN2GUPX8202	VBN2GUSX8202	VBN2GUPX8102	VBN2GUSX8102	VBN2GUPX9202	VBN2GUSX9202	VBN2GUPX9102	VBN2GUSX9102	
		202*	VBN2G1PX8202	VBN2G1SX8202	VBN2G1PX8102	VBN2G1SX8102	VBN2G1PX9202	VBN2G1SX9202	VBN2G1PX9102	VBN2G1SX9102	
		49	VBN2HNPX8202	VBN2HNSX8202	VBN2HNPX8102	VBN2HNSX8102	VBN2HNPX9202	VBN2HNSX9202	VBN2HNPX9102	VBN2HNSX9102	
3"	100	63	VBN2HPPX8202	VBN2HPSX8202	VBN2HPPX8102	VBN2HPSX8102	VBN2HPPX9202	VBN2HPSX9202	VBN2HPPX9102	VBN2HPSX9102	
		82	VBN2HRPX8202	VBN2HRSX8202	VBN2HRPX8102	VBN2HRSX8102	VBN2HRPX9202	VBN2HRSX9202	VBN2HRPX9102	VBN2HRSX9102	
		124	VBN2HTPX8202	VBN2HTSX8202	VBN2HTPX8102	VBN2HTSX8102	VBN2HTPX9202	VBN2HTSX9202	VBN2HTPX9102	VBN2HTSX9102	
		145*	VBN2HUPX8202	VBN2HUSX8202	VBN2HUPX8102	VBN2HUSX8102	VBN2HUPX9202	VBN2HUSX9202	VBN2HUPX9102	VBN2HUSX9102	

* Full port ball. No flow characterizing insert.

VALVES

Product Selection - Valves

3-Way NPT Control Ball Valves 1/2"-2 1/2", NEMA2

Common Features

VBN3 (Three-way):

- Equal % A to AB, linear B to AB
- B-port Cv reduction of 20% approximates constant total loop flow
- Nickel-chrome plated brass ball and stem
- Convert to 2-way by plugging B port (plug not provided)
- Spring return actuators field-configurable for A-port normally open or normally closed fail safe.
- Mixing or diverting control with the same valve
- ANSI Class IV (0.01%) seat leakage on both A and B ports
- Available with NEMA 3R actuator enclosure



3-Way



Actuator Features			Non Fail Safe				Valve Only
Actuator O.S. Number			MN6105A1011	MN6105A1201	MN7505A2001	MN7505A2209	N/A
Power Supply	Voltage		24 VAC/DC	24 VAC/DC	24 VAC/DC	24 VAC/DC	
	Frequency		50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	
	Power		5 VA	5 VA	5 VA	5 VA	
Actuator Torque	(lb.-in.)		44	44	44	44	
Control	(0)2-10 Vdc				•	•	
	4-20 mA (external 500 Ohm Resistor)				•	•	
	Floating		•	•	•	•	
	Two-Position SPDT		•	•	•	•	
	Two-Position SPST				•	•	
Actuator Stroke	(degrees)		95° ± 3°	95° ± 3°	95° ± 3°	95° ± 3°	
Timing	(drive/spring return, seconds)		90	90	90	90	
Aux Switch			0	2	0	2	
Feedback	2-10 Vdc Built In				•	•	
Fail Safe Action			Stay in Place	Stay in Place	Stay in Place	Stay in Place	
Normal Position (no signal)			Stay in Place	Stay in Place	A-AB Open	A-AB Open	
Valve Features	Trim		Nickel-Plated Brass	Nickel-Plated Brass	Nickel-Plated Brass	Nickel-Plated Brass	Nickel-Plated Brass
Valve Size (inches)	Close-off Pressure (psid)	Cv	Short Order Codes				
1/2"	50	0.33	VBN3ABPX4000	VBN3ABPXC000	VBN3ABPX5000	VBN3ABPX0000	VBN3ABPX0000
		0.59	VBN3ACPX4000	VBN3ACPXC000	VBN3ACPX5000	VBN3ACPX0000	VBN3ACPX0000
		1	VBN3AEPX4000	VBN3AEPXC000	VBN3AEPX5000	VBN3AEPX0000	VBN3AEPX0000
		2.4	VBN3AFPX4000	VBN3AFPXC000	VBN3AFPX5000	VBN3AFPX0000	VBN3AFPX0000
		4.3	VBN3AHPX4000	VBN3AHPXC000	VBN3AHPX5000	VBN3AHPX0000	VBN3AHPX0000
		8*	VBN3AJPX4000	VBN3AJPXC000	VBN3AJPX5000	VBN3AJPX0000	VBN3AJPX0000
3/4"	50	0.4	VBN3BCPX4000	VBN3BCPXC000	VBN3BCPX5000	VBN3BCPX0000	VBN3BCPX0000
		0.66	VBN3BDPX4000	VBN3BDPXC000	VBN3BDPX5000	VBN3BDPX0000	VBN3BDPX0000
		1.3	VBN3BEPX4000	VBN3BEPXC000	VBN3BEPX5000	VBN3BEPX0000	VBN3BEPX0000
		2.4	VBN3BFPX4000	VBN3BFPXC000	VBN3BFPX5000	VBN3BFPX0000	VBN3BFPX0000
		3.8	VBN3BGPX4000	VBN3BGPXC000	VBN3BGPX5000	VBN3BGPX0000	VBN3BGPX0000
		7	VBN3BJPX4000	VBN3BJPXC000	VBN3BJPX5000	VBN3BJPX0000	VBN3BJPX0000
1"	50	11*	VBN3BKPX4000	VBN3BKPXC000	VBN3BKPX5000	VBN3BKPX0000	VBN3BKPX0000
		0.4	VBN3CCPX4000	VBN3CCPXC000	VBN3CCPX5000	VBN3CCPX0000	VBN3CCPX0000
		0.65	VBN3CDPX4000	VBN3CDPXC000	VBN3CDPX5000	VBN3CDPX0000	VBN3CDPX0000
		1.3	VBN3CEPX4000	VBN3CEPXC000	VBN3CEPX5000	VBN3CEPX0000	VBN3CEPX0000
		2.3	VBN3CFPX4000	VBN3CFPXC000	VBN3CFPX5000	VBN3CFPX0000	VBN3CFPX0000
		3.5	VBN3CGPX4000	VBN3CGPXC000	VBN3CGPX5000	VBN3CGPX0000	VBN3CGPX0000
		4.5	VBN3CHPX4000	VBN3CHPXC000	VBN3CHPX5000	VBN3CHPX0000	VBN3CHPX0000
		8.6	VBN3CJPX4000	VBN3CJPXC000	VBN3CJPX5000	VBN3CJPX0000	VBN3CJPX0000
		14.9	VBN3CKPX4000	VBN3CKPXC000	VBN3CKPX5000	VBN3CKPX0000	VBN3CKPX0000
		22*	VBN3CLPX4000	VBN3CLPXC000	VBN3CLPX5000	VBN3CLPX0000	VBN3CLPX0000
1-1/4"	40	31*	VBN3CMPX4000	VBN3CMPXC000	VBN3CMPX5000	VBN3CMPX0000	VBN3CMPX0000
		4.1	VBN3DHPX4000	VBN3DHPXC000	VBN3DHPX5000	VBN3DHPX0000	VBN3DHPX0000
		8.7	VBN3DJPX4000	VBN3DJPXC000	VBN3DJPX5000	VBN3DJPX0000	VBN3DJPX0000
		12.7	VBN3DKPX4000	VBN3DKPXC000	VBN3DKPX5000	VBN3DKPX0000	VBN3DKPX0000
		19.4*	VBN3DLPX4000	VBN3DLPXC000	VBN3DLPX5000	VBN3DLPX0000	VBN3DLPX0000
		27	VBN3DMPX4000	VBN3DMPXC000	VBN3DMPX5000	VBN3DMPX0000	VBN3DMPX0000
1-1/2"	40	34*	VBN3DNPX4000	VBN3DNPXC000	VBN3DNPX5000	VBN3DNPX0000	VBN3DNPX0000
		4	VBN3EHPX4000	VBN3EHPXC000	VBN3EHPX5000	VBN3EHPX0000	VBN3EHPX0000
		8.3	VBN3EJPX4000	VBN3EJPXC000	VBN3EJPX5000	VBN3EJPX0000	VBN3EJPX0000
		13.4	VBN3EKPX4000	VBN3EKPXC000	VBN3EKPX5000	VBN3EKPX0000	VBN3EKPX0000
		24	VBN3ELPX4000	VBN3ELPXC000	VBN3ELPX5000	VBN3ELPX0000	VBN3ELPX0000
		32*	VBN3EMPX4000	VBN3EMPXC000	VBN3EMPX5000	VBN3EMPX0000	VBN3EMPX0000
2"	40	61*	VBN3EPPX4000	VBN3EPPXC000	VBN3EPPX5000	VBN3EPPX0000	VBN3EPPX0000
		24	VBN3FLPX4000	VBN3FLPXC000	VBN3FLPX5000	VBN3FLPX0000	VBN3FLPX0000
		38	VBN3FNPX4000	VBN3FNXPXC000	VBN3FNPX5000	VBN3FNPX0000	VBN3FNPX0000
		57*	VBN3FPPX4000	VBN3FPPXC000	VBN3FPPX5000	VBN3FPPX0000	VBN3FPPX0000
		83	VBN3FRPX4000	VBN3FRPXC000	VBN3FRPX5000	VBN3FRPX0000	VBN3FRPX0000
2-1/2"	40	109*	VBN3FTPX4000	VBN3FTPXC000	VBN3FTPX5000	VBN3FTPX0000	VBN3FTPX0000
		38	VBN3GNPX4000	VBN3GNPXC000	VBN3GNPX5000	VBN3GNPX0000	VBN3GNPX0000
		74	VBN3GRPX4000	VBN3GRPXC000	VBN3GRPX5000	VBN3GRPX0000	VBN3GRPX0000
		100*	VBN3GSPX4000	VBN3GSPXC000	VBN3GSPX5000	VBN3GSPX0000	VBN3GSPX0000

* Full port ball. No flow characterizing insert.



Product Selection - Valves

3-Way NPT Control Ball Valves 1/2"-1 1/4", NEMA2

Actuator Features			Fail Safe			
Actuator O.S. Number			MS7103A2024		MS7103A2224	
Power Supply			24 VAC/DC		24 VAC/DC	
Voltage			50 / 60 Hz		50 / 60 Hz	
Frequency			4 VA		4 VA	
Power			27		27	
Actuator Torque (lb.-in.)			•		•	
Control (0)2-10 Vdc			•		•	
4-20 mA (external 500 Ohm Resistor)			•		•	
Floating			•		•	
Two-Position SPDT			•		•	
Two-Position SPST						
Actuator Stroke (degrees)			95° ± 3°		95° ± 3°	
Timing (drive/spring return, seconds)			90 / 25		90 / 25	
Aux Switch			0		2	
Feedback 2-10 Vdc Built In			•		•	
Fail Safe Action			B-AB Open (FSB)	A-AB Open (FSA)	B-AB Open (FSB)	A-AB Open (FSA)
Normal Position (no signal)			B-AB Open	A-AB Open	B-AB Open	A-AB Open
Valve Features			Nickel-Plated Brass		Nickel-Plated Brass	
Trim						
Valve Size (inches)	Close-off Pressure (psid)	Cv	Short Order Codes			
1/2"	50	0.33	VBN3ABPX401	VBN3ABPX301	VBN3ABPXF401	VBN3ABPXF301
		0.59	VBN3ACPXE401	VBN3ACPXE301	VBN3ACPXF401	VBN3ACPXF301
		1	VBN3AEPXE401	VBN3AEPXE301	VBN3AEPXF401	VBN3AEPXF301
		2.4	VBN3AFPXE401	VBN3AFPXE301	VBN3AFPXF401	VBN3AFPXF301
		4.3	VBN3AHPXE401	VBN3AHPXE301	VBN3AHPXF401	VBN3AHPXF301
		8*	VBN3AJPX401	VBN3AJPX301	VBN3AJPXF401	VBN3AJPXF301
3/4"	50	0.4	VBN3BCPX401	VBN3BCPX301	VBN3BCPXF401	VBN3BCPXF301
		0.66	VBN3BDPX401	VBN3BDPX301	VBN3BDPXF401	VBN3BDPXF301
		1.3	VBN3BEPXE401	VBN3BEPXE301	VBN3BEPXF401	VBN3BEPXF301
		2.4	VBN3BFPXE401	VBN3BFPXE301	VBN3BFPXF401	VBN3BFPXF301
		3.8	VBN3BGPXE401	VBN3BGPXE301	VBN3BGPXF401	VBN3BGPXF301
		7	VBN3BJPX401	VBN3BJPX301	VBN3BJPXF401	VBN3BJPXF301
		11*	VBN3BKPXE401	VBN3BKPXE301	VBN3BKPXF401	VBN3BKPXF301
1"	50	0.4	VBN3CCPX401	VBN3CCPX301	VBN3CCPXF401	VBN3CCPXF301
		0.65	VBN3CDPX401	VBN3CDPX301	VBN3CDPXF401	VBN3CDPXF301
		1.3	VBN3CEPX401	VBN3CEPX301	VBN3CEPXF401	VBN3CEPXF301
		2.3	VBN3CFPX401	VBN3CFPX301	VBN3CFPXF401	VBN3CFPXF301
		3.5	VBN3CGPX401	VBN3CGPX301	VBN3CGPXF401	VBN3CGPXF301
		4.5	VBN3CHPX401	VBN3CHPX301	VBN3CHPXF401	VBN3CHPXF301
		8.6	VBN3CJPX401	VBN3CJPX301	VBN3CJPXF401	VBN3CJPXF301
		14.9	VBN3CKPX401	VBN3CKPX301	VBN3CKPXF401	VBN3CKPXF301
		22*	VBN3CLPX401	VBN3CLPX301	VBN3CLPXF401	VBN3CLPXF301
		31*	VBN3CMPXE401	VBN3CMPXE301	VBN3CMPXF401	VBN3CMPXF301
1-1/4"	40	4.1	VBN3DHPXE401	VBN3DHPXE301	VBN3DHPXF401	VBN3DHPXF301
		8.7	VBN3DJPX401	VBN3DJPX301	VBN3DJPXF401	VBN3DJPXF301
		12.7	VBN3DKPX401	VBN3DKPX301	VBN3DKPXF401	VBN3DKPXF301
		19.4*	VBN3DLPXE401	VBN3DLPXE301	VBN3DLPXF401	VBN3DLPXF301
		27	VBN3DMPXE401	VBN3DMPXE301	VBN3DMPXF401	VBN3DMPXF301
		34*	VBN3DNPXE401	VBN3DNPXE301	VBN3DNPXF401	VBN3DNPXF301

3-Way

VALVES

* Full port ball. No flow characterizing insert.

Product Selection - Valves

3-Way NPT Control Ball Valves 1½"-2½", NEMA2

Actuator Features			Fail Safe			
Actuator O.S. Number			MS7505A2030		MS7505A2130	
Power Supply			Voltage		24 VAC/DC	
			Frequency		50 / 60 Hz	
Power			6 VA		6 VA	
Actuator Torque (lb.-in.)			44		44	
Control			(0)2-10 Vdc		•	
			4-20 mA (external 500 Ohm Resistor)		•	
Floating			•		•	
Two-Position SPDT			•		•	
Two-Position SPST			•		•	
Actuator Stroke (degrees)			95° ± 3°		95° ± 3°	
Timing (drive/spring return, seconds)			90 / 25		90 / 25	
Aux Switch			0		1	
Feedback 2-10 Vdc Built In			•		•	
Fail Safe Action			B-AB Open (FSB)	A-AB Open (FSA)	B-AB Open (FSB)	A-AB Open (FSA)
Normal Position (no signal)			B-AB Open		A-AB Open	
Valve Features Trim			Nickel-Plated Brass		Nickel-Plated Brass	
Valve Size (inches)	Close-off Pressure (psid)	Cv	Short Order Codes			
1-1/2"	40	4	VBN3EHPX6400	VBN3EHPX6300	VBN3EHPXB400	VBN3EHPXB300
		8.3	VBN3EJPX6400	VBN3EJPX6300	VBN3EJPXB400	VBN3EJPXB300
		13.4	VBN3EKPX6400	VBN3EKPX6300	VBN3EKPXB400	VBN3EKPXB300
		24	VBN3ELPX6400	VBN3ELPX6300	VBN3ELPXB400	VBN3ELPXB300
		32*	VBN3EMPX6400	VBN3EMPX6300	VBN3EMPXB400	VBN3EMPXB300
2"	40	61*	VBN3EPPX6400	VBN3EPPX6300	VBN3EPPXB400	VBN3EPPXB300
		24	VBN3FLPX6400	VBN3FLPX6300	VBN3FLPXB400	VBN3FLPXB300
		38	VBN3FNPX6400	VBN3FNPX6300	VBN3FNXPB400	VBN3FNXPB300
		57*	VBN3FPPX6400	VBN3FPPX6300	VBN3FPPXB400	VBN3FPPXB300
		83	VBN3FRPX6400	VBN3FRPX6300	VBN3FRPXB400	VBN3FRPXB300
2-1/2"	40	109*	VBN3FTPX6400	VBN3FTPX6300	VBN3FTPXB400	VBN3FTPXB300
		38	VBN3GNPX6400	VBN3GNPX6300	VBN3GNPXB400	VBN3GNPXB300
		74	VBN3GRPX6400	VBN3GRPX6300	VBN3GRPXB400	VBN3GRPXB300
		100*	VBN3GSPX6400	VBN3GSPX6300	VBN3GSPXB400	VBN3GSPXB300

* Full port ball. No flow characterizing insert.

3-Way

Product Selection - Valves

3-Way NPT Control Ball Valves 1/2"-2-1/2", NEMA2

Actuator Features			Fail Safe							
Actuator O.S. Number			MS8105A1030		MS8105A1130		MS4105A1030		MS4105A1130	
Power Supply	Voltage	24 VAC/DC		24 VAC/DC		100-250 VAC		100-250 VAC		
	Frequency	50 / 60 Hz		50 / 60 Hz		50 / 60 Hz		50 / 60 Hz		
Actuator Torque	Power	6 VA		6 VA		6 VA		6 VA		
	(lb.-in.)	44		44		44		44		
Control	(0)2-10 Vdc									
	4-20 mA (external 500 Ohm Resistor)									
	Floating									
	Two-Position SPDT									
Actuator Stroke	(degrees)	95° ± 3°		95° ± 3°		95° ± 3°		95° ± 3°		
	Timing (drive/spring return, seconds)	45 / 25		45 / 25		45 / 25		45 / 25		
Aux Switch	0		1		0		1			
Feedback	2-10 Vdc Built In									
Fail Safe Action	B-AB Open (FSB) A-AB Open (FSA)		B-AB Open (FSB) A-AB Open (FSA)		B-AB Open (FSB) A-AB Open (FSA)		B-AB Open (FSB) A-AB Open (FSA)			
Normal Position (no signal)	B-AB Open		A-AB Open		B-AB Open		A-AB Open		B-AB Open	
Valve Features	Trim	Nickel-Plated Brass		Nickel-Plated Brass		Nickel-Plated Brass		Nickel-Plated Brass		
Valve Size (inches)	Close-off Pressure (psid)	Cv	Short Order Codes							
1/2"	50	0.33	VBN3ABPX7400	VBN3ABPX7300	VBN3ABPX4000	VBN3ABPX3000	VBN3ABPX8400	VBN3ABPX8300	VBN3ABPX9400	VBN3ABPX9300
		0.59	VBN3ACPX7400	VBN3ACPX7300	VBN3ACPX4000	VBN3ACPX3000	VBN3ACPX8400	VBN3ACPX8300	VBN3ACPX9400	VBN3ACPX9300
		1	VBN3AEPX7400	VBN3AEPX7300	VBN3AEPX4000	VBN3AEPX3000	VBN3AEPX8400	VBN3AEPX8300	VBN3AEPX9400	VBN3AEPX9300
		2.4	VBN3AFPX7400	VBN3AFPX7300	VBN3AFPX4000	VBN3AFPX3000	VBN3AFPX8400	VBN3AFPX8300	VBN3AFPX9400	VBN3AFPX9300
		4.3	VBN3AHPX7400	VBN3AHPX7300	VBN3AHPX4000	VBN3AHPX3000	VBN3AHPX8400	VBN3AHPX8300	VBN3AHPX9400	VBN3AHPX9300
3/4"	50	0.4	VBN3BJPX7400	VBN3BJPX7300	VBN3BJPX4000	VBN3BJPX3000	VBN3BJPX8400	VBN3BJPX8300	VBN3BJPX9400	VBN3BJPX9300
		0.66	VBN3BCPX7400	VBN3BCPX7300	VBN3BCPX4000	VBN3BCPX3000	VBN3BCPX8400	VBN3BCPX8300	VBN3BCPX9400	VBN3BCPX9300
		1.3	VBN3BDPX7400	VBN3BDPX7300	VBN3BDPX4000	VBN3BDPX3000	VBN3BDPX8400	VBN3BDPX8300	VBN3BDPX9400	VBN3BDPX9300
		2.4	VBN3BEPX7400	VBN3BEPX7300	VBN3BEPX4000	VBN3BEPX3000	VBN3BEPX8400	VBN3BEPX8300	VBN3BEPX9400	VBN3BEPX9300
		3.8	VBN3BFPX7400	VBN3BFPX7300	VBN3BFPX4000	VBN3BFPX3000	VBN3BFPX8400	VBN3BFPX8300	VBN3BFPX9400	VBN3BFPX9300
1"	50	7	VBN3BGPX7400	VBN3BGPX7300	VBN3BGPX4000	VBN3BGPX3000	VBN3BGPX8400	VBN3BGPX8300	VBN3BGPX9400	VBN3BGPX9300
		11*	VBN3BJPX7400	VBN3BJPX7300	VBN3BJPX4000	VBN3BJPX3000	VBN3BJPX8400	VBN3BJPX8300	VBN3BJPX9400	VBN3BJPX9300
		0.4	VBN3BKPX7400	VBN3BKPX7300	VBN3BKPX4000	VBN3BKPX3000	VBN3BKPX8400	VBN3BKPX8300	VBN3BKPX9400	VBN3BKPX9300
		0.65	VBN3CCPX7400	VBN3CCPX7300	VBN3CCPX4000	VBN3CCPX3000	VBN3CCPX8400	VBN3CCPX8300	VBN3CCPX9400	VBN3CCPX9300
		1.3	VBN3CDPX7400	VBN3CDPX7300	VBN3CDPX4000	VBN3CDPX3000	VBN3CDPX8400	VBN3CDPX8300	VBN3CDPX9400	VBN3CDPX9300
		2.3	VBN3CEPX7400	VBN3CEPX7300	VBN3CEPX4000	VBN3CEPX3000	VBN3CEPX8400	VBN3CEPX8300	VBN3CEPX9400	VBN3CEPX9300
		3.5	VBN3CFPX7400	VBN3CFPX7300	VBN3CFPX4000	VBN3CFPX3000	VBN3CFPX8400	VBN3CFPX8300	VBN3CFPX9400	VBN3CFPX9300
		4.5	VBN3CGPX7400	VBN3CGPX7300	VBN3CGPX4000	VBN3CGPX3000	VBN3CGPX8400	VBN3CGPX8300	VBN3CGPX9400	VBN3CGPX9300
1-1/4"	40	8.6	VBN3CHPX7400	VBN3CHPX7300	VBN3CHPX4000	VBN3CHPX3000	VBN3CHPX8400	VBN3CHPX8300	VBN3CHPX9400	VBN3CHPX9300
		14.9	VBN3CJPX7400	VBN3CJPX7300	VBN3CJPX4000	VBN3CJPX3000	VBN3CJPX8400	VBN3CJPX8300	VBN3CJPX9400	VBN3CJPX9300
		22*	VBN3CKPX7400	VBN3CKPX7300	VBN3CKPX4000	VBN3CKPX3000	VBN3CKPX8400	VBN3CKPX8300	VBN3CKPX9400	VBN3CKPX9300
		31*	VBN3CLPX7400	VBN3CLPX7300	VBN3CLPX4000	VBN3CLPX3000	VBN3CLPX8400	VBN3CLPX8300	VBN3CLPX9400	VBN3CLPX9300
		4.1	VBN3CMPX7400	VBN3CMPX7300	VBN3CMPX4000	VBN3CMPX3000	VBN3CMPX8400	VBN3CMPX8300	VBN3CMPX9400	VBN3CMPX9300
		8.7	VBN3DHPX7400	VBN3DHPX7300	VBN3DHPX4000	VBN3DHPX3000	VBN3DHPX8400	VBN3DHPX8300	VBN3DHPX9400	VBN3DHPX9300
		12.7	VBN3DJPX7400	VBN3DJPX7300	VBN3DJPX4000	VBN3DJPX3000	VBN3DJPX8400	VBN3DJPX8300	VBN3DJPX9400	VBN3DJPX9300
1-1/2"	40	19.4*	VBN3DKPX7400	VBN3DKPX7300	VBN3DKPX4000	VBN3DKPX3000	VBN3DKPX8400	VBN3DKPX8300	VBN3DKPX9400	VBN3DKPX9300
		27	VBN3DLPX7400	VBN3DLPX7300	VBN3DLPX4000	VBN3DLPX3000	VBN3DLPX8400	VBN3DLPX8300	VBN3DLPX9400	VBN3DLPX9300
		34*	VBN3DMPX7400	VBN3DMPX7300	VBN3DMPX4000	VBN3DMPX3000	VBN3DMPX8400	VBN3DMPX8300	VBN3DMPX9400	VBN3DMPX9300
		4	VBN3DNPX7400	VBN3DNPX7300	VBN3DNPX4000	VBN3DNPX3000	VBN3DNPX8400	VBN3DNPX8300	VBN3DNPX9400	VBN3DNPX9300
		8.3	VBN3EHPX7400	VBN3EHPX7300	VBN3EHPX4000	VBN3EHPX3000	VBN3EHPX8400	VBN3EHPX8300	VBN3EHPX9400	VBN3EHPX9300
		13.4	VBN3EJPX7400	VBN3EJPX7300	VBN3EJPX4000	VBN3EJPX3000	VBN3EJPX8400	VBN3EJPX8300	VBN3EJPX9400	VBN3EJPX9300
2"	40	24	VBN3EKPX7400	VBN3EKPX7300	VBN3EKPX4000	VBN3EKPX3000	VBN3EKPX8400	VBN3EKPX8300	VBN3EKPX9400	VBN3EKPX9300
		32*	VBN3ELPX7400	VBN3ELPX7300	VBN3ELPX4000	VBN3ELPX3000	VBN3ELPX8400	VBN3ELPX8300	VBN3ELPX9400	VBN3ELPX9300
		61*	VBN3EMPX7400	VBN3EMPX7300	VBN3EMPX4000	VBN3EMPX3000	VBN3EMPX8400	VBN3EMPX8300	VBN3EMPX9400	VBN3EMPX9300
		24	VBN3EPPX7400	VBN3EPPX7300	VBN3EPPX4000	VBN3EPPX3000	VBN3EPPX8400	VBN3EPPX8300	VBN3EPPX9400	VBN3EPPX9300
		38	VBN3FLPX7400	VBN3FLPX7300	VBN3FLPX4000	VBN3FLPX3000	VBN3FLPX8400	VBN3FLPX8300	VBN3FLPX9400	VBN3FLPX9300
2-1/2"	40	57*	VBN3FNPX7400	VBN3FNPX7300	VBN3FNPX4000	VBN3FNPX3000	VBN3FNPX8400	VBN3FNPX8300	VBN3FNPX9400	VBN3FNPX9300
		83	VBN3FPPX7400	VBN3FPPX7300	VBN3FPPX4000	VBN3FPPX3000	VBN3FPPX8400	VBN3FPPX8300	VBN3FPPX9400	VBN3FPPX9300
		109*	VBN3FRPX7400	VBN3FRPX7300	VBN3FRPX4000	VBN3FRPX3000	VBN3FRPX8400	VBN3FRPX8300	VBN3FRPX9400	VBN3FRPX9300
		38	VBN3FTPX7400	VBN3FTPX7300	VBN3FTPX4000	VBN3FTPX3000	VBN3FTPX8400	VBN3FTPX8300	VBN3FTPX9400	VBN3FTPX9300
2-1/2"	40	74	VBN3GNPX7400	VBN3GNPX7300	VBN3GNPX4000	VBN3GNPX3000	VBN3GNPX8400	VBN3GNPX8300	VBN3GNPX9400	VBN3GNPX9300
		100*	VBN3GRPX7400	VBN3GRPX7300	VBN3GRPX4000	VBN3GRPX3000	VBN3GRPX8400	VBN3GRPX8300	VBN3GRPX9400	VBN3GRPX9300
			VBN3GSPX7400	VBN3GSPX7300	VBN3GSPX4000	VBN3GSPX3000	VBN3GSPX8400	VBN3GSPX8300	VBN3GSPX9400	VBN3GSPX9300

* Full port ball. No flow characterizing insert.

VALVES

Product Selection - Valves

3-Way NPT Control Ball Valves 1/2"-2 1/2", NEMA 3R

Actuator Features			Non Fail Safe				Fail Safe			
Actuator O.S. Number			MN6105A1011	MN6105A1201	MN7505A2001	MN7505A2209	MS7505A2030		MS7505A2130	
Power Supply			Voltage		24 VAC/DC		24 VAC/DC		24 VAC/DC	
			Frequency		50 / 60 Hz		50 / 60 Hz		50 / 60 Hz	
			Power		5 VA		5 VA		6 VA	
Actuator Torque			(lb.-in.)		44		44		44	
Control			(0)2-10 Vdc		•		•		•	
			4-20 mA (external 500 Ohm Resistor)		•		•		•	
			Floating		•		•		•	
			Two-Position SPDT		•		•		•	
			Two-Position SPST		•		•		•	
Actuator Stroke			(degrees)		95° ± 3°		95° ± 3°		95° ± 3°	
Timing			(drive/spring return, seconds)		90		90		90 / 25	
Aux Switch			2 x SPDT Add-on		0		2		0	
Feedback			2-10 Vdc Built In		•		•		•	
Fail Safe Action			Stay in Place		Stay in Place		Stay in Place		B-AB Open (FSB)	
Normal Position (no signal)			Stay in Place		Stay in Place		A-AB Open		B-AB Open (FSB)	
Valve Features			Trim		Nickel-Plated Brass		Nickel-Plated Brass		Nickel-Plated Brass	
Valve Size (inches)	Close-off Pressure (psid)	Cv	Short Order Codes							
1/2"	50	0.33	VBN3ABPX4002	VBN3ABPXC002	VBN3ABPX5002	VBN3ABPXD002	VBN3ABPX6402	VBN3ABPX6302	VBN3ABPXB402	VBN3ABPXB302
		0.59	VBN3ACPX4002	VBN3ACPXC002	VBN3ACPX5002	VBN3ACPXD002	VBN3ACPX6402	VBN3ACPX6302	VBN3ACPXB402	VBN3ACPXB302
		1	VBN3AEPX4002	VBN3AEPXC002	VBN3AEPX5002	VBN3AEPXD002	VBN3AEPX6402	VBN3AEPX6302	VBN3AEPXB402	VBN3AEPXB302
		2.4	VBN3AFPX4002	VBN3AFPXC002	VBN3AFPX5002	VBN3AFPXD002	VBN3AFPX6402	VBN3AFPX6302	VBN3AFPXB402	VBN3AFPXB302
		4.3	VBN3AHPX4002	VBN3AHPXC002	VBN3AHPX5002	VBN3AHPXD002	VBN3AHPX6402	VBN3AHPX6302	VBN3AHPXB402	VBN3AHPXB302
3/4"	50	8*	VBN3AJPX4002	VBN3AJPXC002	VBN3AJPX5002	VBN3AJPXD002	VBN3AJPX6402	VBN3AJPX6302	VBN3AJPXB402	VBN3AJPXB302
		0.4	VBN3BCPX4002	VBN3BCPXC002	VBN3BCPX5002	VBN3BCPXD002	VBN3BCPX6402	VBN3BCPX6302	VBN3BCPXB402	VBN3BCPXB302
		0.66	VBN3BDPX4002	VBN3BDPXC002	VBN3BDPX5002	VBN3BDPXD002	VBN3BDPX6402	VBN3BDPX6302	VBN3BDPXB402	VBN3BDPXB302
		1.3	VBN3BEPX4002	VBN3BEPXC002	VBN3BEPX5002	VBN3BEPXD002	VBN3BEPX6402	VBN3BEPX6302	VBN3BEPXB402	VBN3BEPXB302
		2.4	VBN3BFPX4002	VBN3BFPXC002	VBN3BFPX5002	VBN3BFPXD002	VBN3BFPX6402	VBN3BFPX6302	VBN3BFPXB402	VBN3BFPXB302
1"	50	3.8	VBN3BGPX4002	VBN3BGPXC002	VBN3BGPX5002	VBN3BGPXD002	VBN3BGPX6402	VBN3BGPX6302	VBN3BGPXB402	VBN3BGPXB302
		7	VBN3BJPX4002	VBN3BJPXC002	VBN3BJPX5002	VBN3BJPXD002	VBN3BJPX6402	VBN3BJPX6302	VBN3BJPXB402	VBN3BJPXB302
		11*	VBN3BKPX4002	VBN3BKPXC002	VBN3BKPX5002	VBN3BKPXD002	VBN3BKPX6402	VBN3BKPX6302	VBN3BKPXB402	VBN3BKPXB302
		0.4	VBN3CCPX4002	VBN3CCPXC002	VBN3CCPX5002	VBN3CCPXD002	VBN3CCPX6402	VBN3CCPX6302	VBN3CCPXB402	VBN3CCPXB302
		0.65	VBN3CDPX4002	VBN3CDPXC002	VBN3CDPX5002	VBN3CDPXD002	VBN3CDPX6402	VBN3CDPX6302	VBN3CDPXB402	VBN3CDPXB302
		1.3	VBN3CEPX4002	VBN3CEPXC002	VBN3CEPX5002	VBN3CEPXD002	VBN3CEPX6402	VBN3CEPX6302	VBN3CEPXB402	VBN3CEPXB302
		2.3	VBN3CFPX4002	VBN3CFPXC002	VBN3CFPX5002	VBN3CFPXD002	VBN3CFPX6402	VBN3CFPX6302	VBN3CFPXB402	VBN3CFPXB302
		3.5	VBN3CGPX4002	VBN3CGPXC002	VBN3CGPX5002	VBN3CGPXD002	VBN3CGPX6402	VBN3CGPX6302	VBN3CGPXB402	VBN3CGPXB302
		4.5	VBN3CHPX4002	VBN3CHPXC002	VBN3CHPX5002	VBN3CHPXD002	VBN3CHPX6402	VBN3CHPX6302	VBN3CHPXB402	VBN3CHPXB302
		8.6	VBN3CJPX4002	VBN3CJPXC002	VBN3CJPX5002	VBN3CJPXD002	VBN3CJPX6402	VBN3CJPX6302	VBN3CJPXB402	VBN3CJPXB302
1-1/4"	40	14.9	VBN3CKPX4002	VBN3CKPXC002	VBN3CKPX5002	VBN3CKPXD002	VBN3CKPX6402	VBN3CKPX6302	VBN3CKPXB402	VBN3CKPXB302
		22*	VBN3CLPX4002	VBN3CLPXC002	VBN3CLPX5002	VBN3CLPXD002	VBN3CLPX6402	VBN3CLPX6302	VBN3CLPXB402	VBN3CLPXB302
		31*	VBN3CMPX4002	VBN3CMPXC002	VBN3CMPX5002	VBN3CMPXD002	VBN3CMPX6402	VBN3CMPX6302	VBN3CMPXB402	VBN3CMPXB302
		4.1	VBN3DHPX4002	VBN3DHPXC002	VBN3DHPX5002	VBN3DHPXD002	VBN3DHPX6402	VBN3DHPX6302	VBN3DHPXB402	VBN3DHPXB302
		8.7	VBN3DJPX4002	VBN3DJPXC002	VBN3DJPX5002	VBN3DJPXD002	VBN3DJPX6402	VBN3DJPX6302	VBN3DJPXB402	VBN3DJPXB302
		12.7	VBN3DKPX4002	VBN3DKPXC002	VBN3DKPX5002	VBN3DKPXD002	VBN3DKPX6402	VBN3DKPX6302	VBN3DKPXB402	VBN3DKPXB302
		19.4*	VBN3DLPX4002	VBN3DLPXC002	VBN3DLPX5002	VBN3DLPXD002	VBN3DLPX6402	VBN3DLPX6302	VBN3DLPXB402	VBN3DLPXB302
1-1/2"	40	27	VBN3DMPX4002	VBN3DMPXC002	VBN3DMPX5002	VBN3DMPXD002	VBN3DMPX6402	VBN3DMPX6302	VBN3DMPXB402	VBN3DMPXB302
		34*	VBN3DNPX4002	VBN3DNPXC002	VBN3DNPX5002	VBN3DNPXD002	VBN3DNPX6402	VBN3DNPX6302	VBN3DNPXB402	VBN3DNPXB302
		4	VBN3EHPX4002	VBN3EHPXC002	VBN3EHPX5002	VBN3EHPXD002	VBN3EHPX6402	VBN3EHPX6302	VBN3EHPXB402	VBN3EHPXB302
		8.3	VBN3EJPX4002	VBN3EJPXC002	VBN3EJPX5002	VBN3EJPXD002	VBN3EJPX6402	VBN3EJPX6302	VBN3EJPXB402	VBN3EJPXB302
		13.4	VBN3EKPX4002	VBN3EKPXC002	VBN3EKPX5002	VBN3EKPXD002	VBN3EKPX6402	VBN3EKPX6302	VBN3EKPXB402	VBN3EKPXB302
		24	VBN3ELPX4002	VBN3ELPXC002	VBN3ELPX5002	VBN3ELPXD002	VBN3ELPX6402	VBN3ELPX6302	VBN3ELPXB402	VBN3ELPXB302
2"	40	32*	VBN3EMPX4002	VBN3EMPXC002	VBN3EMPX5002	VBN3EMPXD002	VBN3EMPX6402	VBN3EMPX6302	VBN3EMPXB402	VBN3EMPXB302
		61*	VBN3EPPX4002	VBN3EPPXC002	VBN3EPPX5002	VBN3EPPXD002	VBN3EPPX6402	VBN3EPPX6302	VBN3EPPXB402	VBN3EPPXB302
		24	VBN3FLPX4002	VBN3FLPXC002	VBN3FLPX5002	VBN3FLPXD002	VBN3FLPX6402	VBN3FLPX6302	VBN3FLPXB402	VBN3FLPXB302
		38	VBN3FNPX4002	VBN3FNXPXC002	VBN3FNPX5002	VBN3FNXPXD002	VBN3FNPX6402	VBN3FNPX6302	VBN3FNXPXB402	VBN3FNXPXB302
		57*	VBN3FPPX4002	VBN3FPPXC002	VBN3FPPX5002	VBN3FPPXD002	VBN3FPPX6402	VBN3FPPX6302	VBN3FPPXB402	VBN3FPPXB302
2-1/2"	40	83	VBN3FRPX4002	VBN3FRPXC002	VBN3FRPX5002	VBN3FRPXD002	VBN3FRPX6402	VBN3FRPX6302	VBN3FRPXB402	VBN3FRPXB302
		109*	VBN3FTPX4002	VBN3FTPXC002	VBN3FTPX5002	VBN3FTPXD002	VBN3FTPX6402	VBN3FTPX6302	VBN3FTPXB402	VBN3FTPXB302
		38	VBN3GNPX4002	VBN3GNPXC002	VBN3GNPX5002	VBN3GNPXD002	VBN3GNPX6402	VBN3GNPX6302	VBN3GNPXB402	VBN3GNPXB302
		74	VBN3GRPX4002	VBN3GRPXC002	VBN3GRPX5002	VBN3GRPXD002	VBN3GRPX6402	VBN3GRPX6302	VBN3GRPXB402	VBN3GRPXB302
		100*	VBN3GSPX4002	VBN3GSPXC002	VBN3GSPX5002	VBN3GSPXD002	VBN3GSPX6402	VBN3GSPX6302	VBN3GSPXB402	VBN3GSPXB302

* Full port ball. No flow characterizing insert.

Product Selection - Valves

3-Way NPT Control Ball Valves 1/2"-2 1/2", NEMA 3R

Actuator Features			Fail Safe								
Actuator O.S. Number			MS8105A1030		MS8105A1130		MS4105A1030		MS4105A1130		
Power Supply			24 VAC/DC		24 VAC/DC		100-250 VAC		100-250 VAC		
Voltage			24 VAC/DC		24 VAC/DC		100-250 VAC		100-250 VAC		
Frequency			50 / 60 Hz		50 / 60 Hz		50 / 60 Hz		50 / 60 Hz		
Power			6 VA		6 VA		6 VA		6 VA		
Actuator Torque			44		44		44		44		
(lb.-in.)			44		44		44		44		
Control											
(0)2-10 Vdc											
4-20 mA (external 500 Ohm Resistor)											
Floating											
Two-Position SPDT											
Two-Position SPST			•		•		•		•		
Actuator Stroke			95° ± 3°		95° ± 3°		95° ± 3°		95° ± 3°		
(degrees)			95° ± 3°		95° ± 3°		95° ± 3°		95° ± 3°		
Timing			45 / 25		45 / 25		45 / 25		45 / 25		
(drive/spring return, seconds)			45 / 25		45 / 25		45 / 25		45 / 25		
Aux Switch			0		1		0		1		
2 x SPDT Add-on			0		1		0		1		
Feedback											
2-10 Vdc Built In											
Fail Safe Action			B-AB Open (FSB)	A-AB Open (FSA)	B-AB Open (FSB)	A-AB Open (FSA)	B-AB Open (FSB)	A-AB Open (FSA)	B-AB Open (FSB)	A-AB Open (FSA)	
Normal Position (no signal)			B-AB Open	A-AB Open	B-AB Open	A-AB Open	B-AB Open	A-AB Open	B-AB Open	A-AB Open	
Valve Features			Trim		Nickel-Plated Brass		Nickel-Plated Brass		Nickel-Plated Brass		
Trim			Nickel-Plated Brass		Nickel-Plated Brass		Nickel-Plated Brass		Nickel-Plated Brass		
Valve Size (inches)	Close-off Pressure (psid)	Cv	Short Order Codes								
3-Way 1/2"	50	0.33	VBN3ABPX7402	VBN3ABPX7302	VBN3ABPXA402	VBN3ABPXA302	VBN3ABPX8402	VBN3ABPX8302	VBN3ABPX9402	VBN3ABPX9302	
		0.59	VBN3ACPX7402	VBN3ACPX7302	VBN3ACPXA402	VBN3ACPXA302	VBN3ACPX8402	VBN3ACPX8302	VBN3ACPX9402	VBN3ACPX9302	
		1	VBN3AEPX7402	VBN3AEPX7302	VBN3AEPXA402	VBN3AEPXA302	VBN3AEPX8402	VBN3AEPX8302	VBN3AEPX9402	VBN3AEPX9302	
		2.4	VBN3AFPX7402	VBN3AFPX7302	VBN3AFPXA402	VBN3AFPXA302	VBN3AFPX8402	VBN3AFPX8302	VBN3AFPX9402	VBN3AFPX9302	
		4.3	VBN3AHPX7402	VBN3AHPX7302	VBN3AHPXA402	VBN3AHPXA302	VBN3AHPX8402	VBN3AHPX8302	VBN3AHPX9402	VBN3AHPX9302	
		8*	VBN3AJPX7402	VBN3AJPX7302	VBN3AJPXA402	VBN3AJPXA302	VBN3AJPX8402	VBN3AJPX8302	VBN3AJPX9402	VBN3AJPX9302	
	3/4"	50	0.4	VBN3BCPX7402	VBN3BCPX7302	VBN3BCPXA402	VBN3BCPXA302	VBN3BCPX8402	VBN3BCPX8302	VBN3BCPX9402	VBN3BCPX9302
			0.66	VBN3BDPX7402	VBN3BDPX7302	VBN3BDPXA402	VBN3BDPXA302	VBN3BDPX8402	VBN3BDPX8302	VBN3BDPX9402	VBN3BDPX9302
			1.3	VBN3BEPX7402	VBN3BEPX7302	VBN3BEPXA402	VBN3BEPXA302	VBN3BEPX8402	VBN3BEPX8302	VBN3BEPX9402	VBN3BEPX9302
			2.4	VBN3BFPX7402	VBN3BFPX7302	VBN3BFPA402	VBN3BFPXA302	VBN3BFPX8402	VBN3BFPX8302	VBN3BFPX9402	VBN3BFPX9302
			3.8	VBN3BGPX7402	VBN3BGPX7302	VBN3BGPXA402	VBN3BGPXA302	VBN3BGPX8402	VBN3BGPX8302	VBN3BGPX9402	VBN3BGPX9302
			7	VBN3BJPX7402	VBN3BJPX7302	VBN3BJPXA402	VBN3BJPXA302	VBN3BJPX8402	VBN3BJPX8302	VBN3BJPX9402	VBN3BJPX9302
1"	50	11*	VBN3BKPX7402	VBN3BKPX7302	VBN3BKPXA402	VBN3BKPXA302	VBN3BKPX8402	VBN3BKPX8302	VBN3BKPX9402	VBN3BKPX9302	
		0.4	VBN3CCPX7402	VBN3CCPX7302	VBN3CCPXA402	VBN3CCPXA302	VBN3CCPX8402	VBN3CCPX8302	VBN3CCPX9402	VBN3CCPX9302	
		0.65	VBN3CDPX7402	VBN3CDPX7302	VBN3CDPXA402	VBN3CDPXA302	VBN3CDPX8402	VBN3CDPX8302	VBN3CDPX9402	VBN3CDPX9302	
		1.3	VBN3CEPX7402	VBN3CEPX7302	VBN3CEPXA402	VBN3CEPXA302	VBN3CEPX8402	VBN3CEPX8302	VBN3CEPX9402	VBN3CEPX9302	
		2.3	VBN3CFPX7402	VBN3CFPX7302	VBN3CFPXA402	VBN3CFPXA302	VBN3CFPX8402	VBN3CFPX8302	VBN3CFPX9402	VBN3CFPX9302	
		3.5	VBN3CGPX7402	VBN3CGPX7302	VBN3CGPXA402	VBN3CGPXA302	VBN3CGPX8402	VBN3CGPX8302	VBN3CGPX9402	VBN3CGPX9302	
		4.5	VBN3CHPX7402	VBN3CHPX7302	VBN3CHPXA402	VBN3CHPXA302	VBN3CHPX8402	VBN3CHPX8302	VBN3CHPX9402	VBN3CHPX9302	
		8.6	VBN3CJPX7402	VBN3CJPX7302	VBN3CJPXA402	VBN3CJPXA302	VBN3CJPX8402	VBN3CJPX8302	VBN3CJPX9402	VBN3CJPX9302	
		14.9	VBN3CKPX7402	VBN3CKPX7302	VBN3CKPXA402	VBN3CKPXA302	VBN3CKPX8402	VBN3CKPX8302	VBN3CKPX9402	VBN3CKPX9302	
		22*	VBN3CLPX7402	VBN3CLPX7302	VBN3CLPXA402	VBN3CLPXA302	VBN3CLPX8402	VBN3CLPX8302	VBN3CLPX9402	VBN3CLPX9302	
		31*	VBN3CMPX7402	VBN3CMPX7302	VBN3CMPXA402	VBN3CMPXA302	VBN3CMPX8402	VBN3CMPX8302	VBN3CMPX9402	VBN3CMPX9302	
		1-1/4"	40	4.1	VBN3DHPX7402	VBN3DHPX7302	VBN3DHPXA402	VBN3DHPXA302	VBN3DHPX8402	VBN3DHPX8302	VBN3DHPX9402
8.7	VBN3DJPX7402			VBN3DJPX7302	VBN3DJPXA402	VBN3DJPXA302	VBN3DJPX8402	VBN3DJPX8302	VBN3DJPX9402	VBN3DJPX9302	
12.7	VBN3DKPX7402			VBN3DKPX7302	VBN3DKPXA402	VBN3DKPXA302	VBN3DKPX8402	VBN3DKPX8302	VBN3DKPX9402	VBN3DKPX9302	
19.4*	VBN3DLPX7402			VBN3DLPX7302	VBN3DLPXA402	VBN3DLPXA302	VBN3DLPX8402	VBN3DLPX8302	VBN3DLPX9402	VBN3DLPX9302	
27	VBN3DMPX7402			VBN3DMPX7302	VBN3DMPXA402	VBN3DMPXA302	VBN3DMPX8402	VBN3DMPX8302	VBN3DMPX9402	VBN3DMPX9302	
34*	VBN3DNPX7402			VBN3DNPX7302	VBN3DNPXA402	VBN3DNPXA302	VBN3DNPX8402	VBN3DNPX8302	VBN3DNPX9402	VBN3DNPX9302	
1-1/2"	40	4	VBN3EHPX7402	VBN3EHPX7302	VBN3EHPXA402	VBN3EHPXA302	VBN3EHPX8402	VBN3EHPX8302	VBN3EHPX9402	VBN3EHPX9302	
		8.3	VBN3EJPX7402	VBN3EJPX7302	VBN3EJPXA402	VBN3EJPXA302	VBN3EJPX8402	VBN3EJPX8302	VBN3EJPX9402	VBN3EJPX9302	
		13.4	VBN3EKPX7402	VBN3EKPX7302	VBN3EKPXA402	VBN3EKPXA302	VBN3EKPX8402	VBN3EKPX8302	VBN3EKPX9402	VBN3EKPX9302	
		24	VBN3ELPX7402	VBN3ELPX7302	VBN3ELPXA402	VBN3ELPXA302	VBN3ELPX8402	VBN3ELPX8302	VBN3ELPX9402	VBN3ELPX9302	
		32*	VBN3EMPX7402	VBN3EMPX7302	VBN3EMPXA402	VBN3EMPXA302	VBN3EMPX8402	VBN3EMPX8302	VBN3EMPX9402	VBN3EMPX9302	
		61*	VBN3EPPX7402	VBN3EPPX7302	VBN3EPPXA402	VBN3EPPXA302	VBN3EPPX8402	VBN3EPPX8302	VBN3EPPX9402	VBN3EPPX9302	
2"	40	24	VBN3FLPX7402	VBN3FLPX7302	VBN3FLPXA402	VBN3FLPXA302	VBN3FLPX8402	VBN3FLPX8302	VBN3FLPX9402	VBN3FLPX9302	
		38	VBN3FNPX7402	VBN3FNPX7302	VBN3FNPPXA402	VBN3FNPPXA302	VBN3FNPX8402	VBN3FNPX8302	VBN3FNPX9402	VBN3FNPX9302	
		57*	VBN3FPPX7402	VBN3FPPX7302	VBN3FPPXA402	VBN3FPPXA302	VBN3FPPX8402	VBN3FPPX8302	VBN3FPPX9402	VBN3FPPX9302	
		83	VBN3FRPX7402	VBN3FRPX7302	VBN3FRPXA402	VBN3FRPXA302	VBN3FRPX8402	VBN3FRPX8302	VBN3FRPX9402	VBN3FRPX9302	
		109*	VBN3FTPX7402	VBN3FTPX7302	VBN3FTPXA402	VBN3FTPXA302	VBN3FTPX8402	VBN3FTPX8302	VBN3FTPX9402	VBN3FTPX9302	
		38	VBN3GNPX7402	VBN3GNPX7302	VBN3GNPXA402	VBN3GNPXA302	VBN3GNPX8402	VBN3GNPX8302	VBN3GNPX9402	VBN3GNPX9302	
2-1/2"	40	74	VBN3GRPX7402	VBN3GRPX7302	VBN3GRPXA402	VBN3GRPXA302	VBN3GRPX8402	VBN3GRPX8302	VBN3GRPX9402	VBN3GRPX9302	
		100*	VBN3GSPX7402	VBN3GSPX7302	VBN3GSPXA402	VBN3GSPXA302	VBN3GSPX8402	VBN3GSPX8302	VBN3GSPX9402	VBN3GSPX9302	

* Full port ball. No flow characterizing insert.

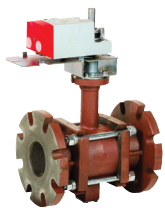
Product Selection - Valves

2-Way Flanged Control Ball Valves 4"-6", NEMA 2+3R


Common Features

- Maximum static pressure 240 psi (-22°F to 250°F)
- Spring return actuators field-configurable for A-port normally open or normally closed fail safe
- Use globe valves for steam ratings
- Medium: Water/glycol solutions up to 50%, closed loop HVAC systems only, not for use with steam
- ANSI class 125 flanged connections
- ANSI class IV leakage (0.01% of Cv)
- Valve ball and stem 316 stainless steel
- Equal percentage flow (laser-milled stainless steel ball)
- Cast iron body construction -- not for use with open systems such as cooling towers

**5-YEAR
LIMITED
WARRANTY**



2-Way

Actuator Features		Non Fail Safe		Fail Safe		Valve Only
Actuator O.S. Number		MN6110A1003 4 to 5 in.	MN7510A2001 4 to 5 in.	MS8110A1008 4 to 5 in.	MS7510A2008 4 to 5 in.	N/A
		MN6134A1003 6 in.	MN7234A2008 6 in.	MS8120A1007 6 in.	MS7520A2007 6 in.	
Power Supply	Voltage	24 Vac	24 Vac	24 Vac	24 Vac	
	Frequency	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	
	Power	5 / 9 VA	5 / 9 VA	30 / 40 VA	14 / 16 VA	
Actuator Torque	(lb.-in.)	88/300	88/300	88/175	88/175	
Control	(0)2-10 Vdc		•		•	
	4-20 mA (external 500 Ohm Resistor)		•		•	
	Floating	•	•**		•	
	Two-Position SPDT	•	•**		•	
	Two-Position SPST	•	•**	•	•	
Fail Safe Action	(field configurable)	Stay in Place	Stay in Place	Closed	Closed	
Normal Position (no signal)	(field configurable)	Stay in Place	Closed	Closed	Closed	
Actuator Stroke	(degrees)	95°	95°	95°	95°	
Timing	(drive/spring return, seconds)	95	95	45/20	90/20	
Aux Switch	2 x SPDT Add-on	SW2-US	SW2-US	SW2-US	SW2-US	
Feedback	2-10 Vdc Built In		•		•	
Valve Features	Trim	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel

Valve Size (inches)	Close-off Pressure (psid)	Cv*	Valve O.S. Number				
NEMA 2 Actuator							
4"	70	91	VBF2JS1SOA	VBF2JS1SOB	VBF2JS1SOC	VBF2JS1SOD	VBF2JS1SOX
		118	VBF2JT1SOA	VBF2JT1SOB	VBF2JT1SOC	VBF2JT1SOD	VBF2JT1SOX
		152	VBF2JU1SOA	VBF2JU1SOB	VBF2JU1SOC	VBF2JU1SOD	VBF2JU1SOX
		197	VBF2J11SOA	VBF2J11SOB	VBF2J11SOC	VBF2J11SOD	VBF2J11SOX
		254	VBF2J21SOA	VBF2J21SOB	VBF2J21SOC	VBF2J21SOD	VBF2J21SOX
5"	70	144	VBF2KU1SOA	VBF2KU1SOB	VBF2KU1SOC	VBF2KU1SOD	VBF2KU1SOX
		185	VBF2K11SOA	VBF2K11SOB	VBF2K11SOC	VBF2K11SOD	VBF2K11SOX
		240	VBF2K21SOA	VBF2K21SOB	VBF2K21SOC	VBF2K21SOD	VBF2K21SOX
		309	VBF2K31SOA	VBF2K31SOB	VBF2K31SOC	VBF2K31SOD	VBF2K31SOX
		400	VBF2K41SOA	VBF2K41SOB	VBF2K41SOC	—	VBF2K41SOX
6"	70	208	VBF2L11SOA	VBF2L11SOB	VBF2L11SOC	VBF2L11SOD	VBF2L11SOX
		268	VBF2L21SOA	VBF2L21SOB	VBF2L21SOC	VBF2L21SOD	VBF2L21SOX
		346	VBF2L41SOA	VBF2L41SOB	VBF2L41SOC	—	VBF2L41SOX
		441	VBF2L51SOA	VBF2L51SOB	VBF2L51SOC	—	VBF2L51SOX
		577	VBF2L61SOA	VBF2L61SOB	VBF2L61SOC	—	VBF2L61SOX
		650	VBF2L71SOA	VBF2L71SOB	VBF2L71SOC	—	VBF2L71SOX
NEMA 3R Actuator							
4"	70	91	VBF2JC1SRA	VBF2JC1SRB	VBF2JC1SRC	VBF2JC1SRD	—
		118	VBF2JT1SRA	VBF2JT1SRB	VBF2JT1SRC	VBF2JT1SRD	—
		152	VBF2JU1SRA	VBF2JU1SRB	VBF2JU1SRC	VBF2JU1SRD	—
		197	VBF2J11SRA	VBF2J11SRB	VBF2J11SRC	VBF2J11SRD	—
		254	VBF2J21SRA	VBF2J21SRB	VBF2J21SRC	VBF2J21SRD	—
5"	70	144	VBF2KU1SRA	VBF2KU1SRB	VBF2KU1SRC	VBF2KU1SRD	—
		185	VBF2K11SRA	VBF2K11SRB	VBF2K11SRC	VBF2K11SRD	—
		240	VBF2K21SRA	VBF2K21SRB	VBF2K21SRC	VBF2K21SRD	—
		309	VBF2K31SRA	VBF2K31SRB	VBF2K31SRC	VBF2K31SRD	—
		400	VBF2K41SRA	VBF2K41SRB	VBF2K41SRC	—	—
6"	70	208	VBF2L11SRA	VBF2L11SRB	VBF2L11SRC	VBF2L11SRD	—
		268	VBF2L21SRA	VBF2L21SRB	VBF2L21SRC	VBF2L21SRD	—
		346	VBF2L41SRA	VBF2L41SRB	VBF2L41SRC	—	—
		441	VBF2L51SRA	VBF2L51SRB	VBF2L51SRC	—	—
		577	VBF2L61SRA	VBF2L61SRB	VBF2L61SRC	—	—
		650	VBF2L71SRA	VBF2L71SRB	VBF2L71SRC	—	—

* Maximum flow 700 gpm
**4 and 5 inch valves only.

Product Selection - Valves

3-Way Flanged Control Ball Valves 4"-6", NEMA 2+3R

Common Features

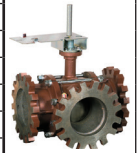
- Spring return actuators field-configurable for A-port normally open or normally closed fail safe
- Globe valve A-B-AB flow pattern (side B port)
- Valve ball and stem 316 stainless steel
- Three-way: A-AB equal percentage, B-AB linear (80% of Cv on B-port) (laser-milled ball)
- Mixing or Diverting control and ANSI Class IV leakage specification (.01% of CV) for all sizes except as noted below.
- VBF3 4 inch with 327 CV, 5 inch with 400 CV, and 6 inch with 650 CV.
 - Mixing control only.
 - Class IV (.01% of CV) leakage A to AB.
 - Class III (.1% of CV) leakage B to AB.
- Cast iron body construction -- not for use with open systems such as cooling towers

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3-Way

Actuator Features		Non Fail Safe		Fail Safe		Valve Only
Actuator O.S. Number		MN6110A1003 4 to 5 in.	MN7510A2001 4 to 5 in.	MS8110A1008 4 to 5 in.	MS7510A2008 4 to 5 in.	N/A
		MN6134A1003 6 in.	MN7234A2008 6 in.	MS8120A1007 6 in.	MS7520A2007 6 in.	
Power Supply	Voltage	24 Vac	24 Vac	24 Vac	24 Vac	
	Frequency	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	
	Power	5 / 9 VA	5 / 9 VA	30 / 40 VA	14 / 16 VA	
Actuator Torque	(lb.-in.)	88/300	88/300	88/175	88/175	
Control	(0)2-10 Vdc		•		•	
	4-20 mA (external 500 Ohm Resistor)		•		•	
	Floating	•	•••		•	
	Two-Position SPDT	•	•••		•	
	Two-Position SPST	•	•••	•	•	
Fail Safe Action	(field configurable)	Stay in Place	Stay in Place	A-AB Closed	A-AB Closed	
Normal Position (no signal)	(field configurable)	Stay in Place	A-AB Closed	A-AB Closed	A-AB Closed	
Actuator Stroke	(degrees)	95°	95°	95°	95°	
Timing	(drive/spring return, seconds)	95	95	45/20	90/20	
Aux Switch	2 x SPDT Add-on	SW2-US	SW2-US	SW2-US	SW2-US	
Feedback	2-10 Vdc Built In		•		•	
Valve Features	Trim	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel



Valve Size (inches)	Close-off Pressure (psid)	Cv*	Valve O.S. Number				
NEMA 2 Actuator							
4"	70	91	VBF3JS1S0A	VBF3JS1S0B	VBF3JS1S0C	VBF3JS1S0D	VBF3JS1S0X
		118	VBF3JT1S0A	VBF3JT1S0B	VBF3JT1S0C	VBF3JT1S0D	VBF3JT1S0X
		152	VBF3JU1S0A	VBF3JU1S0B	VBF3JU1S0C	VBF3JU1S0D	VBF3JU1S0X
		197	VBF3J11S0A	VBF3J11S0B	VBF3J11S0C	VBF3J11S0D	VBF3J11S0X
		254	VBF3J21S0A	VBF3J21S0B	VBF3J21S0C	VBF3J21S0D	VBF3J21S0X
5"	70	327	VBF3J31S0A	VBF3J31S0B	VBF3J31S0C	VBF3J31S0D	VBF3J31S0X
		144	VBF3KU1S0A	VBF3KU1S0B	VBF3KU1S0C	VBF3KU1S0D	VBF3KU1S0X
		185	VBF3K11S0A	VBF3K11S0B	VBF3K11S0C	VBF3K11S0D	VBF3K11S0X
		240	VBF3K21S0A	VBF3K21S0B	VBF3K21S0C	VBF3K21S0D	VBF3K21S0X
		309	VBF3K31S0A	VBF3K31S0B	VBF3K31S0C	VBF3K31S0D	VBF3K31S0X
6"	70	400	VBF3K41S0A	VBF3K41S0B	VBF3K41S0C	—	VBF3K41S0X
		208	VBF3L11S0A	VBF3L11S0B	VBF3L11S0C	VBF3L11S0D	VBF3L11S0X
		268	VBF3L21S0A	VBF3L21S0B	VBF3L21S0C	VBF3L21S0D	VBF3L21S0X
		346	VBF3L41S0A	VBF3L41S0B	VBF3L41S0C	—	VBF3L41S0X
		441	VBF3L51S0A	VBF3L51S0B	VBF3L51S0C	—	VBF3L51S0X
NEMA 3R Actuator	70	577	VBF3L61S0A	VBF3L61S0B	VBF3L61S0C	—	VBF3L61S0X
		650	VBF3L71S0A	VBF3L71S0B	VBF3L71S0C	—	VBF3L71S0X
		91	VBF3JS1SRA	VBF3JS1SRB	VBF3JS1SRC	VBF3JS1SRD	—
		118	VBF3JT1SRA	VBF3JT1SRB	VBF3JT1SRC	VBF3JT1SRD	—
		152	VBF3JU1SRA	VBF3JU1SRB	VBF3JU1SRC	VBF3JU1SRD	—
5"	70	197	VBF3J11SRA	VBF3J11SRB	VBF3J11SRC	VBF3J11SRD	—
		254	VBF3J21SRA	VBF3J21SRB	VBF3J21SRC	VBF3J21SRD	—
		327	VBF3J31SRA	VBF3J31SRB	VBF3J31SRC	VBF3J31SRD	—
		144	VBF3KU1SRA	VBF3KU1SRB	VBF3KU1SRC	VBF3KU1SRD	—
		185	VBF3K11SRA	VBF3K11SRB	VBF3K11SRC	VBF3K11SRD	—
6"	70	240	VBF3K21SRA	VBF3K21SRB	VBF3K21SRC	VBF3K21SRD	—
		309	VBF3K31SRA	VBF3K31SRB	VBF3K31SRC	VBF3K31SRD	—
		400	VBF3K41SRA	VBF3K41SRB	VBF3K41SRC	—	—
		208	VBF3L11SRA	VBF3L11SRB	VBF3L11SRC	VBF3L11SRD	—
		268	VBF3L21SRA	VBF3L21SRB	VBF3L21SRC	VBF3L21SRD	—
6"	70	346	VBF3L41SRA	VBF3L41SRB	VBF3L41SRC	—	—
		441	VBF3L51SRA	VBF3L51SRB	VBF3L51SRC	—	—
		577	VBF3L61SRA	VBF3L61SRB	VBF3L61SRC	—	—
650	VBF3L71SRA	VBF3L71SRB	VBF3L71SRC	—	—		

* Maximum flow 700 gpm
**4 and 5 inch valves only.

Product Selection - Valves

Flanged Control Ball Valves 2½" - 6"

Common Features

- For closed loop HVAC systems with up to 50% glycol, not for use with steam
- Sizes from 2-1/2" to 6" with ANSI Class 125 flanged connections
- Flow characteristics
 - Two-way: equal percentage
 - Three-way: A-AB equal percentage, B-AB linear.
- Choice of four actuator mounting positions on the 4", 5" and 6" valve
- Field configurable for normally open or normally closed fail safe position
- Removable manual operating handle to control valve during installation or in event of power failure (2-1/2" and 3" models)
- ANSI Class leakage specifications:
 - 2-way; ANSI Class IV leakage (0.01% of Cv)
 - 3-way; A to AB; ANSI Class IV leakage (0.01% of Cv)
 - 3-way; B to AB; ANSI Class III leakage (0.1% of Cv)
- Wide range of Cv choices from 63 to 360
- Valve ball and stem 316 stainless steel for all valves except 3-way 2-1/2" valve



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Actuator Features		Non Fail Safe								
Actuator O.S. Number		MN7505A2001 MN7505A2209	MN6105A1011 MN6105A1201	MN7510A2001 MN7510A2209	MN6110A1003 MN6110A1201	MN7220A2007 MN7220A2205	MN6120A1002 MN6120A1200	MN7234A2008	MN6134A1003	
Power Supply	Voltage	24 Vac	24 Vac	24 Vac	24 Vac	24 Vac	24 Vac	24 Vac	24 Vac	24 Vac
	Frequency	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz
	Power	5 VA	5 VA	5 VA	5 VA	6 VA	6 VA	9 VA	9 VA	
Actuator Torque	(lb.-in.)	44	44	88	88	175	175	300	300	
Control	(0)2-10 Vdc	•		•		•		•		
	4-20 mA (external 500 Ohm Resistor)	•		•		•		•		
	Floating	•	•	•	•		•		•	
	Two-Position SPDT	•	•	•	•		•		•	
	Two-Position SPST	•	•	•	•		•		•	
Fail Safe Action		Stay in place								
Normal Position (no signal) (field configurable)		Open or Closed	Stay in Place	Open or Closed	Stay in Place	Open or Closed	Stay in Place	Open or Closed	Stay in Place	Open or Closed
Actuator Stroke	(degrees)	95	95	95	95	95	95	95	95	95
Timing	(seconds)	95	95	95	95	95	95	95	95	95
Aux Switch	SPDT Built In	0 / 2	0 / 2	0 / 2	0 / 2	0 / 2	0 / 2			
	2 x SPDT Add-On					SW2-US	SW2-US	SW2-US	SW2-US	
Feedback	(0)2-10 Vdc Built In	•		•		•		•		

	Valve Size (inches)	Cv	Valve Type	Max Static Water Pressure	Valve Trim	Valve OS Number	Close-off Pressure, psid								
							100	100							
2-Way	2-1/2"	63	On/Off, Mod	360 psi @ 250°F	Stainless Steel	VBF5011A1734	100	100							
	3"	100	On/Off, Mod	360 psi @ 250°F	Stainless Steel	VBF5011A1767	100	100							
	4"	160	On/Off, Mod	240 psig @ 250°F	Stainless Steel	VBF5011A1858			70	70	70	70	70	70	
	5"	250	On/Off, Mod	240 psig @ 250°F	Stainless Steel	VBF5011A1882			70	70	70	70	70	70	
	6"	360	On/Off, Mod	240 psig @ 250°F	Stainless Steel	VBF5011A1916					70*	70	70	70	
3-Way	2.5"	63	Mixing, Diverting	360 psi @ 250°F	Brass	VBF5013B1003	40	40							
	3"	100	Mixing, Diverting	360 psi @ 250°F	Stainless Steel	VBF5013B1011			70	70	70	70	70	70	
	4"	160	Mixing, Diverting	240 psig @ 250°F	Stainless Steel	VBF5013B1029			70	70	70	70	70	70	
	5"	250	Mixing, Diverting	240 psig @ 250°F	Stainless Steel	VBF5013B1037			70	70	70	70	70	70	
	6"	360	Mixing, Diverting	240 psig @ 250°F	Stainless Steel	VBF5013B1045					70*	70	70	70	

* 2-position only

Product Selection - Valves

Flanged Control Ball Valves 2½" - 6"



**5-YEAR
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WARRANTY**

Actuator Features		Fail Safe								
Actuator O.S. Number		MS7505A2030 MS7505A2130	MS8105A1030 MS8105A1130	MS4105A1030 MS4105A1130	MS7510A2208 MS7510A2206 MS7510H2209	MS8110A1008 MS8110A1206	MS4110A1002 MS4110A1200	MS7520A2207 MS7520A2205 MS7520H2208	MS8120A1007 MS8120A1205	MS4120A1001 MS4120A1209
Power Supply	Voltage	24 Vac	24 Vac	100-250 Vac	24 Vac	24 Vac	100-250 Vac	24 Vac	24 Vac	100-250 Vac
	Frequency	50/60 Hz	50/60 Hz	60 Hz	50/60 Hz	50/60 Hz	60 Hz	50/60 Hz	50/60 Hz	60 Hz
	Power	7.5 VA	8 VA	11 VA	14 VA	30 VA	45 VA	16 VA	40 VA	60 VA
Actuator Torque	(lb.-in.)	44	44	44	88	88	88	175	175	175
Control	(0)2-10 Vdc	•			•			•		
	4-20 mA (external 500 Ohm Resistor)	•			•			•		
	Floating	•			•			•		
	Two-Position SPDT	•			•			•		
	Two-Position SPST	•	•	•	•	•	•	•	•	•
Fail Safe Action		Configurable Open/Closed								
Normal Position (no signal) (field configurable)		Open or Closed								
Actuator Stroke	(degrees)	95	95	95	95	95	95	95	95	95
Timing	(seconds)	90	45	45	90	45	45	90	45	45
Aux Switch	SPDT Built In	0 / 1	0 / 1	0 / 1	0 / 2 / 2	0 / 2	0 / 2	0 / 2 / 2	0 / 2	0 / 2
	2 x SPDT Add-On				SW2-US	SW2-US	SW2-US	SW2-US	SW2-US	SW2-US
Feedback	(0)2-10 Vdc Built In	•			•			•		

	Valve Size (inches)	Cv	Valve Type	Max Static Water Pressure	Valve Trim	Valve OS Number	Close-off Pressure, psid							
2-Way	2-1/2"	63	On/Off, Mod	360 psi @ 250°F	Stainless Steel	VBF5011A1734	100	100	100					
	3"	100	On/Off, Mod	360 psi @ 250°F	Stainless Steel	VBF5011A1767	100	100	100					
	4"	160	On/Off, Mod	240 psig @ 250°F	Stainless Steel	VBF5011A1858				70	70	70	70	70
	5"	250	On/Off, Mod	240 psig @ 250°F	Stainless Steel	VBF5011A1882				70	70	70	70	70
	6"	360	On/Off, Mod	240 psig @ 250°F	Stainless Steel	VBF5011A1916						70*	70	70
3-Way	2.5"	63	Mixing, Diverting	360 psi @ 250°F	Brass	VBF5013B1003	40	40	40					
	3"	100	Mixing, Diverting	360 psi @ 250°F	Stainless Steel	VBF5013B1011				70	70	70	70	70
	4"	160	Mixing, Diverting	240 psig @ 250°F	Stainless Steel	VBF5013B1029				70	70	70	70	70
	5"	250	Mixing, Diverting	240 psig @ 250°F	Stainless Steel	VBF5013B1037				70	70	70	70	70
	6"	360	Mixing, Diverting	240 psig @ 250°F	Stainless Steel	VBF5013B1045						70*	70	70

* 2-position only

VALVES

Product Selection - Valves

Pressure Independent Control Valves with Non Spring Return Actuators 1/2"-1 1/4"



Example of complete orderable part number: **VRN2A005.00SA** + **MVN643A0000** + **C1**
 Pressure Independent Control Valve, Female NPT Thread, 2-way, 1/2", 5 GPM, Stainless Steel trim with
 MVN643A0000 Actuator, Fail in place and 1 meter cable.

**5-YEAR
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 WARRANTY**

If the complete orderable part number is too long for your ordering system, please refer to the Short Order Codes on pg 104 to 123.

Valve Specification				Valve Profile	Standard Profile		Black Bracket	
				Valve Trim	Plated Brass	Stainless Steel	Plated Brass	Stainless Steel
Valve Size (inches)	Differential Pressure, psid		Close-off	Max. gpm	Valve Body Model Number			
	Min	Max						
1/2"	3.0	35	100	1.0	VRN2A001.00PA	VRN2A001.00SA	VRN2A001.00PX	VRN2A001.00SX
				2.0	VRN2A002.00PA	VRN2A002.00SA	VRN2A002.00PX	VRN2A002.00SX
				3.0	VRN2A003.00PA	VRN2A003.00SA	VRN2A003.00PX	VRN2A003.00SX
				4.0	VRN2A004.00PA	VRN2A004.00SA	VRN2A004.00PX	VRN2A004.00SX
				5.0	VRN2A005.00PA	VRN2A005.00SA	VRN2A005.00PX	VRN2A005.00SX
				6.0	VRN2A006.00PA	VRN2A006.00SA	VRN2A006.00PX	VRN2A006.00SX
				7.0	VRN2A007.00PA	VRN2A007.00SA	VRN2A007.00PX	VRN2A007.00SX
3/4"	3.0	35	100	1.0	VRN2B001.00PA	VRN2B001.00SA	VRN2B001.00PX	VRN2B001.00SX
				2.0	VRN2B002.00PA	VRN2B002.00SA	VRN2B002.00PX	VRN2B002.00SX
				3.0	VRN2B003.00PA	VRN2B003.00SA	VRN2B003.00PX	VRN2B003.00SX
				4.0	VRN2B004.00PA	VRN2B004.00SA	VRN2B004.00PX	VRN2B004.00SX
				5.0	VRN2B005.00PA	VRN2B005.00SA	VRN2B005.00PX	VRN2B005.00SX
				6.0	VRN2B006.00PA	VRN2B006.00SA	VRN2B006.00PX	VRN2B006.00SX
				7.0	VRN2B007.00PA	VRN2B007.00SA	VRN2B007.00PX	VRN2B007.00SX
	6.0	35	100	8.0	VRN2B008.00PA	VRN2B008.00SA	VRN2B008.00PX	VRN2B008.00SX
				9.0	VRN2B009.00PA	VRN2B009.00SA	VRN2B009.00PX	VRN2B009.00SX
				10.0	VRN2B010.00PA	VRN2B010.00SA	VRN2B010.00PX	VRN2B010.00SX
1"	3.0	35	100	1.0	VRN2C001.00PA	VRN2C001.00SA	VRN2C001.00PX	VRN2C001.00SX
				2.0	VRN2C002.00PA	VRN2C002.00SA	VRN2C002.00PX	VRN2C002.00SX
				3.0	VRN2C003.00PA	VRN2C003.00SA	VRN2C003.00PX	VRN2C003.00SX
				4.0	VRN2C004.00PA	VRN2C004.00SA	VRN2C004.00PX	VRN2C004.00SX
				5.0	VRN2C005.00PA	VRN2C005.00SA	VRN2C005.00PX	VRN2C005.00SX
				6.0	VRN2C006.00PA	VRN2C006.00SA	VRN2C006.00PX	VRN2C006.00SX
				7.0	VRN2C007.00PA	VRN2C007.00SA	VRN2C007.00PX	VRN2C007.00SX
	6.0	35	100	8.0	VRN2C008.00PA	VRN2C008.00SA	VRN2C008.00PX	VRN2C008.00SX
				9.0	VRN2C009.00PA	VRN2C009.00SA	VRN2C009.00PX	VRN2C009.00SX
				10	VRN2C010.00PA	VRN2C010.00SA	VRN2C010.00PX	VRN2C010.00SX
	3.0	50	100	15	VRN2C015.00PA	VRN2C015.00SA	VRN2C015.00PX	VRN2C015.00SX
				20	VRN2C020.00PA	VRN2C020.00SA	VRN2C020.00PX	VRN2C020.00SX
				4.0	VRN2C020.00PA	VRN2C020.00SA	VRN2C020.00PX	VRN2C020.00SX
1-1/4"	3.0	50	100	10	VRN2D010.00PA	VRN2D010.00SA	VRN2D010.00PX	VRN2D010.00SX
				15	VRN2D015.00PA	VRN2D015.00SA	VRN2D015.00PX	VRN2D015.00SX
	4.0			20	VRN2D020.00PA	VRN2D020.00SA	VRN2D020.00PX	VRN2D020.00SX
				25	VRN2D025.00PA	VRN2D025.00SA	VRN2D025.00PX	VRN2D025.00SX
	5.0			30	VRN2D030.00PA	VRN2D030.00SA	VRN2D030.00PX	VRN2D030.00SX
				6.5	58	35	VRN2D035.00PA	VRN2D035.00SA

Actuator Features				MVN Standard Profile	DCA or DCA w/ switches
Control Signal	Timing	Voltage	Enclosure	Actuator Model Number	
Floating	90 sec.	24 VAC/DC*	NEMA 2	+MVN613A0000	+MN6105A1011 or +MN6105A1201
Fast SPDT	30 sec.			+MVN643A0000	
Modulating	90 sec.			+MVN713A0000	+MN7505A2001 or +MN7505A2209
Accessories	1 meter cable			+C1	N/A
	NEMA 3R enclosure			N/A	+3R

Product Selection - Valves

Pressure Independent Control Valves with Non Spring Return Actuators 1½"-3"



Example of complete orderable part number: **VRN2E020.00SX + MN6105A1011**
 Pressure Independent Control Valve, Female NPT Thread, 2-way, 1-1/2", 20 GPM, Stainless Steel trim with
 MN6105A1011 Actuator, Fail in place.

**5-YEAR
 LIMITED
 WARRANTY**

If the complete orderable part number is too long for your ordering system, please refer to the Short Order Codes on pg 104 to 123.

Valve Specification			Valve Profile	Black Bracket		
Valve Size (inches)	Differential Pressure, psid		Valve Trim	Plated Brass	Stainless Steel	
	Min	Max	Max. gpm	Valve Body Model Number		
1-1/2"	3.0	50	10	VRN2E010.00PX	VRN2E010.00SX	
			15	VRN2E015.00PX	VRN2E015.00SX	
	4.0	50	20	VRN2E020.00PX	VRN2E020.00SX	
			25	VRN2E025.00PX	VRN2E025.00SX	
	5.0	58	30	VRN2E030.00PX	VRN2E030.00SX	
			35	VRN2E035.00PX	VRN2E035.00SX	
	4.0	58	40	VRN2E040.00PX	VRN2E040.00SX	
			45	VRN2E045.00PX	VRN2E045.00SX	
	6.0	58	50	VRN2E050.00PX	VRN2E050.00SX	
			55	VRN2E055.00PX	VRN2E055.00SX	
	7.0	58	60	VRN2E060.00PX	VRN2E060.00SX	
			65	VRN2E065.00PX	VRN2E065.00SX	
	11.0	58	70	VRN2E070.00PX	VRN2E070.00SX	
			75	VRN2E075.00PX	VRN2E075.00SX	
2"	4.0	58	25	VRN2F025.00PX	VRN2F025.00SX	
			30	VRN2F030.00PX	VRN2F030.00SX	
	6.0	58	35	VRN2F035.00PX	VRN2F035.00SX	
			40	VRN2F040.00PX	VRN2F040.00SX	
	7.0	58	45	VRN2F045.00PX	VRN2F045.00SX	
			50	VRN2F050.00PX	VRN2F050.00SX	
	7.0	58	55	VRN2F055.00PX	VRN2F055.00SX	
			60	VRN2F060.00PX	VRN2F060.00SX	
	6.0	58	65	VRN2F065.00PX	VRN2F065.00SX	
			70	VRN2F070.00PX	VRN2F070.00SX	
	7.0	58	75	VRN2F075.00PX	VRN2F075.00SX	
			25	VRN2G025.00PX	VRN2G025.00SX	
	2-1/2"	4.0	58	30	VRN2G030.00PX	VRN2G030.00SX
				35	VRN2G035.00PX	VRN2G035.00SX
6.0		58	40	VRN2G040.00PX	VRN2G040.00SX	
			45	VRN2G045.00PX	VRN2G045.00SX	
7.0		58	50	VRN2G050.00PX	VRN2G050.00SX	
			55	VRN2G055.00PX	VRN2G055.00SX	
7.0		58	60	VRN2G060.00PX	VRN2G060.00SX	
			65	VRN2G065.00PX	VRN2G065.00SX	
10		58	70	VRN2G070.00PX	VRN2G070.00SX	
			75	VRN2G075.00PX	VRN2G075.00SX	
12		58	80	VRN2G080.00PX	VRN2G080.00SX	
			85	VRN2G085.00PX	VRN2G085.00SX	
3"		4.0	58	95	VRN2G095.00PX	VRN2G095.00SX
				25	VRN2H025.00PX	VRN2H025.00SX
	6.0	58	30	VRN2H030.00PX	VRN2H030.00SX	
			35	VRN2H035.00PX	VRN2H035.00SX	
	7.0	58	40	VRN2H040.00PX	VRN2H040.00SX	
			45	VRN2H045.00PX	VRN2H045.00SX	
	7.0	58	50	VRN2H050.00PX	VRN2H050.00SX	
			55	VRN2H055.00PX	VRN2H055.00SX	
	10	58	60	VRN2H060.00PX	VRN2H060.00SX	
			65	VRN2H065.00PX	VRN2H065.00SX	
	12	58	70	VRN2H070.00PX	VRN2H070.00SX	
			75	VRN2H075.00PX	VRN2H075.00SX	
	12	58	80	VRN2H080.00PX	VRN2H080.00SX	
			85	VRN2H085.00PX	VRN2H085.00SX	
12	58	95	VRN2H095.00PX	VRN2H095.00SX		

Actuator Features				DCA or DCA w/ switches
Control Signal	Timing	Voltage	Enclosure	Actuator Model Number
Floating	90 sec.	24 VAC/DC	NEMA 2	+MN6105A1011 or +MN6105A1201
Modulating	90 sec.			+MN7505A2001 or +MN7505A2209
Accessories	NEMA 3R enclosure			+3R

VALVES

Product Selection - Valves

Pressure Independent Control Valves With Spring Return Actuators 1/2"-1 1/4"



Example of complete orderable part number: **VRN2A005.00PX + MS7103A2024 + FSC**
 Pressure Independent Control Valve, Female NPT Thread, 2-way, 1/2", 5 GPM, Black Bracket, Plated Brass trim with MS7103A2024 Actuator, Fail closed.

**5-YEAR
LIMITED
WARRANTY**

If the complete orderable part number is too long for your ordering system, please refer to the Short Order Codes on pg 104 to 123.

Valve Specification				Valve Profile	Black Bracket		Black Bracket	
				Valve Trim	Plated Brass	Stainless Steel	Plated Brass	Stainless Steel
Valve Size (inches)	Differential Pressure, psid		Close-off	Max. gpm	Valve Body Model Number			
	Min	Max						
1/2"	3.0	35	100	1.0	VRN2A001.00PX	VRN2A001.00SX	VRN2A001.00PX	VRN2A001.00SX
				2.0	VRN2A002.00PX	VRN2A002.00SX	VRN2A002.00PX	VRN2A002.00SX
				3.0	VRN2A003.00PX	VRN2A003.00SX	VRN2A003.00PX	VRN2A003.00SX
				4.0	VRN2A004.00PX	VRN2A004.00SX	VRN2A004.00PX	VRN2A004.00SX
				5.0	VRN2A005.00PX	VRN2A005.00SX	VRN2A005.00PX	VRN2A005.00SX
				6.0	VRN2A006.00PX	VRN2A006.00SX	VRN2A006.00PX	VRN2A006.00SX
				7.0	VRN2A007.00PX	VRN2A007.00SX	VRN2A007.00PX	VRN2A007.00SX
3/4"	3.0	35	100	1.0	VRN2B001.00PX	VRN2B001.00SX	VRN2B001.00PX	VRN2B001.00SX
				2.0	VRN2B002.00PX	VRN2B002.00SX	VRN2B002.00PX	VRN2B002.00SX
				3.0	VRN2B003.00PX	VRN2B003.00SX	VRN2B003.00PX	VRN2B003.00SX
				4.0	VRN2B004.00PX	VRN2B004.00SX	VRN2B004.00PX	VRN2B004.00SX
				5.0	VRN2B005.00PX	VRN2B005.00SX	VRN2B005.00PX	VRN2B005.00SX
				6.0	VRN2B006.00PX	VRN2B006.00SX	VRN2B006.00PX	VRN2B006.00SX
				7.0	VRN2B007.00PX	VRN2B007.00SX	VRN2B007.00PX	VRN2B007.00SX
	6.0	35	100	8.0	VRN2B008.00PX	VRN2B008.00SX	VRN2B008.00PX	VRN2B008.00SX
				9.0	VRN2B009.00PX	VRN2B009.00SX	VRN2B009.00PX	VRN2B009.00SX
				10	VRN2B010.00PX	VRN2B010.00SX	VRN2B010.00PX	VRN2B010.00SX
1"	3.0	35	100	1.0	VRN2C001.00PX	VRN2C001.00SX	VRN2C001.00PX	VRN2C001.00SX
				2.0	VRN2C002.00PX	VRN2C002.00SX	VRN2C002.00PX	VRN2C002.00SX
				3.0	VRN2C003.00PX	VRN2C003.00SX	VRN2C003.00PX	VRN2C003.00SX
				4.0	VRN2C004.00PX	VRN2C004.00SX	VRN2C004.00PX	VRN2C004.00SX
				5.0	VRN2C005.00PX	VRN2C005.00SX	VRN2C005.00PX	VRN2C005.00SX
				6.0	VRN2C006.00PX	VRN2C006.00SX	VRN2C006.00PX	VRN2C006.00SX
				7.0	VRN2C007.00PX	VRN2C007.00SX	VRN2C007.00PX	VRN2C007.00SX
	6.0	35	100	8.0	VRN2C008.00PX	VRN2C008.00SX	VRN2C008.00PX	VRN2C008.00SX
				9.0	VRN2C009.00PX	VRN2C009.00SX	VRN2C009.00PX	VRN2C009.00SX
				10	VRN2C010.00PX	VRN2C010.00SX	VRN2C010.00PX	VRN2C010.00SX
				15	VRN2C015.00PX	VRN2C015.00SX	VRN2C015.00PX	VRN2C015.00SX
				20	VRN2C020.00PX	VRN2C020.00SX	VRN2C020.00PX	VRN2C020.00SX
				30	VRN2C030.00PX	VRN2C030.00SX	VRN2C030.00PX	VRN2C030.00SX
1-1/4"	3.0	50	100	10	VRN2D010.00PX	VRN2D010.00SX	VRN2D010.00PX	VRN2D010.00SX
				15	VRN2D015.00PX	VRN2D015.00SX	VRN2D015.00PX	VRN2D015.00SX
	4.0			20	VRN2D020.00PX	VRN2D020.00SX	VRN2D020.00PX	VRN2D020.00SX
				25	VRN2D025.00PX	VRN2D025.00SX	VRN2D025.00PX	VRN2D025.00SX
	5.0			30	VRN2D030.00PX	VRN2D030.00SX	VRN2D030.00PX	VRN2D030.00SX
				35	VRN2D035.00PX	VRN2D035.00SX	VRN2D035.00PX	VRN2D035.00SX
6.5	58							

Actuator Features								
				DCA or DCA w/ switches		DCA or DCA w/ switches		
Control Signal	Timing	Voltage	Enclosure	Actuator Model Number				
Modulating	90 sec.	24 VAC/DC	NEMA 2	+MS7103A2024 or +MS7103A2224		+MS7505A2030 or +MS7505A2130		
2-position	45 sec.					+MS8105A1030 or +MS8105A1130		
2-position	45 sec.	120 VAC				+MS4105A1030 or +MS4105A1130		
Fail Safe Position	FSO - Fail Safe Open, FSC - Fail Safe Closed			+FSO or +FSC		+FSO or +FSC		
Accessories	NEMA 3R enclosure			N/A		+3R		

Note: MS7505A2030 and MS7505A2130 are only available with NEMA 3R enclosure on 1/2" - 1-1/4" valves, for NEMA 2 use MS7103A2024 or MS7103A2224

Product Selection - Valves

Pressure Independent Control Valves With Spring Return Actuators 1½"-3"



Example of complete orderable part number: **VRN2E020.00SX** + **MS7505A2030** + **FSC**
 Pressure Independent Control Valve, Female NPT Thread, 2-way, 1-1/2", 20 GPM, Stainless Steel trim with
 MS7505A2030 Actuator, Fail closed.

**5-YEAR
 LIMITED
 WARRANTY**

If the complete orderable part number is too long for your ordering system, please refer to the Short Order Codes on pg 104 to 123.

Valve Specification				Valve Profile	Black Bracket	
Valve Size (inches)	Differential Pressure, psid		Close-off	Valve Trim	Plated Brass	Stainless Steel
	Min	Max		Max. gpm	Valve Body Model Number	
1-1/2"	50	58	100	10	VRN2E010.00PX	VRN2E010.00SX
				15	VRN2E015.00PX	VRN2E015.00SX
				20	VRN2E020.00PX	VRN2E020.00SX
				25	VRN2E025.00PX	VRN2E025.00SX
				30	VRN2E030.00PX	VRN2E030.00SX
				35	VRN2E035.00PX	VRN2E035.00SX
	7.0	40		VRN2E040.00PX	VRN2E040.00SX	
		45		VRN2E045.00PX	VRN2E045.00SX	
		50		VRN2E050.00PX	VRN2E050.00SX	
		55		VRN2E055.00PX	VRN2E055.00SX	
		60		VRN2E060.00PX	VRN2E060.00SX	
		65		VRN2E065.00PX	VRN2E065.00SX	
2"	58	100	70	VRN2E070.00PX	VRN2E070.00SX	
			75	VRN2E075.00PX	VRN2E075.00SX	
			80	VRN2E080.00PX	VRN2E080.00SX	
			85	VRN2E085.00PX	VRN2E085.00SX	
			95	VRN2E095.00PX	VRN2E095.00SX	
			25	VRN2F025.00PX	VRN2F025.00SX	
	7.0		30	VRN2F030.00PX	VRN2F030.00SX	
			35	VRN2F035.00PX	VRN2F035.00SX	
			40	VRN2F040.00PX	VRN2F040.00SX	
			45	VRN2F045.00PX	VRN2F045.00SX	
			50	VRN2F050.00PX	VRN2F050.00SX	
			55	VRN2F055.00PX	VRN2F055.00SX	
2-1/2"	58	100	60	VRN2F060.00PX	VRN2F060.00SX	
			65	VRN2F065.00PX	VRN2F065.00SX	
			70	VRN2F070.00PX	VRN2F070.00SX	
			75	VRN2F075.00PX	VRN2F075.00SX	
			25	VRN2G025.00PX	VRN2G025.00SX	
			30	VRN2G030.00PX	VRN2G030.00SX	
	7.0		35	VRN2G035.00PX	VRN2G035.00SX	
			40	VRN2G040.00PX	VRN2G040.00SX	
			45	VRN2G045.00PX	VRN2G045.00SX	
			50	VRN2G050.00PX	VRN2G050.00SX	
			55	VRN2G055.00PX	VRN2G055.00SX	
			60	VRN2G060.00PX	VRN2G060.00SX	
3"	58	100	65	VRN2G065.00PX	VRN2G065.00SX	
			70	VRN2G070.00PX	VRN2G070.00SX	
			75	VRN2G075.00PX	VRN2G075.00SX	
			80	VRN2G080.00PX	VRN2G080.00SX	
			85	VRN2G085.00PX	VRN2G085.00SX	
			95	VRN2G095.00PX	VRN2G095.00SX	
	7.0		25	VRN2H025.00PX	VRN2H025.00SX	
			30	VRN2H030.00PX	VRN2H030.00SX	
			35	VRN2H035.00PX	VRN2H035.00SX	
			40	VRN2H040.00PX	VRN2H040.00SX	
			45	VRN2H045.00PX	VRN2H045.00SX	
			50	VRN2H050.00PX	VRN2H050.00SX	
10	55	VRN2H055.00PX	VRN2H055.00SX			
	60	VRN2H060.00PX	VRN2H060.00SX			
	65	VRN2H065.00PX	VRN2H065.00SX			
	70	VRN2H070.00PX	VRN2H070.00SX			
	75	VRN2H075.00PX	VRN2H075.00SX			
	80	VRN2H080.00PX	VRN2H080.00SX			
12	85	VRN2H085.00PX	VRN2H085.00SX			
	95	VRN2H095.00PX	VRN2H095.00SX			

Actuator Features				DCA or DCA w/ switches
Control Signal	Timing	Voltage	Enclosure	Actuator Model Number
Floating	90 sec.	24 VAC/DC	NEMA 2	+MS7505A2030 or +MS7505A2130
2-position	45 sec.			+MS8105A1030 or +MS8105A1130
2-position	45 sec.			+MS4105A1030 or +MS4105A1130
Fail Safe Position	FSO - Fail Safe Open, FSC - Fail Safe Closed			+FSO or +FSC
Accessories	NEMA 3R enclosure			+3R

VALVES

Product Selection - Valves

Pressure Independent Control Valves, NPT 1/2"-1 1/4"

Common Features

- Sizes from 1/2 to 3 in. with internal (female) NPT connections.
- Controls hot or chilled water with up to 50% glycol.
- Regulated flow rates available from 1 to 95 gpm.
- Differential pressure regulator for constant pressure drop across valve seat.
- Positive pressure, rolling diaphragm regulator design for long service life for flow control accuracy of ±5% over specified control range.
- Equal percentage flow characteristic using patented flow control ball insert.



Actuator Features		Non Fail Safe								
Actuator O.S Number/ Short Order Code		MVN613A0000		MVN613A0000+C1		MVN643A0000		MVN643A0000+C1		
Power Supply	Voltage	24 VAC		24 VAC		24 VAC/DC		24 VAC/DC		
	Frequency	50/60 Hz		50/60 Hz		50/60 Hz		50/60 Hz		
	Power	1.5 VA		1.5 VA		6 VA		6 VA		
Actuator Torque (lb.-in.)		27		27		27		27		
Control	Modulating (0)2-10Vdc									
	Floating	•		•						
	Fast acting SPDT					•		•		
Actuator Stroke (degrees)		90° ± 3°		90° ± 3°		90° ± 3°		90° ± 3°		
Timing (seconds)		90		90		30		30		
Fail Safe Action		Fail in Place		Fail in Place		Fail in Place		Fail in Place		
Valve Features		Trim	Nickel-Plated Brass	Stainless Steel	Nickel-Plated Brass	Stainless Steel	Nickel-Plated Brass	Stainless Steel	Nickel-Plated Brass	Stainless Steel

Valve Size (inches)	Differential Pressure** (psid)		Close-off Pressure (psid)	Max. GPM	Short Order Codes							
	Min.	Max.			No Cable		1 Meter Cable		No Cable		1 Meter Cable	
1/2"	3.0	35	100	1	VRN2ABPA1000	VRN2ABSA1000	VRN2ABPA1001	VRN2ABSA1001	VRN2ABPA2000	VRN2ABSA2000	VRN2ABPA2001	VRN2ABSA2001
				2	VRN2ADPA1000	VRN2ADSA1000	VRN2ADPA1001	VRN2ADSA1001	VRN2ADPA2000	VRN2ADSA2000	VRN2ADPA2001	VRN2ADSA2001
				3	VRN2AEPa1000	VRN2AESA1000	VRN2AEPa1001	VRN2AESA1001	VRN2AEPa2000	VRN2AESA2000	VRN2AEPa2001	VRN2AESA2001
				4	VRN2AFPA1000	VRN2AFSA1000	VRN2AFPA1001	VRN2AFSA1001	VRN2AFPA2000	VRN2AFSA2000	VRN2AFPA2001	VRN2AFSA2001
				5	VRN2AGPA1000	VRN2AGSA1000	VRN2AGPA1001	VRN2AGSA1001	VRN2AGPA2000	VRN2AGSA2000	VRN2AGPA2001	VRN2AGSA2001
				6	VRN2AHPA1000	VRN2AHTSA1000	VRN2AHPA1001	VRN2AHTSA1001	VRN2AHPA2000	VRN2AHTSA2000	VRN2AHPA2001	VRN2AHTSA2001
				7	VRN2AJPA1000	VRN2AJSA1000	VRN2AJPA1001	VRN2AJSA1001	VRN2AJPA2000	VRN2AJSA2000	VRN2AJPA2001	VRN2AJSA2001
3/4"	3.0	35	100	1	VRN2BBPA1000	VRN2BBSA1000	VRN2BBPA1001	VRN2BBSA1001	VRN2BBPA2000	VRN2BBSA2000	VRN2BBPA2001	VRN2BBSA2001
				2	VRN2BDPA1000	VRN2BDSA1000	VRN2BDPA1001	VRN2BDSA1001	VRN2BDPA2000	VRN2BDSA2000	VRN2BDPA2001	VRN2BDSA2001
				3	VRN2BEPa1000	VRN2BESA1000	VRN2BEPa1001	VRN2BESA1001	VRN2BEPa2000	VRN2BESA2000	VRN2BEPa2001	VRN2BESA2001
				4	VRN2BFPA1000	VRN2BFSA1000	VRN2BFPA1001	VRN2BFSA1001	VRN2BFPA2000	VRN2BFSA2000	VRN2BFPA2001	VRN2BFSA2001
				5	VRN2BGPA1000	VRN2BGSA1000	VRN2BGPA1001	VRN2BGSA1001	VRN2BGPA2000	VRN2BGSA2000	VRN2BGPA2001	VRN2BGSA2001
				6	VRN2BHPA1000	VRN2BHSA1000	VRN2BHPA1001	VRN2BHSA1001	VRN2BHPA2000	VRN2BHSA2000	VRN2BHPA2001	VRN2BHSA2001
				7	VRN2BJPA1000	VRN2BJSa1000	VRN2BJPA1001	VRN2BJSa1001	VRN2BJPA2000	VRN2BJSa2000	VRN2BJPA2001	VRN2BJSa2001
	6.0	8	VRN2BKPA1000	VRN2BKSA1000	VRN2BKPA1001	VRN2BKSA1001	VRN2BKPA2000	VRN2BKSA2000	VRN2BKPA2001	VRN2BKSA2001		
		9	VRN2BLPA1000	VRN2BLSA1000	VRN2BLPA1001	VRN2BLSA1001	VRN2BLPA2000	VRN2BLSA2000	VRN2BLPA2001	VRN2BLSA2001		
		10*	VRN2BMPa1000	VRN2BMSA1000	VRN2BMPa1001	VRN2BMSA1001	VRN2BMPa2000	VRN2BMSA2000	VRN2BMPa2001	VRN2BMSA2001		
1"	3.0	35	100	1	VRN2CBPA1000	VRN2CBSA1000	VRN2CBPA1001	VRN2CBSA1001	VRN2CBPA2000	VRN2CBSA2000	VRN2CBPA2001	VRN2CBSA2001
				2	VRN2CDPA1000	VRN2CDSA1000	VRN2CDPA1001	VRN2CDSA1001	VRN2CDPA2000	VRN2CDSA2000	VRN2CDPA2001	VRN2CDSA2001
				3	VRN2CEPA1000	VRN2CESA1000	VRN2CEPA1001	VRN2CESA1001	VRN2CEPA2000	VRN2CESA2000	VRN2CEPA2001	VRN2CESA2001
				4	VRN2CFPA1000	VRN2CFSA1000	VRN2CFPA1001	VRN2CFSA1001	VRN2CFPA2000	VRN2CFSA2000	VRN2CFPA2001	VRN2CFSA2001
				5	VRN2CGPA1000	VRN2CGSA1000	VRN2CGPA1001	VRN2CGSA1001	VRN2CGPA2000	VRN2CGSA2000	VRN2CGPA2001	VRN2CGSA2001
				6	VRN2CHPA1000	VRN2CHSA1000	VRN2CHPA1001	VRN2CHSA1001	VRN2CHPA2000	VRN2CHSA2000	VRN2CHPA2001	VRN2CHSA2001
				7	VRN2CJPA1000	VRN2CJSA1000	VRN2CJPA1001	VRN2CJSA1001	VRN2CJPA2000	VRN2CJSA2000	VRN2CJPA2001	VRN2CJSA2001
	6.0	8	VRN2CKPA1000	VRN2CKSA1000	VRN2CKPA1001	VRN2CKSA1001	VRN2CKPA2000	VRN2CKSA2000	VRN2CKPA2001	VRN2CKSA2001		
		9	VRN2CLPA1000	VRN2CLSA1000	VRN2CLPA1001	VRN2CLSA1001	VRN2CLPA2000	VRN2CLSA2000	VRN2CLPA2001	VRN2CLSA2001		
		10	VRN2CMPa1000	VRN2CMSA1000	VRN2CMPa1001	VRN2CMSA1001	VRN2CMPa2000	VRN2CMSA2000	VRN2CMPa2001	VRN2CMSA2001		
		15	VRN2CNPA1000	VRN2CNSA1000	VRN2CNPA1001	VRN2CNSA1001	VRN2CNPA2000	VRN2CNSA2000	VRN2CNPA2001	VRN2CNSA2001		
		20	VRN2CPPA1000	VRN2CPSA1000	VRN2CPPA1001	VRN2CPSA1001	VRN2CPPA2000	VRN2CPSA2000	VRN2CPPA2001	VRN2CPSA2001		
1-1/4"	4.0	50	100	10	VRN2DMPa1000	VRN2DMSA1000	VRN2DMPa1001	VRN2DMSA1001	VRN2DMPa2000	VRN2DMSA2000	VRN2DMPa2001	VRN2DMSA2001
				15	VRN2DNPA1000	VRN2DNSA1000	VRN2DNPA1001	VRN2DNSA1001	VRN2DNPA2000	VRN2DNSA2000	VRN2DNPA2001	VRN2DNSA2001
				20	VRN2DPPa1000	VRN2DPSA1000	VRN2DPPa1001	VRN2DPSA1001	VRN2DPPa2000	VRN2DPSA2000	VRN2DPPa2001	VRN2DPSA2001
	5.0			25	VRN2DQPA1000	VRN2DQSA1000	VRN2DQPA1001	VRN2DQSA1001	VRN2DQPA2000	VRN2DQSA2000	VRN2DQPA2001	VRN2DQSA2001
				30	VRN2DRPA1000	VRN2DRSA1000	VRN2DRPA1001	VRN2DRSA1001	VRN2DRPA2000	VRN2DRSA2000	VRN2DRPA2001	VRN2DRSA2001
				35*	VRN2DSPa1000	VRN2DSSA1000	VRN2DSPa1001	VRN2DSSA1001	VRN2DSPa2000	VRN2DSSA2000	VRN2DSPa2001	VRN2DSSA2001

* Full port ball

** Differential pressure regulator operating range, ±5%

Product Selection - Valves

Pressure Independent Control Valves, NPT 1/2"-1 1/4"

Common Features

- Sizes from 1/2 to 3 in. with internal (female) NPT connections.
- Controls hot or chilled water with up to 50% glycol.
- Regulated flow rates available from 1 to 95 gpm.
- Differential pressure regulator for constant pressure drop across valve seat.
- Positive pressure, rolling diaphragm regulator design for long service life for flow control accuracy of ±5% over specified control range.
- Equal percentage flow characteristic using patented flow control ball insert.



Actuator Features		Non Fail Safe		Valve Only	
Actuator O.S Number/ Short Order Code		MVN713A0000	MVN713A0000+C1	N/A	
Power Supply	Voltage	24 VAC/DC	24 VAC/DC		
	Frequency	50/60 Hz	50/60 Hz		
	Power	5 VA	5 VA		
Actuator Torque	(lb.-in.)	27	27		
	Control	Modulating (0)2-10Vdc	•		
Fast acting SPDT					
Actuator Stroke (degrees)		90° ± 3°	90° ± 3°		
Timing (seconds)		90	90		
Fail Safe Action		Fail in Place	Fail in Place		

Valve Size (inches)	Differential Pressure** (psid)		Close-off Pressure (psid)	Max. GPM	Short Order Codes						
	Min.	Max.			No Cable		1 Meter Cable		Valve Only		
					Nickel-Plated Brass	Stainless Steel	Nickel-Plated Brass	Stainless Steel	Nickel-Plated Brass	Stainless Steel	
1/2"	3.0	35	100		1	VRN2ABPA3000	VRN2ABSA3000	VRN2ABPA3001	VRN2ABSA3001	VRN2ABPA0000	VRN2ABSA0000
					2	VRN2ADPA3000	VRN2ADSA3000	VRN2ADPA3001	VRN2ADSA3001	VRN2ADPA0000	VRN2ADSA0000
					3	VRN2AEP3000	VRN2AESA3000	VRN2AEP3001	VRN2AESA3001	VRN2AEP0000	VRN2AESA0000
					4	VRN2AFPA3000	VRN2AFSA3000	VRN2AFPA3001	VRN2AFSA3001	VRN2AFPA0000	VRN2AFSA0000
					5	VRN2AGPA3000	VRN2AGSA3000	VRN2AGPA3001	VRN2AGSA3001	VRN2AGPA0000	VRN2AGSA0000
					6	VRN2AHPA3000	VRN2AHPA3000	VRN2AHPA3001	VRN2AHPA3001	VRN2AHPA0000	VRN2AHPA0000
					7	VRN2AJPA3000	VRN2AJSA3000	VRN2AJPA3001	VRN2AJSA3001	VRN2AJPA0000	VRN2AJSA0000
3/4"	3.0	35	100		1	VRN2BBPA3000	VRN2BBSA3000	VRN2BBPA3001	VRN2BBSA3001	VRN2BBPA0000	VRN2BBSA0000
					2	VRN2BDPA3000	VRN2BDSA3000	VRN2BDPA3001	VRN2BDSA3001	VRN2BDPA0000	VRN2BDSA0000
					3	VRN2BEP3000	VRN2BESA3000	VRN2BEP3001	VRN2BESA3001	VRN2BEP0000	VRN2BESA0000
					4	VRN2BFPA3000	VRN2BFSA3000	VRN2BFPA3001	VRN2BFSA3001	VRN2BFPA0000	VRN2BFSA0000
					5	VRN2BGPA3000	VRN2BGBSA3000	VRN2BGPA3001	VRN2BGBSA3001	VRN2BGPA0000	VRN2BGBSA0000
					6	VRN2BHSA3000	VRN2BHSA3000	VRN2BHSA3001	VRN2BHSA3001	VRN2BHSA0000	VRN2BHSA0000
					7	VRN2BJPA3000	VRN2BBSA3000	VRN2BJPA3001	VRN2BBSA3001	VRN2BJPA0000	VRN2BBSA0000
					8	VRN2BKPA3000	VRN2BKSA3000	VRN2BKPA3001	VRN2BKSA3001	VRN2BKPA0000	VRN2BKSA0000
					9	VRN2BLPA3000	VRN2BLSA3000	VRN2BLPA3001	VRN2BLSA3001	VRN2BLPA0000	VRN2BLSA0000
					10*	VRN2BMPA3000	VRN2BMSA3000	VRN2BMPA3001	VRN2BMSA3001	VRN2BMPA0000	VRN2BMSA0000
1"	3.0	35	100		1	VRN2CBPA3000	VRN2CBSA3000	VRN2CBPA3001	VRN2CBSA3001	VRN2CBPA0000	VRN2CBSA0000
					2	VRN2CDPA3000	VRN2CDSA3000	VRN2CDPA3001	VRN2CDSA3001	VRN2CDPA0000	VRN2CDSA0000
					3	VRN2CEPA3000	VRN2CESA3000	VRN2CEPA3001	VRN2CESA3001	VRN2CEPA0000	VRN2CESA0000
					4	VRN2CFPA3000	VRN2CFSA3000	VRN2CFPA3001	VRN2CFSA3001	VRN2CFPA0000	VRN2CFSA0000
					5	VRN2CGPA3000	VRN2CGSA3000	VRN2CGPA3001	VRN2CGSA3001	VRN2CGPA0000	VRN2CGSA0000
					6	VRN2CHPA3000	VRN2CHSA3000	VRN2CHPA3001	VRN2CHSA3001	VRN2CHPA0000	VRN2CHSA0000
					7	VRN2CJPA3000	VRN2CJSA3000	VRN2CJPA3001	VRN2CJSA3001	VRN2CJPA0000	VRN2CJSA0000
					8	VRN2CKPA3000	VRN2CKSA3000	VRN2CKPA3001	VRN2CKSA3001	VRN2CKPA0000	VRN2CKSA0000
					9	VRN2CLPA3000	VRN2CLSA3000	VRN2CLPA3001	VRN2CLSA3001	VRN2CLPA0000	VRN2CLSA0000
					10	VRN2CMPA3000	VRN2CMSA3000	VRN2CMPA3001	VRN2CMSA3001	VRN2CMPA0000	VRN2CMSA0000
1-1/4"	4.0	50	100		15	VRN2CNPA3000	VRN2CNPA3000	VRN2CNPA3001	VRN2CNPA3001	VRN2CNPA0000	VRN2CNPA0000
					20	VRN2CPA3000	VRN2CPSA3000	VRN2CPA3001	VRN2CPSA3001	VRN2CPA0000	VRN2CPSA0000
					10	VRN2DMPA3000	VRN2DMSA3000	VRN2DMPA3001	VRN2DMSA3001	VRN2DMPA0000	VRN2DMSA0000
					15	VRN2DNPA3000	VRN2DNPA3000	VRN2DNPA3001	VRN2DNPA3001	VRN2DNPA0000	VRN2DNPA0000
					20	VRN2DPPA3000	VRN2DPSA3000	VRN2DPPA3001	VRN2DPSA3001	VRN2DPPA0000	VRN2DPSA0000
					25	VRN2DQPA3000	VRN2DQSA3000	VRN2DQPA3001	VRN2DQSA3001	VRN2DQPA0000	VRN2DQSA0000
1-1/4"	5.0	50	100		30	VRN2DRPA3000	VRN2DRSA3000	VRN2DRPA3001	VRN2DRSA3001	VRN2DRPA0000	VRN2DRSA0000
					35*	VRN2DSPA3000	VRN2DSSA3000	VRN2DSPA3001	VRN2DSSA3001	VRN2DSPA0000	VRN2DSSA0000
					6.5						

* Full port ball

** Differential pressure regulator operating range, ±5%

Product Selection - Valves

Pressure Independent Control Valves, NPT 1/2"-1 1/4" NEMA 2

Common Features

- Sizes from 1/2 to 3 in. with internal (female) NPT connections.
- Controls hot or chilled water with up to 50% glycol.
- Regulated flow rates available from 1 to 95 gpm.
- Differential pressure regulator for constant pressure drop across valve seat.
- Positive pressure, rolling diaphragm regulator design for long service life for flow control accuracy of ±5% over specified control range.
- Equal percentage flow characteristic using patented flow control ball insert.



Actuator Features		Non Fail Safe	
Actuator O.S Number		MN6105A1011	MN6105A1201
Power Supply	Voltage	24 VAC/DC	24 VAC/DC
	Frequency	50 / 60 Hz	50 / 60 Hz
	Power	5 VA	5 VA
Actuator Torque	(lb. -in.)	44	44
Control	(0)2-10Vdc		
	4-20 mA (w/ external 500 Ohm Resistor)		
	Floating	•	•
	Two-Position SPDT	•	•
	Two-Position SPST		
Actuator Stroke	(degrees)	95° ± 3°	95° ± 3°
Timing	(drive/spring return, seconds)	90	90
Aux Switch		0	2
Feedback	2-10 Vdc Built In	-	-
Fail Safe Action		Stay in Place	Stay in Place
Normal Position	(no signal)	Stay in Place	Stay in Place
Valve Features	Trim	Nickel-Plated Brass	Stainless Steel
		Nickel-Plated Brass	Stainless Steel
		Nickel-Plated Brass	Stainless Steel
		Nickel-Plated Brass	Stainless Steel

Valve Size (Inches)	Differential Pressure** (psid)		Close-off Pressure (psid)	Max. GPM	Short Order Codes				
	Min.	Max.							
1/2"	3.0	35	100	1	VRN2ABPX4000	VRN2ABSX4000	VRN2ABPXC000	VRN2ABSXC000	
				2	VRN2ADPX4000	VRN2ADSX4000	VRN2ADPXC000	VRN2ADSXC000	
				3	VRN2AEPX4000	VRN2AESX4000	VRN2AEPXC000	VRN2AESXC000	
				4	VRN2AFPX4000	VRN2AFSX4000	VRN2AFPXC000	VRN2AFSXC000	
				5	VRN2AGPX4000	VRN2AGSX4000	VRN2AGPXC000	VRN2AGSXC000	
				6	VRN2AHPX4000	VRN2AHSX4000	VRN2AHPXC000	VRN2AHSXC000	
				7	VRN2AJPX4000	VRN2AJSX4000	VRN2AJPC000	VRN2AJSXC000	
3/4"	3.0	35	100	1	VRN2BBPX4000	VRN2BBSX4000	VRN2BBPXC000	VRN2BBSXC000	
				2	VRN2BDPX4000	VRN2BDSX4000	VRN2BDPXC000	VRN2BDSXC000	
				3	VRN2BEPX4000	VRN2BESX4000	VRN2BEPXC000	VRN2BESXC000	
				4	VRN2BFPX4000	VRN2BFSX4000	VRN2BFPXC000	VRN2BFSXC000	
				5	VRN2BGPX4000	VRN2BGSX4000	VRN2BGPXC000	VRN2BGSXC000	
	6.0				6	VRN2BHPX4000	VRN2BHSX4000	VRN2BHPXC000	VRN2BHSXC000
					7	VRN2BJPX4000	VRN2BJSX4000	VRN2BJPXC000	VRN2BJSXC000
					8	VRN2BKPX4000	VRN2BKSX4000	VRN2BKPXC000	VRN2BKSXC000
					9	VRN2BLPX4000	VRN2BLSX4000	VRN2BLPXC000	VRN2BLSXC000
					10*	VRN2BMPX4000	VRN2BMSX4000	VRN2BMPXC000	VRN2BMSXC000
1"	3.0	35	100	1	VRN2CBPX4000	VRN2CBSX4000	VRN2CBPXC000	VRN2CBSXC000	
				2	VRN2CDPX4000	VRN2CDSX4000	VRN2CDPXC000	VRN2CDSXC000	
				3	VRN2CEPX4000	VRN2CESX4000	VRN2CEPXC000	VRN2CESXC000	
				4	VRN2CFPX4000	VRN2CFSX4000	VRN2CFPXC000	VRN2CFSXC000	
				5	VRN2CGPX4000	VRN2CGSX4000	VRN2CGPXC000	VRN2CGSXC000	
	6.0				6	VRN2CHPX4000	VRN2CHSX4000	VRN2CHPXC000	VRN2CHSXC000
					7	VRN2CJPX4000	VRN2CJSX4000	VRN2CJPXC000	VRN2CJSXC000
					8	VRN2CKPX4000	VRN2CKSX4000	VRN2CKPXC000	VRN2CKSXC000
					9	VRN2CLPX4000	VRN2CLSX4000	VRN2CLPXC000	VRN2CLSXC000
					10	VRN2CMPX4000	VRN2CMSX4000	VRN2CMPXC000	VRN2CMSXC000
4.0	50			15	VRN2CNPX4000	VRN2CNSX4000	VRN2CNPXC000	VRN2CNSXC000	
				20	VRN2CPPX4000	VRN2CPSX4000	VRN2CPPXC000	VRN2CPSXC000	
				10	VRN2DMPX4000	VRN2DMSX4000	VRN2DMPXC000	VRN2DMSXC000	
				15	VRN2DNPX4000	VRN2DNSX4000	VRN2DNPXC000	VRN2DNSXC000	
				20	VRN2DPPX4000	VRN2DPSX4000	VRN2DPPXC000	VRN2DPSXC000	
1-1/4"	50		100	25	VRN2DQPX4000	VRN2DQSX4000	VRN2DQPXC000	VRN2DQSXC000	
				30	VRN2DRPX4000	VRN2DRSX4000	VRN2DRPXC000	VRN2DRSXC000	
				35*	VRN2DSPX4000	VRN2DSSX4000	VRN2DSPXC000	VRN2DSSXC000	

* Full port ball

** Differential pressure regulator operating range, ±5%

Product Selection - Valves

Pressure Independent Control Valves, NPT 1/2"-1 1/4" NEMA 2

Common Features

- Sizes from 1/2 to 3 in. with internal (female) NPT connections.
- Controls hot or chilled water with up to 50% glycol.
- Regulated flow rates available from 1 to 95 gpm.
- Differential pressure regulator for constant pressure drop across valve seat.
- Positive pressure, rolling diaphragm regulator design for long service life for flow control accuracy of ±5% over specified control range.
- Equal percentage flow characteristic using patented flow control ball insert.

Actuator Features	Non Fail Safe		Valve Only	
	MN7505A2001	MN7505A2209	Nickel-Plated Brass	Stainless Steel
Actuator O.S Number	MN7505A2001	MN7505A2209	Nickel-Plated Brass	Stainless Steel
Power Supply	Voltage	24 VAC/DC	Nickel-Plated Brass	Stainless Steel
	Frequency	50 / 60 Hz	Nickel-Plated Brass	Stainless Steel
	Power	5 VA	Nickel-Plated Brass	Stainless Steel
Actuator Torque	(lb.-in.)	44	Nickel-Plated Brass	Stainless Steel
Control	(0)2-10Vdc	•	Nickel-Plated Brass	Stainless Steel
	4-20 mA (w/ external 500 Ohm Resistor)	•	Nickel-Plated Brass	Stainless Steel
	Floating	•	Nickel-Plated Brass	Stainless Steel
	Two-Position SPDT	•	Nickel-Plated Brass	Stainless Steel
	Two-Position SPST	•	Nickel-Plated Brass	Stainless Steel
Actuator Stroke	(degrees)	95° ± 3°	Nickel-Plated Brass	Stainless Steel
Timing	(drive/spring return, seconds)	90	Nickel-Plated Brass	Stainless Steel
Aux Switch		0	Nickel-Plated Brass	Stainless Steel
Feedback	2-10 Vdc Built In	•	Nickel-Plated Brass	Stainless Steel
Fail Safe Action		Stay in Place	Nickel-Plated Brass	Stainless Steel
Normal Position	(no signal)	Closed	Nickel-Plated Brass	Stainless Steel
Valve Features	Trim		Nickel-Plated Brass	Stainless Steel



Valve Size (inches)	Differential Pressure** (psid)		Close-off Pressure (psid)	Max. GPM	Short Order Codes											
	Min.	Max.			VRN2ABPX5000	VRN2ABSX5000	VRN2ABPX0000	VRN2ABSX0000	VRN2ADPX5000	VRN2ADSX5000	VRN2ADPX0000	VRN2ADSX0000	VRN2AEPX5000	VRN2AESX5000	VRN2AEPX0000	VRN2AESX0000
1/2"	3.0	35	100	1	VRN2ABPX5000	VRN2ABSX5000	VRN2ABPX0000	VRN2ABSX0000	VRN2ADPX5000	VRN2ADSX5000	VRN2ADPX0000	VRN2ADSX0000	VRN2AEPX5000	VRN2AESX5000	VRN2AEPX0000	VRN2AESX0000
				2	VRN2ADPX5000	VRN2ADSX5000	VRN2ADPX0000	VRN2ADSX0000	VRN2AEPX5000	VRN2AESX5000	VRN2AEPX0000	VRN2AESX0000	VRN2AFPX5000	VRN2AFSX5000	VRN2AFPX0000	VRN2AFSX0000
				3	VRN2AEPX5000	VRN2AESX5000	VRN2AEPX0000	VRN2AESX0000	VRN2AFPX5000	VRN2AFSX5000	VRN2AFPX0000	VRN2AFSX0000	VRN2AGPX5000	VRN2AGSX5000	VRN2AGPX0000	VRN2AGSX0000
				4	VRN2AFPX5000	VRN2AFSX5000	VRN2AFPX0000	VRN2AFSX0000	VRN2AGPX5000	VRN2AGSX5000	VRN2AGPX0000	VRN2AGSX0000	VRN2AHPX5000	VRN2AHSX5000	VRN2AHPX0000	VRN2AHSX0000
				5	VRN2AGPX5000	VRN2AGSX5000	VRN2AGPX0000	VRN2AGSX0000	VRN2AHPX5000	VRN2AHSX5000	VRN2AHPX0000	VRN2AHSX0000	VRN2AJPX5000	VRN2AJSX5000	VRN2AJPX0000	VRN2AJSX0000
				6	VRN2AHPX5000	VRN2AHSX5000	VRN2AHPX0000	VRN2AHSX0000	VRN2AJPX5000	VRN2AJSX5000	VRN2AJPX0000	VRN2AJSX0000	VRN2BBPX5000	VRN2BBSX5000	VRN2BBPX0000	VRN2BBSX0000
				7	VRN2AJPX5000	VRN2AJSX5000	VRN2AJPX0000	VRN2AJSX0000	VRN2BBPX5000	VRN2BBSX5000	VRN2BBPX0000	VRN2BBSX0000	VRN2BDPX5000	VRN2BDSX5000	VRN2BDPX0000	VRN2BDSX0000
3/4"	3.0	35	100	1	VRN2BBPX5000	VRN2BBSX5000	VRN2BBPX0000	VRN2BBSX0000	VRN2BDPX5000	VRN2BDSX5000	VRN2BDPX0000	VRN2BDSX0000	VRN2BEPX5000	VRN2BESX5000	VRN2BEPX0000	VRN2BESX0000
				2	VRN2BDPX5000	VRN2BDSX5000	VRN2BDPX0000	VRN2BDSX0000	VRN2BEPX5000	VRN2BESX5000	VRN2BEPX0000	VRN2BESX0000	VRN2BFPX5000	VRN2BFSX5000	VRN2BFPX0000	VRN2BFSX0000
				3	VRN2BEPX5000	VRN2BESX5000	VRN2BEPX0000	VRN2BESX0000	VRN2BFPX5000	VRN2BFSX5000	VRN2BFPX0000	VRN2BFSX0000	VRN2BGPX5000	VRN2BGSX5000	VRN2BGPX0000	VRN2BGSX0000
				4	VRN2BFPX5000	VRN2BFSX5000	VRN2BFPX0000	VRN2BFSX0000	VRN2BGPX5000	VRN2BGSX5000	VRN2BGPX0000	VRN2BGSX0000	VRN2BHPX5000	VRN2BHSX5000	VRN2BHPX0000	VRN2BHSX0000
				5	VRN2BGPX5000	VRN2BGSX5000	VRN2BGPX0000	VRN2BGSX0000	VRN2BHPX5000	VRN2BHSX5000	VRN2BHPX0000	VRN2BHSX0000	VRN2BJPX5000	VRN2BJSX5000	VRN2BJPX0000	VRN2BJSX0000
				6	VRN2BHPX5000	VRN2BHSX5000	VRN2BHPX0000	VRN2BHSX0000	VRN2BJPX5000	VRN2BJSX5000	VRN2BJPX0000	VRN2BJSX0000	VRN2BKPX5000	VRN2BKSX5000	VRN2BKPX0000	VRN2BKSX0000
				7	VRN2BJPX5000	VRN2BJSX5000	VRN2BJPX0000	VRN2BJSX0000	VRN2BKPX5000	VRN2BKSX5000	VRN2BKPX0000	VRN2BKSX0000	VRN2BLPX5000	VRN2BLSX5000	VRN2BLPX0000	VRN2BLSX0000
	8	VRN2BKPX5000	VRN2BKSX5000	VRN2BKPX0000	VRN2BKSX0000	VRN2BLPX5000	VRN2BLSX5000	VRN2BLPX0000	VRN2BLSX0000	VRN2BMPX5000	VRN2BMSX5000	VRN2BMPX0000	VRN2BMSX0000			
	9	VRN2BLPX5000	VRN2BLSX5000	VRN2BLPX0000	VRN2BLSX0000	VRN2BMPX5000	VRN2BMSX5000	VRN2BMPX0000	VRN2BMSX0000	VRN2CBPX5000	VRN2CBSX5000	VRN2CBPX0000	VRN2CBSX0000			
	10*	VRN2BMPX5000	VRN2BMSX5000	VRN2BMPX0000	VRN2BMSX0000	VRN2CBPX5000	VRN2CBSX5000	VRN2CBPX0000	VRN2CBSX0000	VRN2CDPX5000	VRN2CDSX5000	VRN2CDPX0000	VRN2CDSX0000			
1"	3.0	35	100	1	VRN2CBPX5000	VRN2CBSX5000	VRN2CBPX0000	VRN2CBSX0000	VRN2CDPX5000	VRN2CDSX5000	VRN2CDPX0000	VRN2CDSX0000	VRN2CEPX5000	VRN2CESX5000	VRN2CEPX0000	VRN2CESX0000
				2	VRN2CDPX5000	VRN2CDSX5000	VRN2CDPX0000	VRN2CDSX0000	VRN2CEPX5000	VRN2CESX5000	VRN2CEPX0000	VRN2CESX0000	VRN2CFPX5000	VRN2CFSX5000	VRN2CFPX0000	VRN2CFSX0000
				3	VRN2CEPX5000	VRN2CESX5000	VRN2CEPX0000	VRN2CESX0000	VRN2CFPX5000	VRN2CFSX5000	VRN2CFPX0000	VRN2CFSX0000	VRN2CGPX5000	VRN2CGSX5000	VRN2CGPX0000	VRN2CGSX0000
				4	VRN2CFPX5000	VRN2CFSX5000	VRN2CFPX0000	VRN2CFSX0000	VRN2CGPX5000	VRN2CGSX5000	VRN2CGPX0000	VRN2CGSX0000	VRN2CHPX5000	VRN2CHSX5000	VRN2CHPX0000	VRN2CHSX0000
				5	VRN2CGPX5000	VRN2CGSX5000	VRN2CGPX0000	VRN2CGSX0000	VRN2CHPX5000	VRN2CHSX5000	VRN2CHPX0000	VRN2CHSX0000	VRN2CJPX5000	VRN2CJSX5000	VRN2CJPX0000	VRN2CJSX0000
				6	VRN2CHPX5000	VRN2CHSX5000	VRN2CHPX0000	VRN2CHSX0000	VRN2CJPX5000	VRN2CJSX5000	VRN2CJPX0000	VRN2CJSX0000	VRN2CKPX5000	VRN2CKSX5000	VRN2CKPX0000	VRN2CKSX0000
				7	VRN2CJPX5000	VRN2CJSX5000	VRN2CJPX0000	VRN2CJSX0000	VRN2CKPX5000	VRN2CKSX5000	VRN2CKPX0000	VRN2CKSX0000	VRN2CLPX5000	VRN2CLSX5000	VRN2CLPX0000	VRN2CLSX0000
	8	VRN2CKPX5000	VRN2CKSX5000	VRN2CKPX0000	VRN2CKSX0000	VRN2CLPX5000	VRN2CLSX5000	VRN2CLPX0000	VRN2CLSX0000	VRN2CMPX5000	VRN2CMSX5000	VRN2CMPX0000	VRN2CMSX0000			
	9	VRN2CLPX5000	VRN2CLSX5000	VRN2CLPX0000	VRN2CLSX0000	VRN2CMPX5000	VRN2CMSX5000	VRN2CMPX0000	VRN2CMSX0000	VRN2CNPX5000	VRN2CNSX5000	VRN2CNPX0000	VRN2CNSX0000			
	10	VRN2CMPX5000	VRN2CMSX5000	VRN2CMPX0000	VRN2CMSX0000	VRN2CNPX5000	VRN2CNSX5000	VRN2CNPX0000	VRN2CNSX0000	VRN2CPPX5000	VRN2CPSX5000	VRN2CPPX0000	VRN2CPSX0000			
1-1/4"	4.0	50	100	10	VRN2CPPX5000	VRN2CPSX5000	VRN2CPPX0000	VRN2CPSX0000	VRN2DMPX5000	VRN2DMSX5000	VRN2DMPX0000	VRN2DMSX0000	VRN2DNPX5000	VRN2DNSX5000	VRN2DNPX0000	VRN2DNSX0000
				15	VRN2DMPX5000	VRN2DMSX5000	VRN2DMPX0000	VRN2DMSX0000	VRN2DNPX5000	VRN2DNSX5000	VRN2DNPX0000	VRN2DNSX0000	VRN2DPPX5000	VRN2DPSX5000	VRN2DPPX0000	VRN2DPSX0000
				20	VRN2DNPX5000	VRN2DNSX5000	VRN2DNPX0000	VRN2DNSX0000	VRN2DPPX5000	VRN2DPSX5000	VRN2DPPX0000	VRN2DPSX0000	VRN2DQPX5000	VRN2DQSX5000	VRN2DQPX0000	VRN2DQSX0000
				25	VRN2DPPX5000	VRN2DPSX5000	VRN2DPPX0000	VRN2DPSX0000	VRN2DQPX5000	VRN2DQSX5000	VRN2DQPX0000	VRN2DQSX0000	VRN2DRPX5000	VRN2DRSX5000	VRN2DRPX0000	VRN2DRSX0000
				30	VRN2DRPX5000	VRN2DRSX5000	VRN2DRPX0000	VRN2DRSX0000	VRN2DQPX5000	VRN2DQSX5000	VRN2DQPX0000	VRN2DQSX0000	VRN2DSPX5000	VRN2DSSX5000	VRN2DSPX0000	VRN2DSSX0000
				35*	VRN2DSPX5000	VRN2DSSX5000	VRN2DSPX0000	VRN2DSSX0000	VRN2DSPX5000	VRN2DSSX5000	VRN2DSPX0000	VRN2DSSX0000	VRN2DSPX5000	VRN2DSSX5000	VRN2DSPX0000	VRN2DSSX0000

* Full port ball

** Differential pressure regulator operating range, ±5%



VALVES

Product Selection - Valves

Pressure Independent Control Valves, NPT 1/2"-1 1/4" NEMA 2

Actuator Features		Fail Safe							
Actuator O.S Number		MS7103A2024				MS7103A2224			
Power Supply	Voltage	24 VAC/DC				24 VAC/DC			
	Frequency	50 / 60 Hz				50 / 60 Hz			
	Power	4 VA				4 VA			
Actuator Torque	(lb. -in.)	27				27			
Control	(0)2-10Vdc	•				•			
	4-20 mA (w/ external 500 Ohm Resistor)	•				•			
	Floating								
	Two-Position SPDT								
	Two-Position SPST								
Actuator Stroke	(degrees)	95° ± 3°				95° ± 3°			
Timing	(drive/spring return, seconds)	90 / 25				90 / 25			
Aux Switch		0				2			
Feedback	2-10 Vdc Built In	•				•			
Fail Safe Action		Closed		Open		Closed		Open	
Normal Position	(no signal)	Closed		Open		Closed		Open	
Valve Features	Trim	Nickel-Plated Brass	Stainless Steel	Nickel-Plated Brass	Stainless Steel	Nickel-Plated Brass	Stainless Steel	Nickel-Plated Brass	Stainless Steel

Valve Size (inches)	Differential Pressure** (psid)		Close-off Pressure (psid)	Max. GPM	Short Order Codes																																																																																																																		
	Min.	Max.			1	2	3	4	5	6	7	8	9	10*																																																																																																									
1/2"	3.0	35	100	1	VRN2ABPX201	VRN2ABSXE201	VRN2ABPX101	VRN2ABSXE101	VRN2ABPXF201	VRN2ABSXF201	VRN2ABPXF101	VRN2ABSXF101	2	VRN2ADPX201	VRN2ADSXE201	VRN2ADPX101	VRN2ADSXE101	VRN2ADPXF201	VRN2ADSXF201	VRN2ADPXF101	VRN2ADSXF101	3	VRN2AEPXE201	VRN2AESXE201	VRN2AEPXE101	VRN2AESXE101	VRN2AEPXF201	VRN2AESXF201	VRN2AEPXF101	VRN2AESXF101	4	VRN2AFPXE201	VRN2AFSXE201	VRN2AFPXE101	VRN2AFSXE101	VRN2AFPXF201	VRN2AFSXF201	VRN2AFPXF101	VRN2AFSXF101	5	VRN2AGPXE201	VRN2AGSXE201	VRN2AGPXE101	VRN2AGSXE101	VRN2AGPXF201	VRN2AGSXF201	VRN2AGPXF101	VRN2AGSXF101	6	VRN2AHPXE201	VRN2AHSXE201	VRN2AHPXE101	VRN2AHSXE101	VRN2AHPXF201	VRN2AHSXF201	VRN2AHPXF101	VRN2AHSXF101	7	VRN2AJPXE201	VRN2AJSXE201	VRN2AJPXE101	VRN2AJSXE101	VRN2AJPXF201	VRN2AJSXF201	VRN2AJPXF101	VRN2AJSXF101																																																					
				3/4"	3.0	35	100	1	VRN2BBPX201	VRN2BBSXE201	VRN2BBPX101	VRN2BBSXE101	VRN2BBPXF201	VRN2BBSXF201	VRN2BBPXF101	VRN2BBSXF101	2	VRN2BDPX201	VRN2BDSXE201	VRN2BDPX101	VRN2BDSXE101	VRN2BDPXF201	VRN2BDSXF201	VRN2BDPXF101	VRN2BDSXF101	3	VRN2BEPXE201	VRN2BESXE201	VRN2BEPXE101	VRN2BESXE101	VRN2BEPXF201	VRN2BESXF201	VRN2BEPXF101	VRN2BESXF101	4	VRN2BFPXE201	VRN2BFSXE201	VRN2BFPXE101	VRN2BFSXE101	VRN2BFPXF201	VRN2BFSXF201	VRN2BFPXF101	VRN2BFSXF101	5	VRN2BGPXE201	VRN2BGSXE201	VRN2BGPXE101	VRN2BGSXE101	VRN2BGPXF201	VRN2BGSXF201	VRN2BGPXF101	VRN2BGSXF101	6	VRN2BHPXE201	VRN2BHSXE201	VRN2BHPXE101	VRN2BHSXE101	VRN2BHPXF201	VRN2BHSXF201	VRN2BHPXF101	VRN2BHSXF101	7	VRN2BJPX201	VRN2BJSXE201	VRN2BJPX101	VRN2BJSXE101	VRN2BJPXF201	VRN2BJSXF201	VRN2BJPXF101	VRN2BJSXF101	8	VRN2BKPXE201	VRN2BKSXE201	VRN2BKPXE101	VRN2BKSXE101	VRN2BKPF201	VRN2BKSXF201	VRN2BKPXF101	VRN2BKSXF101	9	VRN2BLPX201	VRN2BLSXE201	VRN2BLPX101	VRN2BLSXE101	VRN2BLPXF201	VRN2BLSXF201	VRN2BLPXF101	VRN2BLSXF101	10*	VRN2BMPXE201	VRN2BMSXE201	VRN2BMPXE101	VRN2BMSXE101	VRN2BMPXF201	VRN2BMSXF201	VRN2BMPXF101	VRN2BMSXF101																						
								1"	3.0	35	100	1	VRN2CBPX201	VRN2CBSXE201	VRN2CBPX101	VRN2CBSXE101	VRN2CBPXF201	VRN2CBSXF201	VRN2CBPXF101	VRN2CBSXF101	2	VRN2CDPX201	VRN2CDSXE201	VRN2CDPX101	VRN2CDSXE101	VRN2CDPXF201	VRN2CDSXF201	VRN2CDPXF101	VRN2CDSXF101	3	VRN2CEPX201	VRN2CESXE201	VRN2CEPX101	VRN2CESXE101	VRN2CEPXF201	VRN2CESXF201	VRN2CEPXF101	VRN2CESXF101	4	VRN2CFPX201	VRN2CFSXE201	VRN2CFPX101	VRN2CFSXE101	VRN2CFPXF201	VRN2CFSXF201	VRN2CFPXF101	VRN2CFSXF101	5	VRN2CGPX201	VRN2CGSXE201	VRN2CGPX101	VRN2CGSXE101	VRN2CGPXF201	VRN2CGSXF201	VRN2CGPXF101	VRN2CGSXF101	6	VRN2CHPX201	VRN2CHSXE201	VRN2CHPX101	VRN2CHSXE101	VRN2CHPXF201	VRN2CHSXF201	VRN2CHPXF101	VRN2CHSXF101	7	VRN2CJPX201	VRN2CJSXE201	VRN2CJPX101	VRN2CJSXE101	VRN2CJPXF201	VRN2CJSXF201	VRN2CJPXF101	VRN2CJSXF101	8	VRN2CKPX201	VRN2CKSXE201	VRN2CKPX101	VRN2CKSXE101	VRN2CKPXF201	VRN2CKSXF201	VRN2CKPXF101	VRN2CKSXF101	9	VRN2CLPX201	VRN2CLSXE201	VRN2CLPX101	VRN2CLSXE101	VRN2CLPXF201	VRN2CLSXF201	VRN2CLPXF101	VRN2CLSXF101	10	VRN2CMPXE201	VRN2CMSXE201	VRN2CMPXE101	VRN2CMSXE101	VRN2CMPXF201	VRN2CMSXF201	VRN2CMPXF101	VRN2CMSXF101	15	VRN2CNPXE201	VRN2CNSXE201	VRN2CNPXE101	VRN2CNSXE101	VRN2CNPXF201	VRN2CNSXF201	VRN2CNPXF101	VRN2CNSXF101	20	VRN2CPPXE201	VRN2CPSXE201	VRN2CPPXE101	VRN2CPSXE101	VRN2CPPXF201	VRN2CPSXF201	VRN2CPPXF101	VRN2CPSXF101
												1-1/4"	4.0	50	100	10	VRN2DMPXE201	VRN2DMSXE201	VRN2DMPXE101	VRN2DMSXE101	VRN2DMPXF201	VRN2DMSXF201	VRN2DMPXF101	VRN2DMSXF101	15	VRN2DNPXE201	VRN2DNSXE201	VRN2DNPXE101	VRN2DNSXE101	VRN2DNPXF201	VRN2DNSXF201	VRN2DNPXF101	VRN2DNSXF101	20	VRN2DPPXE201	VRN2DPSXE201	VRN2DPPXE101	VRN2DPSXE101	VRN2DPPXF201	VRN2DPSXF201	VRN2DPPXF101	VRN2DPSXF101	25	VRN2DQPXE201	VRN2DQSXE201	VRN2DQPXE101	VRN2DQSXE101	VRN2DQPF201	VRN2DQSXF201	VRN2DQPF101	VRN2DQSXF101	30	VRN2DRPX201	VRN2DRSXE201	VRN2DRPX101	VRN2DRSXE101	VRN2DRPXF201	VRN2DRSXF201	VRN2DRPXF101	VRN2DRSXF101	35*	VRN2DSPXE201	VRN2DSSXE201	VRN2DSPXE101	VRN2DSSXE101	VRN2DSPXF201	VRN2DSSXF201	VRN2DSPXF101	VRN2DSSXF101																																																		

* Full port ball

** Differential pressure regulator operating range, ±5%

Product Selection - Valves

Pressure Independent Control Valves, NPT 1/2"-1 1/4" NEMA 2

Actuator Features		Fail Safe			
Actuator O.S Number		MS8105A1030		MS8105A1130	
Power Supply	Voltage	24 VAC/DC		24 VAC/DC	
	Frequency	50 / 60 Hz		50 / 60 Hz	
	Power	6 VA		6 VA	
Actuator Torque	(lb.-in.)	44		44	
Control	(0)2-10Vdc				
	4-20 mA (w/ external 500 Ohm Resistor)				
	Floating				
	Two-Position SPDT				
	Two-Position SPST	•		•	
Actuator Stroke	(degrees)	95° ± 3°		95° ± 3°	
Timing	(drive/spring return, seconds)	45 / 25		45 / 25	
Aux Switch		0		1	
Feedback	2-10 Vdc Built In				
Fail Safe Action		Closed		Open	
Normal Position	(no signal)	Closed		Open	
Valve Features	Trim	Nickel-Plated Brass	Stainless Steel	Nickel-Plated Brass	Stainless Steel

Valve Size (inches)	Differential Pressure** (psid)		Close-off Pressure (psid)	Max. GPM	Short Order Codes											
	Min.	Max.			Nickel-Plated Brass	Stainless Steel	Nickel-Plated Brass	Stainless Steel	Nickel-Plated Brass	Stainless Steel	Nickel-Plated Brass	Stainless Steel				
1/2"	3.0	35	100	1	VRN2ABPX7200	VRN2ABSX7200	VRN2ABPX7100	VRN2ABSX7100	VRN2ABPX7200	VRN2ABSX7200	VRN2ABPX7100	VRN2ABSX7100	VRN2ABPX7200	VRN2ABSX7200	VRN2ABPX7100	VRN2ABSX7100
				2	VRN2ADPX7200	VRN2ADSX7200	VRN2ADPX7100	VRN2ADSX7100	VRN2ADPX7200	VRN2ADSX7200	VRN2ADPX7100	VRN2ADSX7100	VRN2ADPX7200	VRN2ADSX7200	VRN2ADPX7100	VRN2ADSX7100
				3	VRN2AEPX7200	VRN2AESX7200	VRN2AEPX7100	VRN2AESX7100	VRN2AEPX7200	VRN2AESX7200	VRN2AEPX7100	VRN2AESX7100	VRN2AEPX7200	VRN2AESX7200	VRN2AEPX7100	VRN2AESX7100
				4	VRN2AFPX7200	VRN2AFSX7200	VRN2AFPX7100	VRN2AFSX7100	VRN2AFPX7200	VRN2AFSX7200	VRN2AFPX7100	VRN2AFSX7100	VRN2AFPX7200	VRN2AFSX7200	VRN2AFPX7100	VRN2AFSX7100
				5	VRN2AGPX7200	VRN2AGSX7200	VRN2AGPX7100	VRN2AGSX7100	VRN2AGPX7200	VRN2AGSX7200	VRN2AGPX7100	VRN2AGSX7100	VRN2AGPX7200	VRN2AGSX7200	VRN2AGPX7100	VRN2AGSX7100
				6	VRN2AHPX7200	VRN2AHSX7200	VRN2AHPX7100	VRN2AHSX7100	VRN2AHPX7200	VRN2AHSX7200	VRN2AHPX7100	VRN2AHSX7100	VRN2AHPX7200	VRN2AHSX7200	VRN2AHPX7100	VRN2AHSX7100
				7	VRN2AJPX7200	VRN2AJSX7200	VRN2AJPX7100	VRN2AJSX7100	VRN2AJPX7200	VRN2AJSX7200	VRN2AJPX7100	VRN2AJSX7100	VRN2AJPX7200	VRN2AJSX7200	VRN2AJPX7100	VRN2AJSX7100
3/4"	3.0	35	100	1	VRN2BBPX7200	VRN2BBSX7200	VRN2BBPX7100	VRN2BBSX7100	VRN2BBPX7200	VRN2BBSX7200	VRN2BBPX7100	VRN2BBSX7100	VRN2BBPX7200	VRN2BBSX7200	VRN2BBPX7100	VRN2BBSX7100
				2	VRN2BDPX7200	VRN2BDSX7200	VRN2BDPX7100	VRN2BDSX7100	VRN2BDPX7200	VRN2BDSX7200	VRN2BDPX7100	VRN2BDSX7100	VRN2BDPX7200	VRN2BDSX7200	VRN2BDPX7100	VRN2BDSX7100
				3	VRN2BEPX7200	VRN2BESX7200	VRN2BEPX7100	VRN2BESX7100	VRN2BEPX7200	VRN2BESX7200	VRN2BEPX7100	VRN2BESX7100	VRN2BEPX7200	VRN2BESX7200	VRN2BEPX7100	VRN2BESX7100
				4	VRN2BFPX7200	VRN2BFSX7200	VRN2BFPX7100	VRN2BFSX7100	VRN2BFPX7200	VRN2BFSX7200	VRN2BFPX7100	VRN2BFSX7100	VRN2BFPX7200	VRN2BFSX7200	VRN2BFPX7100	VRN2BFSX7100
				5	VRN2BGPX7200	VRN2BGSX7200	VRN2BGPX7100	VRN2BGSX7100	VRN2BGPX7200	VRN2BGSX7200	VRN2BGPX7100	VRN2BGSX7100	VRN2BGPX7200	VRN2BGSX7200	VRN2BGPX7100	VRN2BGSX7100
				6	VRN2BHPX7200	VRN2BHSX7200	VRN2BHPX7100	VRN2BHSX7100	VRN2BHPX7200	VRN2BHSX7200	VRN2BHPX7100	VRN2BHSX7100	VRN2BHPX7200	VRN2BHSX7200	VRN2BHPX7100	VRN2BHSX7100
				7	VRN2BJPX7200	VRN2BJSX7200	VRN2BJPX7100	VRN2BJSX7100	VRN2BJPX7200	VRN2BJSX7200	VRN2BJPX7100	VRN2BJSX7100	VRN2BJPX7200	VRN2BJSX7200	VRN2BJPX7100	VRN2BJSX7100
	8	VRN2BKPX7200	VRN2BKSX7200	VRN2BKPX7100	VRN2BKSX7100	VRN2BKPX7200	VRN2BKSX7200	VRN2BKPX7100	VRN2BKSX7100	VRN2BKPX7200	VRN2BKSX7200	VRN2BKPX7100	VRN2BKSX7100			
	9	VRN2BLPX7200	VRN2BLSX7200	VRN2BLPX7100	VRN2BLSX7100	VRN2BLPX7200	VRN2BLSX7200	VRN2BLPX7100	VRN2BLSX7100	VRN2BLPX7200	VRN2BLSX7200	VRN2BLPX7100	VRN2BLSX7100			
	10*	VRN2BMPX7200	VRN2BMSX7200	VRN2BMPX7100	VRN2BMSX7100	VRN2BMPX7200	VRN2BMSX7200	VRN2BMPX7100	VRN2BMSX7100	VRN2BMPX7200	VRN2BMSX7200	VRN2BMPX7100	VRN2BMSX7100			
1"	3.0	35	100	1	VRN2CBPX7200	VRN2CBSX7200	VRN2CBPX7100	VRN2CBSX7100	VRN2CBPX7200	VRN2CBSX7200	VRN2CBPX7100	VRN2CBSX7100	VRN2CBPX7200	VRN2CBSX7200	VRN2CBPX7100	VRN2CBSX7100
				2	VRN2CDPX7200	VRN2CDSX7200	VRN2CDPX7100	VRN2CDSX7100	VRN2CDPX7200	VRN2CDSX7200	VRN2CDPX7100	VRN2CDSX7100	VRN2CDPX7200	VRN2CDSX7200	VRN2CDPX7100	VRN2CDSX7100
				3	VRN2CEPX7200	VRN2CESX7200	VRN2CEPX7100	VRN2CESX7100	VRN2CEPX7200	VRN2CESX7200	VRN2CEPX7100	VRN2CESX7100	VRN2CEPX7200	VRN2CESX7200	VRN2CEPX7100	VRN2CESX7100
				4	VRN2CFPX7200	VRN2CFSX7200	VRN2CFPX7100	VRN2CFSX7100	VRN2CFPX7200	VRN2CFSX7200	VRN2CFPX7100	VRN2CFSX7100	VRN2CFPX7200	VRN2CFSX7200	VRN2CFPX7100	VRN2CFSX7100
				5	VRN2CGPX7200	VRN2CGSX7200	VRN2CGPX7100	VRN2CGSX7100	VRN2CGPX7200	VRN2CGSX7200	VRN2CGPX7100	VRN2CGSX7100	VRN2CGPX7200	VRN2CGSX7200	VRN2CGPX7100	VRN2CGSX7100
				6	VRN2CHPX7200	VRN2CHSX7200	VRN2CHPX7100	VRN2CHSX7100	VRN2CHPX7200	VRN2CHSX7200	VRN2CHPX7100	VRN2CHSX7100	VRN2CHPX7200	VRN2CHSX7200	VRN2CHPX7100	VRN2CHSX7100
				7	VRN2CJPX7200	VRN2CJSX7200	VRN2CJPX7100	VRN2CJSX7100	VRN2CJPX7200	VRN2CJSX7200	VRN2CJPX7100	VRN2CJSX7100	VRN2CJPX7200	VRN2CJSX7200	VRN2CJPX7100	VRN2CJSX7100
	8	VRN2CKPX7200	VRN2CKSX7200	VRN2CKPX7100	VRN2CKSX7100	VRN2CKPX7200	VRN2CKSX7200	VRN2CKPX7100	VRN2CKSX7100	VRN2CKPX7200	VRN2CKSX7200	VRN2CKPX7100	VRN2CKSX7100			
	9	VRN2CLPX7200	VRN2CLSX7200	VRN2CLPX7100	VRN2CLSX7100	VRN2CLPX7200	VRN2CLSX7200	VRN2CLPX7100	VRN2CLSX7100	VRN2CLPX7200	VRN2CLSX7200	VRN2CLPX7100	VRN2CLSX7100			
	10	VRN2CMPX7200	VRN2CMSX7200	VRN2CMPX7100	VRN2CMSX7100	VRN2CMPX7200	VRN2CMSX7200	VRN2CMPX7100	VRN2CMSX7100	VRN2CMPX7200	VRN2CMSX7200	VRN2CMPX7100	VRN2CMSX7100			
1-1/4"	4.0	50	100	10	VRN2DMPX7200	VRN2DMSX7200	VRN2DMPX7100	VRN2DMSX7100	VRN2DMPX7200	VRN2DMSX7200	VRN2DMPX7100	VRN2DMSX7100	VRN2DMPX7200	VRN2DMSX7200	VRN2DMPX7100	VRN2DMSX7100
				15	VRN2DNPX7200	VRN2DNSX7200	VRN2DNPX7100	VRN2DNSX7100	VRN2DNPX7200	VRN2DNSX7200	VRN2DNPX7100	VRN2DNSX7100	VRN2DNPX7200	VRN2DNSX7200	VRN2DNPX7100	VRN2DNSX7100
				20	VRN2DPPX7200	VRN2DPSX7200	VRN2DPPX7100	VRN2DPSX7100	VRN2DPPX7200	VRN2DPSX7200	VRN2DPPX7100	VRN2DPSX7100	VRN2DPPX7200	VRN2DPSX7200	VRN2DPPX7100	VRN2DPSX7100
				25	VRN2DQPX7200	VRN2DQSX7200	VRN2DQPX7100	VRN2DQSX7100	VRN2DQPX7200	VRN2DQSX7200	VRN2DQPX7100	VRN2DQSX7100	VRN2DQPX7200	VRN2DQSX7200	VRN2DQPX7100	VRN2DQSX7100
				30	VRN2DRPX7200	VRN2DRSX7200	VRN2DRPX7100	VRN2DRSX7100	VRN2DRPX7200	VRN2DRSX7200	VRN2DRPX7100	VRN2DRSX7100	VRN2DRPX7200	VRN2DRSX7200	VRN2DRPX7100	VRN2DRSX7100
				35*	VRN2DSPX7200	VRN2DSSX7200	VRN2DSPX7100	VRN2DSSX7100	VRN2DSPX7200	VRN2DSSX7200	VRN2DSPX7100	VRN2DSSX7100	VRN2DSPX7200	VRN2DSSX7200	VRN2DSPX7100	VRN2DSSX7100

* Full port ball

** Differential pressure regulator operating range, ±5%

VALVES

Product Selection - Valves

Pressure Independent Control Valves, NPT 1/2"-1 1/4" NEMA 2

Actuator Features		Fail Safe			
Actuator O.S Number		MS4105A1030		MS4105A1130	
Power Supply	Voltage	100-250 VAC		100-250 VAC	
	Frequency	50 / 60 Hz		50 / 60 Hz	
	Power	6 VA		6 VA	
Actuator Torque	(lb.-in.)	44		44	
Control	(0)2-10Vdc				
	4-20 mA (w/ external 500 Ohm Resistor)				
	Floating				
	Two-Position SPDT				
	Two-Position SPST	•		•	
Actuator Stroke	(degrees)	95° ± 3°		95° ± 3°	
Timing	(drive/spring return, seconds)	45 / 25		45 / 25	
Aux Switch		0		1	
Feedback	2-10 Vdc Built In				
Fail Safe Action		Closed		Open	
Normal Position	(no signal)	Closed		Open	
Valve Features	Trim	Nickel-Plated Brass	Stainless Steel	Nickel-Plated Brass	Stainless Steel

Valve Size (inches)	Differential Pressure** (psid)		Close-off Pressure (psid)	Max. GPM	Short Order Codes									
	Min.	Max.												
1/2"	3.0	35	100	1	VRN2ABPX8200	VRN2ABSX8200	VRN2ABPX8100	VRN2ABSX8100	VRN2ABPX9200	VRN2ABSX9200	VRN2ABPX9100	VRN2ABSX9100		
				2	VRN2ADPX8200	VRN2ADSX8200	VRN2ADPX8100	VRN2ADSX8100	VRN2ADPX9200	VRN2ADSX9200	VRN2ADPX9100	VRN2ADSX9100		
				3	VRN2AEPX8200	VRN2AESX8200	VRN2AEPX8100	VRN2AESX8100	VRN2AEPX9200	VRN2AESX9200	VRN2AEPX9100	VRN2AESX9100		
				4	VRN2AFPX8200	VRN2AFSX8200	VRN2AFPX8100	VRN2AFSX8100	VRN2AFPX9200	VRN2AFSX9200	VRN2AFPX9100	VRN2AFSX9100		
				5	VRN2AGPX8200	VRN2AGSX8200	VRN2AGPX8100	VRN2AGSX8100	VRN2AGPX9200	VRN2AGSX9200	VRN2AGPX9100	VRN2AGSX9100		
				6	VRN2AHPX8200	VRN2AHSX8200	VRN2AHPX8100	VRN2AHSX8100	VRN2AHPX9200	VRN2AHSX9200	VRN2AHPX9100	VRN2AHSX9100		
				7	VRN2AJPX8200	VRN2AJSX8200	VRN2AJPX8100	VRN2AJSX8100	VRN2AJPX9200	VRN2AJSX9200	VRN2AJPX9100	VRN2AJSX9100		
3/4"	3.0	35	100	1	VRN2BBPX8200	VRN2BBSX8200	VRN2BBPX8100	VRN2BBSX8100	VRN2BBPX9200	VRN2BBSX9200	VRN2BBPX9100	VRN2BBSX9100		
				2	VRN2BDPX8200	VRN2BDSX8200	VRN2BDPX8100	VRN2BDSX8100	VRN2BDPX9200	VRN2BDSX9200	VRN2BDPX9100	VRN2BDSX9100		
				3	VRN2BEPX8200	VRN2BESX8200	VRN2BEPX8100	VRN2BESX8100	VRN2BEPX9200	VRN2BESX9200	VRN2BEPX9100	VRN2BESX9100		
				4	VRN2BFPX8200	VRN2BFSX8200	VRN2BFPX8100	VRN2BFSX8100	VRN2BFPX9200	VRN2BFSX9200	VRN2BFPX9100	VRN2BFSX9100		
				5	VRN2BGPX8200	VRN2BGSX8200	VRN2BGPX8100	VRN2BGSX8100	VRN2BGPX9200	VRN2BGSX9200	VRN2BGPX9100	VRN2BGSX9100		
	6			VRN2BHPX8200	VRN2BHSX8200	VRN2BHPX8100	VRN2BHSX8100	VRN2BHPX9200	VRN2BHSX9200	VRN2BHPX9100	VRN2BHSX9100			
	7			VRN2BJPX8200	VRN2BJSX8200	VRN2BJPX8100	VRN2BJSX8100	VRN2BJPX9200	VRN2BJSX9200	VRN2BJPX9100	VRN2BJSX9100			
	8			VRN2BKPX8200	VRN2BKSX8200	VRN2BKPX8100	VRN2BKSX8100	VRN2BKPX9200	VRN2BKSX9200	VRN2BKPX9100	VRN2BKSX9100			
	9			VRN2BLPX8200	VRN2BLSX8200	VRN2BLPX8100	VRN2BLSX8100	VRN2BLPX9200	VRN2BLSX9200	VRN2BLPX9100	VRN2BLSX9100			
	10*			VRN2BMPX8200	VRN2BMSX8200	VRN2BMPX8100	VRN2BMSX8100	VRN2BMPX9200	VRN2BMSX9200	VRN2BMPX9100	VRN2BMSX9100			
1"	3.0	35	100	1	VRN2CBPX8200	VRN2CBSX8200	VRN2CBPX8100	VRN2CBSX8100	VRN2CBPX9200	VRN2CBSX9200	VRN2CBPX9100	VRN2CBSX9100		
				2	VRN2CDPX8200	VRN2CDSX8200	VRN2CDPX8100	VRN2CDSX8100	VRN2CDPX9200	VRN2CDSX9200	VRN2CDPX9100	VRN2CDSX9100		
				3	VRN2CEPX8200	VRN2CESX8200	VRN2CEPX8100	VRN2CESX8100	VRN2CEPX9200	VRN2CESX9200	VRN2CEPX9100	VRN2CESX9100		
				4	VRN2CFPX8200	VRN2CFSX8200	VRN2CFPX8100	VRN2CFSX8100	VRN2CFPX9200	VRN2CFSX9200	VRN2CFPX9100	VRN2CFSX9100		
				5	VRN2CGPX8200	VRN2CGSX8200	VRN2CGPX8100	VRN2CGSX8100	VRN2CGPX9200	VRN2CGSX9200	VRN2CGPX9100	VRN2CGSX9100		
	6			VRN2CHPX8200	VRN2CHSX8200	VRN2CHPX8100	VRN2CHSX8100	VRN2CHPX9200	VRN2CHSX9200	VRN2CHPX9100	VRN2CHSX9100			
	7			VRN2CJPX8200	VRN2CJSX8200	VRN2CJPX8100	VRN2CJSX8100	VRN2CJPX9200	VRN2CJSX9200	VRN2CJPX9100	VRN2CJSX9100			
	8			VRN2CKPX8200	VRN2CKSX8200	VRN2CKPX8100	VRN2CKSX8100	VRN2CKPX9200	VRN2CKSX9200	VRN2CKPX9100	VRN2CKSX9100			
	9			VRN2CLPX8200	VRN2CLSX8200	VRN2CLPX8100	VRN2CLSX8100	VRN2CLPX9200	VRN2CLSX9200	VRN2CLPX9100	VRN2CLSX9100			
	10			VRN2CMPX8200	VRN2CMSX8200	VRN2CMPX8100	VRN2CMSX8100	VRN2CMPX9200	VRN2CMSX9200	VRN2CMPX9100	VRN2CMSX9100			
1-1/4"	4.0	50	100	10	VRN2DMPX8200	VRN2DMSX8200	VRN2DMPX8100	VRN2DMSX8100	VRN2DMPX9200	VRN2DMSX9200	VRN2DMPX9100	VRN2DMSX9100		
				15	VRN2DNPX8200	VRN2DNSX8200	VRN2DNPX8100	VRN2DNSX8100	VRN2DNPX9200	VRN2DNSX9200	VRN2DNPX9100	VRN2DNSX9100		
				20	VRN2DPPX8200	VRN2DPSX8200	VRN2DPPX8100	VRN2DPSX8100	VRN2DPPX9200	VRN2DPSX9200	VRN2DPPX9100	VRN2DPSX9100		
				25	VRN2DQPX8200	VRN2DQSX8200	VRN2DQPX8100	VRN2DQSX8100	VRN2DQPX9200	VRN2DQSX9200	VRN2DQPX9100	VRN2DQSX9100		
				30	VRN2DRPX8200	VRN2DRSX8200	VRN2DRPX8100	VRN2DRSX8100	VRN2DRPX9200	VRN2DRSX9200	VRN2DRPX9100	VRN2DRSX9100		
35*	VRN2DSPX8200	VRN2DSSX8200	VRN2DSPX8100	VRN2DSSX8100	VRN2DSPX9200	VRN2DSSX9200	VRN2DSPX9100	VRN2DSSX9100						

* Full port ball

** Differential pressure regulator operating range, ±5%

Product Selection - Valves

Pressure Independent Control Valves, NPT 1½"-3" NEMA 2

Common Features

- Sizes from 1/2 to 3 in. with internal (female) NPT connections.
- Controls hot or chilled water with up to 50% glycol.
- Regulated flow rates available from 1 to 95 gpm.
- Differential pressure regulator for constant pressure drop across valve seat.
- Positive pressure, rolling diaphragm regulator design for long service life for flow control accuracy of ±5% over specified control range.
- Equal percentage flow characteristic using patented flow control ball insert.

Actuator Features		Non Fail Safe	
Actuator O.S Number		MN6105A1011	MN6105A1201
Power Supply	Voltage	24 VAC/DC	24 VAC/DC
	Frequency	50 / 60 Hz	50 / 60 Hz
	Power	5 VA	5 VA
Actuator Torque	(lb.-in.)	44	44
Control	(0)2-10Vdc		
	4-20 mA (w/ external 500 Ohm Resistor)		
	Floating	•	•
	Two-Position SPDT	•	•
	Two-Position SPST		
Actuator Stroke	(degrees)	95° ± 3°	95° ± 3°
Timing	(drive/spring return, seconds)	90	90
Aux Switch		0	2
Feedback	2-10 Vdc Built In	-	-
Fail Safe Action		Stay in Place	Stay in Place
Normal Position	(no signal)	Stay in Place	Stay in Place
Valve Features	Trim	Nickel-Plated Brass	Stainless Steel
		Nickel-Plated Brass	Stainless Steel

Valve Size (inches)	Differential Pressure** (psid)		Close-off Pressure (psid)	Max. GPM	Short Order Codes			
	Min.	Max.						
1-1/2"	4	50	100	10	VRN2EMPX4000	VRN2EMSX4000	VRN2EMPXC000	VRN2EMSXC000
				15	VRN2ENPX4000	VRN2ENSX4000	VRN2ENPXC000	VRN2ENSXC000
				20	VRN2EPPX4000	VRN2EPSX4000	VRN2EPPXC000	VRN2EPSXC000
				25	VRN2EQPX4000	VRN2EQSX4000	VRN2EQPXC000	VRN2EQSXC000
				30	VRN2ERPX4000	VRN2ERSX4000	VRN2ERPXC000	VRN2ERSXC000
				35	VRN2ESPX4000	VRN2ESSX4000	VRN2ESPXC000	VRN2ESSXC000
	6	58		40	VRN2ETPX4000	VRN2ETSX4000	VRN2ETPXC000	VRN2ETSXC000
				45	VRN2EUPX4000	VRN2EUSX4000	VRN2EUPXC000	VRN2EUSXC000
				50	VRN2E1PX4000	VRN2E1SX4000	VRN2E1PXC000	VRN2E1SXC000
				55	VRN2E2PX4000	VRN2E2SX4000	VRN2E2PXC000	VRN2E2SXC000
				60	VRN2E3PX4000	VRN2E3SX4000	VRN2E3PXC000	VRN2E3SXC000
				65	VRN2E4PX4000	VRN2E4SX4000	VRN2E4PXC000	VRN2E4SXC000
				70	VRN2E5PX4000	VRN2E5SX4000	VRN2E5PXC000	VRN2E5SXC000
				75	VRN2E6PX4000	VRN2E6SX4000	VRN2E6PXC000	VRN2E6SXC000
7	58	80	VRN2E7PX4000	VRN2E7SX4000	VRN2E7PXC000	VRN2E7SXC000		
		85	VRN2E8PX4000	VRN2E8SX4000	VRN2E8PXC000	VRN2E8SXC000		
		95	VRN2E9PX4000	VRN2E9SX4000	VRN2E9PXC000	VRN2E9SXC000		
		25	VRN2FQPX4000	VRN2FQSX4000	VRN2FQPXC000	VRN2FQSXC000		
		30	VRN2FRPX4000	VRN2FRSX4000	VRN2FRPXC000	VRN2FRSXC000		
		35	VRN2FSPX4000	VRN2FSSX4000	VRN2FSPXC000	VRN2FSSXC000		
2"	58	100	40	VRN2FTPX4000	VRN2FTSX4000	VRN2FTPXC000	VRN2FTSXC000	
			45	VRN2FUPX4000	VRN2FUSX4000	VRN2FUPXC000	VRN2FUSXC000	
			50	VRN2F1PX4000	VRN2F1SX4000	VRN2F1PXC000	VRN2F1SXC000	
			55	VRN2F2PX4000	VRN2F2SX4000	VRN2F2PXC000	VRN2F2SXC000	
			60	VRN2F3PX4000	VRN2F3SX4000	VRN2F3PXC000	VRN2F3SXC000	
			65	VRN2F4PX4000	VRN2F4SX4000	VRN2F4PXC000	VRN2F4SXC000	
			70	VRN2F5PX4000	VRN2F5SX4000	VRN2F5PXC000	VRN2F5SXC000	
			75	VRN2F6PX4000	VRN2F6SX4000	VRN2F6PXC000	VRN2F6SXC000	
			25	VRN2GQPX4000	VRN2GQSX4000	VRN2GQPXC000	VRN2GQSXC000	
			30	VRN2GRPX4000	VRN2GRSX4000	VRN2GRPXC000	VRN2GRSXC000	
2-1/2"	58	100	35	VRN2GSPX4000	VRN2GSSX4000	VRN2GSPXC000	VRN2GSSXC000	
			40	VRN2GTPX4000	VRN2GTSX4000	VRN2GTPXC000	VRN2GTSXC000	
			45	VRN2GUPX4000	VRN2GUSX4000	VRN2GUPXC000	VRN2GUSXC000	
			50	VRN2G1PX4000	VRN2G1SX4000	VRN2G1PXC000	VRN2G1SXC000	
			55	VRN2G2PX4000	VRN2G2SX4000	VRN2G2PXC000	VRN2G2SXC000	
			60	VRN2G3PX4000	VRN2G3SX4000	VRN2G3PXC000	VRN2G3SXC000	
			65	VRN2G4PX4000	VRN2G4SX4000	VRN2G4PXC000	VRN2G4SXC000	
			70	VRN2G5PX4000	VRN2G5SX4000	VRN2G5PXC000	VRN2G5SXC000	
			75	VRN2G6PX4000	VRN2G6SX4000	VRN2G6PXC000	VRN2G6SXC000	
			80	VRN2G7PX4000	VRN2G7SX4000	VRN2G7PXC000	VRN2G7SXC000	
3"	58	100	85	VRN2G8PX4000	VRN2G8SX4000	VRN2G8PXC000	VRN2G8SXC000	
			95*	VRN2G9PX4000	VRN2G9SX4000	VRN2G9PXC000	VRN2G9SXC000	
			25	VRN2HQPX4000	VRN2HQSX4000	VRN2HQPXC000	VRN2HQSXC000	
			30	VRN2HRPX4000	VRN2HRSX4000	VRN2HRPXC000	VRN2HRSXC000	
			35	VRN2HSPX4000	VRN2HSSX4000	VRN2HSPXC000	VRN2HSSXC000	
			40	VRN2HTPX4000	VRN2HTSX4000	VRN2HTPXC000	VRN2HTSXC000	
			45	VRN2HUPX4000	VRN2HUSX4000	VRN2HUPXC000	VRN2HUSXC000	
			50	VRN2H1PX4000	VRN2H1SX4000	VRN2H1PXC000	VRN2H1SXC000	
			55	VRN2H2PX4000	VRN2H2SX4000	VRN2H2PXC000	VRN2H2SXC000	
			60	VRN2H3PX4000	VRN2H3SX4000	VRN2H3PXC000	VRN2H3SXC000	
			65	VRN2H4PX4000	VRN2H4SX4000	VRN2H4PXC000	VRN2H4SXC000	
			70	VRN2H5PX4000	VRN2H5SX4000	VRN2H5PXC000	VRN2H5SXC000	
			75	VRN2H6PX4000	VRN2H6SX4000	VRN2H6PXC000	VRN2H6SXC000	
			80	VRN2H7PX4000	VRN2H7SX4000	VRN2H7PXC000	VRN2H7SXC000	
85	VRN2H8PX4000	VRN2H8SX4000	VRN2H8PXC000	VRN2H8SXC000				
95*	VRN2H9PX4000	VRN2H9SX4000	VRN2H9PXC000	VRN2H9SXC000				



VALVES


* Full port ball
 ** Differential pressure regulator operating range, ±5%

Product Selection - Valves

Pressure Independent Control Valves, NPT 1½"-3" NEMA 2

Common Features

- Sizes from 1/2 to 3 in. with internal (female) NPT connections.
- Controls hot or chilled water with up to 50% glycol.
- Regulated flow rates available from 1 to 95 gpm.
- Differential pressure regulator for constant pressure drop across valve seat.
- Positive pressure, rolling diaphragm regulator design for long service life for flow control accuracy of ±5% over specified control range.
- Equal percentage flow characteristic using patented flow control ball insert.

Actuator Features		Non Fail Safe				Valve Only	
Actuator O.S Number		MN7505A2001		MN7505A2209		N/A	
Power Supply	Voltage	24 VAC/DC		24 VAC/DC			
	Frequency	50 / 60 Hz		50 / 60 Hz			
	Power	5 VA		5 VA			
Actuator Torque	(lb.-in.)	44		44			
Control	(0)2-10Vdc	•		•			
	4-20 mA (w/ external 500 Ohm Resistor)	•		•			
	Floating	•		•			
	Two-Position SPDT	•		•			
	Two-Position SPST	•		•			
Actuator Stroke	(degrees)	95° ± 3°		95° ± 3°			
Timing	(drive/spring return, seconds)	90		90			
Aux Switch		0		2			
Feedback	2-10 Vdc Built In	•		•			
Fail Safe Action		Stay in Place		Stay in Place			
Normal Position	(no signal)	Closed		Closed			
Valve Features	Trim	Nickel-Plated Brass	Stainless Steel	Nickel-Plated Brass	Stainless Steel	Nickel-Plated Brass	Stainless Steel

Valve Size (inches)	Differential Pressure** (psid)		Close-off Pressure (psid)	Max. GPM	Short Order Codes									
	Min.	Max.			VRN2EMPX0000	VRN2EMSD0000	VRN2ENPX0000	VRN2ENSD0000	VRN2EPPX0000	VRN2EPSX0000	VRN2EQPX0000	VRN2EQSX0000		
1-1/2"	4	50	100	10	VRN2EMPX5000	VRN2EMSD5000	VRN2ENPX5000	VRN2ENSD5000	VRN2EPPX5000	VRN2EPSX5000	VRN2EQPX5000	VRN2EQSX5000		
				15	VRN2EMPX5000	VRN2EMSD5000	VRN2ENPX5000	VRN2ENSD5000	VRN2EPPX5000	VRN2EPSX5000	VRN2EQPX5000	VRN2EQSX5000		
	5	58		20	VRN2ERPX5000	VRN2ERSX5000	VRN2ETPX5000	VRN2ETSX5000	VRN2EUPX5000	VRN2EUSX5000	VRN2E1PX5000	VRN2E1SX5000		
				25	VRN2ERPX5000	VRN2ERSX5000	VRN2ETPX5000	VRN2ETSX5000	VRN2EUPX5000	VRN2EUSX5000	VRN2E1PX5000	VRN2E1SX5000		
	4	58		30	VRN2ESPX5000	VRN2ESSX5000	VRN2E2PX5000	VRN2E2SX5000	VRN2E3PX5000	VRN2E3SX5000	VRN2E4PX5000	VRN2E4SX5000		
				35	VRN2ESPX5000	VRN2ESSX5000	VRN2E2PX5000	VRN2E2SX5000	VRN2E3PX5000	VRN2E3SX5000	VRN2E4PX5000	VRN2E4SX5000		
	6	58		40	VRN2E5PX5000	VRN2E5SX5000	VRN2E6PX5000	VRN2E6SX5000	VRN2E7PX5000	VRN2E7SX5000	VRN2E8PX5000	VRN2E8SX5000		
				45	VRN2E5PX5000	VRN2E5SX5000	VRN2E6PX5000	VRN2E6SX5000	VRN2E7PX5000	VRN2E7SX5000	VRN2E8PX5000	VRN2E8SX5000		
	7	58		50	VRN2E9PX5000	VRN2E9SX5000	VRN2F0PX5000	VRN2F0SX5000	VRN2F1PX5000	VRN2F1SX5000	VRN2F2PX5000	VRN2F2SX5000		
				55	VRN2E9PX5000	VRN2E9SX5000	VRN2F0PX5000	VRN2F0SX5000	VRN2F1PX5000	VRN2F1SX5000	VRN2F2PX5000	VRN2F2SX5000		
	2"	4		58	100	60	VRN2F3PX5000	VRN2F3SX5000	VRN2F4PX5000	VRN2F4SX5000	VRN2F5PX5000	VRN2F5SX5000	VRN2F6PX5000	VRN2F6SX5000
						65	VRN2F3PX5000	VRN2F3SX5000	VRN2F4PX5000	VRN2F4SX5000	VRN2F5PX5000	VRN2F5SX5000	VRN2F6PX5000	VRN2F6SX5000
		6		58		70	VRN2F7PX5000	VRN2F7SX5000	VRN2F8PX5000	VRN2F8SX5000	VRN2G0PX5000	VRN2G0SX5000	VRN2G1PX5000	VRN2G1SX5000
						75	VRN2F7PX5000	VRN2F7SX5000	VRN2F8PX5000	VRN2F8SX5000	VRN2G0PX5000	VRN2G0SX5000	VRN2G1PX5000	VRN2G1SX5000
7		58	80	VRN2G2PX5000		VRN2G2SX5000	VRN2G3PX5000	VRN2G3SX5000	VRN2G4PX5000	VRN2G4SX5000	VRN2G5PX5000	VRN2G5SX5000		
			85	VRN2G2PX5000		VRN2G2SX5000	VRN2G3PX5000	VRN2G3SX5000	VRN2G4PX5000	VRN2G4SX5000	VRN2G5PX5000	VRN2G5SX5000		
11		58	95*	VRN2G6PX5000		VRN2G6SX5000	VRN2G7PX5000	VRN2G7SX5000	VRN2G8PX5000	VRN2G8SX5000	VRN2G9PX5000	VRN2G9SX5000		
			95*	VRN2G6PX5000		VRN2G6SX5000	VRN2G7PX5000	VRN2G7SX5000	VRN2G8PX5000	VRN2G8SX5000	VRN2G9PX5000	VRN2G9SX5000		
2-1/2"		4	58	100		25	VRN2H0PX5000	VRN2H0SX5000	VRN2H1PX5000	VRN2H1SX5000	VRN2H2PX5000	VRN2H2SX5000	VRN2H3PX5000	VRN2H3SX5000
						30	VRN2H0PX5000	VRN2H0SX5000	VRN2H1PX5000	VRN2H1SX5000	VRN2H2PX5000	VRN2H2SX5000	VRN2H3PX5000	VRN2H3SX5000
		6	58			35	VRN2HRPX5000	VRN2HRSX5000	VRN2HSPX5000	VRN2HSSX5000	VRN2HTPX5000	VRN2HTSX5000	VRN2HUPX5000	VRN2HUSX5000
	40				VRN2HRPX5000	VRN2HRSX5000	VRN2HSPX5000	VRN2HSSX5000	VRN2HTPX5000	VRN2HTSX5000	VRN2HUPX5000	VRN2HUSX5000		
	7	58	45		VRN2H2PX5000	VRN2H2SX5000	VRN2H3PX5000	VRN2H3SX5000	VRN2H4PX5000	VRN2H4SX5000	VRN2H5PX5000	VRN2H5SX5000		
			50		VRN2H2PX5000	VRN2H2SX5000	VRN2H3PX5000	VRN2H3SX5000	VRN2H4PX5000	VRN2H4SX5000	VRN2H5PX5000	VRN2H5SX5000		
	11	58	55		VRN2H6PX5000	VRN2H6SX5000	VRN2H7PX5000	VRN2H7SX5000	VRN2H8PX5000	VRN2H8SX5000	VRN2H9PX5000	VRN2H9SX5000		
			60		VRN2H6PX5000	VRN2H6SX5000	VRN2H7PX5000	VRN2H7SX5000	VRN2H8PX5000	VRN2H8SX5000	VRN2H9PX5000	VRN2H9SX5000		
	3"	7	58		100	65	VRN2H9PX5000	VRN2H9SX5000	VRN2H0PX5000	VRN2H0SX5000	VRN2H1PX5000	VRN2H1SX5000	VRN2H2PX5000	VRN2H2SX5000
						70	VRN2H9PX5000	VRN2H9SX5000	VRN2H0PX5000	VRN2H0SX5000	VRN2H1PX5000	VRN2H1SX5000	VRN2H2PX5000	VRN2H2SX5000
		6	58			75	VRN2H3PX5000	VRN2H3SX5000	VRN2H4PX5000	VRN2H4SX5000	VRN2H5PX5000	VRN2H5SX5000	VRN2H6PX5000	VRN2H6SX5000
						80	VRN2H3PX5000	VRN2H3SX5000	VRN2H4PX5000	VRN2H4SX5000	VRN2H5PX5000	VRN2H5SX5000	VRN2H6PX5000	VRN2H6SX5000
		7	58			85	VRN2H7PX5000	VRN2H7SX5000	VRN2H8PX5000	VRN2H8SX5000	VRN2H9PX5000	VRN2H9SX5000	VRN2H0PX5000	VRN2H0SX5000
						85	VRN2H7PX5000	VRN2H7SX5000	VRN2H8PX5000	VRN2H8SX5000	VRN2H9PX5000	VRN2H9SX5000	VRN2H0PX5000	VRN2H0SX5000
11		58	95*	VRN2H8PX5000		VRN2H8SX5000	VRN2H9PX5000	VRN2H9SX5000	VRN2H0PX5000	VRN2H0SX5000	VRN2H1PX5000	VRN2H1SX5000		
	95*		VRN2H8PX5000	VRN2H8SX5000		VRN2H9PX5000	VRN2H9SX5000	VRN2H0PX5000	VRN2H0SX5000	VRN2H1PX5000	VRN2H1SX5000			

* Full port ball

** Differential pressure regulator operating range, ±5%

Product Selection - Valves

Pressure Independent Control Valves, NPT 1½"-3" NEMA 2

Actuator Features		Fail Safe			
Actuator O.S Number		MS7505A2030		MS7505A2130	
Power Supply	Voltage	24 VAC/DC		24 VAC/DC	
	Frequency	50 / 60 Hz		50 / 60 Hz	
	Power	6 VA		6 VA	
Actuator Torque	(lb.-in.)	44		44	
Control	(0)2-10Vdc	•		•	
	4-20 mA (w/ external 500 Ohm Resistor)	•		•	
	Floating	•		•	
	Two-Position SPDT	•		•	
	Two-Position SPST	•		•	
Actuator Stroke	(degrees)	95° ± 3°		95° ± 3°	
Timing	(drive/spring return, seconds)	90 / 25		90 / 25	
Aux Switch		0		1	
Feedback	2-10 Vdc Built In	•		•	
Fail Safe Action		Closed		Open	
Normal Position	(no signal)	Closed		Open	
Valve Features	Trim	Nickel-Plated Brass	Stainless Steel	Nickel-Plated Brass	Stainless Steel

Valve Size (inches)	Differential Pressure** (psid)		Close-off Pressure (psid)	Max. GPM	Short Order Codes									
	Min.	Max.			Nickel-Plated Brass	Stainless Steel	Nickel-Plated Brass	Stainless Steel	Nickel-Plated Brass	Stainless Steel	Nickel-Plated Brass	Stainless Steel		
1-1/2"	4	50	100	10	VRN2EMPX6200	VRN2EMSX6200	VRN2EMPX6100	VRN2EMSX6100	VRN2EMPXB200	VRN2EMSB200	VRN2EMPXB100	VRN2EMSB100		
				15	VRN2ENPX6200	VRN2ENSX6200	VRN2ENPX6100	VRN2ENSX6100	VRN2ENPB200	VRN2ENSB200	VRN2ENPB100	VRN2ENSB100		
	5	20		VRN2EPPX6200	VRN2EPSX6200	VRN2EPPX6100	VRN2EPSX6100	VRN2EPPXB200	VRN2EPSXB200	VRN2EPPXB100	VRN2EPSXB100			
		25		VRN2EQPX6200	VRN2EQSX6200	VRN2EQPX6100	VRN2EQSX6100	VRN2EQPB200	VRN2EQSB200	VRN2EQPB100	VRN2EQSB100			
	4	58		30	VRN2ERPX6200	VRN2ERSX6200	VRN2ERPX6100	VRN2ERSX6100	VRN2ERPXB200	VRN2ERSXB200	VRN2ERPXB100	VRN2ERSXB100		
				35	VRN2ESPX6200	VRN2ESSX6200	VRN2ESPX6100	VRN2ESSX6100	VRN2ESPXB200	VRN2ESSXB200	VRN2ESPXB100	VRN2ESSXB100		
	6	40		VRN2ETPX6200	VRN2ETSX6200	VRN2ETPX6100	VRN2ETSX6100	VRN2ETPB200	VRN2ETSB200	VRN2ETPB100	VRN2ETSB100			
		45		VRN2EUPX6200	VRN2EUSX6200	VRN2EUPX6100	VRN2EUSX6100	VRN2EUPXB200	VRN2EUSXB200	VRN2EUPXB100	VRN2EUSXB100			
	7	50		VRN2E1PX6200	VRN2E1SX6200	VRN2E1PX6100	VRN2E1SX6100	VRN2E1PB200	VRN2E1SB200	VRN2E1PB100	VRN2E1SB100			
		55		VRN2E2PX6200	VRN2E2SX6200	VRN2E2PX6100	VRN2E2SX6100	VRN2E2PB200	VRN2E2SB200	VRN2E2PB100	VRN2E2SB100			
	11	60		VRN2E3PX6200	VRN2E3SX6200	VRN2E3PX6100	VRN2E3SX6100	VRN2E3PB200	VRN2E3SB200	VRN2E3PB100	VRN2E3SB100			
		65		VRN2E4PX6200	VRN2E4SX6200	VRN2E4PX6100	VRN2E4SX6100	VRN2E4PB200	VRN2E4SB200	VRN2E4PB100	VRN2E4SB100			
	2"	4		58	100	70	VRN2E5PX6200	VRN2E5SX6200	VRN2E5PX6100	VRN2E5SX6100	VRN2E5PB200	VRN2E5SB200	VRN2E5PB100	VRN2E5SB100
						75	VRN2E6PX6200	VRN2E6SX6200	VRN2E6PX6100	VRN2E6SX6100	VRN2E6PB200	VRN2E6SB200	VRN2E6PB100	VRN2E6SB100
6		80	VRN2E7PX6200	VRN2E7SX6200		VRN2E7PX6100	VRN2E7SX6100	VRN2E7PB200	VRN2E7SB200	VRN2E7PB100	VRN2E7SB100			
		85	VRN2E8PX6200	VRN2E8SX6200		VRN2E8PX6100	VRN2E8SX6100	VRN2E8PB200	VRN2E8SB200	VRN2E8PB100	VRN2E8SB100			
7		95	VRN2E9PX6200	VRN2E9SX6200		VRN2E9PX6100	VRN2E9SX6100	VRN2E9PB200	VRN2E9SB200	VRN2E9PB100	VRN2E9SB100			
		25	VRN2FQPX6200	VRN2FQSX6200		VRN2FQPX6100	VRN2FQSX6100	VRN2FQPXB200	VRN2FQSB200	VRN2FQPXB100	VRN2FQSB100			
11		30	VRN2FRPX6200	VRN2FRSX6200		VRN2FRPX6100	VRN2FRSX6100	VRN2FRPB200	VRN2FRSB200	VRN2FRPB100	VRN2FRSB100			
		35	VRN2FSPX6200	VRN2FSSX6200		VRN2FSPX6100	VRN2FSSX6100	VRN2FSPXB200	VRN2FSSXB200	VRN2FSPXB100	VRN2FSSXB100			
6		40	VRN2FTPX6200	VRN2FTSX6200		VRN2FTPX6100	VRN2FTSX6100	VRN2FTPXB200	VRN2FTSB200	VRN2FTPXB100	VRN2FTSB100			
		45	VRN2FUPX6200	VRN2FUSX6200		VRN2FUPX6100	VRN2FUSX6100	VRN2FUPXB200	VRN2FUSXB200	VRN2FUPXB100	VRN2FUSXB100			
7		50	VRN2F1PX6200	VRN2F1SX6200		VRN2F1PX6100	VRN2F1SX6100	VRN2F1PB200	VRN2F1SB200	VRN2F1PB100	VRN2F1SB100			
		55	VRN2F2PX6200	VRN2F2SX6200		VRN2F2PX6100	VRN2F2SX6100	VRN2F2PB200	VRN2F2SB200	VRN2F2PB100	VRN2F2SB100			
2-1/2"		4	58	100		60	VRN2F3PX6200	VRN2F3SX6200	VRN2F3PX6100	VRN2F3SX6100	VRN2F3PB200	VRN2F3SB200	VRN2F3PB100	VRN2F3SB100
						65	VRN2F4PX6200	VRN2F4SX6200	VRN2F4PX6100	VRN2F4SX6100	VRN2F4PB200	VRN2F4SB200	VRN2F4PB100	VRN2F4SB100
	6	70	VRN2F5PX6200		VRN2F5SX6200	VRN2F5PX6100	VRN2F5SX6100	VRN2F5PB200	VRN2F5SB200	VRN2F5PB100	VRN2F5SB100			
		75	VRN2F6PX6200		VRN2F6SX6200	VRN2F6PX6100	VRN2F6SX6100	VRN2F6PB200	VRN2F6SB200	VRN2F6PB100	VRN2F6SB100			
	7	25	VRN2GQPX6200		VRN2GQSX6200	VRN2GQPX6100	VRN2GQSX6100	VRN2GQPXB200	VRN2GQSB200	VRN2GQPXB100	VRN2GQSB100			
		30	VRN2GRPX6200		VRN2GRSX6200	VRN2GRPX6100	VRN2GRSX6100	VRN2GRPB200	VRN2GRSB200	VRN2GRPB100	VRN2GRSB100			
	11	35	VRN2GSPX6200		VRN2GSSX6200	VRN2GSPX6100	VRN2GSSX6100	VRN2GSPXB200	VRN2GSSXB200	VRN2GSPXB100	VRN2GSSXB100			
		40	VRN2GTPX6200		VRN2GTSX6200	VRN2GTPX6100	VRN2GTSX6100	VRN2GTPXB200	VRN2GTSXB200	VRN2GTPXB100	VRN2GTSXB100			
	6	45	VRN2GUPX6200		VRN2GUSX6200	VRN2GUPX6100	VRN2GUSX6100	VRN2GUPXB200	VRN2GUSXB200	VRN2GUPXB100	VRN2GUSXB100			
		50	VRN2G1PX6200		VRN2G1SX6200	VRN2G1PX6100	VRN2G1SX6100	VRN2G1PB200	VRN2G1SB200	VRN2G1PB100	VRN2G1SB100			
	7	55	VRN2G2PX6200		VRN2G2SX6200	VRN2G2PX6100	VRN2G2SX6100	VRN2G2PB200	VRN2G2SB200	VRN2G2PB100	VRN2G2SB100			
		60	VRN2G3PX6200		VRN2G3SX6200	VRN2G3PX6100	VRN2G3SX6100	VRN2G3PB200	VRN2G3SB200	VRN2G3PB100	VRN2G3SB100			
	3"	4	58		100	65	VRN2G4PX6200	VRN2G4SX6200	VRN2G4PX6100	VRN2G4SX6100	VRN2G4PB200	VRN2G4SB200	VRN2G4PB100	VRN2G4SB100
						70	VRN2G5PX6200	VRN2G5SX6200	VRN2G5PX6100	VRN2G5SX6100	VRN2G5PB200	VRN2G5SB200	VRN2G5PB100	VRN2G5SB100
6		75	VRN2G6PX6200	VRN2G6SX6200		VRN2G6PX6100	VRN2G6SX6100	VRN2G6PB200	VRN2G6SB200	VRN2G6PB100	VRN2G6SB100			
		80	VRN2G7PX6200	VRN2G7SX6200		VRN2G7PX6100	VRN2G7SX6100	VRN2G7PB200	VRN2G7SB200	VRN2G7PB100	VRN2G7SB100			
7		85	VRN2G8PX6200	VRN2G8SX6200		VRN2G8PX6100	VRN2G8SX6100	VRN2G8PB200	VRN2G8SB200	VRN2G8PB100	VRN2G8SB100			
		95*	VRN2G9PX6200	VRN2G9SX6200		VRN2G9PX6100	VRN2G9SX6100	VRN2G9PB200	VRN2G9SB200	VRN2G9PB100	VRN2G9SB100			
11		25	VRN2HQPX6200	VRN2HQSX6200		VRN2HQPX6100	VRN2HQSX6100	VRN2HQPB200	VRN2HQSB200	VRN2HQPB100	VRN2HQSB100			
		30	VRN2HRPX6200	VRN2HRSX6200		VRN2HRPX6100	VRN2HRSX6100	VRN2HRPB200	VRN2HRSB200	VRN2HRPB100	VRN2HRSB100			
6		35	VRN2HSPX6200	VRN2HSSX6200		VRN2HSPX6100	VRN2HSSX6100	VRN2HSPXB200	VRN2HSSXB200	VRN2HSPXB100	VRN2HSSXB100			
		40	VRN2HTPX6200	VRN2HTSX6200		VRN2HTPX6100	VRN2HTSX6100	VRN2HTPB200	VRN2HTSB200	VRN2HTPB100	VRN2HTSB100			
7		45	VRN2HUPX6200	VRN2HUSX6200		VRN2HUPX6100	VRN2HUSX6100	VRN2HUPXB200	VRN2HUSXB200	VRN2HUPXB100	VRN2HUSXB100			
		50	VRN2H1PX6200	VRN2H1SX6200		VRN2H1PX6100	VRN2H1SX6100	VRN2H1PB200	VRN2H1SB200	VRN2H1PB100	VRN2H1SB100			
11		55	VRN2H2PX6200	VRN2H2SX6200		VRN2H2PX6100	VRN2H2SX6100	VRN2H2PB200	VRN2H2SB200	VRN2H2PB100	VRN2H2SB100			
		60	VRN2H3PX6200	VRN2H3SX6200		VRN2H3PX6100	VRN2H3SX6100	VRN2H3PB200	VRN2H3SB200	VRN2H3PB100	VRN2H3SB100			
7	65	VRN2H4PX6200	VRN2H4SX6200	VRN2H4PX6100	VRN2H4SX6100	VRN2H4PB200	VRN2H4SB200	VRN2H4PB100	VRN2H4SB100					
	70	VRN2H5PX6200	VRN2H5SX6200	VRN2H5PX6100	VRN2H5SX6100	VRN2H5PB200	VRN2H5SB200	VRN2H5PB100	VRN2H5SB100					
11	75	VRN2H6PX6200	VRN2H6SX6200	VRN2H6PX6100	VRN2H6SX6100	VRN2H6PB200	VRN2H6SB200	VRN2H6PB100	VRN2H6SB100					
	80	VRN2H7PX6200	VRN2H7SX6200	VRN2H7PX6100	VRN2H7SX6100	VRN2H7PB200	VRN2H7SB200	VRN2H7PB100	VRN2H7SB100					
11	85	VRN2H8PX6200	VRN2H8SX6200	VRN2H8PX6100	VRN2H8SX6100	VRN2H8PB200	VRN2H8SB200	VRN2H8PB100	VRN2H8SB100					
	95*	VRN2H9PX6200	VRN2H9SX6200	VRN2H9PX6100	VRN2H9SX6100	VRN2H9PB200	VRN2H9SB200	VRN2H9PB100	VRN2H9SB100					

* Full port ball
 ** Differential pressure regulator operating range, ±5%

VALVES

Product Selection - Valves

Pressure Independent Control Valves, NPT 1½"-3" NEMA 2

Actuator Features		Fail Safe							
Actuator O.S Number		MS8105A1030				MS8105A1130			
Power Supply	Voltage	24 VAC/DC				24 VAC/DC			
	Frequency	50 / 60 Hz				50 / 60 Hz			
	Power	6 VA				6 VA			
Actuator Torque (lb.-in.)		44				44			
Control	(0)2-10Vdc								
	4-20 mA (w/ external 500 Ohm Resistor)								
	Floating								
	Two-Position SPDT								
	Two-Position SPST	•				•			
Actuator Stroke (degrees)		95° ± 3°				95° ± 3°			
Timing (drive/spring return, seconds)		45 / 25				45 / 25			
Aux Switch		0				1			
Feedback	2-10 Vdc Built In								
Fail Safe Action		Closed		Open		Closed		Open	
	Normal Position (no signal)	Closed		Open		Closed		Open	
Valve Features	Trim	Nickel-Plated Brass	Stainless Steel	Nickel-Plated Brass	Stainless Steel	Nickel-Plated Brass	Stainless Steel	Nickel-Plated Brass	Stainless Steel

Valve Size (inches)	Differential Pressure** (psid)		Close-off Pressure (psid)	Max. GPM	Short Order Codes							
	Min.	Max.			VRN2EMPX7200	VRN2EMSX7200	VRN2EMPX7100	VRN2EMSX7100	VRN2EMPX200	VRN2EMSXA200	VRN2EMPX100	VRN2EMSXA100
1-1/2"	4	50	100	10	VRN2EMPX7200	VRN2EMSX7200	VRN2EMPX7100	VRN2EMSX7100	VRN2EMPX200	VRN2EMSXA200	VRN2EMPX100	VRN2EMSXA100
				15	VRN2ENPX7200	VRN2ENSX7200	VRN2ENPX7100	VRN2ENSX7100	VRN2ENPX200	VRN2ENSXA200	VRN2ENPX100	VRN2ENSXA100
	5	20		VRN2EPPX7200	VRN2EPSX7200	VRN2EPPX7100	VRN2EPSX7100	VRN2EPPX200	VRN2EPSXA200	VRN2EPPX100	VRN2EPSXA100	
		25		VRN2EQPX7200	VRN2EQSX7200	VRN2EQPX7100	VRN2EQSX7100	VRN2EQPX200	VRN2EQSXA200	VRN2EQPX100	VRN2EQSXA100	
	4	58		30	VRN2ERPX7200	VRN2ERSX7200	VRN2ERPX7100	VRN2ERSX7100	VRN2ERPX200	VRN2ERSXA200	VRN2ERPX100	VRN2ERSXA100
				35	VRN2ESPX7200	VRN2ESSX7200	VRN2ESPX7100	VRN2ESSX7100	VRN2ESPX200	VRN2ESSXA200	VRN2ESPX100	VRN2ESSXA100
	6	40		VRN2ETPX7200	VRN2ETSX7200	VRN2ETPX7100	VRN2ETSX7100	VRN2ETPX200	VRN2ETSXA200	VRN2ETPX100	VRN2ETSXA100	
		45		VRN2EUPX7200	VRN2EUSX7200	VRN2EUPX7100	VRN2EUSX7100	VRN2EUPX200	VRN2EUSXA200	VRN2EUPX100	VRN2EUSXA100	
	7	50		VRN2E1PX7200	VRN2E1SX7200	VRN2E1PX7100	VRN2E1SX7100	VRN2E1PX200	VRN2E1SXA200	VRN2E1PX100	VRN2E1SXA100	
		55		VRN2E2PX7200	VRN2E2SX7200	VRN2E2PX7100	VRN2E2SX7100	VRN2E2PX200	VRN2E2SXA200	VRN2E2PX100	VRN2E2SXA100	
		60		VRN2E3PX7200	VRN2E3SX7200	VRN2E3PX7100	VRN2E3SX7100	VRN2E3PX200	VRN2E3SXA200	VRN2E3PX100	VRN2E3SXA100	
		65		VRN2E4PX7200	VRN2E4SX7200	VRN2E4PX7100	VRN2E4SX7100	VRN2E4PX200	VRN2E4SXA200	VRN2E4PX100	VRN2E4SXA100	
		70		VRN2E5PX7200	VRN2E5SX7200	VRN2E5PX7100	VRN2E5SX7100	VRN2E5PX200	VRN2E5SXA200	VRN2E5PX100	VRN2E5SXA100	
		75		VRN2E6PX7200	VRN2E6SX7200	VRN2E6PX7100	VRN2E6SX7100	VRN2E6PX200	VRN2E6SXA200	VRN2E6PX100	VRN2E6SXA100	
80		VRN2E7PX7200	VRN2E7SX7200	VRN2E7PX7100	VRN2E7SX7100	VRN2E7PX200	VRN2E7SXA200	VRN2E7PX100	VRN2E7SXA100			
85		VRN2E8PX7200	VRN2E8SX7200	VRN2E8PX7100	VRN2E8SX7100	VRN2E8PX200	VRN2E8SXA200	VRN2E8PX100	VRN2E8SXA100			
95	VRN2E9PX7200	VRN2E9SX7200	VRN2E9PX7100	VRN2E9SX7100	VRN2E9PX200	VRN2E9SXA200	VRN2E9PX100	VRN2E9SXA100				
2"	4	58	25	VRN2FQPX7200	VRN2FQSX7200	VRN2FQPX7100	VRN2FQSX7100	VRN2FQPX200	VRN2FQSXA200	VRN2FQPX100	VRN2FQSXA100	
			30	VRN2FRPX7200	VRN2FRSX7200	VRN2FRPX7100	VRN2FRSX7100	VRN2FRPX200	VRN2FRSXA200	VRN2FRPX100	VRN2FRSXA100	
	6		35	VRN2FSPX7200	VRN2FSSX7200	VRN2FSPX7100	VRN2FSSX7100	VRN2FSPX200	VRN2FSSXA200	VRN2FSPX100	VRN2FSSXA100	
			40	VRN2FTPX7200	VRN2FTSX7200	VRN2FTPX7100	VRN2FTSX7100	VRN2FTPX200	VRN2FTSXA200	VRN2FTPX100	VRN2FTSXA100	
	7		45	VRN2FUPX7200	VRN2FUSX7200	VRN2FUPX7100	VRN2FUSX7100	VRN2FUPX200	VRN2FUSXA200	VRN2FUPX100	VRN2FUSXA100	
			50	VRN2F1PX7200	VRN2F1SX7200	VRN2F1PX7100	VRN2F1SX7100	VRN2F1PX200	VRN2F1SXA200	VRN2F1PX100	VRN2F1SXA100	
			55	VRN2F2PX7200	VRN2F2SX7200	VRN2F2PX7100	VRN2F2SX7100	VRN2F2PX200	VRN2F2SXA200	VRN2F2PX100	VRN2F2SXA100	
			60	VRN2F3PX7200	VRN2F3SX7200	VRN2F3PX7100	VRN2F3SX7100	VRN2F3PX200	VRN2F3SXA200	VRN2F3PX100	VRN2F3SXA100	
			65	VRN2F4PX7200	VRN2F4SX7200	VRN2F4PX7100	VRN2F4SX7100	VRN2F4PX200	VRN2F4SXA200	VRN2F4PX100	VRN2F4SXA100	
			70	VRN2F5PX7200	VRN2F5SX7200	VRN2F5PX7100	VRN2F5SX7100	VRN2F5PX200	VRN2F5SXA200	VRN2F5PX100	VRN2F5SXA100	
2-1/2"	4	58	75	VRN2F6PX7200	VRN2F6SX7200	VRN2F6PX7100	VRN2F6SX7100	VRN2F6PX200	VRN2F6SXA200	VRN2F6PX100	VRN2F6SXA100	
			25	VRN2GQPX7200	VRN2GQSX7200	VRN2GQPX7100	VRN2GQSX7100	VRN2GQPX200	VRN2GQSXA200	VRN2GQPX100	VRN2GQSXA100	
	6		30	VRN2GRPX7200	VRN2GRSX7200	VRN2GRPX7100	VRN2GRSX7100	VRN2GRPX200	VRN2GRSXA200	VRN2GRPX100	VRN2GRSXA100	
			35	VRN2GSPX7200	VRN2GSSX7200	VRN2GSPX7100	VRN2GSSX7100	VRN2GSPX200	VRN2GSSXA200	VRN2GSPX100	VRN2GSSXA100	
	7		40	VRN2GTPX7200	VRN2GTSX7200	VRN2GTPX7100	VRN2GTSX7100	VRN2GTPX200	VRN2GTSXA200	VRN2GTPX100	VRN2GTSXA100	
			45	VRN2GUPX7200	VRN2GUSX7200	VRN2GUPX7100	VRN2GUSX7100	VRN2GUPX200	VRN2GUSXA200	VRN2GUPX100	VRN2GUSXA100	
			50	VRN2G1PX7200	VRN2G1SX7200	VRN2G1PX7100	VRN2G1SX7100	VRN2G1PX200	VRN2G1SXA200	VRN2G1PX100	VRN2G1SXA100	
			55	VRN2G2PX7200	VRN2G2SX7200	VRN2G2PX7100	VRN2G2SX7100	VRN2G2PX200	VRN2G2SXA200	VRN2G2PX100	VRN2G2SXA100	
			60	VRN2G3PX7200	VRN2G3SX7200	VRN2G3PX7100	VRN2G3SX7100	VRN2G3PX200	VRN2G3SXA200	VRN2G3PX100	VRN2G3SXA100	
			65	VRN2G4PX7200	VRN2G4SX7200	VRN2G4PX7100	VRN2G4SX7100	VRN2G4PX200	VRN2G4SXA200	VRN2G4PX100	VRN2G4SXA100	
3"	4	58	70	VRN2G5PX7200	VRN2G5SX7200	VRN2G5PX7100	VRN2G5SX7100	VRN2G5PX200	VRN2G5SXA200	VRN2G5PX100	VRN2G5SXA100	
			75	VRN2G6PX7200	VRN2G6SX7200	VRN2G6PX7100	VRN2G6SX7100	VRN2G6PX200	VRN2G6SXA200	VRN2G6PX100	VRN2G6SXA100	
	6		80	VRN2G7PX7200	VRN2G7SX7200	VRN2G7PX7100	VRN2G7SX7100	VRN2G7PX200	VRN2G7SXA200	VRN2G7PX100	VRN2G7SXA100	
			85	VRN2G8PX7200	VRN2G8SX7200	VRN2G8PX7100	VRN2G8SX7100	VRN2G8PX200	VRN2G8SXA200	VRN2G8PX100	VRN2G8SXA100	
	7		95*	VRN2G9PX7200	VRN2G9SX7200	VRN2G9PX7100	VRN2G9SX7100	VRN2G9PX200	VRN2G9SXA200	VRN2G9PX100	VRN2G9SXA100	
			25	VRN2HQPX7200	VRN2HQSX7200	VRN2HQPX7100	VRN2HQSX7100	VRN2HQPX200	VRN2HQSXA200	VRN2HQPX100	VRN2HQSXA100	
			30	VRN2HRPX7200	VRN2HRSX7200	VRN2HRPX7100	VRN2HRSX7100	VRN2HRPX200	VRN2HRSXA200	VRN2HRPX100	VRN2HRSXA100	
			35	VRN2HSPX7200	VRN2HSSX7200	VRN2HSPX7100	VRN2HSSX7100	VRN2HSPX200	VRN2HSSXA200	VRN2HSPX100	VRN2HSSXA100	
			40	VRN2HTPX7200	VRN2HTSX7200	VRN2HTPX7100	VRN2HTSX7100	VRN2HTPX200	VRN2HTSXA200	VRN2HTPX100	VRN2HTSXA100	
			45	VRN2HUPX7200	VRN2HUSX7200	VRN2HUPX7100	VRN2HUSX7100	VRN2HUPX200	VRN2HUSXA200	VRN2HUPX100	VRN2HUSXA100	
11	50	VRN2H1PX7200	VRN2H1SX7200	VRN2H1PX7100	VRN2H1SX7100	VRN2H1PX200	VRN2H1SXA200	VRN2H1PX100	VRN2H1SXA100			
	55	VRN2H2PX7200	VRN2H2SX7200	VRN2H2PX7100	VRN2H2SX7100	VRN2H2PX200	VRN2H2SXA200	VRN2H2PX100	VRN2H2SXA100			
	60	VRN2H3PX7200	VRN2H3SX7200	VRN2H3PX7100	VRN2H3SX7100	VRN2H3PX200	VRN2H3SXA200	VRN2H3PX100	VRN2H3SXA100			
	65	VRN2H4PX7200	VRN2H4SX7200	VRN2H4PX7100	VRN2H4SX7100	VRN2H4PX200	VRN2H4SXA200	VRN2H4PX100	VRN2H4SXA100			
	70	VRN2H5PX7200	VRN2H5SX7200	VRN2H5PX7100	VRN2H5SX7100	VRN2H5PX200	VRN2H5SXA200	VRN2H5PX100	VRN2H5SXA100			
	75	VRN2H6PX7200	VRN2H6SX7200	VRN2H6PX7100	VRN2H6SX7100	VRN2H6PX200	VRN2H6SXA200	VRN2H6PX100	VRN2H6SXA100			
	80	VRN2H7PX7200	VRN2H7SX7200	VRN2H7PX7100	VRN2H7SX7100	VRN2H7PX200	VRN2H7SXA200	VRN2H7PX100	VRN2H7SXA100			
	85	VRN2H8PX7200	VRN2H8SX7200	VRN2H8PX7100	VRN2H8SX7100	VRN2H8PX200	VRN2H8SXA200	VRN2H8PX100	VRN2H8SXA100			
95*	VRN2H9PX7200	VRN2H9SX7200	VRN2H9PX7100	VRN2H9SX7100	VRN2H9PX200	VRN2H9SXA200	VRN2H9PX100	VRN2H9SXA100				

* Full port ball

** Differential pressure regulator operating range, ±5%

Product Selection - Valves

Pressure Independent Control Valves, NPT 1½"-3" NEMA 2

Actuator Features		Fail Safe			
Actuator O.S Number		MS4105A1030		MS4105A1130	
Power Supply	Voltage	100-250 VAC		100-250 VAC	
	Frequency	50 / 60 Hz		50 / 60 Hz	
	Power	6 VA		6 VA	
Actuator Torque	(lb.-in.)	44		44	
Control	(0)2-10Vdc				
	4-20 mA (w/ external 500 Ohm Resistor)				
	Floating				
	Two-Position SPDT				
	Two-Position SPST	•		•	
Actuator Stroke	(degrees)	95° ± 3°		95° ± 3°	
Timing	(drive/spring return, seconds)	45 / 25		45 / 25	
Aux Switch		0		1	
Feedback	2-10 Vdc Built In				
Fail Safe Action		Closed	Open	Closed	Open
Normal Position	(no signal)	Closed		Open	
Valve Features	Trim	Nickel-Plated Brass	Stainless Steel	Nickel-Plated Brass	Stainless Steel

Valve Size (inches)	Differential Pressure** (psid)		Close-off Pressure (psid)	Max. GPM	Short Order Codes									
	Min.	Max.			Nickel-Plated Brass	Stainless Steel	Nickel-Plated Brass	Stainless Steel	Nickel-Plated Brass	Stainless Steel	Nickel-Plated Brass	Stainless Steel		
1-1/2"	4	50	100	10	VRN2EMPX8200	VRN2EMXS8200	VRN2EMPX8100	VRN2EMXS8100	VRN2EMPX9200	VRN2EMXS9200	VRN2EMPX9100	VRN2EMXS9100		
				15	VRN2ENPX8200	VRN2ENSX8200	VRN2ENPX8100	VRN2ENSX8100	VRN2ENPX9200	VRN2ENSX9200	VRN2ENPX9100	VRN2ENSX9100		
				20	VRN2EPPX8200	VRN2EPSX8200	VRN2EPPX8100	VRN2EPSX8100	VRN2EPPX9200	VRN2EPSX9200	VRN2EPPX9100	VRN2EPSX9100		
	5	50		25	VRN2EQPX8200	VRN2EQSX8200	VRN2EQPX8100	VRN2EQSX8100	VRN2EQPX9200	VRN2EQSX9200	VRN2EQPX9100	VRN2EQSX9100		
				30	VRN2ERPX8200	VRN2ERSX8200	VRN2ERPX8100	VRN2ERSX8100	VRN2ERPX9200	VRN2ERSX9200	VRN2ERPX9100	VRN2ERSX9100		
	4	50		35	VRN2ESPX8200	VRN2ESSX8200	VRN2ESPX8100	VRN2ESSX8100	VRN2ESPX9200	VRN2ESSX9200	VRN2ESPX9100	VRN2ESSX9100		
				40	VRN2ETPX8200	VRN2ETSX8200	VRN2ETPX8100	VRN2ETSX8100	VRN2ETPX9200	VRN2ETSX9200	VRN2ETPX9100	VRN2ETSX9100		
	6	50		45	VRN2EUPX8200	VRN2EUSX8200	VRN2EUPX8100	VRN2EUSX8100	VRN2EUPX9200	VRN2EUSX9200	VRN2EUPX9100	VRN2EUSX9100		
				50	VRN2E1PX8200	VRN2E1SX8200	VRN2E1PX8100	VRN2E1SX8100	VRN2E1PX9200	VRN2E1SX9200	VRN2E1PX9100	VRN2E1SX9100		
	7	58		55	VRN2E2PX8200	VRN2E2SX8200	VRN2E2PX8100	VRN2E2SX8100	VRN2E2PX9200	VRN2E2SX9200	VRN2E2PX9100	VRN2E2SX9100		
				60	VRN2E3PX8200	VRN2E3SX8200	VRN2E3PX8100	VRN2E3SX8100	VRN2E3PX9200	VRN2E3SX9200	VRN2E3PX9100	VRN2E3SX9100		
2"	4	58	100	65	VRN2E4PX8200	VRN2E4SX8200	VRN2E4PX8100	VRN2E4SX8100	VRN2E4PX9200	VRN2E4SX9200	VRN2E4PX9100	VRN2E4SX9100		
				70	VRN2E5PX8200	VRN2E5SX8200	VRN2E5PX8100	VRN2E5SX8100	VRN2E5PX9200	VRN2E5SX9200	VRN2E5PX9100	VRN2E5SX9100		
				75	VRN2E6PX8200	VRN2E6SX8200	VRN2E6PX8100	VRN2E6SX8100	VRN2E6PX9200	VRN2E6SX9200	VRN2E6PX9100	VRN2E6SX9100		
	6	58		80	VRN2E7PX8200	VRN2E7SX8200	VRN2E7PX8100	VRN2E7SX8100	VRN2E7PX9200	VRN2E7SX9200	VRN2E7PX9100	VRN2E7SX9100		
				85	VRN2E8PX8200	VRN2E8SX8200	VRN2E8PX8100	VRN2E8SX8100	VRN2E8PX9200	VRN2E8SX9200	VRN2E8PX9100	VRN2E8SX9100		
	7	58		95	VRN2E9PX8200	VRN2E9SX8200	VRN2E9PX8100	VRN2E9SX8100	VRN2E9PX9200	VRN2E9SX9200	VRN2E9PX9100	VRN2E9SX9100		
				25	VRN2FQPX8200	VRN2FQSX8200	VRN2FQPX8100	VRN2FQSX8100	VRN2FQPX9200	VRN2FQSX9200	VRN2FQPX9100	VRN2FQSX9100		
	2-1/2"	4		58	100	30	VRN2FRPX8200	VRN2FRSX8200	VRN2FRPX8100	VRN2FRSX8100	VRN2FRPX9200	VRN2FRSX9200	VRN2FRPX9100	VRN2FRSX9100
						35	VRN2FSPX8200	VRN2FSSX8200	VRN2FSPX8100	VRN2FSSX8100	VRN2FSPX9200	VRN2FSSX9200	VRN2FSPX9100	VRN2FSSX9100
						40	VRN2FTPX8200	VRN2FTSX8200	VRN2FTPX8100	VRN2FTSX8100	VRN2FTPX9200	VRN2FTSX9200	VRN2FTPX9100	VRN2FTSX9100
		6		58		45	VRN2FUPX8200	VRN2FUSX8200	VRN2FUPX8100	VRN2FUSX8100	VRN2FUPX9200	VRN2FUSX9200	VRN2FUPX9100	VRN2FUSX9100
50			VRN2F1PX8200			VRN2F1SX8200	VRN2F1PX8100	VRN2F1SX8100	VRN2F1PX9200	VRN2F1SX9200	VRN2F1PX9100	VRN2F1SX9100		
7		58	55	VRN2F2PX8200		VRN2F2SX8200	VRN2F2PX8100	VRN2F2SX8100	VRN2F2PX9200	VRN2F2SX9200	VRN2F2PX9100	VRN2F2SX9100		
			60	VRN2F3PX8200		VRN2F3SX8200	VRN2F3PX8100	VRN2F3SX8100	VRN2F3PX9200	VRN2F3SX9200	VRN2F3PX9100	VRN2F3SX9100		
3"		4	58	100		65	VRN2F4PX8200	VRN2F4SX8200	VRN2F4PX8100	VRN2F4SX8100	VRN2F4PX9200	VRN2F4SX9200	VRN2F4PX9100	VRN2F4SX9100
						70	VRN2F5PX8200	VRN2F5SX8200	VRN2F5PX8100	VRN2F5SX8100	VRN2F5PX9200	VRN2F5SX9200	VRN2F5PX9100	VRN2F5SX9100
						75	VRN2F6PX8200	VRN2F6SX8200	VRN2F6PX8100	VRN2F6SX8100	VRN2F6PX9200	VRN2F6SX9200	VRN2F6PX9100	VRN2F6SX9100
		6	58			25	VRN2GQPX8200	VRN2GQSX8200	VRN2GQPX8100	VRN2GQSX8100	VRN2GQPX9200	VRN2GQSX9200	VRN2GQPX9100	VRN2GQSX9100
	30				VRN2GRPX8200	VRN2GRSX8200	VRN2GRPX8100	VRN2GRSX8100	VRN2GRPX9200	VRN2GRSX9200	VRN2GRPX9100	VRN2GRSX9100		
	7	58	35		VRN2GSPX8200	VRN2GSSX8200	VRN2GSPX8100	VRN2GSSX8100	VRN2GSPX9200	VRN2GSSX9200	VRN2GSPX9100	VRN2GSSX9100		
			40		VRN2GTPX8200	VRN2GTSX8200	VRN2GTPX8100	VRN2GTSX8100	VRN2GTPX9200	VRN2GTSX9200	VRN2GTPX9100	VRN2GTSX9100		
	3"	4	58		100	45	VRN2GUPX8200	VRN2GUSX8200	VRN2GUPX8100	VRN2GUSX8100	VRN2GUPX9200	VRN2GUSX9200	VRN2GUPX9100	VRN2GUSX9100
						50	VRN2G1PX8200	VRN2G1SX8200	VRN2G1PX8100	VRN2G1SX8100	VRN2G1PX9200	VRN2G1SX9200	VRN2G1PX9100	VRN2G1SX9100
						55	VRN2G2PX8200	VRN2G2SX8200	VRN2G2PX8100	VRN2G2SX8100	VRN2G2PX9200	VRN2G2SX9200	VRN2G2PX9100	VRN2G2SX9100
		6	58			60	VRN2G3PX8200	VRN2G3SX8200	VRN2G3PX8100	VRN2G3SX8100	VRN2G3PX9200	VRN2G3SX9200	VRN2G3PX9100	VRN2G3SX9100
65				VRN2G4PX8200		VRN2G4SX8200	VRN2G4PX8100	VRN2G4SX8100	VRN2G4PX9200	VRN2G4SX9200	VRN2G4PX9100	VRN2G4SX9100		
7		58	70	VRN2G5PX8200		VRN2G5SX8200	VRN2G5PX8100	VRN2G5SX8100	VRN2G5PX9200	VRN2G5SX9200	VRN2G5PX9100	VRN2G5SX9100		
			75	VRN2G6PX8200		VRN2G6SX8200	VRN2G6PX8100	VRN2G6SX8100	VRN2G6PX9200	VRN2G6SX9200	VRN2G6PX9100	VRN2G6SX9100		
3"		4	58	100		80	VRN2G7PX8200	VRN2G7SX8200	VRN2G7PX8100	VRN2G7SX8100	VRN2G7PX9200	VRN2G7SX9200	VRN2G7PX9100	VRN2G7SX9100
						85	VRN2G8PX8200	VRN2G8SX8200	VRN2G8PX8100	VRN2G8SX8100	VRN2G8PX9200	VRN2G8SX9200	VRN2G8PX9100	VRN2G8SX9100
						95*	VRN2G9PX8200	VRN2G9SX8200	VRN2G9PX8100	VRN2G9SX8100	VRN2G9PX9200	VRN2G9SX9200	VRN2G9PX9100	VRN2G9SX9100
		6	58			25	VRN2HQPX8200	VRN2HQSX8200	VRN2HQPX8100	VRN2HQSX8100	VRN2HQPX9200	VRN2HQSX9200	VRN2HQPX9100	VRN2HQSX9100
	30				VRN2HRPX8200	VRN2HRSX8200	VRN2HRPX8100	VRN2HRSX8100	VRN2HRPX9200	VRN2HRSX9200	VRN2HRPX9100	VRN2HRSX9100		
	7	58	35		VRN2HSPX8200	VRN2HSSX8200	VRN2HSPX8100	VRN2HSSX8100	VRN2HSPX9200	VRN2HSSX9200	VRN2HSPX9100	VRN2HSSX9100		
			40		VRN2HTPX8200	VRN2HTSX8200	VRN2HTPX8100	VRN2HTSX8100	VRN2HTPX9200	VRN2HTSX9200	VRN2HTPX9100	VRN2HTSX9100		
	3"	4	58		100	45	VRN2HUPX8200	VRN2HUSX8200	VRN2HUPX8100	VRN2HUSX8100	VRN2HUPX9200	VRN2HUSX9200	VRN2HUPX9100	VRN2HUSX9100
						50	VRN2H1PX8200	VRN2H1SX8200	VRN2H1PX8100	VRN2H1SX8100	VRN2H1PX9200	VRN2H1SX9200	VRN2H1PX9100	VRN2H1SX9100
						55	VRN2H2PX8200	VRN2H2SX8200	VRN2H2PX8100	VRN2H2SX8100	VRN2H2PX9200	VRN2H2SX9200	VRN2H2PX9100	VRN2H2SX9100
		6	58			60	VRN2H3PX8200	VRN2H3SX8200	VRN2H3PX8100	VRN2H3SX8100	VRN2H3PX9200	VRN2H3SX9200	VRN2H3PX9100	VRN2H3SX9100
65				VRN2H4PX8200		VRN2H4SX8200	VRN2H4PX8100	VRN2H4SX8100	VRN2H4PX9200	VRN2H4SX9200	VRN2H4PX9100	VRN2H4SX9100		
7		58	70	VRN2H5PX8200		VRN2H5SX8200	VRN2H5PX8100	VRN2H5SX8100	VRN2H5PX9200	VRN2H5SX9200	VRN2H5PX9100	VRN2H5SX9100		
			75	VRN2H6PX8200		VRN2H6SX8200	VRN2H6PX8100	VRN2H6SX8100	VRN2H6PX9200	VRN2H6SX9200	VRN2H6PX9100	VRN2H6SX9100		
3"		4	58	100		80	VRN2H7PX8200	VRN2H7SX8200	VRN2H7PX8100	VRN2H7SX8100	VRN2H7PX9200	VRN2H7SX9200	VRN2H7PX9100	VRN2H7SX9100
						85	VRN2H8PX8200	VRN2H8SX8200	VRN2H8PX8100	VRN2H8SX8100	VRN2H8PX9200	VRN2H8SX9200	VRN2H8PX9100	VRN2H8SX9100
						95*	VRN2H9PX8200	VRN2H9SX8200	VRN2H9PX8100	VRN2H9SX8100	VRN2H9PX9200	VRN2H9SX9200	VRN2H9PX9100	VRN2H9SX9100

* Full port ball
 ** Differential pressure regulator operating range, ±5%

VALVES

Product Selection - Valves

Pressure Independent Control Valves, NPT 1/2"-1 1/4" NEMA 3R

Actuator Features		Non Fail Safe							
Actuator O.S Number		MN6105A1011		MN6105A1201		MN7505A2001		MN7505A2209	
Power Supply	Voltage	24 VAC/DC		24 VAC/DC		24 VAC/DC		24 VAC/DC	
	Frequency	50 / 60 Hz		50 / 60 Hz		50 / 60 Hz		50 / 60 Hz	
	Power	5 VA		5 VA		5 VA		5 VA	
Actuator Torque	(lb.-in.)	44		44		44		44	
Control	(0)2-10Vdc					•		•	
	4-20 mA (w/ external 500 Ohm Resistor)					•		•	
	Floating	•		•		•		•	
	Two-Position SPDT	•		•		•		•	
	Two-Position SPST					•		•	
Actuator Stroke	(degrees)	95° ± 3°		95° ± 3°		95° ± 3°		95° ± 3°	
Timing	(drive/spring return, seconds)	90		90		90		90	
Aux Switch		0		2		0		2	
Feedback	2-10 Vdc Built In	-		-		•		•	
Fail Safe Action		Stay in Place		Stay in Place		Stay in Place		Stay in Place	
Normal Position	(no signal)	Stay in Place		Stay in Place		Closed		Closed	
Valve Features	Trim	Nickel-Plated Brass	Stainless Steel	Nickel-Plated Brass	Stainless Steel	Nickel-Plated Brass	Stainless Steel	Nickel-Plated Brass	Stainless Steel

Valve Size (inches)	Differential Pressure** (psid)		Close-off Pressure (psid)	Max. GPM	Short Order Codes																																																																																																												
	Min.	Max.			1	2	3	4	5	6	7	8	9	10*																																																																																																			
1/2"	3.0	35	100	1	VRN2ABPX4002	VRN2ABSX4002	VRN2ABPX0002	VRN2ABSXC002	VRN2ABPX5002	VRN2ABSX5002	VRN2ABPX0002	VRN2ABSXD002	2	VRN2ADPX4002	VRN2ADSX4002	VRN2ADPX0002	VRN2ADSXC002	VRN2ADPX5002	VRN2ADSX5002	VRN2ADPX0002	VRN2ADSD002	3	VRN2AEPX4002	VRN2AESX4002	VRN2AEPX0002	VRN2AESXC002	VRN2AEPX5002	VRN2AESX5002	VRN2AEPX0002	VRN2AESXD002	4	VRN2AFPX4002	VRN2AFSX4002	VRN2AFPX0002	VRN2AFSXC002	VRN2AFPX5002	VRN2AFSX5002	VRN2AFPX0002	VRN2AFSD002	5	VRN2AGPX4002	VRN2AGSX4002	VRN2AGPX0002	VRN2AGSXC002	VRN2AGPX5002	VRN2AGSX5002	VRN2AGPX0002	VRN2AGSD002	6	VRN2AHPX4002	VRN2AHSX4002	VRN2AHPX0002	VRN2AHSXC002	VRN2AHPX5002	VRN2AHSX5002	VRN2AHPX0002	VRN2AHSXD002	7	VRN2AJPX4002	VRN2AJSX4002	VRN2AJPX0002	VRN2AJSXC002	VRN2AJPX5002	VRN2AJSX5002	VRN2AJPX0002	VRN2AJSD002																																															
				6.0	1	VRN2BBPX4002	VRN2BBSX4002	VRN2BBPX0002	VRN2BBSXC002	VRN2BBPX5002	VRN2BBSX5002	VRN2BBPX0002	VRN2BBSXD002	2	VRN2BDPX4002	VRN2BDSX4002	VRN2BDPX0002	VRN2BDSXC002	VRN2BDPX5002	VRN2BDSX5002	VRN2BDPX0002	VRN2BDSXD002	3	VRN2BEPX4002	VRN2BESX4002	VRN2BEPX0002	VRN2BESXC002	VRN2BEPX5002	VRN2BESX5002	VRN2BEPX0002	VRN2BESXD002	4	VRN2BFPX4002	VRN2BFSX4002	VRN2BFPX0002	VRN2BFSXC002	VRN2BFPX5002	VRN2BFSX5002	VRN2BFPX0002	VRN2BFSXD002	5	VRN2BGPX4002	VRN2BGSX4002	VRN2BGPX0002	VRN2BGSXC002	VRN2BGPX5002	VRN2BGSX5002	VRN2BGPX0002	VRN2BGSXD002	6	VRN2BHPX4002	VRN2BHSX4002	VRN2BHPX0002	VRN2BHSXC002	VRN2BHPX5002	VRN2BHSX5002	VRN2BHPX0002	VRN2BHSXD002	7	VRN2BJPX4002	VRN2BJSX4002	VRN2BJPX0002	VRN2BJSXC002	VRN2BJPX5002	VRN2BJSX5002	VRN2BJPX0002	VRN2BJSXD002	8	VRN2BKPX4002	VRN2BKSX4002	VRN2BKPX0002	VRN2BKSXC002	VRN2BKPX5002	VRN2BKSX5002	VRN2BKPX0002	VRN2BKSD002	9	VRN2BLPX4002	VRN2BLSX4002	VRN2BLPX0002	VRN2BLSXC002	VRN2BLPX5002	VRN2BLSX5002	VRN2BLPX0002	VRN2BLSD002	10*	VRN2BMPX4002	VRN2BMSX4002	VRN2BMPX0002	VRN2BMSXC002	VRN2BMPX5002	VRN2BMSX5002	VRN2BMPX0002	VRN2BMSXD002																			
	3.0			35	100	1	VRN2CBPX4002	VRN2CBSX4002	VRN2CBPX0002	VRN2CBSXC002	VRN2CBPX5002	VRN2CBSX5002	VRN2CBPX0002	VRN2CBSXD002	2	VRN2CDPX4002	VRN2CDSX4002	VRN2CDPX0002	VRN2CDSXC002	VRN2CDPX5002	VRN2CDSX5002	VRN2CDPX0002	VRN2CDSXD002	3	VRN2CEPX4002	VRN2CESX4002	VRN2CEPX0002	VRN2CESXC002	VRN2CEPX5002	VRN2CESX5002	VRN2CEPX0002	VRN2CESXD002	4	VRN2CFPX4002	VRN2CFSX4002	VRN2CFPX0002	VRN2CFSXC002	VRN2CFPX5002	VRN2CFSX5002	VRN2CFPX0002	VRN2CFSXD002	5	VRN2CGPX4002	VRN2CGSX4002	VRN2CGPX0002	VRN2CGSXC002	VRN2CGPX5002	VRN2CGSX5002	VRN2CGPX0002	VRN2CGSD002	6	VRN2CHPX4002	VRN2CHSX4002	VRN2CHPX0002	VRN2CHSXC002	VRN2CHPX5002	VRN2CHSX5002	VRN2CHPX0002	VRN2CHSD002	7	VRN2CJPX4002	VRN2CJSX4002	VRN2CJPX0002	VRN2CJSXC002	VRN2CJPX5002	VRN2CJSX5002	VRN2CJPX0002	VRN2CJSXD002	8	VRN2CKPX4002	VRN2CKSX4002	VRN2CKPX0002	VRN2CKSXC002	VRN2CKPX5002	VRN2CKSX5002	VRN2CKPX0002	VRN2CKSD002	9	VRN2CLPX4002	VRN2CLSX4002	VRN2CLPX0002	VRN2CLSXC002	VRN2CLPX5002	VRN2CLSX5002	VRN2CLPX0002	VRN2CLSD002	10	VRN2CMPX4002	VRN2CMSX4002	VRN2CMPX0002	VRN2CMSXC002	VRN2CMPX5002	VRN2CMSX5002	VRN2CMPX0002	VRN2CMSXD002	15	VRN2CNPX4002	VRN2CNSX4002	VRN2CNPX0002	VRN2CNSXC002	VRN2CNPX5002	VRN2CNSX5002	VRN2CNPX0002	VRN2CNSXD002	20	VRN2CPPX4002	VRN2CPSX4002	VRN2CPPX0002	VRN2CPSXC002	VRN2CPPX5002	VRN2CPSX5002	VRN2CPPX0002	VRN2CPSXD002
						4.0	10	VRN2DMPX4002	VRN2DMXS4002	VRN2DMPX0002	VRN2DMXSC002	VRN2DMPX5002	VRN2DMXS5002	VRN2DMPX0002	VRN2DMXSD002	15	VRN2DNXP4002	VRN2DNXS4002	VRN2DNXP0002	VRN2DNXSC002	VRN2DNXP5002	VRN2DNXS5002	VRN2DNXP0002	VRN2DNXSD002	20	VRN2DPXP4002	VRN2DPXS4002	VRN2DPXP0002	VRN2DPXSC002	VRN2DPXP5002	VRN2DPXS5002	VRN2DPXP0002	VRN2DPXSD002	25	VRN2DQXP4002	VRN2DQXS4002	VRN2DQXP0002	VRN2DQXSC002	VRN2DQXP5002	VRN2DQXS5002	VRN2DQXP0002	VRN2DQXSD002	30	VRN2DRXP4002	VRN2DRXS4002	VRN2DRXP0002	VRN2DRXSC002	VRN2DRXP5002	VRN2DRXS5002	VRN2DRXP0002	VRN2DRXSD002	35*	VRN2DSPX4002	VRN2DSXS4002	VRN2DSPX0002	VRN2DSXSC002	VRN2DSPX5002	VRN2DSXS5002	VRN2DSPX0002	VRN2DSXSD002																																																					
	4.0					50	100	10	VRN2DMPX4002	VRN2DMXS4002	VRN2DMPX0002	VRN2DMXSC002	VRN2DMPX5002	VRN2DMXS5002	VRN2DMPX0002	VRN2DMXSD002	15	VRN2DNXP4002	VRN2DNXS4002	VRN2DNXP0002	VRN2DNXSC002	VRN2DNXP5002	VRN2DNXS5002	VRN2DNXP0002	VRN2DNXSD002	20	VRN2DPXP4002	VRN2DPXS4002	VRN2DPXP0002	VRN2DPXSC002	VRN2DPXP5002	VRN2DPXS5002	VRN2DPXP0002	VRN2DPXSD002	25	VRN2DQXP4002	VRN2DQXS4002	VRN2DQXP0002	VRN2DQXSC002	VRN2DQXP5002	VRN2DQXS5002	VRN2DQXP0002	VRN2DQXSD002	30	VRN2DRXP4002	VRN2DRXS4002	VRN2DRXP0002	VRN2DRXSC002	VRN2DRXP5002	VRN2DRXS5002	VRN2DRXP0002	VRN2DRXSD002	35*	VRN2DSPX4002	VRN2DSXS4002	VRN2DSPX0002	VRN2DSXSC002	VRN2DSPX5002	VRN2DSXS5002	VRN2DSPX0002	VRN2DSXSD002																																																				
								5.0	10	VRN2DMPX4002	VRN2DMXS4002	VRN2DMPX0002	VRN2DMXSC002	VRN2DMPX5002	VRN2DMXS5002	VRN2DMPX0002	VRN2DMXSD002	15	VRN2DNXP4002	VRN2DNXS4002	VRN2DNXP0002	VRN2DNXSC002	VRN2DNXP5002	VRN2DNXS5002	VRN2DNXP0002	VRN2DNXSD002	20	VRN2DPXP4002	VRN2DPXS4002	VRN2DPXP0002	VRN2DPXSC002	VRN2DPXP5002	VRN2DPXS5002	VRN2DPXP0002	VRN2DPXSD002	25	VRN2DQXP4002	VRN2DQXS4002	VRN2DQXP0002	VRN2DQXSC002	VRN2DQXP5002	VRN2DQXS5002	VRN2DQXP0002	VRN2DQXSD002	30	VRN2DRXP4002	VRN2DRXS4002	VRN2DRXP0002	VRN2DRXSC002	VRN2DRXP5002	VRN2DRXS5002	VRN2DRXP0002	VRN2DRXSD002	35*	VRN2DSPX4002	VRN2DSXS4002	VRN2DSPX0002	VRN2DSXSC002	VRN2DSPX5002	VRN2DSXS5002	VRN2DSPX0002	VRN2DSXSD002																																																			
								6.5	10	VRN2DMPX4002	VRN2DMXS4002	VRN2DMPX0002	VRN2DMXSC002	VRN2DMPX5002	VRN2DMXS5002	VRN2DMPX0002	VRN2DMXSD002	15	VRN2DNXP4002	VRN2DNXS4002	VRN2DNXP0002	VRN2DNXSC002	VRN2DNXP5002	VRN2DNXS5002	VRN2DNXP0002	VRN2DNXSD002	20	VRN2DPXP4002	VRN2DPXS4002	VRN2DPXP0002	VRN2DPXSC002	VRN2DPXP5002	VRN2DPXS5002	VRN2DPXP0002	VRN2DPXSD002	25	VRN2DQXP4002	VRN2DQXS4002	VRN2DQXP0002	VRN2DQXSC002	VRN2DQXP5002	VRN2DQXS5002	VRN2DQXP0002	VRN2DQXSD002	30	VRN2DRXP4002	VRN2DRXS4002	VRN2DRXP0002	VRN2DRXSC002	VRN2DRXP5002	VRN2DRXS5002	VRN2DRXP0002	VRN2DRXSD002	35*	VRN2DSPX4002	VRN2DSXS4002	VRN2DSPX0002	VRN2DSXSC002	VRN2DSPX5002	VRN2DSXS5002	VRN2DSPX0002	VRN2DSXSD002																																																			

* Full port ball

** Differential pressure regulator operating range, ±5%

Product Selection - Valves

Pressure Independent Control Valves, NPT 1/2"-1 1/4" NEMA 3R

Actuator Features		Fail Safe			
Actuator O.S Number		MS7505A2030		MS7505A2130	
Power Supply	Voltage	24 VAC/DC		24 VAC/DC	
	Frequency	50 / 60 Hz		50 / 60 Hz	
	Power	6 VA		6 VA	
Actuator Torque	(lb. -in.)	44		44	
Control	(0)2-10Vdc	•		•	
	4-20 mA (w/ external 500 Ohm Resistor)	•		•	
	Floating	•		•	
	Two-Position SPDT	•		•	
	Two-Position SPST	•		•	
Actuator Stroke	(degrees)	95° ± 3°		95° ± 3°	
Timing	(drive/spring return, seconds)	90 / 25		90 / 25	
Aux Switch		0		1	
Feedback	2-10 Vdc Built In	•		•	
Fail Safe Action		Closed	Open	Closed	Open
	Normal Position (no signal)	Closed	Open	Closed	Open
Valve Features	Trim	Nickel-Plated Brass	Stainless Steel	Nickel-Plated Brass	Stainless Steel

Valve Size (inches)	Differential Pressure** (psid)		Close-off Pressure (psid)	Max. GPM	Short Order Codes										
	Min.	Max.			1	2	3	4	5	6	7	8	9	10*	
1/2"	3.0	35	100	1	VRN2ABPX6202	VRN2ABSX6202	VRN2ABPX6102	VRN2ABSX6102	VRN2ABPX6202	VRN2ABSX6202	VRN2ABPX6102	VRN2ABSX6102	VRN2ABPX6102	VRN2ABSX6102	
				2	VRN2ADPX6202	VRN2ADSX6202	VRN2ADPX6102	VRN2ADSX6102	VRN2ADPX6202	VRN2ADSX6202	VRN2ADPX6102	VRN2ADSX6102	VRN2ADPX6102	VRN2ADSX6102	VRN2ADPX6102
	3			VRN2AEPX6202	VRN2AESX6202	VRN2AEPX6102	VRN2AESX6102	VRN2AEPX6202	VRN2AESX6202	VRN2AEPX6102	VRN2AESX6102	VRN2AEPX6102	VRN2AESX6102	VRN2AEPX6102	VRN2AESX6102
	4			VRN2AFPX6202	VRN2AFSX6202	VRN2AFPX6102	VRN2AFSX6102	VRN2AFPX6202	VRN2AFSX6202	VRN2AFPX6102	VRN2AFSX6102	VRN2AFPX6102	VRN2AFSX6102	VRN2AFPX6102	VRN2AFSX6102
	5			VRN2AGPX6202	VRN2AGSX6202	VRN2AGPX6102	VRN2AGSX6102	VRN2AGPX6202	VRN2AGSX6202	VRN2AGPX6102	VRN2AGSX6102	VRN2AGPX6102	VRN2AGSX6102	VRN2AGPX6102	VRN2AGSX6102
	6			VRN2AHPX6202	VRN2AHSX6202	VRN2AHPX6102	VRN2AHSX6102	VRN2AHPX6202	VRN2AHSX6202	VRN2AHPX6102	VRN2AHSX6102	VRN2AHPX6102	VRN2AHSX6102	VRN2AHPX6102	VRN2AHSX6102
	7			VRN2AJPX6202	VRN2AJSX6202	VRN2AJPX6102	VRN2AJSX6102	VRN2AJPX6202	VRN2AJSX6202	VRN2AJPX6102	VRN2AJSX6102	VRN2AJPX6102	VRN2AJSX6102	VRN2AJPX6102	VRN2AJSX6102
3/4"	3.0	35	100	1	VRN2BBPX6202	VRN2BBSX6202	VRN2BBPX6102	VRN2BBSX6102	VRN2BBPX6202	VRN2BBSX6202	VRN2BBPX6102	VRN2BBSX6102	VRN2BBPX6102	VRN2BBSX6102	
				2	VRN2BDPX6202	VRN2BDSX6202	VRN2BDPX6102	VRN2BDSX6102	VRN2BDPX6202	VRN2BDSX6202	VRN2BDPX6102	VRN2BDSX6102	VRN2BDPX6102	VRN2BDSX6102	VRN2BDPX6102
	3			VRN2BEPX6202	VRN2BESX6202	VRN2BEPX6102	VRN2BESX6102	VRN2BEPX6202	VRN2BESX6202	VRN2BEPX6102	VRN2BESX6102	VRN2BEPX6102	VRN2BESX6102	VRN2BEPX6102	VRN2BESX6102
	4			VRN2BFPX6202	VRN2BFSX6202	VRN2BFPX6102	VRN2BFSX6102	VRN2BFPX6202	VRN2BFSX6202	VRN2BFPX6102	VRN2BFSX6102	VRN2BFPX6102	VRN2BFSX6102	VRN2BFPX6102	VRN2BFSX6102
	5			VRN2BGPX6202	VRN2BGSX6202	VRN2BGPX6102	VRN2BGSX6102	VRN2BGPX6202	VRN2BGSX6202	VRN2BGPX6102	VRN2BGSX6102	VRN2BGPX6102	VRN2BGSX6102	VRN2BGPX6102	VRN2BGSX6102
	6			VRN2BHPX6202	VRN2BHSX6202	VRN2BHPX6102	VRN2BHSX6102	VRN2BHPX6202	VRN2BHSX6202	VRN2BHPX6102	VRN2BHSX6102	VRN2BHPX6102	VRN2BHSX6102	VRN2BHPX6102	VRN2BHSX6102
	7			VRN2BJPX6202	VRN2BJSX6202	VRN2BJPX6102	VRN2BJSX6102	VRN2BJPX6202	VRN2BJSX6202	VRN2BJPX6102	VRN2BJSX6102	VRN2BJPX6102	VRN2BJSX6102	VRN2BJPX6102	VRN2BJSX6102
	8			VRN2BKPX6202	VRN2BKSX6202	VRN2BKPX6102	VRN2BKSX6102	VRN2BKPX6202	VRN2BKSX6202	VRN2BKPX6102	VRN2BKSX6102	VRN2BKPX6102	VRN2BKSX6102	VRN2BKPX6102	VRN2BKSX6102
	9			VRN2BLPX6202	VRN2BLSX6202	VRN2BLPX6102	VRN2BLSX6102	VRN2BLPX6202	VRN2BLSX6202	VRN2BLPX6102	VRN2BLSX6102	VRN2BLPX6102	VRN2BLSX6102	VRN2BLPX6102	VRN2BLSX6102
	10*			VRN2BMPX6202	VRN2BMSX6202	VRN2BMPX6102	VRN2BMSX6102	VRN2BMPX6202	VRN2BMSX6202	VRN2BMPX6102	VRN2BMSX6102	VRN2BMPX6102	VRN2BMSX6102	VRN2BMPX6102	VRN2BMSX6102
1"	3.0	35	100	1	VRN2CBPX6202	VRN2CBSX6202	VRN2CBPX6102	VRN2CBSX6102	VRN2CBPX6202	VRN2CBSX6202	VRN2CBPX6102	VRN2CBSX6102	VRN2CBPX6102	VRN2CBSX6102	
				2	VRN2CDPX6202	VRN2CDSX6202	VRN2CDPX6102	VRN2CDSX6102	VRN2CDPX6202	VRN2CDSX6202	VRN2CDPX6102	VRN2CDSX6102	VRN2CDPX6102	VRN2CDSX6102	VRN2CDPX6102
	3			VRN2CEPX6202	VRN2CESX6202	VRN2CEPX6102	VRN2CESX6102	VRN2CEPX6202	VRN2CESX6202	VRN2CEPX6102	VRN2CESX6102	VRN2CEPX6102	VRN2CESX6102	VRN2CEPX6102	VRN2CESX6102
	4			VRN2CFPX6202	VRN2CFSX6202	VRN2CFPX6102	VRN2CFSX6102	VRN2CFPX6202	VRN2CFSX6202	VRN2CFPX6102	VRN2CFSX6102	VRN2CFPX6102	VRN2CFSX6102	VRN2CFPX6102	VRN2CFSX6102
	5			VRN2CGPX6202	VRN2CGSX6202	VRN2CGPX6102	VRN2CGSX6102	VRN2CGPX6202	VRN2CGSX6202	VRN2CGPX6102	VRN2CGSX6102	VRN2CGPX6102	VRN2CGSX6102	VRN2CGPX6102	VRN2CGSX6102
	6			VRN2CHPX6202	VRN2CHSX6202	VRN2CHPX6102	VRN2CHSX6102	VRN2CHPX6202	VRN2CHSX6202	VRN2CHPX6102	VRN2CHSX6102	VRN2CHPX6102	VRN2CHSX6102	VRN2CHPX6102	VRN2CHSX6102
	7			VRN2CJPX6202	VRN2CJSX6202	VRN2CJPX6102	VRN2CJSX6102	VRN2CJPX6202	VRN2CJSX6202	VRN2CJPX6102	VRN2CJSX6102	VRN2CJPX6102	VRN2CJSX6102	VRN2CJPX6102	VRN2CJSX6102
	8			VRN2CKPX6202	VRN2CKSX6202	VRN2CKPX6102	VRN2CKSX6102	VRN2CKPX6202	VRN2CKSX6202	VRN2CKPX6102	VRN2CKSX6102	VRN2CKPX6102	VRN2CKSX6102	VRN2CKPX6102	VRN2CKSX6102
	9			VRN2CLPX6202	VRN2CLSX6202	VRN2CLPX6102	VRN2CLSX6102	VRN2CLPX6202	VRN2CLSX6202	VRN2CLPX6102	VRN2CLSX6102	VRN2CLPX6102	VRN2CLSX6102	VRN2CLPX6102	VRN2CLSX6102
	10			VRN2CMPX6202	VRN2CMSX6202	VRN2CMPX6102	VRN2CMSX6102	VRN2CMPX6202	VRN2CMSX6202	VRN2CMPX6102	VRN2CMSX6102	VRN2CMPX6102	VRN2CMSX6102	VRN2CMPX6102	VRN2CMSX6102
1-1/4"	4.0	50	100	10	VRN2DMPX6202	VRN2DMSX6202	VRN2DMPX6102	VRN2DMSX6102	VRN2DMPX6202	VRN2DMSX6202	VRN2DMPX6102	VRN2DMSX6102	VRN2DMPX6102	VRN2DMSX6102	
				15	VRN2DNPX6202	VRN2DNSX6202	VRN2DNPX6102	VRN2DNSX6102	VRN2DNPX6202	VRN2DNSX6202	VRN2DNPX6102	VRN2DNSX6102	VRN2DNPX6102	VRN2DNSX6102	VRN2DNPX6102
	20			VRN2DPPX6202	VRN2DPSX6202	VRN2DPPX6102	VRN2DPSX6102	VRN2DPPX6202	VRN2DPSX6202	VRN2DPPX6102	VRN2DPSX6102	VRN2DPPX6102	VRN2DPSX6102	VRN2DPPX6102	VRN2DPSX6102
	25			VRN2DQPX6202	VRN2DQSX6202	VRN2DQPX6102	VRN2DQSX6102	VRN2DQPX6202	VRN2DQSX6202	VRN2DQPX6102	VRN2DQSX6102	VRN2DQPX6102	VRN2DQSX6102	VRN2DQPX6102	VRN2DQSX6102
	30			VRN2DRPX6202	VRN2DRSX6202	VRN2DRPX6102	VRN2DRSX6102	VRN2DRPX6202	VRN2DRSX6202	VRN2DRPX6102	VRN2DRSX6102	VRN2DRPX6102	VRN2DRSX6102	VRN2DRPX6102	VRN2DRSX6102
6.5	35*	VRN2DSPX6202	VRN2DSSX6202	VRN2DSPX6102	VRN2DSSX6102	VRN2DSPX6202	VRN2DSSX6202	VRN2DSPX6102	VRN2DSSX6102	VRN2DSPX6102	VRN2DSSX6102	VRN2DSPX6102	VRN2DSSX6102		

* Full port ball

** Differential pressure regulator operating range, ±5%

VALVES

Product Selection - Valves

Pressure Independent Control Valves, NPT 1/2"-1 1/4" NEMA 3R

Actuator Features	Fail Safe								
Actuator O.S Number	MS8105A1030				MS8105A1130				
Power Supply	24 VAC/DC				24 VAC/DC				
Voltage	24 VAC/DC				24 VAC/DC				
Frequency	50 / 60 Hz				50 / 60 Hz				
Power	6 VA				6 VA				
Actuator Torque (lb.-in.)	44				44				
Control (0)2-10Vdc									
4-20 mA (w/ external 500 Ohm Resistor)									
Floating									
Two-Position SPDT									
Two-Position SPST	•				•				
Actuator Stroke (degrees)	95° ± 3°				95° ± 3°				
Timing (drive/spring return, seconds)	45 / 25				45 / 25				
Aux Switch	0				1				
Feedback 2-10 Vdc Built In									
Fail Safe Action	Closed		Open		Closed		Open		
Normal Position (no signal)	Closed		Open		Closed		Open		
Valve Features	Trim	Nickel-Plated Brass	Stainless Steel	Nickel-Plated Brass	Stainless Steel	Nickel-Plated Brass	Stainless Steel	Nickel-Plated Brass	Stainless Steel

Valve Size (inches)	Differential Pressure** (psid)		Close-off Pressure (psid)	Max. GPM	Short Order Codes																																																																																																													
	Min.	Max.			1	2	3	4	5	6	7	8	9	10*																																																																																																				
1/2"	3.0	35	100	1	VRN2ABPX7202	VRN2ABSX7202	VRN2ABPX7102	VRN2ABSX7102	VRN2ABPXA202	VRN2ABSXA202	VRN2ABPXA102	VRN2ABSXA102	2	VRN2ADPX7202	VRN2ADSX7202	VRN2ADPX7102	VRN2ADSX7102	VRN2ADPXA202	VRN2ADSXA202	VRN2ADPXA102	VRN2ADSXA102	3	VRN2AEPX7202	VRN2AESX7202	VRN2AEPX7102	VRN2AESX7102	VRN2AEPXA202	VRN2AESXA202	VRN2AEPXA102	VRN2AESXA102	4	VRN2AFPX7202	VRN2AFSX7202	VRN2AFPX7102	VRN2AFSX7102	VRN2AFPXA202	VRN2AFSXA202	VRN2AFPXA102	VRN2AFSXA102	5	VRN2AGPX7202	VRN2AGSX7202	VRN2AGPX7102	VRN2AGSX7102	VRN2AGPXA202	VRN2AGSXA202	VRN2AGPXA102	VRN2AGSXA102	6	VRN2AHPX7202	VRN2AHSX7202	VRN2AHPX7102	VRN2AHSX7102	VRN2AHPXA202	VRN2AHSXA202	VRN2AHPXA102	VRN2AHSXA102	7	VRN2AJPX7202	VRN2AJSX7202	VRN2AJPX7102	VRN2AJSX7102	VRN2AJPXA202	VRN2AJSXA202	VRN2AJPXA102	VRN2AJSXA102																																																
				6.0	1	VRN2BBPX7202	VRN2BBSX7202	VRN2BBPX7102	VRN2BBSX7102	VRN2BBPXA202	VRN2BBSXA202	VRN2BBPXA102	VRN2BBSXA102	2	VRN2BDPX7202	VRN2BDSX7202	VRN2BDPX7102	VRN2BDSX7102	VRN2BDPXA202	VRN2BDSXA202	VRN2BDPXA102	VRN2BDSXA102	3	VRN2BEPX7202	VRN2BESX7202	VRN2BEPX7102	VRN2BESX7102	VRN2BEPXA202	VRN2BESXA202	VRN2BEPXA102	VRN2BESXA102	4	VRN2BFPX7202	VRN2BFSX7202	VRN2BFPX7102	VRN2BFSX7102	VRN2BFPXA202	VRN2BFSXA202	VRN2BFPXA102	VRN2BFSXA102	5	VRN2BGPX7202	VRN2BGSX7202	VRN2BGPX7102	VRN2BGSX7102	VRN2BGPXA202	VRN2BGSXA202	VRN2BGPXA102	VRN2BGSXA102	6	VRN2BHPX7202	VRN2BHSX7202	VRN2BHPX7102	VRN2BHSX7102	VRN2BHPXA202	VRN2BHSXA202	VRN2BHPXA102	VRN2BHSXA102	7	VRN2BJPX7202	VRN2BJSX7202	VRN2BJPX7102	VRN2BJSX7102	VRN2BJPXA202	VRN2BJSXA202	VRN2BJPXA102	VRN2BJSXA102	8	VRN2BKPX7202	VRN2BKSX7202	VRN2BKPX7102	VRN2BKSX7102	VRN2BKPXA202	VRN2BKSXA202	VRN2BKPXA102	VRN2BKSXA102	9	VRN2BLPX7202	VRN2BLSX7202	VRN2BLPX7102	VRN2BLSX7102	VRN2BLPXA202	VRN2BLSXA202	VRN2BLPXA102	VRN2BLSXA102	10*	VRN2BMPX7202	VRN2BMSX7202	VRN2BMPX7102	VRN2BMSX7102	VRN2BMPXA202	VRN2BMSXA202	VRN2BMPXA102	VRN2BMSXA102																				
	1"			3.0	35	100	1	VRN2CBPX7202	VRN2CBSX7202	VRN2CBPX7102	VRN2CBSX7102	VRN2CBPXA202	VRN2CBSXA202	VRN2CBPXA102	VRN2CBSXA102	2	VRN2CDPX7202	VRN2CDSX7202	VRN2CDPX7102	VRN2CDSX7102	VRN2CDPXA202	VRN2CDSXA202	VRN2CDPXA102	VRN2CDSXA102	3	VRN2CEPX7202	VRN2CESX7202	VRN2CEPX7102	VRN2CESX7102	VRN2CEPXA202	VRN2CESXA202	VRN2CEPXA102	VRN2CESXA102	4	VRN2CFPX7202	VRN2CFSX7202	VRN2CFPX7102	VRN2CFSX7102	VRN2CFPXA202	VRN2CFSXA202	VRN2CFPXA102	VRN2CFSXA102	5	VRN2CGPX7202	VRN2CGSX7202	VRN2CGPX7102	VRN2CGSX7102	VRN2CGPXA202	VRN2CGSXA202	VRN2CGPXA102	VRN2CGSXA102	6	VRN2CHPX7202	VRN2CHSX7202	VRN2CHPX7102	VRN2CHSX7102	VRN2CHPXA202	VRN2CHSXA202	VRN2CHPXA102	VRN2CHSXA102	7	VRN2CJPX7202	VRN2CJSX7202	VRN2CJPX7102	VRN2CJSX7102	VRN2CJPXA202	VRN2CJSXA202	VRN2CJPXA102	VRN2CJSXA102	8	VRN2CKPX7202	VRN2CKSX7202	VRN2CKPX7102	VRN2CKSX7102	VRN2CKPXA202	VRN2CKSXA202	VRN2CKPXA102	VRN2CKSXA102	9	VRN2CLPX7202	VRN2CLSX7202	VRN2CLPX7102	VRN2CLSX7102	VRN2CLPXA202	VRN2CLSXA202	VRN2CLPXA102	VRN2CLSXA102	10	VRN2CMPX7202	VRN2CMSX7202	VRN2CMPX7102	VRN2CMSX7102	VRN2CMPXA202	VRN2CMSXA202	VRN2CMPXA102	VRN2CMSXA102	15	VRN2CNPX7202	VRN2CNSX7202	VRN2CNPX7102	VRN2CNSX7102	VRN2CNPXA202	VRN2CNSXA202	VRN2CNPXA102	VRN2CNSXA102	20	VRN2CPPX7202	VRN2CPSX7202	VRN2CPPX7102	VRN2CPSX7102	VRN2CPPXA202	VRN2CPSXA202	VRN2CPPXA102	VRN2CPSXA102
							4.0	50	100	10	VRN2DMPX7202	VRN2DMSX7202	VRN2DMPX7102	VRN2DMSX7102	VRN2DMPXA202	VRN2DMSXA202	VRN2DMPXA102	VRN2DMSXA102	15	VRN2DNPX7202	VRN2DNSX7202	VRN2DNPX7102	VRN2DNSX7102	VRN2DNPXA202	VRN2DNSXA202	VRN2DNPXA102	VRN2DNSXA102	20	VRN2DPPX7202	VRN2DPSX7202	VRN2DPPX7102	VRN2DPSX7102	VRN2DPPXA202	VRN2DPSXA202	VRN2DPPXA102	VRN2DPSXA102	25	VRN2DQPX7202	VRN2DQSX7202	VRN2DQPX7102	VRN2DQSX7102	VRN2DQPXA202	VRN2DQSXA202	VRN2DQPXA102	VRN2DQSXA102	30	VRN2DRPX7202	VRN2DRSX7202	VRN2DRPX7102	VRN2DRSX7102	VRN2DRPXA202	VRN2DRSXA202	VRN2DRPXA102	VRN2DRSXA102	35*	VRN2DSPX7202	VRN2DSSX7202	VRN2DSPX7102	VRN2DSSX7102	VRN2DSPXA202	VRN2DSSXA202	VRN2DSPXA102	VRN2DSSXA102																																																			
				1-1/4"						50	100	10	VRN2DMPX7202	VRN2DMSX7202	VRN2DMPX7102	VRN2DMSX7102	VRN2DMPXA202	VRN2DMSXA202	VRN2DMPXA102	VRN2DMSXA102	15	VRN2DNPX7202	VRN2DNSX7202	VRN2DNPX7102	VRN2DNSX7102	VRN2DNPXA202	VRN2DNSXA202	VRN2DNPXA102	VRN2DNSXA102	20	VRN2DPPX7202	VRN2DPSX7202	VRN2DPPX7102	VRN2DPSX7102	VRN2DPPXA202	VRN2DPSXA202	VRN2DPPXA102	VRN2DPSXA102	25	VRN2DQPX7202	VRN2DQSX7202	VRN2DQPX7102	VRN2DQSX7102	VRN2DQPXA202	VRN2DQSXA202	VRN2DQPXA102	VRN2DQSXA102	30	VRN2DRPX7202	VRN2DRSX7202	VRN2DRPX7102	VRN2DRSX7102	VRN2DRPXA202	VRN2DRSXA202	VRN2DRPXA102	VRN2DRSXA102	35*	VRN2DSPX7202	VRN2DSSX7202	VRN2DSPX7102	VRN2DSSX7102	VRN2DSPXA202	VRN2DSSXA202	VRN2DSPXA102	VRN2DSSXA102																																																	

* Full port ball

** Differential pressure regulator operating range, ±5%

Product Selection - Valves

Pressure Independent Control Valves, NPT 1/2"-1 1/4" NEMA 3R

Actuator Features		Fail Safe							
Actuator O.S Number		MS4105A1030				MS4105A1130			
Power Supply	Voltage	100-250 VAC				100-250 VAC			
	Frequency	50 / 60 Hz				50 / 60 Hz			
	Power	6 VA				6 VA			
Actuator Torque	(lb. - in.)	44				44			
Control	(0)2-10Vdc								
	4-20 mA (w/ external 500 Ohm Resistor)								
	Floating								
	Two-Position SPDT								
	Two-Position SPST	•				•			
Actuator Stroke	(degrees)	95° ± 3°				95° ± 3°			
Timing	(drive/spring return, seconds)	45 / 25				45 / 25			
Aux Switch		0				1			
Feedback	2-10 Vdc Built In								
Fail Safe Action		Closed		Open		Closed		Open	
Normal Position	(no signal)	Closed		Open		Closed		Open	
Valve Features	Trim	Nickel-Plated Brass	Stainless Steel	Nickel-Plated Brass	Stainless Steel	Nickel-Plated Brass	Stainless Steel	Nickel-Plated Brass	Stainless Steel

Valve Size (inches)	Differential Pressure** (psid)		Close-off Pressure (psid)	Max. GPM	Short Order Codes																																																																																																													
	Min.	Max.			VRN2ABPX8202	VRN2ABSX8202	VRN2ABPX8102	VRN2ABSX8102	VRN2ABPX9202	VRN2ABSX9202	VRN2ABPX9102	VRN2ABSX9102	VRN2ADPX8202	VRN2ADSX8202	VRN2ADPX8102	VRN2ADSX8102	VRN2ADPX9202	VRN2ADSX9202	VRN2ADPX9102	VRN2ADSX9102	VRN2AEPX8202	VRN2AESX8202	VRN2AEPX8102	VRN2AESX8102	VRN2AEPX9202	VRN2AESX9202	VRN2AEPX9102	VRN2AESX9102	VRN2AFPX8202	VRN2AFSX8202	VRN2AFPX8102	VRN2AFSX8102	VRN2AFPX9202	VRN2AFSX9202	VRN2AFPX9102	VRN2AFSX9102	VRN2AGPX8202	VRN2AGSX8202	VRN2AGPX8102	VRN2AGSX8102	VRN2AGPX9202	VRN2AGSX9202	VRN2AGPX9102	VRN2AGSX9102	VRN2AHPX8202	VRN2AHSX8202	VRN2AHPX8102	VRN2AHSX8102	VRN2AHPX9202	VRN2AHSX9202	VRN2AHPX9102	VRN2AHSX9102	VRN2AJPX8202	VRN2AJSX8202	VRN2AJPX8102	VRN2AJSX8102	VRN2AJPX9202	VRN2AJSX9202	VRN2AJPX9102	VRN2AJSX9102																																																						
1/2"	3.0	35	100	1	VRN2ABPX8202	VRN2ABSX8202	VRN2ABPX8102	VRN2ABSX8102	VRN2ABPX9202	VRN2ABSX9202	VRN2ABPX9102	VRN2ABSX9102	2	VRN2ADPX8202	VRN2ADSX8202	VRN2ADPX8102	VRN2ADSX8102	VRN2ADPX9202	VRN2ADSX9202	VRN2ADPX9102	VRN2ADSX9102	3	VRN2AEPX8202	VRN2AESX8202	VRN2AEPX8102	VRN2AESX8102	VRN2AEPX9202	VRN2AESX9202	VRN2AEPX9102	VRN2AESX9102	4	VRN2AFPX8202	VRN2AFSX8202	VRN2AFPX8102	VRN2AFSX8102	VRN2AFPX9202	VRN2AFSX9202	VRN2AFPX9102	VRN2AFSX9102	5	VRN2AGPX8202	VRN2AGSX8202	VRN2AGPX8102	VRN2AGSX8102	VRN2AGPX9202	VRN2AGSX9202	VRN2AGPX9102	VRN2AGSX9102	6	VRN2AHPX8202	VRN2AHSX8202	VRN2AHPX8102	VRN2AHSX8102	VRN2AHPX9202	VRN2AHSX9202	VRN2AHPX9102	VRN2AHSX9102	7	VRN2AJPX8202	VRN2AJSX8202	VRN2AJPX8102	VRN2AJSX8102	VRN2AJPX9202	VRN2AJSX9202	VRN2AJPX9102	VRN2AJSX9102																																																
				3/4"	3.0	100	1	VRN2BBPX8202	VRN2BBSX8202	VRN2BBPX8102	VRN2BBSX8102	VRN2BBPX9202	VRN2BBSX9202	VRN2BBPX9102	VRN2BBSX9102	2	VRN2BDPX8202	VRN2BDSX8202	VRN2BDPX8102	VRN2BDSX8102	VRN2BDPX9202	VRN2BDSX9202	VRN2BDPX9102	VRN2BDSX9102	3	VRN2BEPX8202	VRN2BESX8202	VRN2BEPX8102	VRN2BESX8102	VRN2BEPX9202	VRN2BESX9202	VRN2BEPX9102	VRN2BESX9102	4	VRN2BFPX8202	VRN2BFSX8202	VRN2BFPX8102	VRN2BFSX8102	VRN2BFPX9202	VRN2BFSX9202	VRN2BFPX9102	VRN2BFSX9102	5	VRN2BGPX8202	VRN2BGSX8202	VRN2BGPX8102	VRN2BGSX8102	VRN2BGPX9202	VRN2BGSX9202	VRN2BGPX9102	VRN2BGSX9102	6	VRN2BHPX8202	VRN2BHSX8202	VRN2BHPX8102	VRN2BHSX8102	VRN2BHPX9202	VRN2BHSX9202	VRN2BHPX9102	VRN2BHSX9102	7	VRN2BJPX8202	VRN2BJSX8202	VRN2BJPX8102	VRN2BJSX8102	VRN2BJPX9202	VRN2BJSX9202	VRN2BJPX9102	VRN2BJSX9102	8	VRN2BKPX8202	VRN2BKSX8202	VRN2BKPX8102	VRN2BKSX8102	VRN2BKPX9202	VRN2BKSX9202	VRN2BKPX9102	VRN2BKSX9102	9	VRN2BLPX8202	VRN2BLSX8202	VRN2BLPX8102	VRN2BLSX8102	VRN2BLPX9202	VRN2BLSX9202	VRN2BLPX9102	VRN2BLSX9102	10*	VRN2BMPX8202	VRN2BMSX8202	VRN2BMPX8102	VRN2BMSX8102	VRN2BMPX9202	VRN2BMSX9202	VRN2BMPX9102	VRN2BMSX9102																		
	1"	3.0					100	1	VRN2CBPX8202	VRN2CBSX8202	VRN2CBPX8102	VRN2CBSX8102	VRN2CBPX9202	VRN2CBSX9202	VRN2CBPX9102	VRN2CBSX9102	2	VRN2CDPX8202	VRN2CDSX8202	VRN2CDPX8102	VRN2CDSX8102	VRN2CDPX9202	VRN2CDSX9202	VRN2CDPX9102	VRN2CDSX9102	3	VRN2CEPX8202	VRN2CESX8202	VRN2CEPX8102	VRN2CESX8102	VRN2CEPX9202	VRN2CESX9202	VRN2CEPX9102	VRN2CESX9102	4	VRN2CFPX8202	VRN2CFSX8202	VRN2CFPX8102	VRN2CFSX8102	VRN2CFPX9202	VRN2CFSX9202	VRN2CFPX9102	VRN2CFSX9102	5	VRN2CGPX8202	VRN2CGSX8202	VRN2CGPX8102	VRN2CGSX8102	VRN2CGPX9202	VRN2CGSX9202	VRN2CGPX9102	VRN2CGSX9102	6	VRN2CHPX8202	VRN2CHSX8202	VRN2CHPX8102	VRN2CHSX8102	VRN2CHPX9202	VRN2CHSX9202	VRN2CHPX9102	VRN2CHSX9102	7	VRN2CJPX8202	VRN2CJSX8202	VRN2CJPX8102	VRN2CJSX8102	VRN2CJPX9202	VRN2CJSX9202	VRN2CJPX9102	VRN2CJSX9102	8	VRN2CKPX8202	VRN2CKSX8202	VRN2CKPX8102	VRN2CKSX8102	VRN2CKPX9202	VRN2CKSX9202	VRN2CKPX9102	VRN2CKSX9102	9	VRN2CLPX8202	VRN2CLSX8202	VRN2CLPX8102	VRN2CLSX8102	VRN2CLPX9202	VRN2CLSX9202	VRN2CLPX9102	VRN2CLSX9102	10	VRN2CMPX8202	VRN2CMSX8202	VRN2CMPX8102	VRN2CMSX8102	VRN2CMPX9202	VRN2CMSX9202	VRN2CMPX9102	VRN2CMSX9102	15	VRN2CNPX8202	VRN2CNSX8202	VRN2CNPX8102	VRN2CNSX8102	VRN2CNPX9202	VRN2CNSX9202	VRN2CNPX9102	VRN2CNSX9102	20	VRN2CPPX8202	VRN2CPSX8202	VRN2CPPX8102	VRN2CPSX8102	VRN2CPPX9202	VRN2CPSX9202	VRN2CPPX9102
					1-1/4"			50	100	10	VRN2DMPX8202	VRN2DMSX8202	VRN2DMPX8102	VRN2DMSX8102	VRN2DMPX9202	VRN2DMSX9202	VRN2DMPX9102	VRN2DMSX9102	15	VRN2DNPX8202	VRN2DNSX8202	VRN2DNPX8102	VRN2DNSX8102	VRN2DNPX9202	VRN2DNSX9202	VRN2DNPX9102	VRN2DNSX9102	20	VRN2DPPX8202	VRN2DPSX8202	VRN2DPPX8102	VRN2DPSX8102	VRN2DPPX9202	VRN2DPSX9202	VRN2DPPX9102	VRN2DPSX9102	25	VRN2DQPX8202	VRN2DQSX8202	VRN2DQPX8102	VRN2DQSX8102	VRN2DQPX9202	VRN2DQSX9202	VRN2DQPX9102	VRN2DQSX9102	30	VRN2DRPX8202	VRN2DRSX8202	VRN2DRPX8102	VRN2DRSX8102	VRN2DRPX9202	VRN2DRSX9202	VRN2DRPX9102	VRN2DRSX9102	35*	VRN2DSPX8202	VRN2DSSX8202	VRN2DSPX8102	VRN2DSSX8102	VRN2DSPX9202	VRN2DSSX9202	VRN2DSPX9102	VRN2DSSX9102																																																			

* Full port ball

** Differential pressure regulator operating range, ±5%

VALVES

Product Selection - Valves

Pressure Independent Control Valves, NPT 1½"-3" NEMA 3R

Actuator Features		Non Fail Safe								
Actuator O.S Number		MN6105A1011		MN6105A1201		MN7505A2001		MN7505A2209		
Power Supply	Voltage	24 VAC/DC		24 VAC/DC		24 VAC/DC		24 VAC/DC		
	Frequency	50 / 60 Hz		50 / 60 Hz		50 / 60 Hz		50 / 60 Hz		
	Power	5 VA		5 VA		5 VA		5 VA		
Actuator Torque	(lb.-in.)	44		44		44		44		
	(0)2-10Vdc									
	4-20 mA (w/ external 500 Ohm Resistor)									
Control	Floating	•		•		•		•		
	Two-Position SPDT	•		•		•		•		
	Two-Position SPST									
Actuator Stroke	(degrees)	95° ± 3°		95° ± 3°		95° ± 3°		95° ± 3°		
	Timing (drive/spring return, seconds)	90		90		90		90		
Aux Switch	0		2		0		2			
Feedback	2-10 Vdc Built In		-		-		•		•	
Fail Safe Action	Stay in Place		Stay in Place		Stay in Place		Stay in Place			
Normal Position	(no signal)		Stay in Place		Stay in Place		Closed		Closed	
Valve Features	Trim	Nickel-Plated Brass	Stainless Steel	Nickel-Plated Brass	Stainless Steel	Nickel-Plated Brass	Stainless Steel	Nickel-Plated Brass	Stainless Steel	

Valve Size (inches)	Differential Pressure** (psid)		Close-off Pressure (psid)	Max. GPM	Short Order Codes							
	Min.	Max.			VRN2EMPX4002	VRN2EMSX4002	VRN2EMPXC002	VRN2EMSXC002	VRN2EMPX5002	VRN2EMSX5002	VRN2EMPX0002	VRN2EMSXD002
1-1/2"	4	50	100	10	VRN2EMPX4002	VRN2EMSX4002	VRN2EMPXC002	VRN2EMSXC002	VRN2EMPX5002	VRN2EMSX5002	VRN2EMPX0002	VRN2EMSXD002
				15	VRN2ENPX4002	VRN2ENSX4002	VRN2ENPXC002	VRN2ENSXC002	VRN2ENPX5002	VRN2ENSX5002	VRN2ENPX0002	VRN2ENSD002
				20	VRN2EPPX4002	VRN2EPSX4002	VRN2EPPXC002	VRN2EPSXC002	VRN2EPPX5002	VRN2EPSX5002	VRN2EPPX0002	VRN2EPSXD002
				25	VRN2EQPX4002	VRN2EQSX4002	VRN2EQPXC002	VRN2EQSXC002	VRN2EQPX5002	VRN2EQSX5002	VRN2EQPX0002	VRN2EQSXD002
				30	VRN2ERPX4002	VRN2ERSX4002	VRN2ERPXC002	VRN2ERSXC002	VRN2ERPX5002	VRN2ERSX5002	VRN2ERPXD002	VRN2ERSXD002
				35	VRN2ESPX4002	VRN2ESSX4002	VRN2ESPC002	VRN2ESSXC002	VRN2ESPX5002	VRN2ESSX5002	VRN2ESPX0002	VRN2ESSXD002
	5	58	100	40	VRN2ETPX4002	VRN2ETSX4002	VRN2ETPXC002	VRN2ETSC002	VRN2ETPX5002	VRN2ETSX5002	VRN2ETPX0002	VRN2ETSD002
				45	VRN2EUPX4002	VRN2EUSX4002	VRN2EUPXC002	VRN2EUSXC002	VRN2EUPX5002	VRN2EUSX5002	VRN2EUPXD002	VRN2EUSXD002
				50	VRN2E1PX4002	VRN2E1SX4002	VRN2E1PXC002	VRN2E1SXC002	VRN2E1PX5002	VRN2E1SX5002	VRN2E1PX0002	VRN2E1SXD002
				55	VRN2E2PX4002	VRN2E2SX4002	VRN2E2PXC002	VRN2E2SXC002	VRN2E2PX5002	VRN2E2SX5002	VRN2E2PX0002	VRN2E2SXD002
				60	VRN2E3PX4002	VRN2E3SX4002	VRN2E3PXC002	VRN2E3SXC002	VRN2E3PX5002	VRN2E3SX5002	VRN2E3PX0002	VRN2E3SXD002
				65	VRN2E4PX4002	VRN2E4SX4002	VRN2E4PXC002	VRN2E4SXC002	VRN2E4PX5002	VRN2E4SX5002	VRN2E4PX0002	VRN2E4SXD002
7	58	100	70	VRN2E5PX4002	VRN2E5SX4002	VRN2E5PXC002	VRN2E5SXC002	VRN2E5PX5002	VRN2E5SX5002	VRN2E5PX0002	VRN2E5SXD002	
			75	VRN2E6PX4002	VRN2E6SX4002	VRN2E6PXC002	VRN2E6SXC002	VRN2E6PX5002	VRN2E6SX5002	VRN2E6PX0002	VRN2E6SXD002	
			80	VRN2E7PX4002	VRN2E7SX4002	VRN2E7PXC002	VRN2E7SXC002	VRN2E7PX5002	VRN2E7SX5002	VRN2E7PX0002	VRN2E7SXD002	
			85	VRN2E8PX4002	VRN2E8SX4002	VRN2E8PXC002	VRN2E8SXC002	VRN2E8PX5002	VRN2E8SX5002	VRN2E8PX0002	VRN2E8SXD002	
			95	VRN2E9PX4002	VRN2E9SX4002	VRN2E9PXC002	VRN2E9SXC002	VRN2E9PX5002	VRN2E9SX5002	VRN2E9PX0002	VRN2E9SXD002	
			95*	VRN2FQPX4002	VRN2FQSX4002	VRN2FQPXC002	VRN2FQSC002	VRN2FQPX5002	VRN2FQSX5002	VRN2FQPX0002	VRN2FQSD002	
2"	4	58	100	25	VRN2FRPX4002	VRN2FRSX4002	VRN2FRPXC002	VRN2FRSXC002	VRN2FRPX5002	VRN2FRSX5002	VRN2FRPX0002	VRN2FRSD002
				30	VRN2FSPX4002	VRN2FSSX4002	VRN2FSPXC002	VRN2FSSXC002	VRN2FSPX5002	VRN2FSSX5002	VRN2FSPXD002	VRN2FSSXD002
				35	VRN2FTPX4002	VRN2FTSX4002	VRN2FTPXC002	VRN2FTSXC002	VRN2FTPX5002	VRN2FTSX5002	VRN2FTPXD002	VRN2FTSXD002
				40	VRN2FUPX4002	VRN2FUSX4002	VRN2FUPXC002	VRN2FUSXC002	VRN2FUPX5002	VRN2FUSX5002	VRN2FUPXD002	VRN2FUSXD002
				45	VRN2F1PX4002	VRN2F1SX4002	VRN2F1PXC002	VRN2F1SXC002	VRN2F1PX5002	VRN2F1SX5002	VRN2F1PX0002	VRN2F1SXD002
				50	VRN2F2PX4002	VRN2F2SX4002	VRN2F2PXC002	VRN2F2SXC002	VRN2F2PX5002	VRN2F2SX5002	VRN2F2PX0002	VRN2F2SXD002
	5	58	100	55	VRN2F3PX4002	VRN2F3SX4002	VRN2F3PXC002	VRN2F3SXC002	VRN2F3PX5002	VRN2F3SX5002	VRN2F3PX0002	VRN2F3SXD002
				60	VRN2F4PX4002	VRN2F4SX4002	VRN2F4PXC002	VRN2F4SXC002	VRN2F4PX5002	VRN2F4SX5002	VRN2F4PX0002	VRN2F4SXD002
				65	VRN2F5PX4002	VRN2F5SX4002	VRN2F5PXC002	VRN2F5SXC002	VRN2F5PX5002	VRN2F5SX5002	VRN2F5PX0002	VRN2F5SXD002
				70	VRN2F6PX4002	VRN2F6SX4002	VRN2F6PXC002	VRN2F6SXC002	VRN2F6PX5002	VRN2F6SX5002	VRN2F6PX0002	VRN2F6SXD002
				75	VRN2F7PX4002	VRN2F7SX4002	VRN2F7PXC002	VRN2F7SXC002	VRN2F7PX5002	VRN2F7SX5002	VRN2F7PX0002	VRN2F7SXD002
				80	VRN2F8PX4002	VRN2F8SX4002	VRN2F8PXC002	VRN2F8SXC002	VRN2F8PX5002	VRN2F8SX5002	VRN2F8PX0002	VRN2F8SXD002
2-1/2"	4	58	100	85	VRN2GQPX4002	VRN2GQSX4002	VRN2GQPXC002	VRN2GQSC002	VRN2GQPX5002	VRN2GQSX5002	VRN2GQPX0002	VRN2GQSD002
				25	VRN2GRPX4002	VRN2GRSX4002	VRN2GRPXC002	VRN2GRSXC002	VRN2GRPX5002	VRN2GRSX5002	VRN2GRPX0002	VRN2GRSD002
				30	VRN2GSPX4002	VRN2GSSX4002	VRN2GSPXC002	VRN2GSSXC002	VRN2GSPX5002	VRN2GSSX5002	VRN2GSPXD002	VRN2GSSXD002
				35	VRN2GTPX4002	VRN2GTSX4002	VRN2GTPXC002	VRN2GTSXC002	VRN2GTPX5002	VRN2GTSX5002	VRN2GTPXD002	VRN2GTSXD002
				40	VRN2GUPX4002	VRN2GUSX4002	VRN2GUPXC002	VRN2GUSXC002	VRN2GUPX5002	VRN2GUSX5002	VRN2GUPXD002	VRN2GUSXD002
				45	VRN2G1PX4002	VRN2G1SX4002	VRN2G1PXC002	VRN2G1SXC002	VRN2G1PX5002	VRN2G1SX5002	VRN2G1PX0002	VRN2G1SXD002
	5	58	100	50	VRN2G2PX4002	VRN2G2SX4002	VRN2G2PXC002	VRN2G2SXC002	VRN2G2PX5002	VRN2G2SX5002	VRN2G2PX0002	VRN2G2SXD002
				55	VRN2G3PX4002	VRN2G3SX4002	VRN2G3PXC002	VRN2G3SXC002	VRN2G3PX5002	VRN2G3SX5002	VRN2G3PX0002	VRN2G3SXD002
				60	VRN2G4PX4002	VRN2G4SX4002	VRN2G4PXC002	VRN2G4SXC002	VRN2G4PX5002	VRN2G4SX5002	VRN2G4PX0002	VRN2G4SXD002
				65	VRN2G5PX4002	VRN2G5SX4002	VRN2G5PXC002	VRN2G5SXC002	VRN2G5PX5002	VRN2G5SX5002	VRN2G5PX0002	VRN2G5SXD002
				70	VRN2G6PX4002	VRN2G6SX4002	VRN2G6PXC002	VRN2G6SXC002	VRN2G6PX5002	VRN2G6SX5002	VRN2G6PX0002	VRN2G6SXD002
				75	VRN2G7PX4002	VRN2G7SX4002	VRN2G7PXC002	VRN2G7SXC002	VRN2G7PX5002	VRN2G7SX5002	VRN2G7PX0002	VRN2G7SXD002
3"	4	58	100	80	VRN2G8PX4002	VRN2G8SX4002	VRN2G8PXC002	VRN2G8SXC002	VRN2G8PX5002	VRN2G8SX5002	VRN2G8PX0002	VRN2G8SXD002
				85	VRN2G9PX4002	VRN2G9SX4002	VRN2G9PXC002	VRN2G9SXC002	VRN2G9PX5002	VRN2G9SX5002	VRN2G9PX0002	VRN2G9SXD002
				95*	VRN2HQPX4002	VRN2HQSX4002	VRN2HQPXC002	VRN2HQSC002	VRN2HQPX5002	VRN2HQSX5002	VRN2HQPXD002	VRN2HQSD002
				25	VRN2HRPX4002	VRN2HRSX4002	VRN2HRPXC002	VRN2HRSC002	VRN2HRPX5002	VRN2HRSX5002	VRN2HRPX0002	VRN2HRSD002
				30	VRN2HSPX4002	VRN2HSSX4002	VRN2HSPXC002	VRN2HSSXC002	VRN2HSPX5002	VRN2HSSX5002	VRN2HSPXD002	VRN2HSSXD002
				35	VRN2HTPX4002	VRN2HTSX4002	VRN2HTPXC002	VRN2HTSXC002	VRN2HTPX5002	VRN2HTSX5002	VRN2HTPX0002	VRN2HTSD002
	5	58	100	40	VRN2HUPX4002	VRN2HUSX4002	VRN2HUPXC002	VRN2HUSXC002	VRN2HUPX5002	VRN2HUSX5002	VRN2HUPXD002	VRN2HUSXD002
				45	VRN2H1PX4002	VRN2H1SX4002	VRN2H1PXC002	VRN2H1SXC002	VRN2H1PX5002	VRN2H1SX5002	VRN2H1PX0002	VRN2H1SXD002
				50	VRN2H2PX4002	VRN2H2SX4002	VRN2H2PXC002	VRN2H2SXC002	VRN2H2PX5002	VRN2H2SX5002	VRN2H2PX0002	VRN2H2SXD002
				55	VRN2H3PX4002	VRN2H3SX4002	VRN2H3PXC002	VRN2H3SXC002	VRN2H3PX5002	VRN2H3SX5002	VRN2H3PX0002	VRN2H3SXD002
				60	VRN2H4PX4002	VRN2H4SX4002	VRN2H4PXC002	VRN2H4SXC002	VRN2H4PX5002	VRN2H4SX5002	VRN2H4PX0002	VRN2H4SXD002
				65	VRN2H5PX4002	VRN2H5SX4002	VRN2H5PXC002	VRN2H5SXC002	VRN2H5PX5002	VRN2H5SX5002	VRN2H5PX0002	VRN2H5SXD002
6	58	100	70	VRN2H6PX4002	VRN2H6SX4002	VRN2H6PXC002	VRN2H6SXC002	VRN2H6PX5002	VRN2H6SX5002	VRN2H6PX0002	VRN2H6SXD002	
			75	VRN2H7PX4002	VRN2H7SX4002	VRN2H7PXC002	VRN2H7SXC002	VRN2H7PX5002	VRN2H7SX5002	VRN2H7PX0002	VRN2H7SXD002	
			80	VRN2H8PX4002	VRN2H8SX4002	VRN2H8PXC002	VRN2H8SXC002	VRN2H8PX5002	VRN2H8SX5002	VRN2H8PX0002	VRN2H8SXD002	
			85	VRN2H9PX4002	VRN2H9SX4002	VRN2H9PXC002	VRN2H9SXC002	VRN2H9PX5002	VRN2H9SX5002	VRN2H9PX0002	VRN2H9SXD002	
			95*	VRN2H9PX4002	VRN2H9SX4002	VRN2H9PXC002	VRN2H9SXC002	VRN2H9PX5002	VRN2H9SX5002	VRN2H9PX0002	VRN2H9SXD002	
			95*	VRN2H9PX4002	VRN2H9SX4002	VRN2H9PXC002	VRN2H9SXC002	VRN2H9PX5002	VRN2H9SX5002	VRN2H9PX0002	VRN2H9SXD002	

* Full port ball

** Differential pressure regulator operating range, ±5%

Product Selection - Valves

Pressure Independent Control Valves, NPT 1½"-3" NEMA 3R

Actuator Features		Fail Safe							
Actuator O.S Number		MS7505A2030				MS7505A2130			
Power Supply	Voltage	24 VAC/DC				24 VAC/DC			
	Frequency	50 / 60 Hz				50 / 60 Hz			
	Power	6 VA				6 VA			
Actuator Torque (lb.-in.)		44				44			
Control	(0)2-10Vdc	•				•			
	4-20 mA (w/ external 500 Ohm Resistor)	•				•			
	Floating	•				•			
	Two-Position SPDT	•				•			
	Two-Position SPST	•				•			
Actuator Stroke (degrees)		95° ± 3°				95° ± 3°			
Timing (drive/spring return, seconds)		90 / 25				90 / 25			
Aux Switch		0				1			
Feedback	2-10 Vdc Built In	•				•			
Fail Safe Action		Closed				Open			
	Normal Position (no signal)	Closed				Open			
Valve Features	Trim	Nickel-Plated Brass	Stainless Steel	Nickel-Plated Brass	Stainless Steel	Nickel-Plated Brass	Stainless Steel	Nickel-Plated Brass	Stainless Steel

Valve Size (inches)	Differential Pressure** (psid)		Close-off Pressure (psid)	Max. GPM	Short Order Codes							
	Min.	Max.			VRN2EMPX6202	VRN2EMSX6202	VRN2EMPX6102	VRN2EMSX6102	VRN2EMPXB202	VRN2EMSXB202	VRN2EMXPXB102	VRN2EMSXB102
1-1/2"	4	50	100	10	VRN2EMPX6202	VRN2EMSX6202	VRN2EMPX6102	VRN2EMSX6102	VRN2EMPXB202	VRN2EMSXB202	VRN2EMXPXB102	VRN2EMSXB102
				15	VRN2ENPX6202	VRN2ENSX6202	VRN2ENPX6102	VRN2ENSX6102	VRN2ENPXB202	VRN2ENSXB202	VRN2ENXPXB102	VRN2ENSXB102
	20	VRN2EPPX6202		VRN2EPSX6202	VRN2EPPX6102	VRN2EPSX6102	VRN2EPPXB202	VRN2EPSXB202	VRN2EPPXB102	VRN2EPSXB102		
	25	VRN2EQPX6202		VRN2EQSX6202	VRN2EQPX6102	VRN2EQSX6102	VRN2EQPXB202	VRN2EQSXB202	VRN2EQPXB102	VRN2EQSXB102		
	30	VRN2ERPX6202		VRN2ERSX6202	VRN2ERPX6102	VRN2ERSX6102	VRN2ERPXB202	VRN2ERSXB202	VRN2ERPXB102	VRN2ERSXB102		
	35	VRN2ESPX6202		VRN2ESSX6202	VRN2ESPX6102	VRN2ESSX6102	VRN2ESXPXB202	VRN2ESSXB202	VRN2ESXPXB102	VRN2ESSXB102		
	40	VRN2ETPX6202		VRN2ETSX6202	VRN2ETPX6102	VRN2ETSX6102	VRN2ETPXB202	VRN2ETSXB202	VRN2ETPXB102	VRN2ETSXB102		
	45	VRN2EUPX6202		VRN2EUSX6202	VRN2EUPX6102	VRN2EUSX6102	VRN2EUPXB202	VRN2EUSXB202	VRN2EUPXB102	VRN2EUSXB102		
	50	VRN2E1PX6202		VRN2E1SX6202	VRN2E1PX6102	VRN2E1SX6102	VRN2E1PXB202	VRN2E1SXB202	VRN2E1PXB102	VRN2E1SXB102		
	55	VRN2E2PX6202		VRN2E2SX6202	VRN2E2PX6102	VRN2E2SX6102	VRN2E2PXB202	VRN2E2SXB202	VRN2E2PXB102	VRN2E2SXB102		
	60	VRN2E3PX6202		VRN2E3SX6202	VRN2E3PX6102	VRN2E3SX6102	VRN2E3PXB202	VRN2E3SXB202	VRN2E3PXB102	VRN2E3SXB102		
2"	4	58	100	65	VRN2E4PX6202	VRN2E4SX6202	VRN2E4PX6102	VRN2E4SX6102	VRN2E4PXB202	VRN2E4SXB202	VRN2E4PXB102	VRN2E4SXB102
				70	VRN2E5PX6202	VRN2E5SX6202	VRN2E5PX6102	VRN2E5SX6102	VRN2E5PXB202	VRN2E5SXB202	VRN2E5PXB102	VRN2E5SXB102
	75	VRN2E6PX6202		VRN2E6SX6202	VRN2E6PX6102	VRN2E6SX6102	VRN2E6PXB202	VRN2E6SXB202	VRN2E6PXB102	VRN2E6SXB102		
	80	VRN2E7PX6202		VRN2E7SX6202	VRN2E7PX6102	VRN2E7SX6102	VRN2E7PXB202	VRN2E7SXB202	VRN2E7PXB102	VRN2E7SXB102		
	85	VRN2E8PX6202		VRN2E8SX6202	VRN2E8PX6102	VRN2E8SX6102	VRN2E8PXB202	VRN2E8SXB202	VRN2E8PXB102	VRN2E8SXB102		
	95	VRN2E9PX6202		VRN2E9SX6202	VRN2E9PX6102	VRN2E9SX6102	VRN2E9PXB202	VRN2E9SXB202	VRN2E9PXB102	VRN2E9SXB102		
	25	VRN2FQPX6202		VRN2FQSX6202	VRN2FQPX6102	VRN2FQSX6102	VRN2FQPXB202	VRN2FQSXB202	VRN2FQPXB102	VRN2FQSXB102		
	30	VRN2FRPX6202		VRN2FRSX6202	VRN2FRPX6102	VRN2FRSX6102	VRN2FRPXB202	VRN2FRSXB202	VRN2FRPXB102	VRN2FRSXB102		
	35	VRN2FSPX6202		VRN2FSSX6202	VRN2FSPX6102	VRN2FSSX6102	VRN2FSPXB202	VRN2FSSXB202	VRN2FSPXB102	VRN2FSSXB102		
	40	VRN2FTPX6202		VRN2FTSX6202	VRN2FTPX6102	VRN2FTSX6102	VRN2FTPXB202	VRN2FTSXB202	VRN2FTPXB102	VRN2FTSXB102		
	45	VRN2FUPX6202		VRN2FUSX6202	VRN2FUPX6102	VRN2FUSX6102	VRN2FUPXB202	VRN2FUSXB202	VRN2FUPXB102	VRN2FUSXB102		
2-1/2"	4	58	100	50	VRN2F1PX6202	VRN2F1SX6202	VRN2F1PX6102	VRN2F1SX6102	VRN2F1PXB202	VRN2F1SXB202	VRN2F1PXB102	VRN2F1SXB102
				55	VRN2F2PX6202	VRN2F2SX6202	VRN2F2PX6102	VRN2F2SX6102	VRN2F2PXB202	VRN2F2SXB202	VRN2F2PXB102	VRN2F2SXB102
	60	VRN2F3PX6202		VRN2F3SX6202	VRN2F3PX6102	VRN2F3SX6102	VRN2F3PXB202	VRN2F3SXB202	VRN2F3PXB102	VRN2F3SXB102		
	65	VRN2F4PX6202		VRN2F4SX6202	VRN2F4PX6102	VRN2F4SX6102	VRN2F4PXB202	VRN2F4SXB202	VRN2F4PXB102	VRN2F4SXB102		
	70	VRN2F5PX6202		VRN2F5SX6202	VRN2F5PX6102	VRN2F5SX6102	VRN2F5PXB202	VRN2F5SXB202	VRN2F5PXB102	VRN2F5SXB102		
	75	VRN2F6PX6202		VRN2F6SX6202	VRN2F6PX6102	VRN2F6SX6102	VRN2F6PXB202	VRN2F6SXB202	VRN2F6PXB102	VRN2F6SXB102		
	25	VRN2GQPX6202		VRN2GQSX6202	VRN2GQPX6102	VRN2GQSX6102	VRN2GQPXB202	VRN2GQSXB202	VRN2GQPXB102	VRN2GQSXB102		
	30	VRN2GRPX6202		VRN2GRSX6202	VRN2GRPX6102	VRN2GRSX6102	VRN2GRPXB202	VRN2GRSXB202	VRN2GRPXB102	VRN2GRSXB102		
	35	VRN2GSPX6202		VRN2GSSX6202	VRN2GSPX6102	VRN2GSSX6102	VRN2GSPXB202	VRN2GSSXB202	VRN2GSPXB102	VRN2GSSXB102		
	40	VRN2GTPX6202		VRN2GTSX6202	VRN2GTPX6102	VRN2GTSX6102	VRN2GTPXB202	VRN2GTSXB202	VRN2GTPXB102	VRN2GTSXB102		
	45	VRN2GUPX6202		VRN2GUSX6202	VRN2GUPX6102	VRN2GUSX6102	VRN2GUPXB202	VRN2GUSXB202	VRN2GUPXB102	VRN2GUSXB102		
3"	4	58	100	50	VRN2G1PX6202	VRN2G1SX6202	VRN2G1PX6102	VRN2G1SX6102	VRN2G1PXB202	VRN2G1SXB202	VRN2G1PXB102	VRN2G1SXB102
				55	VRN2G2PX6202	VRN2G2SX6202	VRN2G2PX6102	VRN2G2SX6102	VRN2G2PXB202	VRN2G2SXB202	VRN2G2PXB102	VRN2G2SXB102
	60	VRN2G3PX6202		VRN2G3SX6202	VRN2G3PX6102	VRN2G3SX6102	VRN2G3PXB202	VRN2G3SXB202	VRN2G3PXB102	VRN2G3SXB102		
	65	VRN2G4PX6202		VRN2G4SX6202	VRN2G4PX6102	VRN2G4SX6102	VRN2G4PXB202	VRN2G4SXB202	VRN2G4PXB102	VRN2G4SXB102		
	70	VRN2G5PX6202		VRN2G5SX6202	VRN2G5PX6102	VRN2G5SX6102	VRN2G5PXB202	VRN2G5SXB202	VRN2G5PXB102	VRN2G5SXB102		
	75	VRN2G6PX6202		VRN2G6SX6202	VRN2G6PX6102	VRN2G6SX6102	VRN2G6PXB202	VRN2G6SXB202	VRN2G6PXB102	VRN2G6SXB102		
	80	VRN2G7PX6202		VRN2G7SX6202	VRN2G7PX6102	VRN2G7SX6102	VRN2G7PXB202	VRN2G7SXB202	VRN2G7PXB102	VRN2G7SXB102		
	85	VRN2G8PX6202		VRN2G8SX6202	VRN2G8PX6102	VRN2G8SX6102	VRN2G8PXB202	VRN2G8SXB202	VRN2G8PXB102	VRN2G8SXB102		
	95*	VRN2G9PX6202		VRN2G9SX6202	VRN2G9PX6102	VRN2G9SX6102	VRN2G9PXB202	VRN2G9SXB202	VRN2G9PXB102	VRN2G9SXB102		
	25	VRN2HQPX6202		VRN2HQSX6202	VRN2HQPX6102	VRN2HQSX6102	VRN2HQPXB202	VRN2HQSXB202	VRN2HQPXB102	VRN2HQSXB102		
	30	VRN2HRPX6202		VRN2HRSX6202	VRN2HRPX6102	VRN2HRSX6102	VRN2HRPXB202	VRN2HRSXB202	VRN2HRPXB102	VRN2HRSXB102		
35	VRN2HSPX6202	VRN2HSSX6202	VRN2HSPX6102	VRN2HSSX6102	VRN2HSPXB202	VRN2HSSXB202	VRN2HSPXB102	VRN2HSSXB102				
40	VRN2HTPX6202	VRN2HTSX6202	VRN2HTPX6102	VRN2HTSX6102	VRN2HTPXB202	VRN2HTSXB202	VRN2HTPXB102	VRN2HTSXB102				
45	VRN2HUPX6202	VRN2HUSX6202	VRN2HUPX6102	VRN2HUSX6102	VRN2HUPXB202	VRN2HUSXB202	VRN2HUPXB102	VRN2HUSXB102				
50	VRN2H1PX6202	VRN2H1SX6202	VRN2H1PX6102	VRN2H1SX6102	VRN2H1PXB202	VRN2H1SXB202	VRN2H1PXB102	VRN2H1SXB102				
55	VRN2H2PX6202	VRN2H2SX6202	VRN2H2PX6102	VRN2H2SX6102	VRN2H2PXB202	VRN2H2SXB202	VRN2H2PXB102	VRN2H2SXB102				
60	VRN2H3PX6202	VRN2H3SX6202	VRN2H3PX6102	VRN2H3SX6102	VRN2H3PXB202	VRN2H3SXB202	VRN2H3PXB102	VRN2H3SXB102				
65	VRN2H4PX6202	VRN2H4SX6202	VRN2H4PX6102	VRN2H4SX6102	VRN2H4PXB202	VRN2H4SXB202	VRN2H4PXB102	VRN2H4SXB102				
70	VRN2H5PX6202	VRN2H5SX6202	VRN2H5PX6102	VRN2H5SX6102	VRN2H5PXB202	VRN2H5SXB202	VRN2H5PXB102	VRN2H5SXB102				
75	VRN2H6PX6202	VRN2H6SX6202	VRN2H6PX6102	VRN2H6SX6102	VRN2H6PXB202	VRN2H6SXB202	VRN2H6PXB102	VRN2H6SXB102				
80	VRN2H7PX6202	VRN2H7SX6202	VRN2H7PX6102	VRN2H7SX6102	VRN2H7PXB202	VRN2H7SXB202	VRN2H7PXB102	VRN2H7SXB102				
85	VRN2H8PX6202	VRN2H8SX6202	VRN2H8PX6102	VRN2H8SX6102	VRN2H8PXB202	VRN2H8SXB202	VRN2H8PXB102	VRN2H8SXB102				
95*	VRN2H9PX6202	VRN2H9SX6202	VRN2H9PX6102	VRN2H9SX6102	VRN2H9PXB202	VRN2H9SXB202	VRN2H9PXB102	VRN2H9SXB102				

* Full port ball

** Differential pressure regulator operating range, ±5%

Product Selection - Valves

Pressure Independent Control Valves, NPT 1½"-3" NEMA 3R

Actuator Features		Fail Safe							
Actuator O.S Number		MS8105A1030				MS8105A1130			
Power Supply	Voltage	24 VAC/DC				24 VAC/DC			
	Frequency	50 / 60 Hz				50 / 60 Hz			
	Power	6 VA				6 VA			
Actuator Torque	(lb.-in.)	44				44			
Control	(0)2-10Vdc								
	4-20 mA (w/ external 500 Ohm Resistor)								
	Floating								
	Two-Position SPDT								
	Two-Position SPST	•							
Actuator Stroke	(degrees)	95° ± 3°				95° ± 3°			
Timing	(drive/spring return, seconds)	45 / 25				45 / 25			
Aux Switch		0				1			
Feedback	2-10 Vdc Built In								
Fail Safe Action		Closed		Open		Closed		Open	
Normal Position	(no signal)	Closed				Open			
Valve Features	Trim	Nickel-Plated Brass	Stainless Steel	Nickel-Plated Brass	Stainless Steel	Nickel-Plated Brass	Stainless Steel	Nickel-Plated Brass	Stainless Steel

Valve Size (inches)	Differential Pressure** (psid)		Close-off Pressure (psid)	Max. GPM	Short Order Codes								
	Min.	Max.			VRN2EMPX7202	VRN2EMSX7202	VRN2ENPX7102	VRN2ENSX7102	VRN2ENPXA202	VRN2ENSXA202	VRN2ENPXA102	VRN2ENSXA102	
1-1/2"	4	50	100	10	VRN2EMPX7202	VRN2EMSX7202	VRN2ENPX7102	VRN2ENSX7102	VRN2ENPXA202	VRN2ENSXA202	VRN2ENPXA102	VRN2ENSXA102	
				15	VRN2ENPX7202	VRN2ENSX7202	VRN2ENPX7102	VRN2ENSX7102	VRN2ENPXA202	VRN2ENSXA202	VRN2ENPXA102	VRN2ENSXA102	
				20	VRN2EPPX7202	VRN2EPSX7202	VRN2EPPX7102	VRN2EPSX7102	VRN2EPPXA202	VRN2EPSXA202	VRN2EPPXA102	VRN2EPSXA102	
	5	58		25	VRN2EQPX7202	VRN2EQSX7202	VRN2EQPX7102	VRN2EQSX7102	VRN2EQPXA202	VRN2EQSXA202	VRN2EQPXA102	VRN2EQSXA102	
				30	VRN2ERPX7202	VRN2ERSX7202	VRN2ERPX7102	VRN2ERSX7102	VRN2ERPXA202	VRN2ERSXA202	VRN2ERPXA102	VRN2ERSXA102	
				35	VRN2ESPX7202	VRN2ESSX7202	VRN2ESPX7102	VRN2ESSX7102	VRN2ESPXA202	VRN2ESSXA202	VRN2ESPXA102	VRN2ESSXA102	
	6	58		40	VRN2ETPX7202	VRN2ETSX7202	VRN2ETPX7102	VRN2ETSX7102	VRN2ETPXA202	VRN2ETSXA202	VRN2ETPXA102	VRN2ETSXA102	
				45	VRN2EUPX7202	VRN2EUSX7202	VRN2EUPX7102	VRN2EUSX7102	VRN2EUPXA202	VRN2EUSXA202	VRN2EUPXA102	VRN2EUSXA102	
				50	VRN2E1PX7202	VRN2E1SX7202	VRN2E1PX7102	VRN2E1SX7102	VRN2E1PXA202	VRN2E1SXA202	VRN2E1PXA102	VRN2E1SXA102	
	7	58		55	VRN2E2PX7202	VRN2E2SX7202	VRN2E2PX7102	VRN2E2SX7102	VRN2E2PXA202	VRN2E2SXA202	VRN2E2PXA102	VRN2E2SXA102	
				60	VRN2E3PX7202	VRN2E3SX7202	VRN2E3PX7102	VRN2E3SX7102	VRN2E3PXA202	VRN2E3SXA202	VRN2E3PXA102	VRN2E3SXA102	
65			VRN2E4PX7202	VRN2E4SX7202	VRN2E4PX7102	VRN2E4SX7102	VRN2E4PXA202	VRN2E4SXA202	VRN2E4PXA102	VRN2E4SXA102			
70			VRN2E5PX7202	VRN2E5SX7202	VRN2E5PX7102	VRN2E5SX7102	VRN2E5PXA202	VRN2E5SXA202	VRN2E5PXA102	VRN2E5SXA102			
75			VRN2E6PX7202	VRN2E6SX7202	VRN2E6PX7102	VRN2E6SX7102	VRN2E6PXA202	VRN2E6SXA202	VRN2E6PXA102	VRN2E6SXA102			
80			VRN2E7PX7202	VRN2E7SX7202	VRN2E7PX7102	VRN2E7SX7102	VRN2E7PXA202	VRN2E7SXA202	VRN2E7PXA102	VRN2E7SXA102			
85			VRN2E8PX7202	VRN2E8SX7202	VRN2E8PX7102	VRN2E8SX7102	VRN2E8PXA202	VRN2E8SXA202	VRN2E8PXA102	VRN2E8SXA102			
95	VRN2E9PX7202	VRN2E9SX7202	VRN2E9PX7102	VRN2E9SX7102	VRN2E9PXA202	VRN2E9SXA202	VRN2E9PXA102	VRN2E9SXA102					
2"	4	58	100	25	VRN2FQPX7202	VRN2FQSX7202	VRN2FQPX7102	VRN2FQSX7102	VRN2FQPXA202	VRN2FQSXA202	VRN2FQPXA102	VRN2FQSXA102	
				30	VRN2FRPX7202	VRN2FRSX7202	VRN2FRPX7102	VRN2FRSX7102	VRN2FRPXA202	VRN2FRSXA202	VRN2FRPXA102	VRN2FRSXA102	
				35	VRN2FSPX7202	VRN2FSSX7202	VRN2FSPX7102	VRN2FSSX7102	VRN2FSPXA202	VRN2FSSXA202	VRN2FSPXA102	VRN2FSSXA102	
	6			58	40	VRN2FTPX7202	VRN2FTSX7202	VRN2FTPX7102	VRN2FTSX7102	VRN2FTPXA202	VRN2FTSXA202	VRN2FTPXA102	VRN2FTSXA102
					45	VRN2FUPX7202	VRN2FUSX7202	VRN2FUPX7102	VRN2FUSX7102	VRN2FUPXA202	VRN2FUSXA202	VRN2FUPXA102	VRN2FUSXA102
					50	VRN2F1PX7202	VRN2F1SX7202	VRN2F1PX7102	VRN2F1SX7102	VRN2F1PXA202	VRN2F1SXA202	VRN2F1PXA102	VRN2F1SXA102
	7			58	55	VRN2F2PX7202	VRN2F2SX7202	VRN2F2PX7102	VRN2F2SX7102	VRN2F2PXA202	VRN2F2SXA202	VRN2F2PXA102	VRN2F2SXA102
					60	VRN2F3PX7202	VRN2F3SX7202	VRN2F3PX7102	VRN2F3SX7102	VRN2F3PXA202	VRN2F3SXA202	VRN2F3PXA102	VRN2F3SXA102
					65	VRN2F4PX7202	VRN2F4SX7202	VRN2F4PX7102	VRN2F4SX7102	VRN2F4PXA202	VRN2F4SXA202	VRN2F4PXA102	VRN2F4SXA102
					70	VRN2F5PX7202	VRN2F5SX7202	VRN2F5PX7102	VRN2F5SX7102	VRN2F5PXA202	VRN2F5SXA202	VRN2F5PXA102	VRN2F5SXA102
					75	VRN2F6PX7202	VRN2F6SX7202	VRN2F6PX7102	VRN2F6SX7102	VRN2F6PXA202	VRN2F6SXA202	VRN2F6PXA102	VRN2F6SXA102
80		VRN2GQPX7202	VRN2GQSX7202		VRN2GQPX7102	VRN2GQSX7102	VRN2GQPXA202	VRN2GQSXA202	VRN2GQPXA102	VRN2GQSXA102			
85		VRN2GRPX7202	VRN2GRSX7202		VRN2GRPX7102	VRN2GRSX7102	VRN2GRPXA202	VRN2GRSXA202	VRN2GRPXA102	VRN2GRSXA102			
2-1/2"	4	58	100	30	VRN2GSPX7202	VRN2GSSX7202	VRN2GSPX7102	VRN2GSSX7102	VRN2GSPXA202	VRN2GSSXA202	VRN2GSPXA102	VRN2GSSXA102	
				35	VRN2GTPX7202	VRN2GTSX7202	VRN2GTPX7102	VRN2GTSX7102	VRN2GTPXA202	VRN2GTSXA202	VRN2GTPXA102	VRN2GTSXA102	
				40	VRN2GUPX7202	VRN2GUSX7202	VRN2GUPX7102	VRN2GUSX7102	VRN2GUPXA202	VRN2GUSXA202	VRN2GUPXA102	VRN2GUSXA102	
	6			58	45	VRN2G1PX7202	VRN2G1SX7202	VRN2G1PX7102	VRN2G1SX7102	VRN2G1PXA202	VRN2G1SXA202	VRN2G1PXA102	VRN2G1SXA102
					50	VRN2G2PX7202	VRN2G2SX7202	VRN2G2PX7102	VRN2G2SX7102	VRN2G2PXA202	VRN2G2SXA202	VRN2G2PXA102	VRN2G2SXA102
					55	VRN2G3PX7202	VRN2G3SX7202	VRN2G3PX7102	VRN2G3SX7102	VRN2G3PXA202	VRN2G3SXA202	VRN2G3PXA102	VRN2G3SXA102
	7			58	60	VRN2G4PX7202	VRN2G4SX7202	VRN2G4PX7102	VRN2G4SX7102	VRN2G4PXA202	VRN2G4SXA202	VRN2G4PXA102	VRN2G4SXA102
					65	VRN2G5PX7202	VRN2G5SX7202	VRN2G5PX7102	VRN2G5SX7102	VRN2G5PXA202	VRN2G5SXA202	VRN2G5PXA102	VRN2G5SXA102
					70	VRN2G6PX7202	VRN2G6SX7202	VRN2G6PX7102	VRN2G6SX7102	VRN2G6PXA202	VRN2G6SXA202	VRN2G6PXA102	VRN2G6SXA102
					75	VRN2G7PX7202	VRN2G7SX7202	VRN2G7PX7102	VRN2G7SX7102	VRN2G7PXA202	VRN2G7SXA202	VRN2G7PXA102	VRN2G7SXA102
					80	VRN2G8PX7202	VRN2G8SX7202	VRN2G8PX7102	VRN2G8SX7102	VRN2G8PXA202	VRN2G8SXA202	VRN2G8PXA102	VRN2G8SXA102
85	VRN2G9PX7202	VRN2G9SX7202	VRN2G9PX7102	VRN2G9SX7102	VRN2G9PXA202	VRN2G9SXA202	VRN2G9PXA102	VRN2G9SXA102					
95*	VRN2HQPX7202	VRN2HQSX7202	VRN2HQPX7102	VRN2HQSX7102	VRN2HQPXA202	VRN2HQSXA202	VRN2HQPXA102	VRN2HQSXA102					
3"	4	58	100	25	VRN2HRPX7202	VRN2HRSX7202	VRN2HRPX7102	VRN2HRSX7102	VRN2HRPXA202	VRN2HRSXA202	VRN2HRPXA102	VRN2HRSXA102	
				30	VRN2HSPX7202	VRN2HSSX7202	VRN2HSPX7102	VRN2HSSX7102	VRN2HSPXA202	VRN2HSSXA202	VRN2HSPXA102	VRN2HSSXA102	
				35	VRN2HTPX7202	VRN2HTSX7202	VRN2HTPX7102	VRN2HTSX7102	VRN2HTPXA202	VRN2HTSXA202	VRN2HTPXA102	VRN2HTSXA102	
	6			58	40	VRN2HUPX7202	VRN2HUSX7202	VRN2HUPX7102	VRN2HUSX7102	VRN2HUPXA202	VRN2HUSXA202	VRN2HUPXA102	VRN2HUSXA102
					45	VRN2H1PX7202	VRN2H1SX7202	VRN2H1PX7102	VRN2H1SX7102	VRN2H1PXA202	VRN2H1SXA202	VRN2H1PXA102	VRN2H1SXA102
					50	VRN2H2PX7202	VRN2H2SX7202	VRN2H2PX7102	VRN2H2SX7102	VRN2H2PXA202	VRN2H2SXA202	VRN2H2PXA102	VRN2H2SXA102
	7			58	55	VRN2H3PX7202	VRN2H3SX7202	VRN2H3PX7102	VRN2H3SX7102	VRN2H3PXA202	VRN2H3SXA202	VRN2H3PXA102	VRN2H3SXA102
					60	VRN2H4PX7202	VRN2H4SX7202	VRN2H4PX7102	VRN2H4SX7102	VRN2H4PXA202	VRN2H4SXA202	VRN2H4PXA102	VRN2H4SXA102
					65	VRN2H5PX7202	VRN2H5SX7202	VRN2H5PX7102	VRN2H5SX7102	VRN2H5PXA202	VRN2H5SXA202	VRN2H5PXA102	VRN2H5SXA102
					70	VRN2H6PX7202	VRN2H6SX7202	VRN2H6PX7102	VRN2H6SX7102	VRN2H6PXA202	VRN2H6SXA202	VRN2H6PXA102	VRN2H6SXA102
					75	VRN2H7PX7202	VRN2H7SX7202	VRN2H7PX7102	VRN2H7SX7102	VRN2H7PXA202	VRN2H7SXA202	VRN2H7PXA102	VRN2H7SXA102
					80	VRN2H8PX7202	VRN2H8SX7202	VRN2H8PX7102	VRN2H8SX7102	VRN2H8PXA202	VRN2H8SXA202	VRN2H8PXA102	VRN2H8SXA102
					85	VRN2H9PX7202	VRN2H9SX7202	VRN2H9PX7102	VRN2H9SX7102	VRN2H9PXA202	VRN2H9SXA202	VRN2H9PXA102	VRN2H9SXA102
	95*			VRN2H9PX7202	VRN2H9SX7202	VRN2H9PX7102	VRN2H9SX7102	VRN2H9PXA202	VRN2H9SXA202	VRN2H9PXA102	VRN2H9SXA102		

* Full port ball

** Differential pressure regulator operating range, ±5%

Product Selection - Valves

Pressure Independent Control Valves, NPT 1½"-3" NEMA 3R

Actuator Features		Fail Safe							
Actuator O.S Number		MS4105A1030				MS4105A1130			
Power Supply	Voltage	100-250 VAC				100-250 VAC			
	Frequency	50 / 60 Hz				50 / 60 Hz			
	Power	6 VA				6 VA			
Actuator Torque (lb.-in.)		44				44			
Control	(0)2-10Vdc								
	4-20 mA (w/ external 500 Ohm Resistor)								
	Floating								
	Two-Position SPDT								
	Two-Position SPST	•							
Actuator Stroke (degrees)		95° ± 3°				95° ± 3°			
Timing (drive/spring return, seconds)		45 / 25				45 / 25			
Aux Switch		0				1			
Feedback	2-10 Vdc Built In								
Fail Safe Action		Closed		Open		Closed		Open	
Normal Position (no signal)		Closed		Open		Closed		Open	
Valve Features	Trim	Nickel-Plated Brass	Stainless Steel	Nickel-Plated Brass	Stainless Steel	Nickel-Plated Brass	Stainless Steel	Nickel-Plated Brass	Stainless Steel

Valve Size (inches)	Differential Pressure** (psid)		Close-off Pressure (psid)	Max. GPM	Short Order Codes							
	Min.	Max.			VRN2EMPSX8202	VRN2EMSX8202	VRN2EMPX8102	VRN2EMSX8102	VRN2EMPX9202	VRN2EMSX9202	VRN2EMPX9102	VRN2EMSX9102
1-1/2"	4	50	100	10	VRN2EMPSX8202	VRN2EMSX8202	VRN2EMPX8102	VRN2EMSX8102	VRN2EMPX9202	VRN2EMSX9202	VRN2EMPX9102	VRN2EMSX9102
				15	VRN2ENPX8202	VRN2ENSX8202	VRN2ENPX8102	VRN2ENSX8102	VRN2ENPX9202	VRN2ENSX9202	VRN2ENPX9102	VRN2ENSX9102
	20	VRN2EPPX8202		VRN2EPSX8202	VRN2EPPX8102	VRN2EPSX8102	VRN2EPPX9202	VRN2EPSX9202	VRN2EPPX9102	VRN2EPSX9102		
	25	VRN2EQPX8202		VRN2EQSX8202	VRN2EQPX8102	VRN2EQSX8102	VRN2EQPX9202	VRN2EQSX9202	VRN2EQPX9102	VRN2EQSX9102		
	30	VRN2ERPX8202		VRN2ERSX8202	VRN2ERPX8102	VRN2ERSX8102	VRN2ERPX9202	VRN2ERSX9202	VRN2ERPX9102	VRN2ERSX9102		
	35	VRN2ESPX8202		VRN2ESSX8202	VRN2ESPX8102	VRN2ESSX8102	VRN2ESPX9202	VRN2ESSX9202	VRN2ESPX9102	VRN2ESSX9102		
	40	VRN2ETPX8202		VRN2ETSX8202	VRN2ETPX8102	VRN2ETSX8102	VRN2ETPX9202	VRN2ETSX9202	VRN2ETPX9102	VRN2ETSX9102		
	45	VRN2EUPX8202		VRN2EUSX8202	VRN2EUPX8102	VRN2EUSX8102	VRN2EUPX9202	VRN2EUSX9202	VRN2EUPX9102	VRN2EUSX9102		
	50	VRN2E1PX8202		VRN2E1SX8202	VRN2E1PX8102	VRN2E1SX8102	VRN2E1PX9202	VRN2E1SX9202	VRN2E1PX9102	VRN2E1SX9102		
	55	VRN2E2PX8202		VRN2E2SX8202	VRN2E2PX8102	VRN2E2SX8102	VRN2E2PX9202	VRN2E2SX9202	VRN2E2PX9102	VRN2E2SX9102		
	60	VRN2E3PX8202		VRN2E3SX8202	VRN2E3PX8102	VRN2E3SX8102	VRN2E3PX9202	VRN2E3SX9202	VRN2E3PX9102	VRN2E3SX9102		
7	65	VRN2E4PX8202	VRN2E4SX8202	VRN2E4PX8102	VRN2E4SX8102	VRN2E4PX9202	VRN2E4SX9202	VRN2E4PX9102	VRN2E4SX9102			
	70	VRN2E5PX8202	VRN2E5SX8202	VRN2E5PX8102	VRN2E5SX8102	VRN2E5PX9202	VRN2E5SX9202	VRN2E5PX9102	VRN2E5SX9102			
	75	VRN2E6PX8202	VRN2E6SX8202	VRN2E6PX8102	VRN2E6SX8102	VRN2E6PX9202	VRN2E6SX9202	VRN2E6PX9102	VRN2E6SX9102			
	80	VRN2E7PX8202	VRN2E7SX8202	VRN2E7PX8102	VRN2E7SX8102	VRN2E7PX9202	VRN2E7SX9202	VRN2E7PX9102	VRN2E7SX9102			
	85	VRN2E8PX8202	VRN2E8SX8202	VRN2E8PX8102	VRN2E8SX8102	VRN2E8PX9202	VRN2E8SX9202	VRN2E8PX9102	VRN2E8SX9102			
	90	VRN2E9PX8202	VRN2E9SX8202	VRN2E9PX8102	VRN2E9SX8102	VRN2E9PX9202	VRN2E9SX9202	VRN2E9PX9102	VRN2E9SX9102			
	95	VRN2E9PX8202	VRN2E9SX8202	VRN2E9PX8102	VRN2E9SX8102	VRN2E9PX9202	VRN2E9SX9202	VRN2E9PX9102	VRN2E9SX9102			
2"	4	58	100	25	VRN2FQPX8202	VRN2FQSX8202	VRN2FQPX8102	VRN2FQSX8102	VRN2FQPX9202	VRN2FQSX9202	VRN2FQPX9102	VRN2FQSX9102
				30	VRN2FRPX8202	VRN2FRSX8202	VRN2FRPX8102	VRN2FRSX8102	VRN2FRPX9202	VRN2FRSX9202	VRN2FRPX9102	VRN2FRSX9102
	35			VRN2FSPX8202	VRN2FSSX8202	VRN2FSPX8102	VRN2FSSX8102	VRN2FSPX9202	VRN2FSSX9202	VRN2FSPX9102	VRN2FSSX9102	
	40			VRN2FTPX8202	VRN2FTSX8202	VRN2FTPX8102	VRN2FTSX8102	VRN2FTPX9202	VRN2FTSX9202	VRN2FTPX9102	VRN2FTSX9102	
	45			VRN2FUPX8202	VRN2FUSX8202	VRN2FUPX8102	VRN2FUSX8102	VRN2FUPX9202	VRN2FUSX9202	VRN2FUPX9102	VRN2FUSX9102	
	50			VRN2F1PX8202	VRN2F1SX8202	VRN2F1PX8102	VRN2F1SX8102	VRN2F1PX9202	VRN2F1SX9202	VRN2F1PX9102	VRN2F1SX9102	
	55			VRN2F2PX8202	VRN2F2SX8202	VRN2F2PX8102	VRN2F2SX8102	VRN2F2PX9202	VRN2F2SX9202	VRN2F2PX9102	VRN2F2SX9102	
	60			VRN2F3PX8202	VRN2F3SX8202	VRN2F3PX8102	VRN2F3SX8102	VRN2F3PX9202	VRN2F3SX9202	VRN2F3PX9102	VRN2F3SX9102	
	65			VRN2F4PX8202	VRN2F4SX8202	VRN2F4PX8102	VRN2F4SX8102	VRN2F4PX9202	VRN2F4SX9202	VRN2F4PX9102	VRN2F4SX9102	
	70			VRN2F5PX8202	VRN2F5SX8202	VRN2F5PX8102	VRN2F5SX8102	VRN2F5PX9202	VRN2F5SX9202	VRN2F5PX9102	VRN2F5SX9102	
	75			VRN2F6PX8202	VRN2F6SX8202	VRN2F6PX8102	VRN2F6SX8102	VRN2F6PX9202	VRN2F6SX9202	VRN2F6PX9102	VRN2F6SX9102	
2-1/2"	4	58	100	25	VRN2GQPX8202	VRN2GQSX8202	VRN2GQPX8102	VRN2GQSX8102	VRN2GQPX9202	VRN2GQSX9202	VRN2GQPX9102	VRN2GQSX9102
				30	VRN2GRPX8202	VRN2GRSX8202	VRN2GRPX8102	VRN2GRSX8102	VRN2GRPX9202	VRN2GRSX9202	VRN2GRPX9102	VRN2GRSX9102
	35			VRN2GSPX8202	VRN2GSSX8202	VRN2GSPX8102	VRN2GSSX8102	VRN2GSPX9202	VRN2GSSX9202	VRN2GSPX9102	VRN2GSSX9102	
	40			VRN2GTPX8202	VRN2GTSX8202	VRN2GTPX8102	VRN2GTSX8102	VRN2GTPX9202	VRN2GTSX9202	VRN2GTPX9102	VRN2GTSX9102	
	45			VRN2GUPX8202	VRN2GUSX8202	VRN2GUPX8102	VRN2GUSX8102	VRN2GUPX9202	VRN2GUSX9202	VRN2GUPX9102	VRN2GUSX9102	
	50			VRN2G1PX8202	VRN2G1SX8202	VRN2G1PX8102	VRN2G1SX8102	VRN2G1PX9202	VRN2G1SX9202	VRN2G1PX9102	VRN2G1SX9102	
	55			VRN2G2PX8202	VRN2G2SX8202	VRN2G2PX8102	VRN2G2SX8102	VRN2G2PX9202	VRN2G2SX9202	VRN2G2PX9102	VRN2G2SX9102	
	60			VRN2G3PX8202	VRN2G3SX8202	VRN2G3PX8102	VRN2G3SX8102	VRN2G3PX9202	VRN2G3SX9202	VRN2G3PX9102	VRN2G3SX9102	
	65			VRN2G4PX8202	VRN2G4SX8202	VRN2G4PX8102	VRN2G4SX8102	VRN2G4PX9202	VRN2G4SX9202	VRN2G4PX9102	VRN2G4SX9102	
	70			VRN2G5PX8202	VRN2G5SX8202	VRN2G5PX8102	VRN2G5SX8102	VRN2G5PX9202	VRN2G5SX9202	VRN2G5PX9102	VRN2G5SX9102	
	75			VRN2G6PX8202	VRN2G6SX8202	VRN2G6PX8102	VRN2G6SX8102	VRN2G6PX9202	VRN2G6SX9202	VRN2G6PX9102	VRN2G6SX9102	
3"	4	58	100	80	VRN2G7PX8202	VRN2G7SX8202	VRN2G7PX8102	VRN2G7SX8102	VRN2G7PX9202	VRN2G7SX9202	VRN2G7PX9102	VRN2G7SX9102
				85	VRN2G8PX8202	VRN2G8SX8202	VRN2G8PX8102	VRN2G8SX8102	VRN2G8PX9202	VRN2G8SX9202	VRN2G8PX9102	VRN2G8SX9102
	95*			VRN2G9PX8202	VRN2G9SX8202	VRN2G9PX8102	VRN2G9SX8102	VRN2G9PX9202	VRN2G9SX9202	VRN2G9PX9102	VRN2G9SX9102	
	25			VRN2HQPX8202	VRN2HQSX8202	VRN2HQPX8102	VRN2HQSX8102	VRN2HQPX9202	VRN2HQSX9202	VRN2HQPX9102	VRN2HQSX9102	
	30			VRN2HRPX8202	VRN2HRSX8202	VRN2HRPX8102	VRN2HRSX8102	VRN2HRPX9202	VRN2HRSX9202	VRN2HRPX9102	VRN2HRSX9102	
	35			VRN2HSPX8202	VRN2HSSX8202	VRN2HSPX8102	VRN2HSSX8102	VRN2HSPX9202	VRN2HSSX9202	VRN2HSPX9102	VRN2HSSX9102	
	40			VRN2HTPX8202	VRN2HTSX8202	VRN2HTPX8102	VRN2HTSX8102	VRN2HTPX9202	VRN2HTSX9202	VRN2HTPX9102	VRN2HTSX9102	
	45			VRN2HUPX8202	VRN2HUSX8202	VRN2HUPX8102	VRN2HUSX8102	VRN2HUPX9202	VRN2HUSX9202	VRN2HUPX9102	VRN2HUSX9102	
	50			VRN2H1PX8202	VRN2H1SX8202	VRN2H1PX8102	VRN2H1SX8102	VRN2H1PX9202	VRN2H1SX9202	VRN2H1PX9102	VRN2H1SX9102	
	55			VRN2H2PX8202	VRN2H2SX8202	VRN2H2PX8102	VRN2H2SX8102	VRN2H2PX9202	VRN2H2SX9202	VRN2H2PX9102	VRN2H2SX9102	
	60			VRN2H3PX8202	VRN2H3SX8202	VRN2H3PX8102	VRN2H3SX8102	VRN2H3PX9202	VRN2H3SX9202	VRN2H3PX9102	VRN2H3SX9102	
65	VRN2H4PX8202	VRN2H4SX8202	VRN2H4PX8102	VRN2H4SX8102	VRN2H4PX9202	VRN2H4SX9202	VRN2H4PX9102	VRN2H4SX9102				
70	VRN2H5PX8202	VRN2H5SX8202	VRN2H5PX8102	VRN2H5SX8102	VRN2H5PX9202	VRN2H5SX9202	VRN2H5PX9102	VRN2H5SX9102				
75	VRN2H6PX8202	VRN2H6SX8202	VRN2H6PX8102	VRN2H6SX8102	VRN2H6PX9202	VRN2H6SX9202	VRN2H6PX9102	VRN2H6SX9102				
80	VRN2H7PX8202	VRN2H7SX8202	VRN2H7PX8102	VRN2H7SX8102	VRN2H7PX9202	VRN2H7SX9202	VRN2H7PX9102	VRN2H7SX9102				
85	VRN2H8PX8202	VRN2H8SX8202	VRN2H8PX8102	VRN2H8SX8102	VRN2H8PX9202	VRN2H8SX9202	VRN2H8PX9102	VRN2H8SX9102				
95*	VRN2H9PX8202	VRN2H9SX8202	VRN2H9PX8102	VRN2H9SX8102	VRN2H9PX9202	VRN2H9SX9202	VRN2H9PX9102	VRN2H9SX9102				

* Full port ball
 ** Differential pressure regulator operating range, ±5%

VALVES

Product Selection - Valves

Pressure Independent Control Valves, Flanged 2½"-6"

Common Features

- Multi-sized bodies from 2-1/2 to 6 inch pipes with wafer flanged connections.
- Combination ANSI/ASME Class 150/300 flange compatibility.
- Controls hot or chilled water with up to 50% glycol, closed loop HVAC systems only, not for use with steam.
- Regulated flow rates available from 40.7 to 468 gpm.
- Stainless steel pressure regulator maintains constant pressure drop across valve seat.
- Positive pressure, rolling diaphragm regulator design provides flow control accuracy of ±5% over specified pressure range.
- Equal percentage flow characteristic using multi turn, nonrising, characterized plug.
- High close-off rating.
- 50 discrete, selectable flow rates available per valve size.
- Stainless steel trim.
- Six-turn actuator with floating or modulating inputs available with stay-in-place or electronic fail safe action.
- Fail safe actuators field-configurable for normally open or normally closed power failure return position.
- Two Test Ports for venting or pressure gauge attachment.



Flanged Pressure Independent Control Valves									
Actuator Features			Non Fail Safe		Fail Safe				
Power Supply	Voltage		24 Vac/30 Vdc		24 Vac/30 Vdc				
	Frequency		50 / 60 Hz		50 / 60 Hz				
	Power		20 VA		20 VA				
Enclosure	(ingress protection)		IP44		IP44				
Control	2-10 Vdc		•		•				
	4-20 mA (w/external 500 Ohm Resistor)		•		•				
	Pulse-width Modulating		•		•				
	Floating		•		•				
	Two-Position SPDT		•		•				
Fail Safe Action	(field configurable)		Stay in Place		Open/Closed				
Normal Position (no signal)	(field configurable)		Open/Closed		Open/Closed				
Actuator Stroke	(degrees)		6 x 360°		6 x 360°				
Timing	(seconds, 60 Hz)		150 (maximum)		150 (maximum)				
Feedback	4-20 mA (2-10 Vdc) Built in		•		•				
			Trim		Stainless Steel				
			Body		Cast Iron				
			Pressure Ratings		ANSI 150/300				
			Test Ports		Two - 1/4" ISO				
Valve Features			Flow, gpm*			Differential Pressure (psid)		Valve O.S. Number	
Valve Size	Flow, gpm*		Differential Pressure (psid)			Valve O.S. Number			
	Min.	Max.	Min.*	Max.*	Close-off				
2-1/2 and 3 in. [DN65-DN80]	40.7	113	4.5	87	100	VRW2JV4SMB	VRW2JV4SMD		
	56.3	157	5.1			VRW2JW4SMB	VRW2JW4SMD		
3 and 4 in. [DN80-DN100]	55.4	149	4.5			VRW2KV4SMB	VRW2KV4SMD		
	75	225	5.1			VRW2KW4SMB	VRW2KW4SMD		
5 and 6 in. [DN125-DN150]	103	369	4.5			VRW2LV4SMB	VRW2LV4SMD		
	113	468	5.1			VRW2LW4SMB	VRW2LW4SMD		

* Differential pressure regulator operating range, ±5%

Product Selection - Valves

NPT Globe Valves 1/2" - 3", With Dedicated Valve Actuators

For more than 50 years, Honeywell Globe Valves (V5011/13, VGF) have provided precise control for many applications.

Globe valves provide the rangeability and close-off needed to keep tight control of the environment.

Valve and Actuator Assemblies available.

Full part numbers are **valve part number+actuator part number**

Example of complete orderable part number: **V5011N1008+ML7984A4009**



Actuator Features		Non Fail Safe					
Actuator O.S. Number		ML7984A4009	ML6984A4000	ML7420A3065	ML7420A3063	ML6420A3049	ML6420A3066
Power Supply	Voltage	24 Vac / 28 Vdc	24 Vac / 28 Vdc	24 Vac	24 Vac	24 Vac	24 Vac
	Frequency	0 / 50 / 60 Hz	0 / 50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz
	Power	12 VA	12 VA	7 VA	7 VA	6 VA	6 VA
Stem Force (lbs.)		160	160	135	135	135	135
Control	(0)2-10 Vdc	•		•	•		
	4-20 mA (external 500 Ohm Resistor)	Built-in		•	•		
	Floating		•			•	•
	Two-Position SPDT		•			•	•
	135 Ohm	•					
Fail Safe Action		Stay in place	Stay in place	Stay in place	Stay in place	Stay in place	Stay in place
Normal Position (no signal) (field configurable)		Stem Up/Down	Stay in place	Stem Up/Down	Stem Up/Down	Stay in place	Stay in place
Actuator Stroke (inches)		0.5 - 1 self adj	0.5 - 1 self adj	0.75	0.75	0.75	0.75
Timing (seconds at 0.75" stroke)		63	63	60	30	60	30
Aux Switch	1 x SPDT Add-On	272630D	272630D				
	2 x SPDT Add-On					43191680-105	43191680-105
Feedback	2-10 Vdc Built-in			•	•		
	2-10 Vdc Add-On	272630D	272630D	•	•		

	Valve Size (inches)	Cv	Max Static Water Pressure	Max Steam Pressure / Temperature	Flow Characteristic	Valve Action	Valve OS Number	Close-off Pressure, psid					
2-Way Water Valves Straight Through	1/2"	0.73	217 psi @ 248 F	15 psi (2-position)	Equal %	Stem down to close	V5011N1008	230	230	230	230	230	230
		1.16					V5011N1016	230	230	230	230	230	230
		1.85					V5011N1024	230	230	230	230	230	230
		2.9					V5011N1032	230	230	230	230	230	230
		4.7					V5011N1040	230	230	230	230	230	230
	3/4"	7.3	250 psi @ 100F	100 psig / 337 F	Linear	Stem down to close	V5011N1057	230	230	230	230	230	230
	1"	11.7					V5011N1065	193	193	163	163	163	163
	1-1/4"	18.7					V5011N1073	123	123	104	104	104	104
	1-1/2"	29.3					V5011N1081	79	79	67	67	67	67
	2"	46.8					V5011N1099	44	44	37	37	37	37
	2-1/2"	63					V5011F1105	33	33	28	28	28	28
	3"	100					V5011F1113	19	19	16	16	16	16
2-Way Steam Valves Straight Through	1/2"	0.73	217 psi @ 248 F	100 psig / 337 F	Linear	Stem down to close	V5011N2006	100	100	100	100	100	100
		1.16					V5011N2014	100	100	100	100	100	100
		1.85					V5011N2022	100	100	100	100	100	100
		2.9					V5011N2030	100	100	100	100	100	100
		4.7					V5011N2048	100	100	100	100	100	100
	3/4"	7.3	250 psi @ 100F	100 psig / 337 F	Linear	Stem down to close	V5011N2055	100	100	100	100	100	100
	1"	11.7					V5011N2063	100	100	100	100	100	100
	1-1/4"	18.7					V5011N2071	100	100	100	100	100	100
	1-1/2"	29.3					V5011N2089	79	79	67	67	67	67
	2"	46.8					V5011N2097	44	44	37	37	37	37
3-Way Water Valves Mixing	1/2"	2.9	217 psi @ 248 F	N / A	Linear B-AB / Equal % A-AB	Stem up closes A-AB	V5011G1111	33	33	28	28	28	28
		4.7					V5011G1129	19	19	16	16	16	16
	3/4"	7.3					V5013N1030	230	230	230	230	230	230
	1"	11.7					V5013N1048	230	230	230	230	230	230
	1-1/4"	18.7					V5013N1055	230	230	230	230	230	230
	1-1/2"	29.3					V5013N1063	193	193	163	163	163	163
	2"	46.8					V5013N1071	123	123	104	104	104	104
							V5013N1089	79	79	67	67	67	67
		V5013N1097	44	44	37	37	37	37					

Product Selection - Valves

NPT Globe Valves 1/2" - 3", With Dedicated Valve Actuators

Common Features

- ANSI body class 150
- Close-off pressure = maximum differential pressure
- Maximum static water pressure (250°F): 240 psi
- Maximum steam pressure
- 2-way steam valves, 337°F: 100 psi
- 2-way water valves: 15 psi
- Stem travel: 0.75"
- Rangeability: 50:1
- Leakage < 0.05% of Cv
- Body material: Red brass, stainless steel stem (steam valve has stainless steel trim.)

Valve and Actuator Assemblies available.

Full part numbers are **valve part number+actuator part number**

Example of complete orderable part number: **V5011N1008+ML7421A1032**



Actuator Features		Non Fail Safe		Fail Safe			
Actuator O.S. Number		ML7421A1032	ML6421A1017	ML7425A3013	ML7425B3012	ML6425A3022	ML6425B3013
Power Supply	Voltage	24 Vac	24 Vac	24 Vac	24 Vac	24 Vac	24 Vac
	Frequency	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz
	Power	12 VA	11 VA	12 VA	12 VA	11 VA	11 VA
Stem Force	(lbs.)	404	404	135	135	135	135
Control	(0)2-10 Vdc	•		•	•		
	4-20 mA (external 500 Ohm Resistor)	•		•	•		
	Floating		•			•	•
	Two-Position SPDT		•			•	•
	Two-Position SPST					•	•
Fail Safe Action		Stay in place	Stay in place	Stem Down	Stem Up	Stem Down	Stem Up
Normal Position (no signal)	(field configurable)	Stem Up/Down	Stay in place	Stem Up/Down	Stem Up/Down	Stay in place	Stay in place
Actuator Stroke	(inches)	0.75	0.75	0.75	0.75	0.75	0.75
Timing	(seconds at 0.75" stroke)	90	90	90	90	90	90
Aux Switch	2 x SPDT Add-On	43191680-102	43191680-102			43191680-105	43191680-105
Feedback	2-10 Vdc Built-in	•		•	•		
	220 Ohm Add-On					43191679-112	43191679-112
	10 kOhm Add-On		43191679-101			43191679-111	43191679-111

	Valve Size (inches)	Cv	Max Static Water Pressure	Max Steam Pressure / Temperature	Flow Characteristic	Valve Action	Valve OS Number	Close-off Pressure, psid				
2-Way Water Valves Straight Through	1/2"	0.73	217 psi @ 248 F	15 psi (2-position)	Equal %	Stem down to close	V5011N1008		230*	230**	230*	230**
		1.16					V5011N1016		230*	230**	230*	230**
		1.85					V5011N1024		230*	230**	230*	230**
		2.9					V5011N1032		230*	230**	230*	230**
		4.7					V5011N1040		230*	230**	230*	230**
	3/4"	7.3			230*	230**	230*	230**				
	1"	11.7			230*	230**	230*	230**				
	1-1/4"	18.7			230*	230**	230*	230**				
	1-1/2"	29.3			230*	230**	230*	230**				
	2"	46.8			230*	230**	230*	230**				
	2-1/2"	63	250 psi @ 100F				230*	230**	230*	230**		
	3"	100					230*	230**	230*	230**		
2-Way Steam Valves Straight Through	1/2"	0.73	217 psi @ 248 F	100 psig / 337 F	Linear	Stem down to close	V5011N2006		100*	100**	100*	100**
		1.16					V5011N2014		100*	100**	100*	100**
		1.85					V5011N2022		100*	100**	100*	100**
		2.9					V5011N2030		100*	100**	100*	100**
		4.7					V5011N2048		100*	100**	100*	100**
	3/4"	7.3			100*	100**	100*	100**				
	1"	11.7			100*	100**	100*	100**				
	1-1/4"	18.7			100*	100**	100*	100**				
	1-1/2"	29.3			100*	100**	100*	100**				
	2"	46.8			100*	100**	100*	100**				
	2-1/2"	63	250 psi @ 100F				100*	100**	100*	100**		
	3"	100					100*	100**	100*	100**		
3-Way Water Valves Mixing	1/2"	2.9	217 psi @ 248 F	N / A	Linear B-AB / Equal % A-AB	Stem up closes A-AB	V5013N1030		230	230	230	230
	1/2"	4.7					V5013N1048		230	230	230	230
	3/4"	7.3					V5013N1055		230	230	230	230
	1"	11.7					V5013N1063	230	230	163	163	163
	1-1/4"	18.7					V5013N1071	230	230	104	104	104
	1-1/2"	29.3					V5013N1089	221	221	67	67	67
	2"	46.8					V5013N1097	126	126	37	37	37

* valve is Normally Closed on loss of power
** valve is Normally Open on loss of power.

Product Selection - Valves

NPT Globe Valves 1/2"- 3", With DCA and Valve Linkage

Common Features

- ANSI body class 150
- Close-Off pressure = maximum differential pressure
- Maximum static water pressure (250°F): 240 psi
- Maximum steam pressure
2-way steam valves, 337°F: 100 psi
2-way water valves: 15 psi
- Stem travel: 0.75"
- Rangeability: 50:1
- Leakage < 0.05% of Cv
- Body material: Red brass, stainless steel stem (steam valve has stainless steel stem.)



**Q5020A1003
Required**



Actuator Features		Non Fail Safe			
Actuator O.S. Number		MN7505A2001 MN7505A2209	MN6105A1011 MN6105A1201	MN7510A2001 MN7510A2209	MN6110A1003 MN6110A1201
Power Supply	Voltage	24 Vac	24 Vac	24 Vac	24 Vac
	Frequency	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz
	Power	5 VA	5 VA	5 VA	5 VA
Actuator Torque	(lb.-in.)	44	44	88	88
Linkage Stem Force	(lbs.)	58	58	117	117
Control	(0)2-10 Vdc	•		•	
	4-20 mA (external 500 Ohm Resistor)	•		•	
	Floating	•	•	•	•
	Two-Position SPDT	•	•	•	•
	Two-Position SPST	•	•	•	•
Fail Safe Action		Stay in Place	Stay in Place	Stay in Place	Stay in Place
Normal Position (no signal)	(field configurable)	Stem Up/Down	Stay in Place	Stem Up/Down	Stay in Place
Actuator Stroke	(inches)	95°	95°	95°	95°
Timing	(seconds at 0.75" stroke)	95	95	95	95
Aux Switch	2 x SPDT Built In	0 / 2	0 / 2	0 / 2	0 / 2
Feedback	(0)2-10 Vdc Built In	•		•	

	Valve Size (inches)	Cv	Max Static Water Pressure	Max Steam Pressure / Temperature	Flow Characteristic	Valve Action	Valve OS Number	Close-off Pressure, psid			
2-Way Water Valves Straight Through	1/2"	0.73	217 psi @ 248 F	15 psi (2-position)	Equal %	Stem down to close	V5011N1008	230	230	230	230
		1.16					V5011N1016	230	230	230	230
		1.85					V5011N1024	230	230	230	230
		2.9					V5011N1032	230	230	230	230
		4.7					V5011N1040	188	188	230	230
	3/4"	7.3	V5011N1057	91	91	192	192				
	1"	11.7	V5011N1065	63	63	135	135				
	1-1/4"	18.7	V5011N1073	39	39	85	85				
	1-1/2"	29.3	V5011N1081	24	24	55	55				
	2"	46.8	V5011N1099	12	12	30	30				
2-Way Steam Valves Straight Through	1/2"	0.73	217 psi @ 248 F	100 psig / 337 F	Linear	Stem down to close	V5011N2006	100	100	100	100
		1.16					V5011N2014	100	100	100	100
		1.85					V5011N2022	100	100	100	100
		2.9					V5011N2030	100	100	100	100
		4.7					V5011N2048	100	100	100	100
	3/4"	7.3	V5011N2055	91	91	100	100				
	1"	11.7	V5011N2063	63	63	100	100				
	1-1/4"	18.7	V5011N2071	39	39	85	85				
	1-1/2"	29.3	V5011N2089	24	24	55	55				
	2"	46.8	V5011N2097	12	12	30	30				
3-Way Water Valves Mixing	2-1/2"	63	250 psi @ 100F	N / A	Linear B-AB / Equal % A-AB	Stem up closes A-AB	V5011G1111	7	7	19	19
	3"	100					V5011G1129	3	3	11	11
	1/2"	2.9	V5013N1030				230	230	230	230	
	1/2"	4.7	V5013N1048				188	188	230	230	
	3/4"	7.3	V5013N1055				91	91	192	192	
	1"	11.7	V5013N1063				63	63	135	135	
	1-1/4"	18.7	V5013N1071				39	39	85	85	
1-1/2"	29.3	V5013N1089	24	24	55	55					
2"	46.8	V5013N1097	12	12	30	30					

Product Selection - Valves

NPT Globe Valves 1/2"- 3", With DCA and Valve Linkage

**Q5020A1003
Required**



Actuator Features		Non Fail Safe			
Actuator O.S. Number		MNT720A2007 MNT720A2205	MN6120A1002 MN6120A1200	MNT734A2008	MN6134A1003
	Power Supply Voltage	24 Vac	24 Vac	24 Vac	24 Vac
	Frequency	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz
	Power	6 VA	6 VA	9 VA	9 VA
Actuator Torque (lb.-in.)		175	175	300	300
Linkage Stem Force (lbs.)		234	234	402	402
Control (0)2-10 Vdc		•		•	
	4-20 mA (external 500 Ohm Resistor)	•		•	
	Floating		•		•
	Two-Position SPDT		•		•
	Two-Position SPST		•		•
Fail Safe Action		Stay in Place	Stay in Place	Stay in Place	Stay in Place
Normal Position (no signal) (field configurable)		Stem Up/Down	Stem Up/Down	Stem Up/Down	Stay in Place
Actuator Stroke (inches)		95°	95°	95°	95°
Timing (seconds at 0.75" stroke)		95	95	95	95
Aux Switch	2 x SPDT Built In	0 / 2	0 / 2		
	2 x SPDT Add-On	SW2-US	SW2-US	SW2-US	SW2-US
Feedback (0)2-10 Vdc Built In		•		•	

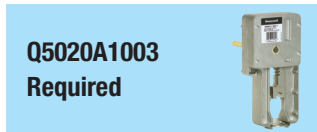
	Valve Size (inches)	Cv	Max Static Water Pressure	Max Steam Pressure / Temperature	Flow Characteristic	Valve Action	Valve OS Number	Close-off Pressure, psid			
2-Way Water Valves Straight Through	1/2"	0.73	217 psi @ 248 F	15 psi (2-position)	Equal %	Stem down to close	V5011N1008				
		1.16					V5011N1016				
		1.85					V5011N1024				
		2.9					V5011N1032				
		4.7					V5011N1040				
	3/4"	7.3					230	230			
	1"	11.7					230	230			
	1-1/4"	18.7					168	168	230	230	
	1-1/2"	29.3					113	113	180	180	
	2"	46.8					63	63	103	103	
	2-1/2"	63	250 psi @ 100F				42	42	74	74	
	3"	100					26	26	45	45	
	2-Way Steam Valves Straight Through	1/2"	0.73	217 psi @ 248 F	100 psig / 337 F	Linear	Stem down to close	V5011N2006			
1.16			V5011N2014								
1.85			V5011N2022								
2.9			V5011N2030								
4.7			V5011N2048								
3/4"		7.3					100	100	100	100	
1"		11.7					100	100	100	100	
1-1/4"		18.7					100	100	100	100	
1-1/2"		29.3					58	58	100	100	
2"		46.8					42	42	74	74	
2-1/2"		63	250 psi @ 100F				26	26	45	45	
3"		100									
3-Way Water Valves Mixing		1/2"	2.9	217 psi @ 248 F	N / A	Linear B-AB / Equal % A-AB	Stem up closes A-AB	V5013N1030	230	230	230
	1/2"	4.7	V5013N1048					230	230	230	230
	3/4"	7.3	V5013N1055					230	230	230	230
	1"	11.7	V5013N1063					230	230	230	230
	1-1/4"	18.7	V5013N1071					168	168	230	230
	1-1/2"	29.3	V5013N1089					105	105	180	180
	2"	46.8	V5013N1097					103	103	103	103

Product Selection - Valves

NPT Globe Valves 1/2"- 3", With DCA and Valve Linkage

Common Features

- ANSI body class 150
- Close-Off pressure = maximum differential pressure
- Maximum static water pressure (250°F): 240 psi
- Maximum steam pressure
2-way steam valves, 337°F: 100 psi
2-way water valves: 15 psi
- Stem travel: 0.75"
- Rangeability: 50:1
- Leakage < 0.05% of Cv
- Body material: Red brass, stainless steel stem (steam valve has stainless steel trim.)



Actuator Features		Fail Safe				
Actuator O.S. Number		MS7505A2030 MS7505A2130	MS8105A1030 MS8105A1130	MS4105A1030 MS4105A1130	MS7510A2008 MS7510A2206 MS7510H2209	MS8110A1008 MS8110A1206
	Power Supply	Voltage	24 Vac	24 Vac	100-250 Vac	24 Vac
	Frequency	50 / 60 Hz	50 / 60 Hz	60 Hz	50 / 60 Hz	50 / 60 Hz
	Power	7.5VA	8 VA	11VA	14 VA	30 VA
Actuator Torque	(lb.-in.)	44	44	44	88	88
Linkage Stem Force	(lbs.)	58	58	58	117	117
Control	(0)2-10 Vdc	•			•	
	4-20 mA (external 500 Ohm Resistor)	•			•	
	Floating	•			•	
	Two-Position SPDT	•			•	
	Two-Position SPST	•	•	•	•	•
Fail Safe Action		Configurable Open/Closed	Configurable Open/Closed	Configurable Open/Closed	Configurable Open/Closed	Configurable Open/Closed
Normal Position (no signal)	(field configurable)	Stem Up/Down	Stem Up/Down	Stem Up/Down	Stem Up/Down	Stem Up/Down
Actuator Stroke	(inches)	95°	95°	95°	95°	95°
Timing	(seconds at 0.75" stroke)	90	90	90	90	90
Aux Switch	SPDT Built In	0 / 1	0 / 1	0 / 1	0 / 2 / 2	0 / 2
	2 x SPDT Add-On				SW2-US	SW2-US
Feedback	2-10 Vdc Built In	•			•	

	Valve Size (inches)	Cv	Max Static Water Pressure	Max Steam Pressure / Temperature	Flow Characteristic	Valve Action	Valve OS Number	Close-off Pressure, psid				
								230	230	230	230	230
2-Way Water Valves Straight Through	1/2"	0.73	217 psi @ 248 F	15 psi (2-position)	Equal %	Stem down to close	V5011N1008	230	230	230	230	230
		1.16					V5011N1016	230	230	230	230	230
		1.85					V5011N1024	230	230	230	230	230
		2.9					V5011N1032	230	230	230	230	230
		4.7					V5011N1040	184	184	184	230	230
		7.3					V5011N1057	79	79	79	150	150
	3/4"	11.7	V5011N1065	66	66	66	136	136				
		18.7	V5011N1073	40	40	40	84	84				
		29.3	V5011N1081	26	26	26	55	55				
		46.8	V5011N1099	13	13	13	30	30				
		63	V5011F1105	9	9	9	21	21				
		100	V5011F1113	6	6	6	13	13				
2-Way Steam Valves Straight Through	1/2"	0.73	217 psi @ 248 F	100 psig / 337 F	Linear	Stem down to close	V5011N2006	100	100	100	100	100
		1.16					V5011N2014	100	100	100	100	100
		1.85					V5011N2022	100	100	100	100	100
		2.9					V5011N2030	100	100	100	100	100
		4.7					V5011N2048	100	100	100	100	100
		7.3					V5011N2055	79	79	79	100	100
	1"	11.7	V5011N2063	66	66	66	100	100				
		18.7	V5011N2071	40	40	40	84	84				
		29.3	V5011N2089	26	26	26	55	55				
		46.8	V5011N2097	13	13	13	30	30				
		63	V5011G1111	9	9	9	21	21				
		100	V5011G1129	6	6	6	13	13				
3-Way Water Valves Mixing	1/2"	2.9	217 psi @ 248 F	N / A	Linear B-AB / Equal % A-AB	Stem up closes A-AB	V5013N1030	230	230	230	230	230
	4.7	V5013N1048					184	184	184	230	230	
	7.3	V5013N1055					79	79	79	150	150	
	11.7	V5013N1063					66	66	66	136	136	
	18.7	V5013N1071					40	40	40	84	84	
	29.3	V5013N1089					26	26	26	55	55	
	46.8	V5013N1097					13	13	13	30	30	

Product Selection - Valves

NPT Globe Valves 1/2" - 3", With DCA and Valve Linkage

**Q5020A1003
Required**



Actuator Features		Fail Safe			
Actuator O.S. Number		MS4110A1002 MS4110A1200	MS7520A2007 MS7520A2205 MS7520H2208	MS8120A1007 MS8120A1205	MS4120A1001 MS4120A1209
Power Supply	Voltage	100-250 Vac	24 Vac	24 Vac	100-250 Vac
	Frequency	60 Hz	50 / 60 Hz	50 / 60 Hz	60 Hz
	Power	45 VA	16 VA	40 VA	60 VA
Actuator Torque	(lb.-in.)	88	175	175	175
Linkage Stem Force	(lbs.)	117	234	234	234
Control	(0)2-10 Vdc		•		
	4-20 mA (external 500 Ohm Resistor)		•		
	Floating		•		
	Two-Position SPDT		•		
	Two-Position SPST		•		
Fail Safe Action		Configurable Open/Closed	Configurable Open/Closed	Configurable Open/Closed	Configurable Open/Closed
Normal Position (no signal)	(field configurable)	Stem Up/Down	Stem Up/Down	Stem Up/Down	Stem Up/Down
Actuator Stroke	(inches)	95°	95°	95°	95°
Timing	(seconds at 0.75" stroke)	90	90	90	90
Aux Switch	SPDT Built In	0 / 2	0 / 2 / 2	0 / 2	0 / 2
	2 x SPDT Add-On	SW2-US	SW2-US	SW2-US	SW2-US
Feedback	2-10 Vdc Built In		•		

	Valve Size (inches)	Cv	Max Static Water Pressure	Max Steam Pressure / Temperature	Flow Characteristic	Valve Action	Valve OS Number	Close-off Pressure, psid			
2-Way Water Valves Straight Through	1/2"	0.73	217 psi @ 248 F	15 psi (2-position)	Equal %	Stem down to close	V5011N1008	230			
		1.16					V5011N1016	230			
		1.85					V5011N1024	230			
		2.9					V5011N1032	230			
		4.7					V5011N1040	230			
	3/4"	7.3	250 psi @ 100F	100 psig / 337 F	Linear	Stem down to close	V5011N1057	150	230	230	230
	1"	11.7					V5011N1065	136	230	230	230
	1-1/4"	18.7					V5011N1073	84	171	171	171
	1-1/2"	29.3					V5011N1081	55	113	113	113
	2"	46.8					V5011N1099	30	63	63	63
2-1/2"	63	V5011F1105	21	45	45	45					
3"	100	V5011F1113	13	27	27	27					
2-Way Steam Valves Straight Through	1/2"	0.73	217 psi @ 248 F	100 psig / 337 F	Linear	Stem down to close	V5011N2006	100	100	100	100
		1.16					V5011N2014	100	100	100	100
		1.85					V5011N2022	100	100	100	100
		2.9					V5011N2030	100	100	100	100
		4.7					V5011N2048	100	100	100	100
	3/4"	7.3	250 psi @ 100F	N / A	Linear B-AB / Equal % A-AB	Stem up closes A-AB	V5011N2055	100	100	100	100
	1"	11.7					V5011N2063	100	100	100	100
	1-1/4"	18.7					V5011N2071	84	100	100	100
	1-1/2"	29.3					V5011N2089	55	100	100	100
	2"	46.8					V5011N2097	30	63	63	63
2-1/2"	63	V5011G1111	21	45	45	45					
3"	100	V5011G1129	13	27	27	27					
3-Way Water Valves Mixing	1/2"	2.9	217 psi @ 248 F	N / A	Linear B-AB / Equal % A-AB	Stem up closes A-AB	V5013N1030	230	230	230	230
	1/2"	4.7					V5013N1048	230	230	230	230
	3/4"	7.3					V5013N1055	150	230	230	230
	1"	11.7					V5013N1063	136	230	230	230
	1-1/4"	18.7					V5013N1071	84	171	171	171
	1-1/2"	29.3					V5013N1089	55	113	113	113
	2"	46.8					V5013N1097	30	63	63	63

VALVES

Product Selection - Valves

NPT Globe Valves 1/2" - 3", With Pneumatic Actuator

Common Features

- Easy installation and attachment to the valve
- Direct or reverse acting
- No positive positioner

Valve and Actuator Assemblies available.

Full part numbers are **valve part number+actuator part number**



Example of complete orderable part number: **V5011N1081+MP953C1000**



Actuator Features		Without Positive Positioner											
Actuator O.S. Number		MP953C1000	MP953C1018	MP953C1026	MP953C1067	MP953C1075	MP953C1083	MP953C1554	MP953C1562	MP953D1107	MP953D1131	MP953D1172	
Direct Acting / Reverse Acting		Direct Acting						Reverse Acting					
Diaphragm Size		5"			8"			13"			7-1/8"		
Fail Safe Action		Stem Up						Stem Down					
Actuator Force		Low			Medium			High			Medium		
Spring Range	2-7 psi	•			•			•					
	3-7 psi											•	
	8-12 psi		•			•							
	8-13 psi									•			
	4-11 psi			•			•		•		•		

Valve Size (inches)	Cv	Flow Characteristic	Valve Action	Valve OS Number	Close-off Pressure - See Charts On Page 134-135										
					C*-NO	C*-NO	C*-NO	B*-NO	B*-NO	B*-NO	N/A	A*-NC	A*-NC	A*-NC	
2-Way Water Valves Straight Through	1/2"	Equal %	Stem down to close	V5011N1008	C*-NO	C*-NO	C*-NO	B*-NO	B*-NO	B*-NO	N/A	A*-NC	A*-NC	A*-NC	
				V5011N1016	C*-NO	C*-NO	C*-NO	B*-NO	B*-NO	B*-NO		A*-NC	A*-NC	A*-NC	
				V5011N1024	C*-NO	C*-NO	C*-NO	B*-NO	B*-NO	B*-NO		A*-NC	A*-NC	A*-NC	
				V5011N1032	C*-NO	C*-NO	C*-NO	B*-NO	B*-NO	B*-NO		A*-NC	A*-NC	A*-NC	
				V5011N1040	C*-NO	C*-NO	C*-NO	B*-NO	B*-NO	B*-NO		A*-NC	A*-NC	A*-NC	
	3/4"	7.3	1"	V5011N1057	C*-NO	C*-NO	C*-NO	B*-NO	B*-NO	B*-NO	A*-NC	A*-NC	A*-NC		
	1"	11.7		V5011N1065	C*-NO	C*-NO	C*-NO	B*-NO	B*-NO	B*-NO	A*-NC	A*-NC	A*-NC		
	1-1/4"	18.7		V5011N1073	C*-NO	C*-NO	C*-NO	B*-NO	B*-NO	B*-NO	A*-NC	A*-NC	A*-NC		
	1-1/2"	29.3		V5011N1081	C*-NO	C*-NO	C*-NO	B*-NO	B*-NO	B*-NO	A*-NC	A*-NC	A*-NC		
	2"	46.8		V5011N1099	C*-NO	C*-NO	C*-NO	B*-NO	B*-NO	B*-NO	A*-NC	A*-NC	A*-NC		
2-1/2"	63	V5011F1105				H*-NO	H*-NO	H*-NO	J*-NO	J*-NO	D*-NC	D*-NC	D*-NC		
3"	100	V5011F1113		N/A		H*-NO	H*-NO	H*-NO	J*-NO	J*-NO	D*-NC	D*-NC	D*-NC		
2-Way Steam Valves Straight Through	1/2"	Linear	Stem down to close	V5011N2006	C*-NO	C*-NO	C*-NO	B*-NO	B*-NO	B*-NO	N/A	A*-NC	A*-NC	A*-NC	
				V5011N2014	C*-NO	C*-NO	C*-NO	B*-NO	B*-NO	B*-NO		A*-NC	A*-NC	A*-NC	
				V5011N2022	C*-NO	C*-NO	C*-NO	B*-NO	B*-NO	B*-NO		A*-NC	A*-NC	A*-NC	
				V5011N2030	C*-NO	C*-NO	C*-NO	B*-NO	B*-NO	B*-NO		A*-NC	A*-NC	A*-NC	
				V5011N2048	C*-NO	C*-NO	C*-NO	B*-NO	B*-NO	B*-NO		A*-NC	A*-NC	A*-NC	
	3/4"	7.3	V5011N2055	C*-NO	C*-NO	C*-NO	B*-NO	B*-NO	B*-NO	A*-NC	A*-NC	A*-NC			
	1"	11.7	V5011N2063	C*-NO	C*-NO	C*-NO	B*-NO	B*-NO	B*-NO	A*-NC	A*-NC	A*-NC			
	1-1/4"	18.7	V5011N2071	C*-NO	C*-NO	C*-NO	B*-NO	B*-NO	B*-NO	A*-NC	A*-NC	A*-NC			
	1-1/2"	29.3	V5011N2089	C*-NO	C*-NO	C*-NO	B*-NO	B*-NO	B*-NO	A*-NC	A*-NC	A*-NC			
	2"	46.8	V5011N2097	C*-NO	C*-NO	C*-NO	B*-NO	B*-NO	B*-NO	A*-NC	A*-NC	A*-NC			
2-1/2"	63	V5011G1111				H*-NO	H*-NO	H*-NO	J*-NO	J*-NO	D*-NC	D*-NC	D*-NC		
3"	100	V5011G1129				H*-NO	H*-NO	H*-NO	J*-NO	J*-NO	D*-NC	D*-NC	D*-NC		
3-Way Water Valves Mixing	1/2"	Linear B-AB / Equal % A-AB	Stem up closes A-AB	V5013N1030	E-NC	E-NC	E-NC	F-NC	F-NC	F-NC	N/A	G-NO	G-NO	G-NO	
				V5013N1048	E-NC	E-NC	E-NC	F-NC	F-NC	F-NC		G-NO	G-NO	G-NO	
	3/4"			7.3	V5013N1055	E-NC	E-NC	E-NC	F-NC	F-NC		F-NC	G-NO	G-NO	G-NO
	1"			11.7	V5013N1063	E-NC	E-NC	E-NC	F-NC	F-NC		F-NC	G-NO	G-NO	G-NO
	1-1/4"			18.7	V5013N1071	E-NC	E-NC	E-NC	F-NC	F-NC		F-NC	G-NO	G-NO	G-NO
	1-1/2"			29.3	V5013N1089	E-NC	E-NC	E-NC	F-NC	F-NC		F-NC	G-NO	G-NO	G-NO
	2"			46.8	V5013N1097	E-NC	E-NC	E-NC	F-NC	F-NC		F-NC	G-NO	G-NO	G-NO

*The close-off pressure not to exceed rated pressure of steam valve
 NC = Normally Closed, A to AB Normally Closed for 3-way valves
 NO = Normally Open, A to AB Normally Open for 3-way valves

Product Selection - Valves

NPT Globe Valves 1/2"-3", With Pneumatic Actuator

Common Features

- Easy installation and attachment to the valve
- Direct or reverse acting
- Integrated positive positioner

Valve and Actuator Assemblies available.

Full part numbers are **valve part number+actuator part number**



Example of complete orderable part number: **V5011N1081+MP953E1301**



Actuator Features	With Positive Positioner										
Actuator O.S. Number	MP953E1301	MP953E1319	MP953E1327	MP953E1368	MP953E1376	MP953E1384	MP953E1435	MP953E1443	MP953E1083	MP953E1101	MP953E1119
Direct Acting / Reverse Acting	Direct Acting						Reverse Acting				
Diaphragm Size	5"			8"			13"		7-1/8"		
Fail Safe Action	Stem Up						Stem Down				
Actuator Force	Low			Medium			High		Medium		
Spring Range	4-11 psi	•	•	•	•	•	•	•	•	•	•
	8-13 psi								•	•	•
Positioner Span	10 psi			•				•			•
	5 psi		•		•			•		•	
	3 psi	•			•				•		

Valve Size (inches)	Cv	Flow Characteristic	Valve Action	Valve OS Number	Close-off Pressure - See Charts On Page 134-135										
					C*-NO	C*-NO	C*-NO	B*-NO	B*-NO	B*-NO	N/A	N/A	N/A	D*-NC	D*-NC
2-Way Water Valves Straight Through	1/2"	Equal %	Stem down to close	V5011N1008	C-NO	C-NO	C-NO	B-NO	B-NO	B-NO	N/A	N/A	A-NC	A-NC	A-NC
				V5011N1016	C-NO	C-NO	C-NO	B-NO	B-NO	B-NO			A-NC	A-NC	A-NC
				V5011N1024	C-NO	C-NO	C-NO	B-NO	B-NO	B-NO			A-NC	A-NC	A-NC
				V5011N1032	C-NO	C-NO	C-NO	B-NO	B-NO	B-NO			A-NC	A-NC	A-NC
	V5011N1040			C-NO	C-NO	C-NO	B-NO	B-NO	B-NO	A-NC			A-NC	A-NC	
	V5011N1057			C-NO	C-NO	C-NO	B-NO	B-NO	B-NO	A-NC			A-NC	A-NC	
	V5011N1065			C-NO	C-NO	C-NO	B-NO	B-NO	B-NO	A-NC			A-NC	A-NC	
	V5011N1073			C-NO	C-NO	C-NO	B-NO	B-NO	B-NO	A-NC			A-NC	A-NC	
	V5011N1081			C-NO	C-NO	C-NO	B-NO	B-NO	B-NO	A-NC			A-NC	A-NC	
	V5011N1089			C-NO	C-NO	C-NO	B-NO	B-NO	B-NO	A-NC			A-NC	A-NC	
V5011F1105					H-NO	H-NO	H-NO	J*-NO	J*-NO	D*-NC	D*-NC	D*-NC			
V5011F1113					H-NO	H-NO	H-NO	J*-NO	J*-NO	D*-NC	D*-NC	D*-NC			
2-Way Steam Valves Straight Through	1/2"	Linear	Stem down to close	V5011N2006	C*-NO	C*-NO	C*-NO	B*-NO	B*-NO	B*-NO	N/A	N/A	A*-NC	A*-NC	A*-NC
				V5011N2014	C*-NO	C*-NO	C*-NO	B*-NO	B*-NO	B*-NO			A*-NC	A*-NC	A*-NC
				V5011N2022	C*-NO	C*-NO	C*-NO	B*-NO	B*-NO	B*-NO			A*-NC	A*-NC	A*-NC
				V5011N2030	C*-NO	C*-NO	C*-NO	B*-NO	B*-NO	B*-NO			A*-NC	A*-NC	A*-NC
	V5011N2048			C*-NO	C*-NO	C*-NO	B*-NO	B*-NO	B*-NO	A*-NC			A*-NC	A*-NC	
	V5011N2055			C*-NO	C*-NO	C*-NO	B*-NO	B*-NO	B*-NO	A*-NC			A*-NC	A*-NC	
	V5011N2063			C*-NO	C*-NO	C*-NO	B*-NO	B*-NO	B*-NO	A*-NC			A*-NC	A*-NC	
	V5011N2071			C*-NO	C*-NO	C*-NO	B*-NO	B*-NO	B*-NO	A*-NC			A*-NC	A*-NC	
	V5011N2089			C*-NO	C*-NO	C*-NO	B*-NO	B*-NO	B*-NO	A*-NC			A*-NC	A*-NC	
	V5011N2097			C*-NO	C*-NO	C*-NO	B*-NO	B*-NO	B*-NO	A*-NC			A*-NC	A*-NC	
V5011G1111					H*-NO	H*-NO	H*-NO	J*-NO	J*-NO	D*-NC	D*-NC	D*-NC			
V5011G1129					H*-NO	H*-NO	H*-NO	J*-NO	J*-NO	D*-NC	D*-NC	D*-NC			
3-Way Water Valves Mixing	1/2"	Linear B-AB / Equal % A-AB	Stem up closes A-AB	V5013N1030	E-NC	E-NC	E-NC	F-NC	F-NC	F-NC	N/A	N/A	G-NO	G-NO	G-NO
				V5013N1048	E-NC	E-NC	E-NC	F-NC	F-NC	F-NC			G-NO	G-NO	G-NO
	V5013N1055			E-NC	E-NC	E-NC	F-NC	F-NC	F-NC	G-NO			G-NO	G-NO	
	V5013N1063			E-NC	E-NC	E-NC	F-NC	F-NC	F-NC	G-NO			G-NO	G-NO	
	V5013N1071			E-NC	E-NC	E-NC	F-NC	F-NC	F-NC	G-NO			G-NO	G-NO	
	V5013N1089			E-NC	E-NC	E-NC	F-NC	F-NC	F-NC	G-NO			G-NO	G-NO	
	V5013N1097			E-NC	E-NC	E-NC	F-NC	F-NC	F-NC	G-NO			G-NO	G-NO	

*The close-off pressure not to exceed rated pressure of steam valve.

NC = Normally Closed, A to AB Normally Closed for 3-way valves

NO = Normally Open, A to AB Normally Open for 3-way valves

Close-off Pressure Charts - Valves

NPT Globe Valves 1/2" - 3"

Chart A

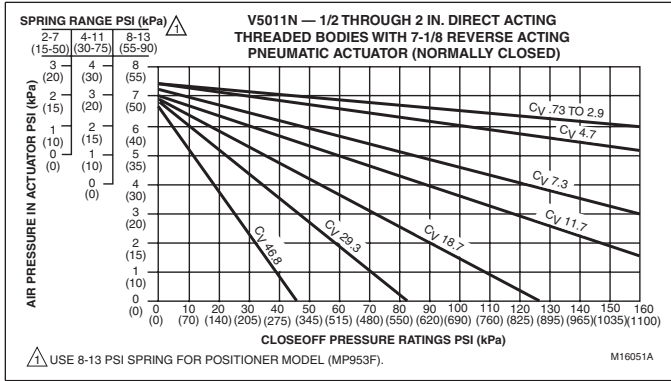


Chart B

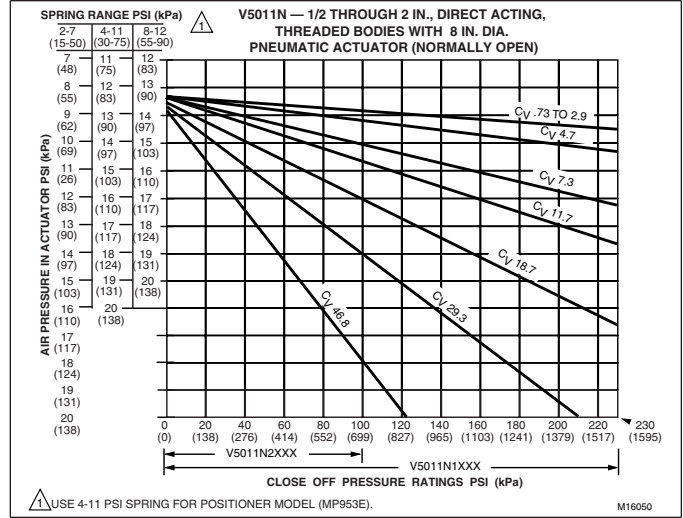


Chart C

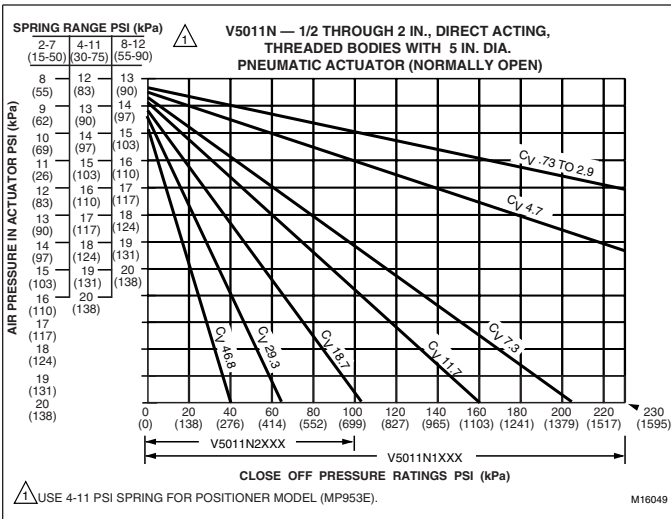


Chart D

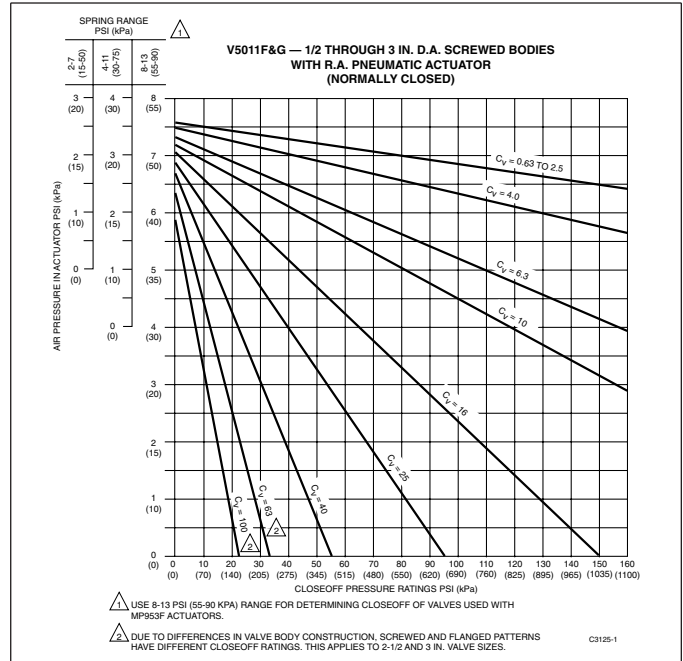
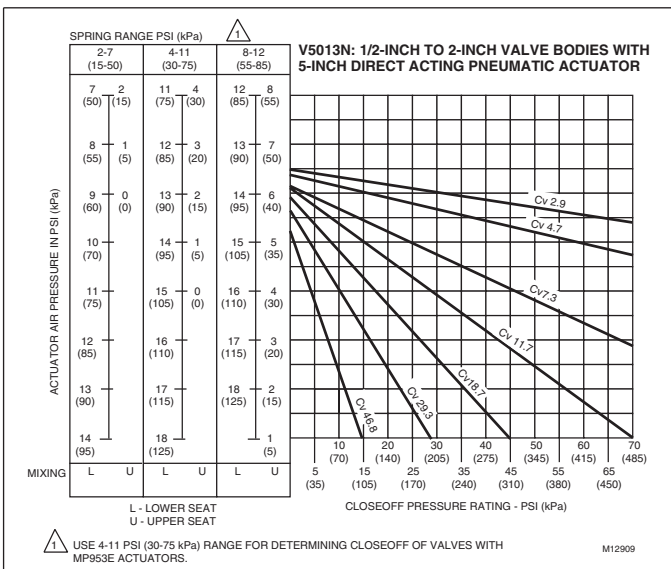


Chart E



Close-off Pressure Charts - Valves

NPT Globe Valves 1/2" - 3"

Chart F

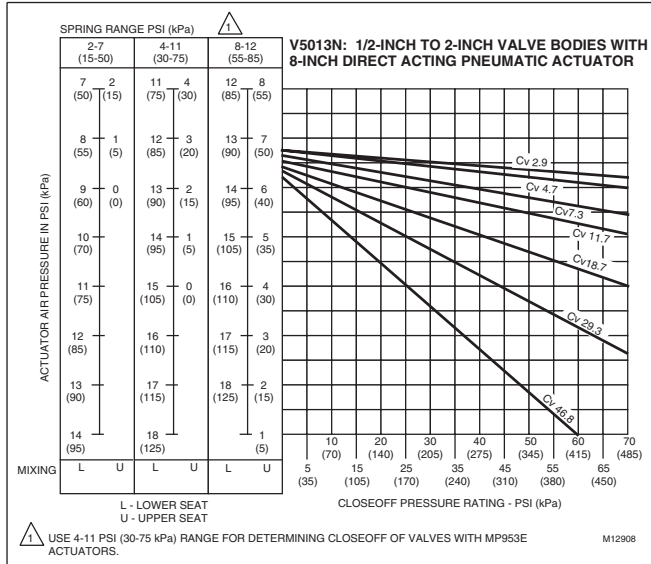


Chart G

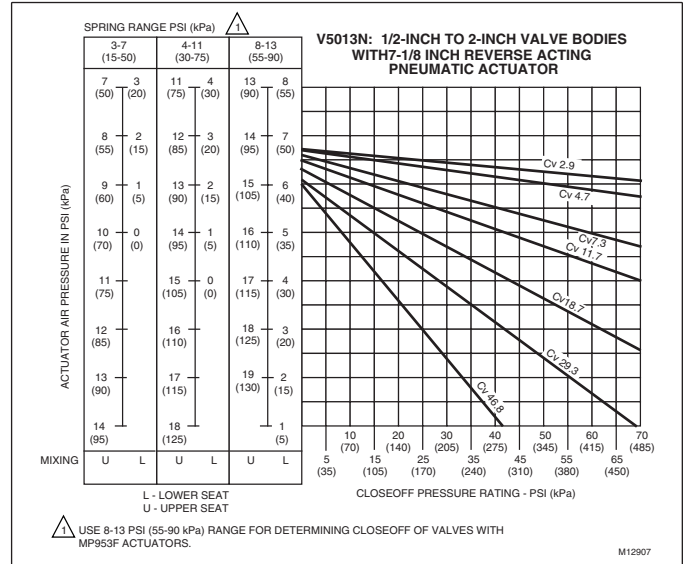


Chart H

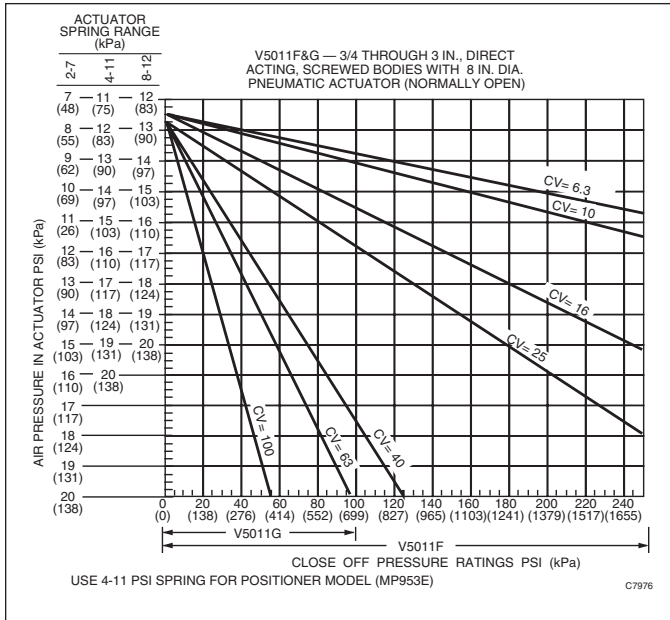
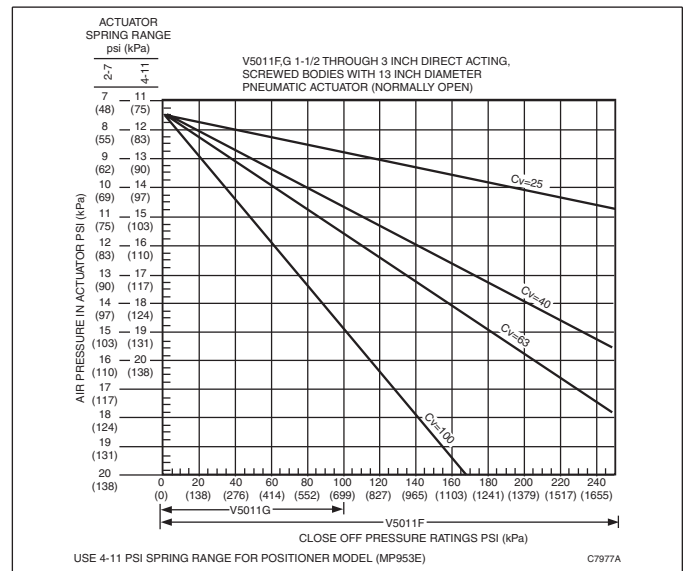


Chart J



VALVES

Product Selection - Valves

Flanged Globe Valves 2½"- 3", With Non Fail Safe DCA and Valve Linkage

Common Features

- For closed loop HVAC systems with up to 50% glycol
- ANSI Class 125 and 250 flanged cast iron bodies
- Close-off pressure = Maximum differential pressure
- Maximum static water pressure: Up to 400 psi
- Stem travel: 0.75"
- Rangeability: 50:1
- Valve trim: Stainless steel stem and plug. Integrated (cast iron) seat on VGF mixing valves, stainless steel seat on all other VGF valves)



Q5020A1003 Required		Non Fail Safe			
Actuator Features		MN720A2007 MN720A2205	MN6120A1002 MN6120A1200	MN7234A2008	MN6134A1003
Actuator O.S. Number	Power Supply	24 Vac	24 Vac	24 Vac	24 Vac
	Frequency	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz
	Power	6 VA	6 VA	9 VA	9 VA
Actuator Torque	(lb.-in.)	175	175	300	300
Linkage Stem Force	(lbs.)	234	234	402	402
Control	(0)2-10 Vdc	•		•	
	4-20 mA (external 500 Ohm Resistor)	•		•	
	Floating		•		•
	Two-Position SPDT		•		•
	Two-Position SPST		•		•
Fail Safe Action		Stay in Place	Stay in Place	Stay in Place	Stay in Place
Normal Position (no signal)	(field configurable)	Stem Up/Down	Stay in Place	Stem Up/Down	Stay in Place
Actuator Stroke	(degrees)	95°	95°	95°	95°
Timing	(seconds)	95	95	95	95
High Temperature Kit	Steam Application	43196000-001	43196000-001	43196000-001	43196000-001
Aux Switch	SPDT Built In	0 / 2	0 / 2		
	2 x SPDT Add-On	SW2-US	SW2-US	SW2-US	SW2-US
Feedback	(0)2-10 Vdc Built In	•		•	

Valve Size (inches)	Cv	Valve Type	ANSI Class	Max Static Water Pressure	Max Steam Pressure / Temperature	Flow Characteristic	Valve Action	Valve OS Number	Close-off Pressure, psid											
ANSI Class III (<0.05% Cv) seat leakage																				
2-Way Water & Steam	2-1/2"	70	Standard	125	175 psi @ 130 F	100 psig / 337 F	Equal %	Stem down to close	VGF21ES25	39	39	68	68							
									VGF21LS25	39	39	68	68							
									VGF22ES25	39	39	68	68							
									VGF21ES30	19	19	33	33							
	3"	125	Standard	125	175 psi @ 130 F	100 psig / 337 F	Equal %	Stem down to close	VGF21LS30	19	19	33	33							
									VGF22ES30	19	19	33	33							
									120	Standard	250	400 psi @ 130 F	100 psig / 337 F	Equal %	Stem down to close	VGF21EP25	175	175	175	175
																VGF21LP25	175	175	175	175
3"	115	Pressure Balanced	125	175 psi @ 130 F	100 psig / 337 F	Equal %	Stem down to close	VGF21EP30	175	175	175	175								
								VGF21LP30	175	175	175	175								
ANSI Class IV (<0.01% Cv) seat leakage																				
ANSI Class III (<0.05% Cv) seat leakage (A to AB)																				
3-Way Water Valves	2-1/2"	70	Mixing	125	175 psi @ 130 F	N / A	Equal % A-AB	Stem up closes A-AB	VGF31EM25	55	55	94	94							
									Linear, Constant Total	Stem up closes B-AB	VGF31LD25	55	55	94	94					
			Diverting	250	400 psi @ 130 F		Equal % A-AB	Stem up closes A-AB	VGF32EM25	55	55	94	94							
									Linear, Constant Total	Stem up closes B-AB	VGF32LD25	39	39	68	68					
			3"	120	Mixing		125	175 psi @ 130 F	N / A	Equal % A-AB	Stem up closes A-AB	VGF31EM30	34	34	58	58				
												Linear, Constant Total	Stem up closes B-AB	VGF31LD30	19	19	33	33		
	115	Mixing	250	400 psi @ 130 F	N / A	Equal % A-AB	Stem up closes A-AB	Stem up closes B-AB	VGF32EM30	34	34	58	58							
									VGF32LD30	19	19	33	33							
	120	Diverting	250	400 psi @ 130 F	N / A	Equal % A-AB	Stem up closes A-AB	Stem up closes B-AB	VGF32EM30	34	34	58	58							
									VGF32LD30	19	19	33	33							

Product Selection - Valves

Flanged Globe Valves 2½"-3", With Fail Safe DCA and Valve Linkage

Common Features

- For closed loop HVAC systems with up to 50% glycol
- ANSI Class 125 and 250 flanged cast iron bodies
- Close-off pressure = Maximum differential pressure
- Maximum static water pressure: Up to 400 psi
- Stem travel: 0.75"
- Rangeability: 50:1
- Valve trim: Stainless steel stem and plug. Integrated (cast iron) seat on VGF mixing valves, stainless steel seat on all other VGF valves)



**Q5020A1003
Required**



Actuator Features		Fail Safe		
Actuator O.S. Number		MS7520A2007 MS7520A2205 MS7520HZ208	MS8120A1007 MS8120A1205	MS4120A1001 MS4120A1209
Power Supply	Voltage	24 Vac	24 Vac	100-250 Vac
	Frequency	50 / 60 Hz	50 / 60 Hz	60 Hz
	Power	16 VA	40 VA	60 VA
Actuator Torque	(lb.-in.)	175	175	175
Linkage Stem Force	(lbs.)	234	234	234
Control	(0)2-10 Vdc	•		
	4-20 mA (external 500 Ohm Resistor)	•		
	Floating	•		
	Two-Position SPDT	•		
	Two-Position SPST	•	•	•
Fail Safe Action		Configurable Open/Closed	Configurable Open/Closed	Configurable Open/Closed
Normal Position (no signal)	(field configurable)	Stem Up/Down	Stem Up/Down	Stem Up/Down
Actuator Stroke	(degrees)	95°	95°	95°
Timing	(seconds)	90	90	90
High Temperature Kit	Steam Application	43196000-001	43196000-001	43196000-001
Aux Switch	SPDT Built In	0 / 2 / 2	0 / 2	0 / 2
	2 x SPDT Add-On	SW2-US	SW2-US	SW2-US
Feedback	(0)2-10 Vdc Built In	•		

Valve Size (inches)	Cv	Valve Type	ANSI Class	Max Static Water Pressure	Max Steam Pressure / Temperature	Flow Characteristic	Valve Action	Valve OS Number	Close-off Pressure, psid									
ANSI Class III (<0.05% Cv) seat leakage																		
2-1/2"	70	Standard	125	175 psi @ 130 F	100 psig / 337 F	Equal %	Stem down to close	VGF21ES25	39	39	39							
								VGF21LS25	39	39	39							
								VGF22ES25	39	39	39							
	3"							125	125	175 psi @ 130 F	100 psig / 337 F	Equal %	Stem down to close	VGF21ES30	19	19	19	
														VGF21LS30	19	19	19	
														VGF22ES30	19	19	19	
120	250	400 psi @ 130 F	100 psig / 337 F	Equal %	Stem down to close	VGF22ES30	19	19	19									
ANSI Class IV (<0.01% Cv) seat leakage																		
2-1/2"	70	Pressure Balanced	125	175 psi @ 130 F	100 psig / 337 F	Equal %	Stem down to close	VGF21EP25	175	175	175							
								VGF21LP25	175	175	175							
	3"							115	Equal %	175	175	175	Stem down to close	VGF21EP30	175	175	175	
														VGF21LP30	175	175	175	
ANSI Class III (<0.05% Cv) seat leakage (A to AB)																		
2-1/2"	70	Mixing	125	175 psi @ 130 F	N / A	Equal % A-AB	Stem up closes A-AB	VGF31EM25	55	55	55							
								Diverting	250	400 psi @ 130 F	Linear, Constant Total	Stem up closes B-AB	VGF31LD25	39	39	39		
		Mixing											125	175 psi @ 130 F	Equal % A-AB	Stem up closes A-AB	VGF32EM25	55
								Diverting	250	400 psi @ 130 F	Linear, Constant Total	Stem up closes B-AB					VGF32LD25	39
		3"											120	Mixing	125	175 psi @ 130 F	N / A	Equal % A-AB
								Diverting	250	400 psi @ 130 F	Linear, Constant Total	Stem up closes B-AB						
	115		Mixing	125	175 psi @ 130 F	N / A	Equal % A-AB						Stem up closes A-AB	VGF32EM30	34	34	34	
								120	Diverting	250	400 psi @ 130 F	N / A		Linear, Constant Total	Stem up closes B-AB	VGF32LD30	19	19

2-Way Water & Steam

3-Way Water Valves

VALVES

Product Selection - Valves

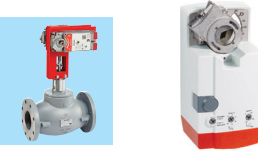
Threaded/Flanged Globe Valves 2"-3", With Tandem Non Fail Safe DCA and Valve Linkage

Common Features

- For closed loop HVAC systems with up to 50% glycol
- ANSI Class 125 and 250 flanged cast iron bodies (VGF), brass body (V5011/13)
- Close-off pressure = Maximum differential pressure
- Maximum static water pressure: Up to 400 psi
- Stem travel: 0.75"
- Rangeability: 50:1
- Valve trim
VGF: Stainless steel stem and plug. Integrated (cast iron) seat on VGF mixing valves, stainless steel seat on all other VGF valves
V5011F/G/N1 & V5013: Stainless steel stem and brass seat
V5011N2: Stainless steel stem and seat
- Use Q5020 linkage on VGF_LP and VGF_EP pressure balanced valves



Q5024B2230 and HU5024-001 Required



Actuator Features		Non Fail Safe			
Actuator O.S. Number (Two required per linkage/valve)		MN7220A2007 MN7220A2205	MN6120A1002 MN6120A1200	MN7234A2008	MN6134A1003
Power Supply	Voltage	24 Vac	24 Vac	24 Vac	24 Vac
	Frequency	60 Hz	60 Hz	60 Hz	60 Hz
	Power	6 VA	6 VA	9 VA	9 VA
Actuator Torque (lb.-in.)		175	175	300	300
Linkage Stem Force, Two Actuators (lbs.)		360	360	667	667
Stem & Bonnet Adapter Kit		HU5024-001			
Control	(0)2-10 Vdc	•		•	
	4-20 mA (external 500 Ohm Resistor)	•		•	
	Floating		•		•
	Two-Position SPDT		•		•
Two-Position SPST			•		
Fail Safe Action		Stay in Place	Stay in Place	Stay in Place	Stay in Place
Normal Position (no signal) (field configurable)		Stem Up/Down	Stem Up/Down	Stem Up/Down	Stem Up/Down
Actuator Stroke (inches)		0.75	0.75	0.75	0.75
Timing (seconds)		95	95	95	95
Aux Switch	2 x SPDT Add-On	SW2-US	SW2-US	SW2-US	SW2-US
	SPDT Built In	0/2	0/2		
Feedback (0)2-10 Vdc Built In		•		•	

Valve Size (inches)	Pipe Fitting	Cv	Valve Type	ANSI Class	Max Static Water Pressure	Max Steam Pressure / Temperature	Flow Characteristic	Valve Action	Valve OS Number	Close-off Pressure, psid				
ANSI Class III (<0.05% Cv) seat leakage														
2-Way Water & Steam Valves	2"	f NPT	Standard	N/A	217 psi @ 248 F	15 psi (2-position) 100 psig / 337 F	Equal % Linear	Stem down to close	V5011N1099	162	162	240	240	
									V5011N2097	100	100	100	100	
	V5011F1105	130			130	225	225							
	V5011G1111	100			100	100	100							
	VGF21ES25	61			61	105	105							
	VGF21LS25	61			61	105	105							
	2-1/2"	Flanged	70	125	175 psi @ 130 F	100 psig / 337 F	Equal % Linear	VGF22ES25	61	61	105	105		
								V5011F1113	65	65	115	115		
	3"	f NPT	100	N/A	250 psi @ 100F	15 psi (2-position)	Equal % Linear	V5011G1129	65	65	100	100		
								VGF21ES30	30	30	52	52		
	3"	Flanged	125	125	175 psi @ 130 F	100 psig / 337 F	Equal % Linear	VGF21LS30	30	30	52	52		
								VGF22ES30	30	30	52	52		
3"	Flanged	120	250	400 psi @ 130 F	100 psig / 337 F	Equal % Linear	VGF21EP25							
							VGF21EP30							
ANSI Class IV (<0.01% Cv) seat leakage														
2-1/2"	Flanged	70	Pressure Balanced	125	175 psi @ 130 F	125 psig / 353 F	Equal % Linear	Stem down to close	VGF21EP25	See previous page for Q5020 linkages				
3"	Flanged	115							VGF21EP30					
					VGF21LP30									
ANSI Class III (<0.05% Cv) seat leakage (A to AB)														
3-Way Water Valves	2"	f NPT	Mixing Diverting	N/A	217 psi @ 248 F	Linear B-AB / Equal % A-AB	Stem up closes A-AB	V5013N1097	162	162	240	240		
								VGF31EM25	77	77	133	133		
	2-1/2"	Flanged			70	125	175 psi @ 130 F	Linear, Constant Total	Stem up closes B-AB	VGF31LD25	61	61	105	105
										VGF32EM25	77	77	133	133
	3"	Flanged			120	125	175 psi @ 130 F	Linear, Constant Total	Stem up closes B-AB	VGF32LD25	61	61	105	105
										VGF31EM30	52	52	89	89
	3"	Flanged	115	250	400 psi @ 130 F	Linear, Constant Total	Stem up closes B-AB	VGF31LD30	30	30	52	52		
								VGF32EM30	52	52	89	89		
	3"	Flanged	120	250	400 psi @ 130 F	Linear, Constant Total	Stem up closes B-AB	VGF32LD30	30	30	52	52		

Product Selection - Valves

Threaded/Flanged Globe Valves 2"- 3", With Tandem Fail Safe DCA and Valve Linkage

Common Features

- For closed loop HVAC systems with up to 50% glycol
- ANSI Class 125 and 250 flanged cast iron bodies (VGF), brass body (V5011/13)
- Close-off pressure = Maximum differential pressure
- Maximum static water pressure: Up to 400 psi
- Stem travel: 0.75"
- Rangeability: 50:1
- Valve trim
VGF: Stainless steel stem and plug. Integrated (cast iron) seat on VGF mixing valves, stainless steel seat on all other VGF valves
V5011F/G/N1 & V5013: Stainless steel stem and brass seat
V5011N2: Stainless steel stem and seat
- Use Q5020 linkage on VGF_LP and VGF_EP pressure balanced valves



Q5024B2230 and HU5024-001 Required



Actuator Features		Fail Safe		
Actuator O.S. Number (Two required per linkage/valve)		MS7520A2007	MS8120A1007	MS4120A1001
		MS7520A2205	MS8120A1205	MS4120A1209
		MS7520HZ208		
Power Supply	Voltage	24 Vac	24 Vac	100-250 Vac
	Frequency	60 Hz	60 Hz	60 Hz
	Power	16 VA	40 VA	60 VA
Actuator Torque	(lb.-in.)	175	175	175
Linkage Stem Force, Two Actuators	(lbs.)	360	360	360
Stem & Bonnet Adapter Kit		HU5024-001		
Control	(0)2-10 Vdc	•		
	4-20 mA (external 500 Ohm Resistor)	•		
	Floating	•		
	Two-Position SPDT	•		
	Two-Position SPST	•	•	•
Fail Safe Action		Configurable Open/Closed	Configurable Open/Closed	Configurable Open/Closed
Normal Position (no signal)	(field configurable)	Stem Up/Down	Stem Up/Down	Stem Up/Down
Actuator Stroke	(inches)	0.75	0.75	0.75
Timing	(seconds)	90	90	90
Aux Switch	2 x SPDT Add-On	SW2-US	SW2-US	SW2-US
	SPDT Built In	0 / 2 / 2	0 / 2	0 / 2
Feedback	(0)2-10 Vdc Built In	•		

2-Way Water & Steam Valves

Valve Size (inches)	Pipe Fitting	Cv	Valve Type	ANSI Class	Max Static Water Pressure	Max Steam Pressure / Temperature	Flow Characteristic	Valve Action	Valve OS Number	Close-off Pressure, psid												
ANSI Class III (<0.05% Cv) seat leakage																						
2"	f NPT	47	Standard	N/A	217 psi @ 248 F	15 psi (2-position)	Equal %	Stem down to close	V5011N1099	162	162	162										
										100	100	100										
		63			15 psi (2-position)	Equal %	V5011N2097			100	100	20										
							V5011F1105			130	130	130										
		Flanged			70	125	175 psi @ 130 F			100 psig / 337 F	Linear	V5011G1111	100	100	100							
												VGF21ES25	61	61	61							
	250			400 psi @ 130 F	100 psig / 337 F	Equal %	VGF21LS25			61	61	61										
							VGF22ES25			61	61	61										
	100			N/A	250 psi @ 100F	15 psi (2-position)	Equal %			V5011F1113	65	65	65									
										V5011G1129	65	65	65									
	Flanged	125		175 psi @ 130 F	100 psig / 337 F	Linear	VGF21ES30			30	30	30										
							VGF21LS30			30	30	30										
									VGF22ES30	30	30	30										
ANSI Class IV (<0.01% Cv) seat leakage																						
2-1/2"	Flanged	70	Pressure Balanced	125	175 psi @ 130 F	125 psig / 353 F	Equal %	Stem down to close		VGF21EP25	See previous page for Q5020 linkages											
										VGF21LP25												
										VGF21EP30												
3"		115					Linear		VGF21LP30													
ANSI Class III (<0.05% Cv) seat leakage (A to AB)																						
2-1/2"	f NPT	47	Mixing	N/A	217 psi @ 248 F	Linear B-AB / Equal % A-AB	Linear	Stem up closes A-AB	V5013N1097	162	162	162										
										70	125	175 psi @ 130 F	Linear B-AB / Equal % A-AB	Linear	Stem up closes A-AB	VGF31EM25	77	77	77			
																VGF31LD25	61	61	61			
										250	400 psi @ 130 F	Linear B-AB / Equal % A-AB	Linear	Stem up closes B-AB	VGF32EM25	77	77	77				
															VGF32LD25	61	61	61				
										120	125	175 psi @ 130 F	Linear B-AB / Equal % A-AB	Linear	Stem up closes A-AB	VGF31EM30	52	52	52			
																VGF31LD30	30	30	30			
										115	250	400 psi @ 130 F	Linear B-AB / Equal % A-AB	Linear	Stem up closes B-AB	VGF32EM30	52	52	52			
																VGF32LD30	30	30	30			
										120			Diverting						VGF32LD30	30	30	30

3-Way Water Valves

VALVES

Product Selection - Valves

Flanged Globe Valves 2½"- 3", With Dedicated Valve Actuators



Common Features

- ANSI Class 125 and 250 flanged cast iron bodies
- Close-off pressure = Maximum differential pressure
- Maximum static water pressure: Up to 400 psi
- Stem travel: 0.75"
- Rangeability: 50:1
- Valve trim: Stainless steel stem and plug. Integrated (cast iron) seat on VGF mixing valves, stainless steel seat on all other VGF valves



Actuator Features		Non Fail Safe			
Actuator O.S. Number		ML6420A3049	ML6420A3066	ML7420A3065	ML7420A3063
Power Supply	Voltage	24 Vac	24 Vac	24 Vac	24 Vac
	Frequency	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz
	Power	6 VA	6 VA	7 VA	7 VA
Stem Force (lbs.)	135	135	135	135	
Control (0)2-10 Vdc	4-20 mA (external 500 Ohm Resistor)			•	•
	Floating	•	•		
	Two-Position SPDT	•	•		
	Two-Position SPST				
	135 Ohm				
Fail Safe Action		Stay in place	Stay in place	Stay in place	Stay in place
Normal Position (no signal) (field configurable)		Stay in place	Stay in place	Stem Up	Stem Up
Actuator Stroke (inches)		0.75	0.75	0.75	0.75
Timing (seconds at 0.75" stroke)		60	30	60	30
High Temperature Kit Steam Application		43196000-001	43196000-001	43196000-001	43196000-001
Aux Switch	1 x SPDT Add-On				
	2 x SPDT Add-On	43191680-105	43191680-105	43191680-105	43191680-105
Feedback	2-10 Vdc Built In			•	•
	2-10 Vdc Add-On				
	220 Ohm Add-On	43191679-112	43191679-112		
	10 kOhm Add-On	43191679-111	43191679-111		

Valve Size (inches)	Cv	Valve Type	ANSI Class	Max Static Water Pressure	Max Steam Pressure / Temperature	Flow Characteristic	Valve Action	Valve OS Number	Close-off Pressure, psid							
ANSI Class III (<0.05% Cv) seat leakage																
2-1/2"	70	Standard	125	175 psi @ 130 F	100 psig / 337 F	Equal %	Stem down to close	VGF21ES25	17	17	17	17				
								VGF21LS25	17	17	17	17				
								VGF22ES25	17	17	17	17				
	3"		125	125				175 psi @ 130 F	125	Equal %	Stem down to close	VGF21ES30	7	7	7	7
												VGF21LS30	7	7	7	7
												VGF22ES30	7	7	7	7
2-1/2"	70	Pressure Balanced	125	175 psi @ 130 F	100 psig / 337 F	Equal %	Stem down to close	VGF21EP25	175	175	175	175				
								VGF21LP25	175	175	175	175				
								VGF21EP30	175	175	175	175				
	3"		115	115				175 psi @ 130 F	115	Linear	Stem down to close	VGF21LP30	175	175	175	175
												VGF21EP30	175	175	175	175
												VGF21LP30	175	175	175	175
ANSI Class III (<0.05% Cv) seat leakage (A to AB)																
2-1/2"	70	Mixing	125	175 psi @ 130 F	N/A	Equal % A-AB	Stem up closes A-AB	VGF31EM25	23	23	23	23				
		Diverting						250	400 psi @ 130 F	Linear, Constant Total	Stem up closes B-AB	VGF31LD25	17	17	17	17
		Mixing										250	400 psi @ 130 F	Equal % A-AB	Stem up closes A-AB	VGF32EM25
	Diverting	120	175 psi @ 130 F	Linear, Constant Total		Stem up closes B-AB	VGF32LD25									17
	3"						120	125	175 psi @ 130 F	Equal % A-AB	Stem up closes A-AB					VGF31EM30
												115	250	400 psi @ 130 F	Linear, Constant Total	Stem up closes B-AB
120		115	250	400 psi @ 130 F	Equal % A-AB	Stem up closes A-AB										
	120						120	250	400 psi @ 130 F	Linear, Constant Total	Stem up closes B-AB					

Product Selection - Valves

Flanged Globe Valves 2½"- 3", With Dedicated Valve Actuators



Common Features

- ANSI Class 125 and 250 flanged cast iron bodies
- Close-off pressure = Maximum differential pressure
- Maximum static water pressure: Up to 400 psi
- Maximum steam pressure (V5011, 2-pos): 15 psi
- Stem travel: 0.75"
- Rangeability: 50:1
- Valve trim: Stainless steel stem and plug. Integrated (cast iron) seat on VGF mixing valves, stainless steel seat on all other VGF valves

Actuator Features		Non Fail Safe	
Actuator O.S. Number		ML7421A1032	ML6421A1017
Power Supply	Voltage	24 Vac	24 Vac
	Frequency	50 / 60 Hz	50 / 60 Hz
	Power	12 VA	11 VA
Stem Force	(lbs.)	404	404
Control	(0)2-10 Vdc	•	
	4-20 mA (external 500 Ohm Resistor)	•	
	Floating		•
	Two-Position SPDT		•
Fail Safe Action		Stay in place	Stay in place
Normal Position (no signal)	(field configurable)	Stem Up	Stay in place
Actuator Stroke	(inches)	0.75	0.75
Timing	(seconds at 0.75" stroke)	90	90
High Temperature Kit	Steam Application	43196000-001	43196000-001
Aux Switch	2 x SPDT Add-On	43191680-102	43191680-102
Feedback	2-10 Vdc Built In	•	
	220 Ohm Add-On		43191679-101
	10 kOhm Add-On		

Valve Size (inches)	Cv	Valve Type	ANSI Class	Max Static Water Pressure	Max Steam Pressure / Temperature	Flow Characteristic	Valve Action	Valve OS Number	Close-off Pressure, psid		
ANSI Class III (<0.05% Cv) seat leakage											
2-1/2"	70	Standard	125	175 psi @ 130 F	100 psig / 337 F	Equal %	Stem down to close	VGF21ES25	68	68	
						Linear		VGF21LS25	68	68	
	250					400 psi @ 130 F		Equal %	VGF22ES25	68	68
	3"					125		125	175 psi @ 130 F	Equal %	VGF21ES30
120	250	400 psi @ 130 F	Linear	VGF21LS30	33		33				
						Equal %		VGF22ES30	33	33	
ANSI Class IV (<0.01% Cv) seat leakage											
2-1/2"	70	Pressure Balanced	125	175 psi @ 130 F	100 psig / 337 F	Equal %	Stem down to close	VGF21EP25	175	175	
						Linear		VGF21LP25	175	175	
	3"					115		Equal %	VGF21EP30	175	175
	Linear							VGF21LP30	175	175	
ANSI Class III (<0.05% Cv) seat leakage (A to AB)											
2-1/2"	70	Mixing	125	175 psi @ 130 F	N / A	Equal % A-AB	Stem up closes A-AB	VGF31EM25	94	94	
		Diverting				Linear, Constant Total	Stem up closes B-AB	VGF31LD25	68	68	
		Mixing				Equal % A-AB	Stem up closes A-AB	VGF32EM25	94	94	
	Diverting	Linear, Constant Total	Stem up closes B-AB	VGF32LD25		68	68				
	3"	120	Mixing	125		175 psi @ 130 F	Equal % A-AB	Stem up closes A-AB	VGF31EM30	58	58
			Diverting				Linear, Constant Total	Stem up closes B-AB	VGF31LD30	33	33
115		Mixing	Equal % A-AB		Stem up closes A-AB		VGF32EM30	58	58		
120	Diverting	Linear, Constant Total	Stem up closes B-AB	VGF32LD30	33	33					

2-Way Water & Steam Valves

3-Way Water Valves

VALVES

Product Selection - Valves

Flanged Globe Valves 2½"- 3", With Dedicated Fail Safe Valve Actuators



Common Features

- ANSI Class 125 and 250 flanged cast iron bodies
- Close-off pressure = Maximum differential pressure
- Maximum static water pressure: Up to 400 psi
- Stem travel: 0.75"
- Rangeability: 50:1
- Valve trim: Stainless steel stem and plug. Integrated (cast iron) seat on VGF mixing valves, stainless steel seat on all other VGF valves



Actuator Features	Fail Safe			
	ML7425A3013	ML7425B3012	ML6425A3022	ML6425B3013
Actuator O.S. Number				
Power Supply Voltage	24 Vac	24 Vac	24 Vac	24 Vac
Frequency	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz
Power	12 VA	12 VA	11 VA	11 VA
Stem Force (lbs.)	135	135	135	135
Control	(0)2-10 Vdc	•	•	
4-20 mA (external 500 Ohm Resistor)	•	•		
Floating			•	•
Two-Position SPDT			•	•
Fail Safe Action	Stem Down (2-way N.C.)	Stem Up (2-way N.O.)	Stem Down (2-way N.C.)	Stem Up (2-way N.O.)
Normal Position (no signal) (field configurable)	Stem Up	Stem Up	Stay in Place	Stay in Place
Actuator Stroke (inches)	0.75	0.75	0.75	0.75
Timing (seconds at 0.75" stroke)	90	90	90	90
High Temperature Kit Steam Application	43196000-001	43196000-001	43196000-001	43196000-001
Aux Switch 2 x SPDT Add-On	43191680-105	43191680-105	43191680-105	43191680-105
Feedback 2-10 Vdc Built In	•	•		
220 Ohm Add-On	43191679-112	43191679-112	43191679-112	43191679-112
10 kOhm Add-On	43191679-111	43191679-111	43191679-111	43191679-111

Valve Size (inches)	Cv	Valve Type	ANSI Class	Max Static Water Pressure	Max Steam Pressure / Temperature	Flow Characteristic	Valve Action	Valve OS Number	Close-off Pressure, psid												
ANSI Class III (<0.05% Cv) seat leakage																					
2-1/2"	70	Standard	125	175 psi @ 130 F	100 psig / 337 F	Equal %	Stem down to close	VGF21ES25	17	17	17	17									
						Linear		VGF21LS25	17	17	17	17									
						Equal %		VGF22ES25	17	17	17	17									
						Equal %		VGF21ES30	7	7	7	7									
						Linear		VGF21LS30	7	7	7	7									
						Equal %		VGF22ES30	7	7	7	7									
3"	125	Standard	125	175 psi @ 130 F	100 psig / 337 F	Equal %	Stem down to close	VGF21EP25	175	175	175	175									
						Linear		VGF21LP25	175	175	175	175									
						Equal %		VGF21EP30	175	175	175	175									
						Linear		VGF21LP30	175	175	175	175									
2-1/2"	70	Pressure Balanced	125	175 psi @ 130 F	100 psig / 337 F	Equal %	Stem down to close	VGF21EP25	175	175	175	175									
						Linear		VGF21LP25	175	175	175	175									
						Equal %		VGF21EP30	175	175	175	175									
						Linear		VGF21LP30	175	175	175	175									
						ANSI Class III (<0.05% Cv) seat leakage (A to AB)															
						2-1/2"		70	Mixing	125	175 psi @ 130 F	N / A	Equal % A-AB	Stem up closes A-AB	VGF31EM25	23	23	23	23		
													Linear, Constant Total		Stem up closes B-AB	VGF31LD25	23	23	23	23	
													Equal % A-AB			Stem up closes A-AB	VGF32EM25	23	23	23	23
													Linear, Constant Total				Stem up closes B-AB	VGF32LD25	17	17	17
									Diverting	250	400 psi @ 130 F		Equal % A-AB	Stem up closes A-AB		VGF31EM30		15	15	15	15
													Linear, Constant Total		Stem up closes B-AB	VGF31LD30	7	7	7	7	
													Equal % A-AB			Stem up closes A-AB	VGF32EM30	15	15	15	15
Linear, Constant Total	Stem up closes B-AB	VGF32LD30	7	7	7		7														
3"		120	Mixing	125	175 psi @ 130 F	N / A	Equal % A-AB	Stem up closes A-AB	VGF31EM30	15	15	15	15								
	Linear, Constant Total						Stem up closes B-AB		VGF31LD30	7	7	7	7								
	Equal % A-AB								Stem up closes A-AB	VGF32EM30	15	15	15	15							
	Linear, Constant Total									Stem up closes B-AB	VGF32LD30	7	7	7	7						
Diverting	115	Mixing	250	400 psi @ 130 F	N / A			Equal % A-AB	Stem up closes A-AB		VGF31EM30	15	15	15	15						
							Linear, Constant Total	Stem up closes B-AB		VGF31LD30	7	7	7	7							
							Equal % A-AB			Stem up closes A-AB	VGF32EM30	15	15	15	15						
							Linear, Constant Total				Stem up closes B-AB	VGF32LD30	7	7	7	7					
Diverting	120	Diverting	250	400 psi @ 130 F		N / A	Equal % A-AB		Stem up closes A-AB	VGF31EM30		15	15	15	15						
							Linear, Constant Total	Stem up closes B-AB		VGF31LD30	7	7	7	7							
							Equal % A-AB			Stem up closes A-AB	VGF32EM30	15	15	15	15						
							Linear, Constant Total				Stem up closes B-AB	VGF32LD30	7	7	7	7					

2-Way Water & Steam Valves

3-Way Water Valves

Product Selection - Valves

Flanged Globe Valves 4"- 6", With Tandem DCA and Valve Linkage

Common Features

- ANSI Class 125 and 250 flanged cast iron bodies
- Close-off pressure = Maximum differential pressure
- Maximum static water pressure: Up to 400 psi
- Stem travel: 1.5"
- Rangeability: 50:1
- Valve trim: Stainless steel stem and plug. Integrated (cast iron) seat on VGF mixing valves, stainless steel seat on all other VGF valves



Q5024B2240 and HU5024-002 Required



Actuator Features		Non Fail Safe			
Actuator O.S. Number (Two Actuators per valve/linkage)		MN7220A2007 MN7220A2205	MN6120A1002 MN6120A1200	MN7234A2008	MN6134A1003
Power Supply	Voltage	24 Vac	24 Vac	24 Vac	24 Vac
	Frequency	60 Hz	60 Hz	60 Hz	60 Hz
	Power	6 VA	6 VA	9 VA	9 VA
Actuator Torque (lb.-in.)		175	175	300	300
Linkage Stem Force, Two Actuators (lbs.)		272	272	467	467
Stem & Bonnet Adapter Kit		HU5024-002			
Control	(0)2-10 Vdc	•		•	
	4-20 mA (external 500 Ohm Resistor)	•		•	
	Floating		•		•
	Two-Position SPDT		•		•
	Two-Position SPST		•		
Fail Safe Action		Stay in Place	Stay in Place	Stay in Place	Stay in Place
Normal Position (no signal) (field configurable)		Stem Up/Down	Stem Up/Down	Stem Up/Down	Stem Up/Down
Actuator Stroke (inches)		1.5	1.5	1.5	1.5
Timing (seconds)		95	95	95	95
Aux Switch	2 x SPDT Add-On	SW2-US	SW2-US	SW2-US	SW2-US
	SPDT Built In	0 / 2	0 / 2		
Feedback (0)2-10 Vdc Built In		•		•	

Valve Size (inches)	Cv	Valve Type	Max Static Water Pressure	ANSI Class	Max Steam Pressure	Flow Characteristic	Valve Action	Valve OS Number	Close-off Pressure, psid				
ANSI Class III (<0.05% Cv) Seat Leakage													
2-Way Water & Steam Valves	4"	Standard	175 psi @ 130 F	125	100 psig / 337 F	Equal %	Stem down to close	VGF21ES40	22	22	39	39	
								VGF21LS40	22	22	39	39	
	150		250	Equal %		VGF22ES40		22	22	39	39		
						VGF21ES50		9	9	15	15		
	5"	Standard	175 psi @ 130 F	125	100 psig / 337 F	Linear	Stem down to close	VGF21LS50	9	9	15	15	
								VGF22ES50	9	9	15	15	
	320		250	Equal %		VGF21ES60		9	9	15	15		
						VGF21LS60		9	9	15	15		
	6"	Standard	175 psi @ 130 F	125	100 psig / 337 F	Linear	Stem down to close	VGF22ES60	9	9	15	15	
								370	250	Equal %	VGF21EP40	175	175
	VGF21LP40		175	175									
	4"		Pressure Balanced	175 psi @ 130 F		125		100 psig / 337 F	Equal %	Stem down to close	VGF21EP50	175	175
285		250			Equal %		VGF21LP50				175	175	
	370			250		Linear	VGF21EP60		175		175		
VGF21LP60		175			175								
ANSI Class IV (<0.01% Cv) Seat Leakage													
ANSI Class III (<0.05% Cv) Seat Leakage													
3-Way Water Valves	4"	150	Mixing	175 psi @ 130 F	125	N / A	Equal % A-AB	Stem up closes A-AB	VGF31EM40	22	22	39	39
			Diverting						250	Linear, Constant Total	Stem up closes B-AB	VGF31LD40	22
		170	Mixing	400 psi @ 130 F	250		Equal % A-AB	Stem up closes A-AB				VGF32EM40	22
			Diverting						250	Linear, Constant Total	Stem up closes B-AB	VGF32LD40	22
	5"	320	250	175 psi @ 130 F	125	N / A	Equal % A-AB	Stem up closes A-AB				VGF31EM50	9
									285	250	Linear, Constant Total	Stem up closes B-AB	VGF31LD50
		370	250	Equal % A-AB	Stem up closes A-AB		VGF32EM50	9					9
							285	250	Linear, Constant Total	Stem up closes B-AB	VGF32LD50	9	9
	6"	370	250	175 psi @ 130 F	125	N / A					Equal % A-AB	Stem up closes A-AB	VGF31EM60
							380	250	Linear, Constant Total	Stem up closes B-AB			VGF31LD60
		370	250	Equal % A-AB	Stem up closes A-AB						VGF32EM60	9	9
							380	250	Linear, Constant Total	Stem up closes B-AB	VGF32LD60	9	9

VALVES

Product Selection - Valves

Flanged Globe Valves 4"- 6", With Tandem DCA and Valve Linkage

Common Features

- ANSI Class 125 and 250 flanged cast iron bodies
- Close-off pressure = Maximum differential pressure
- Maximum static water pressure: Up to 400 psi
- Stem travel: 1.5"
- Rangeability: 50:1
- Valve trim: Stainless steel stem and plug. Integrated (cast iron) seat on VGF mixing valves, stainless steel seat on all other VGF valves

Q5024B2240 and HU5024-002 Required



Actuator Features		Fail Safe		
Actuator O.S. Number (Two Actuators per valve/linkage)		MS7520A2007 MS7520A2205 MS7520H2208	MS8120A1007 MS8120A1205	MS4120A1001 MS4120A1209
Power Supply	Voltage	24 Vac	24 Vac	100-250 Vac
	Frequency	60 Hz	60 Hz	60 Hz
	Power	16 VA	40 VA	60 VA
Actuator Torque (lb.-in.)		175	175	175
Linkage Stem Force, Two Actuators (lbs.)		325	325	272
Stem & Bonnet Adapter Kit		HU5024-002		
Control	(0)2-10 Vdc	•		
	4-20 mA (external 500 Ohm Resistor)	•		
	Floating	•		
	Two-Position SPDT	•		
	Two-Position SPST	•	•	•
Fail Safe Action		Configurable Open/Closed	Configurable Open/Closed	Configurable Open/Closed
Normal Position (no signal) (field configurable)		Stem Up/Down	Stem Up/Down	Stem Up/Down
Actuator Stroke (inches)		1.5	1.5	1.5
Timing (seconds)		90	90	90
Aux Switch	2 x SPDT Add-On	SW2-US	SW2-US	SW2-US
	SPDT Built In	0 / 2 / 2	0 / 2	0 / 2
Feedback (0)2-10 Vdc Built In		•		

Valve Size (Inches)	Cv	Valve Type	Max Static Water Pressure	ANSI Class	Max Steam Pressure	Flow Characteristic	Valve Action	Valve OS Number	Close-off Pressure, psid									
ANSI Class III (<0.05% Cv) Seat Leakage																		
4"	155	Standard	175 psi @ 130 F	125	100 psig / 337 F	Equal %	Stem down to close	VGF21ES40	22	22	22							
								VGF21LS40	22	22	22							
	150							400 psi @ 130 F	250	Equal %	VGF22ES40	22	22	22				
											VGF21ES50	9	9	9				
	5"							320	175 psi @ 130 F	125	100 psig / 337 F	Linear	Stem down to close	VGF21LS50	9	9	9	
														VGF22ES50	9	9	9	
370		400 psi @ 130 F	250	Equal %	VGF21ES60	9	9							9				
					VGF21LS60	9	9							9				
6"	370	175 psi @ 130 F	125	100 psig / 337 F	Linear	Stem down to close	VGF21ES60	9	9	9								
							VGF22ES60	9	9	9								
ANSI Class IV (<0.01% Cv) Seat Leakage																		
4"	150	Pressure Balanced	175 psi @ 130 F	125	100 psig / 337 F	Equal %	Stem down to close	VGF21EP40	175	175	175							
								VGF21LP40	175	175	175							
	285							Linear	175 psi @ 130 F	125	100 psig / 337 F	Equal %	Stem down to close	VGF21EP50	175	175	175	
														VGF21LP50	175	175	175	
	6"							370	Linear	175 psi @ 130 F	125	100 psig / 337 F	Equal %	Stem down to close	VGF21EP60	175	175	175
															VGF21LP60	175	175	175
ANSI Class III (<0.05% Cv) Seat Leakage																		
4"	150	Mixing	175 psi @ 130 F	125	N / A	Equal % A-AB	Stem up closes A-AB	VGF31EM40	22	22	22							
								160	Diverting	400 psi @ 130 F	250	Linear, Constant Total	Stem up closes B-AB	VGF31LD40	22	22	22	
	170	Mixing	175 psi @ 130 F	125	Equal % A-AB	Stem up closes A-AB	VGF32EM40							22	22	22		
							160	Diverting	400 psi @ 130 F	250	Linear, Constant Total	Stem up closes B-AB	VGF32LD40	22	22	22		
	5"	320	Mixing	175 psi @ 130 F	125	Equal % A-AB							Stem up closes A-AB	VGF31EM50	9	9	9	
							285	Diverting	400 psi @ 130 F	250	Linear, Constant Total	Stem up closes B-AB		VGF31LD50	9	9	9	
		320	Mixing	175 psi @ 130 F	125	Equal % A-AB							Stem up closes A-AB	VGF32EM50	9	9	9	
							285	Diverting	400 psi @ 130 F	250	Linear, Constant Total	Stem up closes B-AB		VGF32LD50	9	9	9	
	6"	370	Mixing	175 psi @ 130 F	125	Equal % A-AB							Stem up closes A-AB	VGF31EM60	9	9	9	
							380	Diverting	400 psi @ 130 F	250	Linear, Constant Total	Stem up closes B-AB		VGF31LD60	9	9	9	
		370	Mixing	175 psi @ 130 F	125	Equal % A-AB							Stem up closes A-AB	VGF32EM60	9	9	9	
							380	Diverting	400 psi @ 130 F	250	Linear, Constant Total	Stem up closes B-AB		VGF32LD60	9	9	9	

Product Selection - Valves

Flanged Globe Valves 4"- 6", With Dedicated Valve Actuators

Common Features

- ANSI Class 125 and 250 flanged cast iron bodies
- Close-off pressure = Maximum differential pressure
- Maximum static water pressure: Up to 400 psi
- Stem travel: 1.5"
- Rangeability: 50:1
- Valve trim: Stainless steel stem and plug. Integrated (cast iron) seat on VGF mixing valves, stainless steel seat on all other VGF valves



Actuator Features		Non Fail Safe	
Actuator O.S. Number		ML7421B1023	ML6421B1040
Power Supply	Voltage	24 Vac	24 Vac
	Frequency	50 / 60 Hz	50 / 60 Hz
	Power	12 VA	11 VA
Stem Force (lbs.)		404	404
Control	(0)2-10 Vdc	•	
	4-20 mA (external 500 Ohm Resistor)	•	
	Floating		•
	Two-Position SPDT		•
Fail Safe Action		Stay in Place	Stay in Place
Normal Position (no signal) (field configurable)		Stem up/down	Stay in Place
Actuator Stroke (inches)		1.5	1.5
Stroke Timing (seconds)		175	175
High Temperature Kit	Steam Application	43196000-038	43196000-038
Aux Switch	2 x SPDT (24 Vac) (add-on)	43191680-102	43191680-102
Feedback	1 x 220 Ohm Potentiometer (add-on)	43191679-102	
	2-10 Vdc (built in)	•	

Valve Size (inches)	Cv	Valve Type	Max Static Water Pressure	ANSI Class	Max Steam Pressure / Temperature	Flow Characteristic	Valve Action	Valve OS Number	Close-off Pressure, psid		
ANSI Class III (<0.05% Cv) Seat Leakage											
4"	155	Standard	175 psi @ 130 F	125	100 psig / 337 F	Equal %	Stem down to close	VGF21ES40	22	22	
			400 psi @ 130 F	250		Linear		VGF21LS40	22	22	
	175 psi @ 130 F		125	Equal %		VGF22ES40		22	22		
	400 psi @ 130 F		250	Linear		VGF21ES50		9	9		
	175 psi @ 130 F		125	Equal %		VGF21LS50		9	9		
	400 psi @ 130 F		250	Linear		VGF22ES50		9	9		
5"	320	Standard	175 psi @ 130 F	125	100 psig / 337 F	Equal %	Stem down to close	VGF21EP40	175	175	
			400 psi @ 130 F	250		Linear		VGF21LP40	175	175	
			175 psi @ 130 F	125		Equal %		VGF21EP50	175	175	
			400 psi @ 130 F	250		Linear		VGF21LP50	175	175	
6"	370	Standard	175 psi @ 130 F	125	100 psig / 337 F	Equal %	Stem down to close	VGF21EP60	175	175	
			400 psi @ 130 F	250		Linear		VGF21LP60	175	175	
			175 psi @ 130 F	125		Equal %		VGF31EM40	34	34	
			400 psi @ 130 F	250		Linear		VGF31LD40	34	34	
ANSI Class IV (<0.01% Cv) Seat Leakage											
4"	150	Pressure Balanced	175 psi @ 130 F	125	100 psig / 337 F	Equal %	Stem down to close	VGF31EM50	9	9	
			400 psi @ 130 F	250		Linear		VGF31LD50	9	9	
	175 psi @ 130 F		125	Equal %		VGF32EM50		9	9		
	400 psi @ 130 F		250	Linear		VGF32LD50		9	9		
	175 psi @ 130 F		125	Equal %		VGF31EM60		9	9		
	400 psi @ 130 F		250	Linear		VGF31LD60		9	9		
5"	320	Pressure Balanced	175 psi @ 130 F	125	100 psig / 337 F	Equal %	Stem down to close	VGF32EM60	9	9	
			400 psi @ 130 F	250		Linear		VGF32LD60	9	9	
	175 psi @ 130 F		125	Equal %		VGF31EM60		9	9		
	400 psi @ 130 F		250	Linear		VGF31LD60		9	9		
	175 psi @ 130 F		125	Equal %		VGF32EM60		9	9		
	400 psi @ 130 F		250	Linear		VGF32LD60		9	9		
ANSI Class III (<0.05% Cv) Seat Leakage											
4"	150	Mixing	175 psi @ 130 F	125	N/A	Equal % A-AB	Stem up closes A-AB	VGF31EM40	34	34	
		Diverting	400 psi @ 130 F	250		Linear, Constant Total	Stem up closes B-AB	VGF31LD40	34	34	
	160	Mixing	175 psi @ 130 F	125		Equal % A-AB	Stem up closes A-AB	VGF32EM40	34	34	
		Diverting	400 psi @ 130 F	250		Linear, Constant Total	Stem up closes B-AB	VGF32LD40	34	34	
	320	Mixing	175 psi @ 130 F	125		Equal % A-AB	Stem up closes A-AB	VGF31EM50	9	9	
		Diverting	400 psi @ 130 F	250		Linear, Constant Total	Stem up closes B-AB	VGF31LD50	9	9	
		285	Mixing	175 psi @ 130 F		125	Equal % A-AB	Stem up closes A-AB	VGF32EM50	9	9
			Diverting	400 psi @ 130 F		250	Linear, Constant Total	Stem up closes B-AB	VGF32LD50	9	9
	370	Mixing	175 psi @ 130 F	125		Equal % A-AB	Stem up closes A-AB	VGF31EM60	9	9	
		Diverting	400 psi @ 130 F	250		Linear, Constant Total	Stem up closes B-AB	VGF31LD60	9	9	
		370	Mixing	175 psi @ 130 F		125	Equal % A-AB	Stem up closes A-AB	VGF32EM60	9	9
			Diverting	400 psi @ 130 F		250	Linear, Constant Total	Stem up closes B-AB	VGF32LD60	9	9

2-Way Water & Steam Valves

3-Way Water Valves

VALVES

Product Selection - Valves

Flanged Globe Valves 2½"- 3", With Pneumatic Actuators

Common Features

- Easy installation and attachment to the valve
- Direct or reverse acting
- No positive positioner



Actuator Features	Without Positive Positioner							
Actuator O.S. Number	MP953C1067	MP953C1075	MP953C1083	MP953C1554	MP953C1562	MP953D1107	MP953D1131	MP953D1172
Direct Acting/ Reverse Acting	Direct Acting				Reverse Acting			
Diaphragm Size	8"			13"		7-1/8"		
Fail Safe Action	Stem Up				Stem Down			
Actuator Force	Medium			High		Medium		
Spring Range	2-7 psi	•			•			
	3-7 psi							•
	8-12 psi		•					
	8-13 psi					•		
	4-11 psi			•	•		•	

Valve Size (Inches)	Cv	Valve Type	Max Static Water Pressure	ANSI Class	Max Steam Pressure	Flow Characteristic	Valve Action	Valve OS Number	Close-off Pressure - See Charts On Page 149											
ANSI Class III (<0.05% Cv) Seat Leakage																				
2-1/2"	70	Standard	175 psi @ 130 F	125	100 psig / 337 F	Equal %	Stem down to close	VGF21ES25	K*-NO	K*-NO	K*-NO	L*-NO	L*-NO	M*-NC	M*-NC	M*-NC				
						Linear		VGF21LS25	K*-NO	K*-NO	K*-NO	L*-NO	L*-NO	M*-NC	M*-NC	M*-NC				
						Equal %		VGF22ES25	K*-NO	K*-NO	K*-NO	L*-NO	L*-NO	M*-NC	M*-NC	M*-NC				
						Equal %		VGF21ES30	K*-NO	K*-NO	K*-NO	L*-NO	L*-NO	M*-NC	M*-NC	M*-NC				
						Linear		VGF21LS30	K*-NO	K*-NO	K*-NO	L*-NO	L*-NO	M*-NC	M*-NC	M*-NC				
						Equal %		VGF22ES30	K*-NO	K*-NO	K*-NO	L*-NO	L*-NO	M*-NC	M*-NC	M*-NC				
3"	125	Standard	175 psi @ 130 F	125	100 psig / 337 F	Equal %	Stem down to close	VGF21EP25	L*-NO	L*-NO	L*-NO	L*-NO	L*-NO	N/A						
						Linear		VGF21LP25	L*-NO	L*-NO	L*-NO	L*-NO	L*-NO	N/A						
						Equal %		VGF21EP30	L*-NO	L*-NO	L*-NO	L*-NO	L*-NO	N/A						
						Linear		VGF21LP30	L*-NO	L*-NO	L*-NO	L*-NO	L*-NO	N/A						
						Equal %		VGF21EP30	L*-NO	L*-NO	L*-NO	L*-NO	L*-NO	N/A						
						Linear		VGF21LP30	L*-NO	L*-NO	L*-NO	L*-NO	L*-NO	N/A						
ANSI Class IV (<0.01% Cv) Seat Leakage																				
2-1/2"	70	Pressure Balanced	175 psi @ 130 F	125	100 psig / 337 F	Equal %	Stem down to close	VGF21EP25	L*-NO	L*-NO	L*-NO	L*-NO	L*-NO	N/A						
						Linear		VGF21LP25	L*-NO	L*-NO	L*-NO	L*-NO	L*-NO	N/A						
						Equal %		VGF21EP30	L*-NO	L*-NO	L*-NO	L*-NO	L*-NO	N/A						
						Linear		VGF21LP30	L*-NO	L*-NO	L*-NO	L*-NO	L*-NO	N/A						
						Equal %		VGF21EP30	L*-NO	L*-NO	L*-NO	L*-NO	L*-NO	N/A						
						Linear		VGF21LP30	L*-NO	L*-NO	L*-NO	L*-NO	L*-NO	N/A						
ANSI Class III (<0.05% Cv) Seat Leakage																				
2-1/2"	70	Mixing	175 psi @ 130 F	125	N/A	Equal % A-AB	Stem up closes A-AB	VGF31EM25	K-NC	K-NC	K-NC	L-NC	L-NC	M-NO	M-NO	M-NO				
		Diverting				Linear, Constant Total	Stem up closes B-AB	VGF31LD25	K-NO	K-NO	K-NO	L-NO	L-NO	M-NC	M-NC	M-NC				
		Mixing				400 psi @ 130 F	250	Equal % A-AB	Stem up closes A-AB	VGF32EM25	K-NC	K-NC	K-NC	L-NC	L-NC	M-NO	M-NO	M-NO		
		Diverting						Linear, Constant Total	Stem up closes B-AB	VGF32LD25	K-NO	K-NO	K-NO	L-NO	L-NO	M-NC	M-NC	M-NC		
		Mixing						175 psi @ 130 F	125	Equal % A-AB	Stem up closes A-AB	VGF31EM30	K-NC	K-NC	K-NC	L-NC	L-NC	M-NO	M-NO	M-NO
		Diverting								Linear, Constant Total	Stem up closes B-AB	VGF31LD30	K-NO	K-NO	K-NO	L-NO	L-NO	M-NC	M-NC	M-NC
Mixing	400 psi @ 130 F	250	Equal % A-AB	Stem up closes A-AB	VGF32EM30					K-NC	K-NC	K-NC	L-NC	L-NC	M-NO	M-NO	M-NO			
Diverting			Linear, Constant Total	Stem up closes B-AB	VGF32LD30					K-NO	K-NO	K-NO	L-NO	L-NO	M-NC	M-NC	M-NC			

*The close-off pressure not to exceed rated pressure of steam valve
 †175 psi close-off, see chart for pneumatic air pressure required for operation.
 NC = Normally Closed, A to AB Normally Closed for 3-way valves
 NO = Normally Open, A to AB Normally Open for 3-way valves

Flanged Globe Valves 2½" - 3", With Positive Positioning Pneumatic Actuators

Common Features

- Easy installation and attachment to the valve
- Direct or reverse acting
- Integrated positive positioner



Actuator Features	With Positive Positioner							
Actuator O.S. Number	MP953E1368	MP953E1376	MP953E1384	MP953E1435	MP953E1443	MP953F1093	MP953F1101	MP953F1119
Direct Acting/ Reverse Acting	Direct Acting				Reverse Acting			
Diaphragm Size	8"			13"		7-1/8"		
Fail Safe Action	Stem Up				Stem Down			
Actuator Force	Medium			High		Medium		
Spring Range	4-11 psi	•	•	•	•	•	•	•
	8-13 psi					•	•	•
Positioner Span	10 psi		•		•			•
	5 psi	•		•			•	
	3 psi	•				•		

Valve Size (Inches)	Cv	Valve Type	Max Static Water Pressure	ANSI Class	Max Steam Pressure	Flow Characteristic	Valve Action	Valve OS Number	Close-off Pressure - See Charts On Page 149																
ANSI Class III (<0.05% Cv) Seat Leakage																									
2-1/2"	70	Standard	175 psi @ 130 F	125	100 psig / 337 F	Equal %	Stem down to close	VGf21ES25	K*-NO	K*-NO	K*-NO	L*-NO	L*-NO	M*-NC	M*-NC	M*-NC									
						Linear		VGf21LS25	K*-NO	K*-NO	K*-NO	L*-NO	L*-NO	M*-NC	M*-NC	M*-NC									
						Equal %		VGf22ES25	K*-NO	K*-NO	K*-NO	L*-NO	L*-NO	M*-NC	M*-NC	M*-NC									
	3"					125		175 psi @ 130 F	125	100 psig / 337 F	Equal %	VGf21ES30	K*-NO	K*-NO	K*-NO	L*-NO	L*-NO	M*-NC	M*-NC	M*-NC					
								400 psi @ 130 F	250	Linear	VGf21LS30	K*-NO	K*-NO	K*-NO	L*-NO	L*-NO	M*-NC	M*-NC	M*-NC						
										Equal %	VGf22ES30	K*-NO	K*-NO	K*-NO	L*-NO	L*-NO	M*-NC	M*-NC	M*-NC						
ANSI Class IV (<0.01% Cv) Seat Leakage																									
2-1/2"	70	Pressure Balanced	175 psi @ 130 F	125	100 psig / 337 F	Equal %	Stem down to close	VGf21EP25	L**-NO	L**-NO	L**-NO	L**-NO	L**-NO	N/A											
						Linear		VGf21LP25	L**-NO	L**-NO	L**-NO	L**-NO	L**-NO	N/A											
	3"					115		Equal %	VGf21EP30	L**-NO	L**-NO	L**-NO	L**-NO	L**-NO	N/A										
								Linear	VGf21LP30	L**-NO	L**-NO	L**-NO	L**-NO	L**-NO	N/A										
ANSI Class III (<0.05% Cv) Seat Leakage																									
2-1/2"	70	Mixing	175 psi @ 130 F	125	N/A	Equal % A-AB	Stem up closes A-AB	VGf31EM25	K-NC	K-NC	K-NC	L-NC	L-NC	M-NO	M-NO	M-NO									
		Diverting				Linear, Constant Total	Stem up closes B-AB	VGf31LD25	K-NO	K-NO	K-NO	L-NO	L-NO	M-NC	M-NC	M-NC									
		Mixing				400 psi @ 130 F	250	Equal % A-AB	Stem up closes A-AB	VGf32EM25	K-NC	K-NC	K-NC	L-NC	L-NC	M-NO	M-NO	M-NO							
		Diverting						Linear, Constant Total	Stem up closes B-AB	VGf32LD25	K-NO	K-NO	K-NO	L-NO	L-NO	M-NC	M-NC	M-NC							
	3"	120	Mixing	175 psi @ 130 F		125	Equal % A-AB	Stem up closes A-AB	VGf31EM30	K-NC	K-NC	K-NC	L-NC	L-NC	M-NO	M-NO	M-NO								
			Diverting				Linear, Constant Total	Stem up closes B-AB	VGf31LD30	K-NO	K-NO	K-NO	L-NO	L-NO	M-NC	M-NC	M-NC								
		115	Mixing				400 psi @ 130 F	250	Equal % A-AB	Stem up closes A-AB	VGf32EM30	K-NC	K-NC	K-NC	L-NC	L-NC	M-NO	M-NO	M-NO						
			Diverting						Linear, Constant Total	Stem up closes B-AB	VGf32LD30	K-NO	K-NO	K-NO	L-NO	L-NO	M-NC	M-NC	M-NC						

*The close-off pressure not to exceed rated pressure of steam valve

**175 psi close-off, see chart for pneumatic air pressure required for operation.

NC = Normally Closed, A to AB Normally Closed for 3-way valves

NO = Normally Open, A to AB Normally Open for 3-way valves

VALVES

Product Selection - Valves

Flanged Globe Valves 4"- 6", With Pneumatic Actuators

Common Features

- Easy installation and attachment to the valve
- Direct acting
- Large 13 inch diaphragm for high stem force



Actuator Features	Without Positive Positioner		With Positive Positioner	
	MP953C1471	MP953C1489	MP953E1400	MP953E1418
Actuator O.S. Number	MP953C1471	MP953C1489	MP953E1400	MP953E1418
Direct Acting / Reverse Acting	Direct Acting			
Diaphragm Size	13"			
Fail Safe Action	Stem Up			
Actuator Force	High			
Stroke	1-1/2"			
Spring Range	2-7 psi	•		
	4-11 psi		•	•
Positioner Span	10 psi	N/A		•
	5 psi		•	

Valve Size (inches)	Cv	Valve Type	Max Static Water Pressure	ANSI Class	Max Steam Pressure	Flow Characteristic	Valve Action	Valve OS Number	Close-off Pressure - See Charts On Page 149				
ANSI Class III (<0.05% Cv) Seat Leakage													
2-Way Water & Steam Valves	4"	155	Standard	175 psi @ 130 F	125	Equal %	Stem down to close	VGf21ES40	L*-NO	L*-NO	L*-NO	L*-NO	
								VGf21LS40	L*-NO	L*-NO	L*-NO	L*-NO	
	4"	150	Standard	400 psi @ 130 F	250	Equal %	Stem down to close	VGf22ES40	L*-NO	L*-NO	L*-NO	L*-NO	
								VGf22LS40	L*-NO	L*-NO	L*-NO	L*-NO	
	5"	320	Standard	175 psi @ 130 F	125	Equal %	Stem down to close	VGf21ES50	L*-NO	L*-NO	L*-NO	L*-NO	
								VGf21LS50	L*-NO	L*-NO	L*-NO	L*-NO	
								VGf22ES50	L*-NO	L*-NO	L*-NO	L*-NO	
								VGf22LS50	L*-NO	L*-NO	L*-NO	L*-NO	
	6"	370	Standard	175 psi @ 130 F	125	Equal %	Stem down to close	VGf21ES60	L*-NO	L*-NO	L*-NO	L*-NO	
								VGf21LS60	L*-NO	L*-NO	L*-NO	L*-NO	
								VGf22ES60	L*-NO	L*-NO	L*-NO	L*-NO	
								VGf22LS60	L*-NO	L*-NO	L*-NO	L*-NO	
ANSI Class IV (<0.01% Cv) Seat Leakage													
2-Way Water & Steam Valves	4"	150	Pressure Balanced	175 psi @ 130 F	125	Equal %	Stem down to close	VGf21EP40	L*-NO	L*-NO	L*-NO	L*-NO	
								VGf21LP40	L*-NO	L*-NO	L*-NO	L*-NO	
	5"	285	Pressure Balanced	175 psi @ 130 F	125	Equal %	Stem down to close	VGf21EP50	L*-NO	L*-NO	L*-NO	L*-NO	
								VGf21LP50	L*-NO	L*-NO	L*-NO	L*-NO	
	6"	370	Pressure Balanced	175 psi @ 130 F	125	Equal %	Stem down to close	VGf21EP60	L*-NO	L*-NO	L*-NO	L*-NO	
								VGf21LP60	L*-NO	L*-NO	L*-NO	L*-NO	
ANSI Class III (<0.05% Cv) Seat Leakage													
3-Way Water Valves	4"	150	Mixing	175 psi @ 130 F	125	Equal % A-AB	Stem up closes A-AB	VGf31EM40	L-NC	L-NC	L-NC	L-NC	
		160	Diverting					VGf31LD40	L-NC	L-NC	L-NC	L-NC	
		4"	170	Mixing	400 psi @ 130 F	250	Equal % A-AB	Stem up closes A-AB	VGf32EM40	L-NC	L-NC	L-NC	L-NC
			160	Diverting					VGf32LD40	L-NC	L-NC	L-NC	L-NC
	5"	320	Mixing	175 psi @ 130 F	125	Equal % A-AB	Stem up closes A-AB	VGf31EM50	L-NC	L-NC	L-NC	L-NC	
		285	Diverting					VGf31LD50	L-NC	L-NC	L-NC	L-NC	
		5"	320	Mixing	400 psi @ 130 F	250	Equal % A-AB	Stem up closes A-AB	VGf32EM50	L-NC	L-NC	L-NC	L-NC
			285	Diverting					VGf32LD50	L-NC	L-NC	L-NC	L-NC
	6"	370	Mixing	175 psi @ 130 F	125	Equal % A-AB	Stem up closes A-AB	VGf31EM60	L-NC	L-NC	L-NC	L-NC	
		380	Diverting					VGf31LD60	L-NC	L-NC	L-NC	L-NC	
		6"	370	Mixing	400 psi @ 130 F	250	Equal % A-AB	Stem up closes A-AB	VGf32EM60	L-NC	L-NC	L-NC	L-NC
			380	Diverting					VGf32LD60	L-NC	L-NC	L-NC	L-NC

*The close-off pressure not to exceed rated pressure of steam valve
 †175 psi close-off, see chart for pneumatic air pressure required for operation.
 NC = Normally Closed, A to AB Normally Closed for 3-way valves
 NO = Normally Open, A to AB Normally Open for 3-way valves

Close-off Pressure Charts - Valves

Flanged Globe Valves 2½"- 6", With Pneumatic Actuators

Chart K

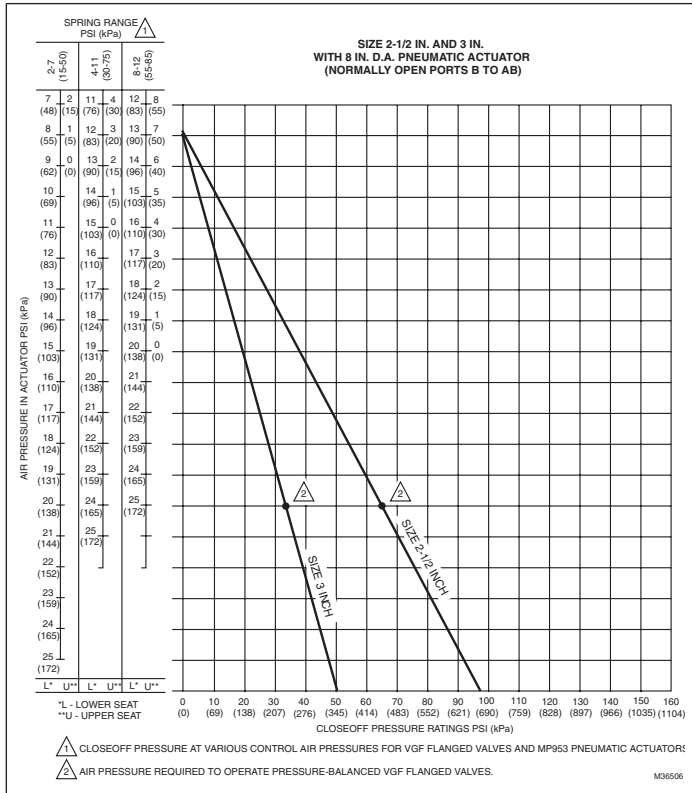


Chart L

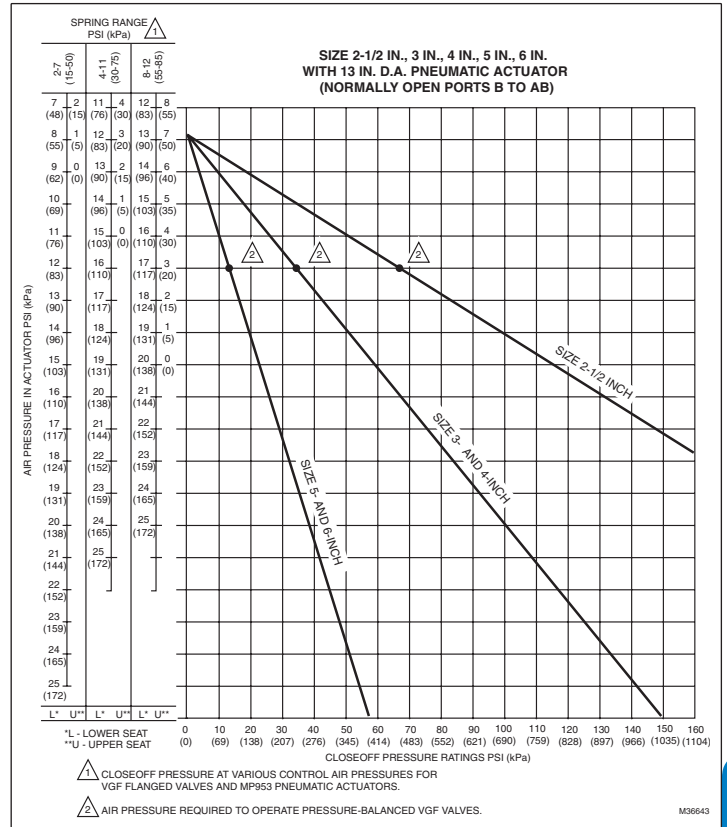
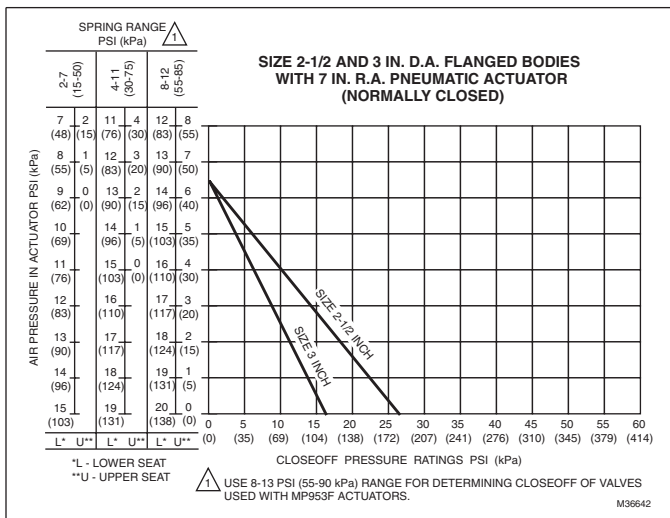


Chart M



VALVES

Product Selection - Valves

Resilient Seat Butterfly Valves, 2-Way Fail-in-place

VR2 – 2 to 5 inch

Common Features

- Fail-In-Place Actuators
- 5-Year Warranty
- Heater Option – Must be ordered with the assembly. Cannot be field installed.
- Aux Switch – Can be field installed.
- Max static pressure 232 psi CWP

Actuator Features		Fail-In-Place			
Control Signal	Floating	•	•		
	2-Position SPDT	•	•		
	Modulating 2-10Vdc			•	•
Enclosure Rating	NEMA2	•		•	
	NEMA4X		•		•
Heater Option	(for NEMA4X)		MB-NSR-N4HEAT/U		MB-NSR-N4HEAT/U
Power Supply Voltage	24Vac/Vdc	•	•	•	•
	24-240Vac				
Aux Switch	Add-On	MB-NSR-SWITCH/U	MB-NSR-SWITCH/U	MB-NSR-SWITCH/U	MB-NSR-SWITCH/U
Feedback	2-10Vdc				

Valve Size (inches)	Cv @ 60°	Cv @ 90°	Close-off (psi)					
2	44	115	200	Valve/Actuator Assembly	VR2F6LPN2/M	VR2F6LPN4/M	VR2F7LPF2/M	VR2F7LPF4/M
				Replacement Actuator (included in assembly)	MBP6L2N2/U	MBP6L4N4/U	MBP7L2F2/U	MBP7L4F4/U
2-1/2	75	196	200	Valve/Actuator Assembly	VR2G6LPN2/M	VR2G6LPN4/M	VR2G7LPF2/M	VR2G7LPF4/M
				Replacement Actuator (included in assembly)	MBP6L2N2/U	MBP6L4N4/U	MBP7L2F2/U	MBP7L4F4/U
3	116	302	200	Valve/Actuator Assembly	VR2H6LPN2/M	VR2H6LPN4/M	VR2H7LPF2/M	VR2H7LPF4/M
				Replacement Actuator (included in assembly)	MBP6L4N2/U	MBP6L4N4/U	MBP7L4F2/U	MBP7L4F4/U
4	230	600	200	Valve/Actuator Assembly	VR2J6LPN2/M	VR2J6LPN4/M	VR2J7LPF2/M	VR2J7LPF4/M
				Replacement Actuator (included in assembly)	MBP6L5N2/U	MBP6L5N4/U	MBP7L5F2/U	MBP7L5F4/U
5	392	1022	200	Valve/Actuator Assembly	VR2K6LPN2/M	VR2K6LPN4/M	VR2K7LPF2/M	VR2K7LPF4/M
				Replacement Actuator (included in assembly)	MBP6L5N2/U	MBP6L5N4/U	MBP7L5F2/U	MBP7L5F4/U

VR2 – 6 to 2 inch

Common Features

- Fail-In-Place Actuators
- 5-Year Warranty
- Max static pressure 232 psi CWP

Actuator Features		Fail-In-Place	
Control Signal	Floating	•	
	2-Position SPDT	•	
	Modulating 2-10Vdc		•
Enclosure Rating	NEMA4X	•	•
Heater Option	(for NEMA4X)	Built in (Standard)	Built in (Standard)
Power Supply Voltage	24-240Vac	•	•
Aux Switch	Built-In	2 x SPDT	2 x SPDT
Feedback	2-10Vdc		•

Valve Size (inches)	Cv @ 60°	Cv @ 90°	Close-off (psi)			
6	605	1,579	200	Valve/Actuator Assembly	VR2L6UPSH/M	VR2L7UPBH/M
				Replacement Actuator (included in assembly)	MBP6U6SH/U	MBP7U6BH/U
8	1,202	3,136	200	Valve/Actuator Assembly	VR2M6UPSH/M	VR2M7UPBH/M
				Replacement Actuator (included in assembly)	MBP6U7SH/U	MBP7U7BH/U
10	2,047	5,340	200	Valve/Actuator Assembly	VR2N6UPSH/M	VR2N7UPBH/M
				Replacement Actuator (included in assembly)	MBP6U8SH/U	MBP7U8BH/U
12	3,162	8,250	200	Valve/Actuator Assembly	VR2P6UPSH/M	VR2P7UPBH/M
				Replacement Actuator (included in assembly)	MBP6U6SH/U	MBP7U6BH/U

Product Selection - Valves

Resilient Seat Butterfly Valves, 2-Way Fail-in-place and Spring Return

VR2 – 14 to 24 inch

Common Features

- Fail-In-Place Actuators
- 2-Year Warranty
- Max static pressure 232 psi CWP

				Actuator Features		Fail-In-Place			
		Control Signal		Floating	•		•		
				2-Position SPDT	•		•		
				Modulating 2-10Vdc		•			•
		Enclosure Rating		NEMA4X	•	•	•	•	
		Heater Option		(for NEMA4X)	Built in (Standard)	Built in (Standard)	Built in (Standard)	Built in (Standard)	
		Power Supply Voltage		24Vac	•	•			
				120Vac			•		•
		Aux Switch		Built-In	2 x SPDT	2 x SPDT	2 x SPDT	2 x SPDT	
		Feedback		2-10Vdc		•			•
Valve Size (inches)	Cv @ 60°	Cv @ 90°	Close-off (psi)						
14	4,658	11,917	150	Valve/Actuator Assembly	VR2R6LPSH/M	VR2R7LPBH/M			
				Replacement Actuator (included in assembly)	MBP6LBSH/U	MBP7LBBH/U			
16	6,282	16,388	150	Valve/Actuator Assembly			VR2S6HPSH/M	VR2S7HPBH/M	
				Replacement Actuator (included in assembly)			MBP6HCSH/U	MBP7HCBH/U	
18	8,320	21,705	150	Valve/Actuator Assembly			VR2T6HPSH/M	VR2T7HPBH/M	
				Replacement Actuator (included in assembly)			MBP6HESH/U	MBP7HEBH/U	
20	10,698	27,908	150	Valve/Actuator Assembly			VR2U6HPSH/M	VR2U7HPBH/M	
				Replacement Actuator (included in assembly)			MBP6HESH/U	MBP7HEBH/U	
24	16,528	43,116	150	Valve/Actuator Assembly			VR2V6HPSH/M	VR2V7HPBH/M	
				Replacement Actuator (included in assembly)			MBP6HSH/U	MBP7HHBH/U	

VR2 – 2 and 2.5 inch

Common Features

- Spring Return Actuators
- 5-Year Warranty
- Heater Option – Must be ordered with the assembly. Cannot be field installed.
- Max static pressure 232 psi CWP

				Actuator Features		Spring Return						
		Control Signal		2-Position SPST				•	•	•	•	
				Modulating 2-10Vdc	•	•	•	•				
		Enclosure Rating		NEMA2	•			•		•		
				NEMA4X		•					•	
		Heater Option		(for NEMA4X)	MB-SR-N4HEAT/U	MB-SR-N4HEAT/U	MB-SR-N4HEAT/U	MB-SR-N4HEAT/U				
		Power Supply Voltage		24Vac/Vdc	•	•	•					
				24-240Vac				•	•	•	•	
		Aux Switch		Built-In	2 x SPDT	2 x SPDT		2 x SPDT	2 x SPDT			
		Feedback		2-10Vdc	•	•	•	•				
Valve Size (Inches)	Cv @ 60°	Cv @ 90°	Close-off (psi)	Fail-Safe Open								
2	44	115	200	Valve/Actuator Assembly	VR2F7LSB2/M	VR2F7LSB4/M	VR2F7LSF2/M	VR2F7LSF4/M	VR2F8USS2/M	VR2F8USS4/M	VR2F8USN2/M	VR2F8USN4/M
				Replacement Actuator (included in assembly)	MBS7L3B2/U	MBS7L3B4/U	MBS7L3F2/U	MBS7L3F4/U	MBS8U3S2/U	MBS8U3S4/U	MBS8U3N2/U	MBS8U3N4/U
2-1/2	75	196	200	Valve/Actuator Assembly	VR2G7LSB2/M	VR2G7LSB4/M	VR2G7LSF2/M	VR2G7LSF4/M	VR2G8USS2/M	VR2G8USS4/M	VR2G8USN2/M	VR2G8USN4/M
				Replacement Actuator (included in assembly)	MBS7L3B2/U	MBS7L3B4/U	MBS7L3F2/U	MBS7L3F4/U	MBS8U3S2/U	MBS8U3S4/U	MBS8U3N2/U	MBS8U3N4/U
				Fail-Safe Closed								
2	44	115	200	Valve/Actuator Assembly	VR2F7LTB2/M	VR2F7LTB4/M	VR2F7LTF2/M	VR2F7LTF4/M	VR2F8UTS2/M	VR2F8UTS4/M	VR2F8UTN2/M	VR2F8UTN4/M
				Replacement Actuator (included in assembly)	MBS7L3B2/U	MBS7L3B4/U	MBS7L3F2/U	MBS7L3F4/U	MBS8U3S2/U	MBS8U3S4/U	MBS8U3N2/U	MBS8U3N4/U
2-1/2	75	196	200	Valve/Actuator Assembly	VR2G7LTB2/M	VR2G7LTB4/M	VR2G7LTF2/M	VR2G7LTF4/M	VR2G8UTS2/M	VR2G8UTS4/M	VR2G8UTN2/M	VR2G8UTN4/M
				Replacement Actuator (included in assembly)	MBS7L3B2/U	MBS7L3B4/U	MBS7L3F2/U	MBS7L3F4/U	MBS8U3S2/U	MBS8U3S4/U	MBS8U3N2/U	MBS8U3N4/U

VALVES

Product Selection - Valves

Resilient Seat Butterfly Valves, 2-Way Electronic Fail-safe

VR2 – 3 and 4 inch

Common Features

- Electronic Fail-Safe Actuators
- 5-Year Warranty
- Fail-Safe Position Field Selectable
- Factory Configured to Normally Closed / Fail Closed
- Heater Option – Must be ordered with the assembly. Cannot be field installed.
- Aux Switch – Can be field installed.
- Max static pressure 232 psi CWP

				Actuator Features		Electronic Fail-Safe				
				Control Signal	Floating	•	•			
				2-Position SPDT		•	•			
				Modulating 2-10Vdc				•		•
				Enclosure Rating	NEMA2	•		•		
				NEMA4X			•			•
				Heater Option	(for NEMA4X)		MB-NSR-N4HEAT/U			MB-NSR-N4HEAT/U
				Power Supply Voltage	24Vac/Vdc	•	•	•		•
				Aux Switch	Add-On	MB-NSR-SWITCH/U	MB-NSR-SWITCH/U	MB-NSR-SWITCH/U		MB-NSR-SWITCH/U
				Feedback	2-10Vdc			•		•
Valve Size (inches)	Cv @ 60°	Cv @ 90°	Close-off (psi)							
3	116	302	200	Valve/Actuator Assembly	VR2H6LEN2/M	VR2H6LEN4/M	VR2H7LEF2/M			VR2H7LEF4/M
				Replacement Actuator (included in assembly)	MBE6L4N2/U	MBE6L4N4/U	MBE7L4F2/U			MBE7L4F4/U
4	230	600	200	Valve/Actuator Assembly	VR2J6LEN2/M	VR2J6LEN4/M	VR2J7LEF2/M			VR2J7LEF4/M
				Replacement Actuator (included in assembly)	MBE6L5N2/U	MBE6L5N4/U	MBE7L5F2/U			MBE7L5F4/U

VR2 – 5 to 12 inch

Common Features

- Electronic Fail-Safe Actuators
- 5-Year Warranty
- Fail-Safe Position Field Selectable
- Factory Configured to Normally Closed / Fail Closed
- Max static pressure 232 psi CWP

				Actuator Features		Electronic Fail-Safe				
				Control Signal	Floating	•				
				2-Position SPDT		•				
				Modulating 2-10Vdc				•		
				Enclosure Rating	NEMA4X	•				•
				Heater Option	(for NEMA4X)	Built in (Standard)				Built in (Standard)
				Power Supply Voltage	24-240Vac	•				•
				Aux Switch	Built-In	2 x SPDT				2 x SPDT
				Feedback	2-10Vdc					•
Valve Size (inches)	Cv @ 60°	Cv @ 90°	Close-off (psi)							
5	392	1,022	200	Valve/Actuator Assembly	VR2K6UESH/M					VR2K7UEBH/M
				Replacement Actuator (included in assembly)	MBE6U6SH/U					MBE7U6BH/U
6	605	1,579	200	Valve/Actuator Assembly	VR2L6UESH/M					VR2L7UEBH/M
				Replacement Actuator (included in assembly)	MBE6U6SH/U					MBE7U6BH/U
8	1,202	3,136	200	Valve/Actuator Assembly	VR2M6UESH/M					VR2M7UEBH/M
				Replacement Actuator (included in assembly)	MBE6U7SH/U					MBE7U7BH/U
10	2,047	5,340	200	Valve/Actuator Assembly	VR2N6UESH/M					VR2N7UEBH/M
				Replacement Actuator (included in assembly)	MBE6U8SH/U					MBE7U8BH/U
12	3,162	8,250	200	Valve/Actuator Assembly	VR2P6UESH/M					VR2P7UEBH/M
				Replacement Actuator (included in assembly)	MBE6U6SH/U					MBE7U6BH/U

Product Selection - Valves

Resilient Seat Butterfly Valves, 3-Way Fail-in-place

VR3 / VR4 / VR5 – 2 to 3 inch

Common Features

- Fail-In-Place Actuators
- 5-Year Warranty
- Heater Option – Must be ordered with the assembly. Cannot be field installed.
- Aux Switch – Can be field installed.
- Max static pressure 232 psi CWP

				Actuator Features	Fail-In-Place				
				Control Signal	Floating	•	•		
					2-Position SPDT	•	•		
					Modulating 2-10Vdc			•	•
				Enclosure Rating	NEMA2	•		•	
					NEMA4X		•		•
				Heater Option	(for NEMA4X)		MB-SR-N4HEAT/U		MB-SR-N4HEAT/U
				Power Supply Voltage	24Vac/Vdc	•	•	•	•
				Aux Switch	Add-On	MB-NSR-SWITCH/U	MB-NSR-SWITCH/U	MB-NSR-SWITCH/U	MB-NSR-SWITCH/U
				Feedback	2-10Vdc			•	•
Valve Size (inches)	Cv @ 60°	Cv @ 90°	Close-off (psi)	VR3 3-Way Configuration*					
2	44	115	200	Valve/Actuator Assembly	VR3F6LPN2/M	n/a	VR3F7LPF2/M	VR3F7LPF4/M	
				Replacement Actuator (included in assembly)	MBP6LAN2/U	n/a	MBP7L3F2/U	MBP7LRN4/U	
2-1/2	75	196	200	Valve/Actuator Assembly	VR3G6LPN2/M	VR3G6LPN4/M	VR3G7LPF2/M	VR3G7LPF4/M	
				Replacement Actuator (included in assembly)	MBP6LRN2/U	MBP6LRN4/U	MBP7LRF2/U	MBP7LRN4/U	
3	116	302	200	Valve/Actuator Assembly	(next page)	(next page)	VR3H7LPF2/M	VR3H7LPF4/M	
				Replacement Actuator (included in assembly)	(next page)	(next page)	MBP7LRF2/U	MBP7LRN4/U	
				VR4 3-Way Configuration*					
2	44	115	200	Valve/Actuator Assembly	VR4F6LPN2/M	n/a	VR4F7LPF2/M	VR4F7LPF4/M	
				Replacement Actuator (included in assembly)	MBP6LAN2/U	n/a	MBP7L3F2/U	MBP7LRN4/U	
2-1/2	75	196	200	Valve/Actuator Assembly	VR4G6LPN2/M	VR4G6LPN4/M	VR4G7LPF2/M	VR4G7LPF4/M	
				Replacement Actuator (included in assembly)	MBP6LRN2/U	MBP6LRN4/U	MBP7LRF2/U	MBP7LRN4/U	
3	116	302	200	Valve/Actuator Assembly	(next page)	(next page)	VR4H7LPF2/M	VR4H7LPF4/M	
				Replacement Actuator (included in assembly)	(next page)	(next page)	MBP7LRF2/U	MBP7LRN4/U	
				VR5 3-Way Configuration*					
2	44	115	200	Valve/Actuator Assembly	VR5F6LPN2/M	n/a	VR5F7LPF2/M	VR5F7LPF4/M	
				Replacement Actuator (included in assembly)	MBP6LAN2/U	n/a	MBP7L3F2/U	MBP7LRN4/U	
2-1/2	75	196	200	Valve/Actuator Assembly	VR5G6LPN2/M	VR5G6LPN4/M	VR5G7LPF2/M	VR5G7LPF4/M	
				Replacement Actuator (included in assembly)	MBP6LRN2/U	MBP6LRN4/U	MBP7LRF2/U	MBP7LRN4/U	
3	116	302	200	Valve/Actuator Assembly	(next page)	(next page)	VR5H7LPF2/M	VR5H7LPF4/M	
				Replacement Actuator (included in assembly)	(next page)	(next page)	MBP7LRF2/U	MBP7LRN4/U	

* See diagram on page 192 for port configurations.

Product Selection - Valves

Resilient Seat Butterfly Valves, 3-Way Fail-in-place

VR3 / VR4 / VR5 – 3 to 12 inch

Common Features

- Fail-In-Place Actuators
- 5-Year Warranty
- Max static pressure 232 psi CWP

				Actuator Features		Fail-In-Place	
				Control Signal	Floating	•	
				2-Position SPDT		•	
				Modulating 2-10Vdc			•
				Enclosure Rating	NEMA4X	•	•
				Heater Option	(for NEMA4X)	Built in	Built in
				Power Supply Voltage	24-240Vac	•	•
				Aux Switch	Built-In	2 x SPDT	2 x SPDT
				Feedback	2-10Vdc		•
Valve Size (inches)	Cv @ 60°	Cv @ 90°	Close-off (psi)	VR3 3-Way Configuration*			
3	116	302	200	Valve/Actuator Assembly	VR3H6UPNH/M	(previous page)	
				Replacement Actuator (included in assembly)	MBP6U6SH/U	(previous page)	
4	230	600	200	Valve/Actuator Assembly	VR3J6UPSH/M	VR3J7UPBH/M	
				Replacement Actuator (included in assembly)	MBP6U6SH/U	MBP7U6BH/U	
5	392	1,022	200	Valve/Actuator Assembly	VR3K6UPSH/M	VR3K7UPBH/M	
				Replacement Actuator (included in assembly)	MBP6U6SH/U	MBP7U6BH/U	
6	605	1,579	200	Valve/Actuator Assembly	VR3L6UPSH/M	VR3L7UPBH/M	
				Replacement Actuator (included in assembly)	MBP6U6SH/U	MBP7U6BH/U	
8	1,202	3,136	200	Valve/Actuator Assembly	VR3M6UPSH/M	VR3M7UPBH/M	
				Replacement Actuator (included in assembly)	MBP6U7SH/U	MBP7U7BH/U	
10	2,047	5,340	200	Valve/Actuator Assembly	VR3N6UPSH/M	VR3N7UPBH/M	
				Replacement Actuator (included in assembly)	MBP6U8SH/U	MBP7U8BH/U	
12	3,162	8,250	200	Valve/Actuator Assembly	VR3P6UPSH/M	VR3P7UPBH/M	
				Replacement Actuator (included in assembly)	MBP6U6SH/U	MBP7U6BH/U	
				VR4 3-Way Configuration*			
3	116	302	200	Valve/Actuator Assembly	VR4H6UPNH/M	(previous page)	
				Replacement Actuator (included in assembly)	MBP6U6SH/U	(previous page)	
4	230	600	200	Valve/Actuator Assembly	VR4J6UPSH/M	VR4J7UPBH/M	
				Replacement Actuator (included in assembly)	MBP6U6SH/U	MBP7U6BH/U	
5	392	1,022	200	Valve/Actuator Assembly	VR4K6UPSH/M	VR4K7UPBH/M	
				Replacement Actuator (included in assembly)	MBP6U6SH/U	MBP7U6BH/U	
6	605	1,579	200	Valve/Actuator Assembly	VR4L6UPSH/M	VR4L7UPBH/M	
				Replacement Actuator (included in assembly)	MBP6U6SH/U	MBP7U6BH/U	
8	1,202	3,136	200	Valve/Actuator Assembly	VR4M6UPSH/M	VR4M7UPBH/M	
				Replacement Actuator (included in assembly)	MBP6U7SH/U	MBP7U7BH/U	
10	2,047	5,340	200	Valve/Actuator Assembly	VR4N6UPSH/M	VR4N7UPBH/M	
				Replacement Actuator (included in assembly)	MBP6U8SH/U	MBP7U8BH/U	
12	3,162	8,250	200	Valve/Actuator Assembly	VR4P6UPSH/M	VR4P7UPBH/M	
				Replacement Actuator (included in assembly)	MBP6U6SH/U	MBP7U6BH/U	
				VR5 3-Way Configuration*			
3	116	302	200	Valve/Actuator Assembly	VR5H6UPNH/M	(previous page)	
				Replacement Actuator (included in assembly)	MBP6U6SH/U	(previous page)	
4	230	600	200	Valve/Actuator Assembly	VR5J6UPSH/M	VR5J7UPBH/M	
				Replacement Actuator (included in assembly)	MBP6U6SH/U	MBP7U6BH/U	
5	392	1,022	200	Valve/Actuator Assembly	VR5K6UPSH/M	VR5K7UPBH/M	
				Replacement Actuator (included in assembly)	MBP6U6SH/U	MBP7U6BH/U	
6	605	1,579	200	Valve/Actuator Assembly	VR5L6UPSH/M	VR5L7UPBH/M	
				Replacement Actuator (included in assembly)	MBP6U6SH/U	MBP7U6BH/U	
8	1,202	3,136	200	Valve/Actuator Assembly	VR5M6UPSH/M	VR5M7UPBH/M	
				Replacement Actuator (included in assembly)	MBP6U7SH/U	MBP7U7BH/U	
10	2,047	5,340	200	Valve/Actuator Assembly	VR5N6UPSH/M	VR5N7UPBH/M	
				Replacement Actuator (included in assembly)	MBP6U8SH/U	MBP7U8BH/U	
12	3,162	8,250	200	Valve/Actuator Assembly	VR5P6UPSH/M	VR5P7UPBH/M	
				Replacement Actuator (included in assembly)	MBP6U6SH/U	MBP7U6BH/U	

* See diagram on page 192 for port configurations.

Product Selection - Valves

Resilient Seat Butterfly Valves, 3-way Fail-in-place

VR3 / VR4 / VR5 – 14 to 18 inch

Common Features

- Fail-In-Place Actuators
- 2-Year Warranty
- Max static pressure 232 psi CWP

				Actuator Features		Fail-In-Place	
				Control Signal	Floating	•	
					2-Position SPDT	•	
					Modulating 2-10Vdc		•
				Enclosure Rating	NEMA4X	•	•
				Heater Option	(for NEMA4X)	Built in	Built in
				Power Supply Voltage	120Vac	•	•
				Aux Switch	Built-In	2 x SPDT	2 x SPDT
				Feedback	2-10Vdc		•
Valve Size (inches)	Cv @ 60°	Cv @ 90°	Close-off (psi)	VR3 3-Way Configuration*			
14	4,658	11,917	150	Valve/Actuator Assembly	VR3R6HPSH/M		VR3R7HPBH/M
				Replacement Actuator (included in assembly)	MBP6HCSH/U		MBP7HCBH/U
16	6,282	16,388	150	Valve/Actuator Assembly	VR3S6HPSH/M		VR3S7HPBH/M
				Replacement Actuator (included in assembly)	MBP6HDSH/U		MBP7HDBH/U
18	8,320	21,705	150	Valve/Actuator Assembly	VR3T6HPSH/M		VR3T7HPBH/M
				Replacement Actuator (included in assembly)	MBP6HESH/U		MBP7HEBH/U
				VR4 3-Way Configuration*			
14	4,658	11,917	150	Valve/Actuator Assembly	VR4R6HPSH/M		VR4R7HPBH/M
				Replacement Actuator (included in assembly)	MBP6HCSH/U		MBP7HCBH/U
16	6,282	16,388	150	Valve/Actuator Assembly	VR4S6HPSH/M		VR4S7HPBH/M
				Replacement Actuator (included in assembly)	MBP6HDSH/U		MBP7HDBH/U
18	8,320	21,705	150	Valve/Actuator Assembly	VR4T6HPSH/M		VR4T7HPBH/M
				Replacement Actuator (included in assembly)	MBP6HESH/U		MBP7HEBH/U
				VR5 3-Way Configuration*			
14	4,658	11,917	150	Valve/Actuator Assembly	VR5R6HPSH/M		VR5R7HPBH/M
				Replacement Actuator (included in assembly)	MBP6HCSH/U		MBP7HCBH/U
16	6,282	16,388	150	Valve/Actuator Assembly	VR5S6HPSH/M		VR5S7HPBH/M
				Replacement Actuator (included in assembly)	MBP6HDSH/U		MBP7HDBH/U
18	8,320	21,705	150	Valve/Actuator Assembly	VR5T6HPSH/M		VR5T7HPBH/M
				Replacement Actuator (included in assembly)	MBP6HESH/U		MBP7HEBH/U

* See diagram on page 192 for port configurations.

Product Selection - Valves

Resilient Seat Butterfly Valves, 3-Way Spring Return and Electronic Fail-Safe

VR3 / VR4 / VR5 – 2 inch

Common Features

- Spring Return Actuators
- 5-Year Warranty
- Max static pressure 232 psi CWP

				Actuator Features	Spring Return	
				Control Signal	2-Position SPST	•
					Modulating 2-10Vdc	•
				Enclosure Rating	NEMA2	•
				Power Supply Voltage	24Vac/Vdc	•
				Aux Switch	n/a	n/a
				Feedback	2-10Vdc	•
Valve Size (inches)	Cv @ 60°	Cv @ 90°	Close-off (psi)	Master Actuator Fail Open / VR3 3-Way Configuration*		
2	44	115	200	Valve/Actuator Assembly	VR3F8USN2/M	VR3F7LSF2/M
				Replacement Actuator (included in assembly)	MBS8U1N2/U	MBS7L1F2/U
				Master Actuator Fail Closed / VR3 3-Way Configuration*		
2	44	115	200	Valve/Actuator Assembly	VR3F8UTN2/M	VR3F7LTF2/M
				Replacement Actuator (included in assembly)	MBS8U1N2/U	MBS7L1F2/U
				Master Actuator Fail Open / VR4 3-Way Configuration*		
2	44	115	200	Valve/Actuator Assembly	VR4F8USN2/M	VR4F7LSF2/M
				Replacement Actuator (included in assembly)	MBS8U1N2/U	MBS7L1F2/U
				Master Actuator Fail Closed / VR4 3-Way Configuration*		
2	44	115	200	Valve/Actuator Assembly	VR4F8UTN2/M	VR4F7LTF2/M
				Replacement Actuator (included in assembly)	MBS8U1N2/U	MBS7L1F2/U
				Master Actuator Fail Open / VR5 3-Way Configuration*		
2	44	115	200	Valve/Actuator Assembly	VR5F8USN2/M	VR5F7LSF2/M
				Replacement Actuator (included in assembly)	MBS8U1N2/U	MBS7L1F2/U
				Master Actuator Fail Closed / VR5 3-Way Configuration*		
2	44	115	200	Valve/Actuator Assembly	VR5F8UTN2/M	VR5F7LTF2/M
				Replacement Actuator (included in assembly)	MBS8U1N2/U	MBS7L1F2/U

* See diagram on page 192 for port configurations.

VR3 / VR4 / VR5 – 2.5 and 3 inch

Common Features

- Electronic Fail-Safe Actuators
- Fail-Safe Position Field Selectable
- Factory Configured to Normally Closed / Fail Closed
- Aux Switch – Can be field installed.
- Max static pressure 232 psi CWP

				Actuator Features	Electronic Fail-Safe	
				Control Signal	Floating	•
					2-Position SPDT	•
					Modulating 2-10Vdc	•
				Enclosure Rating	NEMA2	•
				Power Supply Voltage	24Vac/Vdc	•
				Aux Switch	Add-On	MB-NSR-SWITCH/U
				Feedback	2-10Vdc	•
Valve Size (inches)	Cv @ 60°	Cv @ 90°	Close-off (psi)	VR3 3-Way Configuration*		
2-1/2	75	196	200	Valve/Actuator Assembly	VR3G8LEN2/M	VR3G7LEF2/M
				Replacement Actuator (included in assembly)	MBE6LRN2/U	MBE7LRF2/U
3	116	302	200	Valve/Actuator Assembly	VR3H6LEN2/M	VR3H7LEF2/M
				Replacement Actuator (included in assembly)	MBE6LRN2/U	MBE7LRF2/U
				VR4 3-Way Configuration*		
2-1/2	75	196	200	Valve/Actuator Assembly	VR4G8LEN2/M	VR4G7LEF2/M
				Replacement Actuator (included in assembly)	MBE6LRN2/U	MBE7LRF2/U
3	116	302	200	Valve/Actuator Assembly	VR4H6LEN2/M	VR4H7LEF2/M
				Replacement Actuator (included in assembly)	MBE6LRN2/U	MBE7LRF2/U
				VR5 3-Way Configuration*		
2-1/2	75	196	200	Valve/Actuator Assembly	VR5G8LEN2/M	VR5G7LEF2/M
				Replacement Actuator (included in assembly)	MBE6LRN2/U	MBE7LRF2/U
3	116	302	200	Valve/Actuator Assembly	VR5H6LEN2/M	VR5H7LEF2/M
				Replacement Actuator (included in assembly)	MBE6LRN2/U	MBE7LRF2/U

* See diagram on page 192 for port configurations.

Resilient Seat Butterfly Valves, 3-Way Electronic Fail-Safe

VR3 / VR4 / VR5 – 4 to 12 inch

Common Features

- Electronic Fail-Safe Actuators
- 5-Year Warranty
- Fail-Safe Position Field Selectable
- Factory Configured to Normally Closed / Fail Closed
- Max static pressure 232 psi CWP

Actuator Features		Electronic Fail-Safe	
Control Signal	Floating	•	
	2-Position SPDT	•	
	Modulating 2-10Vdc		•
Enclosure Rating	NEMA4X	•	•
Heater Option	(for NEMA4X)	Built in	Built in
Power Supply Voltage	24-240Vac	•	•
Aux Switch	Built-In	2 x SPDT	2 x SPDT
Feedback	2-10Vdc		•

Valve Size (inches)	Cv @ 60°	Cv @ 90°	Close-off (psi)		VR3 3-Way Configuration*	
4	230	600	200	Valve/Actuator Assembly	VR3J6UESH/M	VR3J7UEBH/M
				Replacement Actuator (included in assembly)	MBE6U6SH/U	MBE7U6BH/U
5	392	1,022	200	Valve/Actuator Assembly	VR3K6UESH/M	VR3K7UEBH/M
				Replacement Actuator (included in assembly)	MBE6U6SH/U	MBE7U6BH/U
6	605	1,579	200	Valve/Actuator Assembly	VR3L6UESH/M	VR3L7UEBH/M
				Replacement Actuator (included in assembly)	MBE6U6SH/U	MBE7U6BH/U
8	1,202	3,136	200	Valve/Actuator Assembly	VR3M6UESH/M	VR3M7UEBH/M
				Replacement Actuator (included in assembly)	MBE6U7SH/U	MBE7U7BH/U
10	2,047	5,340	200	Valve/Actuator Assembly	VR3N6UESH/M	VR3N7UEBH/M
				Replacement Actuator (included in assembly)	MBE6U8SH/U	MBE7U8BH/U
12	3,162	8,250	200	Valve/Actuator Assembly	VR3P6UESH/M	VR3P7UEBH/M
				Replacement Actuator (included in assembly)	MBE6U6SH/U	MBE7U6BH/U
					VR4 3-Way Configuration*	
4	230	600	200	Valve/Actuator Assembly	VR4J6UESH/M	VR4J7UEBH/M
				Replacement Actuator (included in assembly)	MBE6U6SH/U	MBE7U6BH/U
5	392	1,022	200	Valve/Actuator Assembly	VR4K6UESH/M	VR4K7UEBH/M
				Replacement Actuator (included in assembly)	MBE6U6SH/U	MBE7U6BH/U
6	605	1,579	200	Valve/Actuator Assembly	VR4L6UESH/M	VR4L7UEBH/M
				Replacement Actuator (included in assembly)	MBE6U6SH/U	MBE7U6BH/U
8	1,202	3,136	200	Valve/Actuator Assembly	VR4M6UESH/M	VR4M7UEBH/M
				Replacement Actuator (included in assembly)	MBE6U7SH/U	MBE7U7BH/U
10	2,047	5,340	200	Valve/Actuator Assembly	VR4N6UESH/M	VR4N7UEBH/M
				Replacement Actuator (included in assembly)	MBE6U8SH/U	MBE7U8BH/U
12	3,162	8,250	200	Valve/Actuator Assembly	VR4P6UESH/M	VR4P7UEBH/M
				Replacement Actuator (included in assembly)	MBE6U6SH/U	MBE7U6BH/U
					VR5 3-Way Configuration*	
4	230	600	200	Valve/Actuator Assembly	VR5J6UESH/M	VR5J7UEBH/M
				Replacement Actuator (included in assembly)	MBE6U6SH/U	MBE7U6BH/U
5	392	1,022	200	Valve/Actuator Assembly	VR5K6UESH/M	VR5K7UEBH/M
				Replacement Actuator (included in assembly)	MBE6U6SH/U	MBE7U6BH/U
6	605	1,579	200	Valve/Actuator Assembly	VR5L6UESH/M	VR5L7UEBH/M
				Replacement Actuator (included in assembly)	MBE6U6SH/U	MBE7U6BH/U
8	1,202	3,136	200	Valve/Actuator Assembly	VR5M6UESH/M	VR5M7UEBH/M
				Replacement Actuator (included in assembly)	MBE6U7SH/U	MBE7U7BH/U
10	2,047	5,340	200	Valve/Actuator Assembly	VR5N6UESH/M	VR5N7UEBH/M
				Replacement Actuator (included in assembly)	MBE6U8SH/U	MBE7U8BH/U
12	3,162	8,250	200	Valve/Actuator Assembly	VR5P6UESH/M	VR5P7UEBH/M
				Replacement Actuator (included in assembly)	MBE6U6SH/U	MBE7U6BH/U

* See diagram on page 192 for port configurations.

Product Selection - Valves

High Performance Butterfly Valves, 2-way Fail-in-place and Spring Return

VH2 – 2 to 4 inch

Common Features

- Fail-In-Place Actuators
- 5-Year Warranty
- Aux Switch – Can be field installed.
- ASME/ANSI Class 150 Flanges
- Max static pressure 285 psi (100°F)

				Actuator Features		Fail-In-Place	
				Control Signal	Floating	•	
				2-Position SPDT		•	
				Modulating 2-10Vdc			•
				Enclosure Rating	NEMA2	•	•
				Power Supply Voltage	24Vac/Vdc	•	•
				Aux Switch	Add-On	MB-NSR-SWITCH/U	MB-NSR-SWITCH/U
				Feedback	2-10Vdc		•
Valve Size (inches)	Cv @ 60°	Cv @ 90°	Close-off (psi)				
2	56	102	150	Valve/Actuator Assembly	VH2F6LPN2/M	VH2F7LPF2/M	
				Replacement Actuator (included in assembly)	MBP6LRN2/U	MBP7LRF2/U	
2-1/2	80	146	150	Valve/Actuator Assembly	VH2G6LPN2/M	VH2G7LPF2/M	
				Replacement Actuator (included in assembly)	MBP6LRN2/U	MBP7LRF2/U	
3	125	228	150	Valve/Actuator Assembly	VH2H6LPN2/M	VH2H7LPF2/M	
				Replacement Actuator (included in assembly)	MBP6LRN2/U	MBP7LRF2/U	
4	248	451	150	Valve/Actuator Assembly	VH2J6LPN2/M	VH2J7LPF2/M	
				Replacement Actuator (included in assembly)	MBP6LRN2/U	MBP7LRF2/U	

VH2 – 2 to 4 inch

Common Features

- Spring Return Actuators
- 5-Year Warranty
- ASME/ANSI Class 150 Flanges
- Max static pressure 285 psi (100°F)

				Actuator Features		Spring Return	
				Control Signal	2-Position SPDT	•	
				Modulating 2-10Vdc			•
				Enclosure Rating	NEMA2	•	•
				Power Supply Voltage	24Vac/Vdc	•	•
				Feedback	2-10Vdc	•	
Valve Size (inches)	Cv @ 60°	Cv @ 90°	Close-off (psi)	Fail-Safe Open			
2	56	102	150	Valve/Actuator Assembly	VH2F8LSN2/M	VH2F7LSF2/M	
				Replacement Actuator (included in assembly)	MBS8L1N2/U	MBS7L1F2/U	
2-1/2	80	146	150	Valve/Actuator Assembly	VH2G8LSN2/M	VH2G7LSF2/M	
				Replacement Actuator (included in assembly)	MBS8L1N2/U	MBS7L1F2/U	
3	125	228	150	Valve/Actuator Assembly	VH2H8LSN2/M	VH2H7LSF2/M	
				Replacement Actuator (included in assembly)	MBS8L1N2/U	MBS7L1F2/U	
4	248	451	150	Valve/Actuator Assembly	VH2J8LSN2/M	VH2J7LSF2/M	
				Replacement Actuator (included in assembly)	MBS8L1N2/U	MBS7L1F2/U	
				Fail-Safe Closed			
2	56	102	150	Valve/Actuator Assembly	VH2F8LTN2/M	VH2F7LTF2/M	
				Replacement Actuator (included in assembly)	MBS8L1N2/U	MBS7L1F2/U	
2-1/2	80	146	150	Valve/Actuator Assembly	VH2G8LTN2/M	VH2G7LTF2/M	
				Replacement Actuator (included in assembly)	MBS8L1N2/U	MBS7L1F2/U	
3	125	228	150	Valve/Actuator Assembly	VH2H8LTN2/M	VH2H7LTF2/M	
				Replacement Actuator (included in assembly)	MBS8L1N2/U	MBS7L1F2/U	
4	248	451	150	Valve/Actuator Assembly	VH2J8LTN2/M	VH2J7LTF2/M	
				Replacement Actuator (included in assembly)	MBS8L1N2/U	MBS7L1F2/U	

High Performance Butterfly Valves, 2-way Electronic Fail-safe and Fail-in-place

VH2 – 5 to 6 inch

Common Features

- Electronic Fail-Safe Actuators
- 5-Year Warranty
- Fail-Safe Position Field Selectable
- Factory set to Normally Closed / Fail Closed
- ASME/ANSI Class 150 Flanges
- Max static pressure 285 psi (100°F)

				Actuator Features		Electronic Fail-Safe	
				Control Signal	Floating	•	
				2-Position SPDT		•	
				Modulating 2-10Vdc			•
				Enclosure Rating	NEMA4X	•	
				Heater Option	(for NEMA4X)	Built in	Built in
				Power Supply Voltage	24-240Vac	•	•
				Aux Switch	Built-In	•	•
				Feedback	2-10Vdc		•
Valve Size (inches)	Cv @ 60°	Cv @ 90°	Close-off (psi)				
5	392	714	150	Valve/Actuator Assembly	VH2K6UESH/M	VH2K7UEBH/M	
				Replacement Actuator (included in assembly)	MBE6U6SH/U	MBE7U6BH/U	
6	607	1,103	150	Valve/Actuator Assembly	VH2L6UESH/M	VH2L7UEBH/M	
				Replacement Actuator (included in assembly)	MBE6U6SH/U	MBE7U6BH/U	

VH2 – 8 to 12 inch

Common Features

- Fail-In-Place Actuators
- 2-Year Warranty
- ASME/ANSI Class 150 Flanges
- Max static pressure 285 psi (100°F)

				Actuator Features		Fail-In-Place			
				Control Signal	Floating	•		•	
				2-Position SPDT		•		•	
				Modulating 2-10Vdc			•		•
				Enclosure Rating	NEMA4X	•	•	•	•
				Heater Option	(for NEMA4X)	Built in (Standard)	Built in (Standard)	Built in (Standard)	Built in (Standard)
				Power Supply Voltage	24Vac	•	•		
				120Vac				•	•
				Aux Switch	Built-In	•	•	•	•
				Feedback	2-10Vdc		•		•
Valve Size (inches)	Cv @ 60°	Cv @ 90°	Close-off (psi)						
8	1,135	2,064	150	Valve/Actuator Assembly	VH2M6LPSH/M	VH2M7LPBH/M			
				Replacement Actuator (included in assembly)	MBP6L9SH/U	MBP7L9SH/U			
10	1,934	3,517	150	Valve/Actuator Assembly	VH2N6LPSH/M	VH2N7LPBH/M			
				Replacement Actuator (included in assembly)	MBP6L9SH/U	MBP7L9SH/U			
12	2,660	1,837	150	Valve/Actuator Assembly	VH2P6LPSH/M	VH2P7LPBH/M			
				Replacement Actuator (included in assembly)	MBP6L9SH/U	MBP7L9SH/U			
14	3,592	6,857	150	Valve/Actuator Assembly	VH2R6LPSH/M	VH2R7LPBH/M			
				Replacement Actuator (included in assembly)	MBP6LBSH/U	MBP7LBBH/U			
16	4,865	9,287	150	Valve/Actuator Assembly			VH2S6HPSH/M	VH2S7HPBH/M	
				Replacement Actuator (included in assembly)			MBP6HDSH/U	MBP7HDBH/U	
18	6,270	11,400	150	Valve/Actuator Assembly			VH2T6HPSH/M	VH2T7HPBH/M	
				Replacement Actuator (included in assembly)			MBP6HDSH/U	MBP7HDBH/U	
20	7,590	14,420	150	Valve/Actuator Assembly			VH2U6HPSH/M	VH2U7HPBH/M	
				Replacement Actuator (included in assembly)			MBP6HFSH/U	MBP7HFBH/U	
24	11,550	22,050	150	Valve/Actuator Assembly			VH2V6HPSH/M	VH2V7HPBH/M	
				Replacement Actuator (included in assembly)			MBP6HGSH/U	MBP7HGBH/U	

Product Selection - Valves

High Performance Butterfly Valves, 3-way MIXING Fail-in-place

VH3 / VH4 / VH5 – 2 to 3 inch

Common Features

- Fail-in-Place Actuators
- 5-Year Warranty
- ASME/ANSI Class 150 Flanges
- Max static pressure 285 psi (100°F)

				Actuator Features		Fail-In-Place	
				Control Signal	Floating	•	
				2-Position SPDT		•	
				Modulating 2-10Vdc			•
				Enclosure Rating	NEMA2	•	•
				Power Supply Voltage	24Vac/Vdc	•	•
				Aux Switch	Add-On	MB-NSR-SWITCH/U	MB-NSR-SWITCH/U
				Feedback	2-10Vdc		•
Valve Size (inches)	Cv @ 60°	Cv @ 90°	Close-off (psi)	VH3 3-Way MIXING Configuration*			
2	52	102	150	Valve/Actuator Assembly		VH3F6LPN2/M	VH3F7LPF2/M
				Replacement Actuator (included in assembly)		MBP6LRN2/U	MBP7LRF2/U
2-1/2	75	143	150	Valve/Actuator Assembly		VH3G6LPN2/M	VH3G7LPF2/M
				Replacement Actuator (included in assembly)		MBP6LRN2/U	MBP7LRF2/U
3	117	223	150	Valve/Actuator Assembly		VH3H6LPN2/M	VH3H7LPF2/M
				Replacement Actuator (included in assembly)		MBP6LRN2/U	MBP7LRF2/U
				VH4 3-Way MIXING Configuration*			
2	52	102	150	Valve/Actuator Assembly		VH4F6LPN2/M	VH4F7LPF2/M
				Replacement Actuator (included in assembly)		MBP6LRN2/U	MBP7LRF2/U
2-1/2	75	143	150	Valve/Actuator Assembly		VH4G6LPN2/M	VH4G7LPF2/M
				Replacement Actuator (included in assembly)		MBP6LRN2/U	MBP7LRF2/U
3	117	223	150	Valve/Actuator Assembly		VH4H6LPN2/M	VH4H7LPF2/M
				Replacement Actuator (included in assembly)		MBP6LRN2/U	MBP7LRF2/U
				VH5 3-Way MIXING Configuration*			
2	52	102	150	Valve/Actuator Assembly		VH5F6LPN2/M	VH5F7LPF2/M
				Replacement Actuator (included in assembly)		MBP6LRN2/U	MBP7LRF2/U
2-1/2	75	143	150	Valve/Actuator Assembly		VH5G6LPN2/M	VH5G7LPF2/M
				Replacement Actuator (included in assembly)		MBP6LRN2/U	MBP7LRF2/U
3	117	223	150	Valve/Actuator Assembly		VH5H6LPN2/M	VH5H7LPF2/M
				Replacement Actuator (included in assembly)		MBP6LRN2/U	MBP7LRF2/U

* See diagram on page 194 for port configurations.

VH3 / VH4 / VH5 – 4 inch

Common Features

- Fail-in-Place Actuators
- 5-Year Warranty
- ASME/ANSI Class 150 Flanges
- Max static pressure 285 psi (100°F)

				Actuator Features		Fail-In-Place	
				Control Signal	Floating	•	
				2-Position SPDT		•	
				Modulating 2-10Vdc			•
				Enclosure Rating	NEMA4X	•	•
				Heater Option	(for NEMA4X)	Built In	Built In
				Power Supply Voltage	24-240Vac/Vdc	•	•
				Aux Switch	Built In	•	•
				Feedback	2-10Vdc		•
Valve Size (inches)	Cv @ 60°	Cv @ 90°	Close-off (psi)	VH3 3-Way MIXING Configuration*			
4	224	435	150	Valve/Actuator Assembly		VH3J6UPSH/M	VH3J7UPBH/M
				Replacement Actuator (included in assembly)		MBP6U6SH/U	MBP7U6BH/U
				VH4 3-Way MIXING Configuration*			
4	224	435	150	Valve/Actuator Assembly		VH4J6UPSH/M	VH4J7UPBH/M
				Replacement Actuator (included in assembly)		MBP6U6SH/U	MBP7U6BH/U
				VH5 3-Way MIXING Configuration*			
4	224	435	150	Valve/Actuator Assembly		VH5J6UPSH/M	VH5J7UPBH/M
				Replacement Actuator (included in assembly)		MBP6U6SH/U	MBP7U6BH/U

* See diagram on page 194 for port configurations.

Product Selection - Valves

High Performance Butterfly Valves, 3-way MIXING Fail-in-place

VH3 / VH4 / VH5 – 5 to 16 inch

Common Features

- Fail-In-Place Actuators
- 2-Year Warranty
- ASME/ANSI Class 150 Flanges
- Max static pressure 285 psi (100°F)

				Actuator Features		Fail-In-Place			
				Control Signal	Floating	•		•	
					2-Position SPDT	•		•	
					Modulating 2-10Vdc		•		•
				Enclosure Rating	NEMA4X	•	•	•	•
				Heater Option	(for NEMA4X)	Built in	Built in	Built in	Built in
				Power Supply Voltage	24Vac/Vdc	•	•		
					120Vac			•	•
				Aux Switch	Built-In	•	•	•	•
				Feedback	2-10Vdc		•		•
Valve Size (inches)	Cv @ 60°	Cv @ 90°	Close-off (psi)	VH3 3-Way MIXING Configuration*					
5	361	688	150	Valve/Actuator Assembly	VH3K6UPSH/M	VH3K7UPBH/M			
				Replacement Actuator (included in assembly)	MBP6L9SH/U	MBP7L9SH/U			
6	546	1,041	150	Valve/Actuator Assembly	VH3L6LPSH/M	VH3L7LPBH/M			
				Replacement Actuator (included in assembly)	MBP6L9SH/U	MBP7L9SH/U			
8	1,001	1,911	150	Valve/Actuator Assembly	VH3M6LPSH/M	VH3M7LPBH/M			
				Replacement Actuator (included in assembly)	MBP6L9SH/U	MBP7L9SH/U			
10	1,673	3,194	150	Valve/Actuator Assembly	VH3N6LPSH/M	VH3N7LPBH/M			
				Replacement Actuator (included in assembly)	MBP6L9SH/U	MBP7L9SH/U			
12	2,319	4,428	150	Valve/Actuator Assembly	VH3P6LPSH/M	VH3P7LPBH/M			
				Replacement Actuator (included in assembly)	MBP6L9SH/U	MBP7L9SH/U			
14	2,986	5,702	150	Valve/Actuator Assembly				VH3R6HPSH/M	VH3R7HPBH/M
				Replacement Actuator (included in assembly)				MBP6HDSH/U	MBP7HDBH/U
16	3,988	8,243	150	Valve/Actuator Assembly				VH3S6HPSH/M	VH3S7HPBH/M
				Replacement Actuator (included in assembly)				MBP6HDSH/U	MBP7HDBH/U
				VH4 3-Way MIXING Configuration*					
5	361	688	150	Valve/Actuator Assembly	VH4K6UPSH/M	VH4K7UPBH/M			
				Replacement Actuator (included in assembly)	MBP6L9SH/U	MBP7L9SH/U			
6	546	1,041	150	Valve/Actuator Assembly	VH4L6LPSH/M	VH4L7LPBH/M			
				Replacement Actuator (included in assembly)	MBP6L9SH/U	MBP7L9SH/U			
8	1,001	1,911	150	Valve/Actuator Assembly	VH4M6LPSH/M	VH4M7LPBH/M			
				Replacement Actuator (included in assembly)	MBP6L9SH/U	MBP7L9SH/U			
10	1,673	3,194	150	Valve/Actuator Assembly	VH4N6LPSH/M	VH4N7LPBH/M			
				Replacement Actuator (included in assembly)	MBP6L9SH/U	MBP7L9SH/U			
12	2,319	4,428	150	Valve/Actuator Assembly	VH4P6LPSH/M	VH4P7LPBH/M			
				Replacement Actuator (included in assembly)	MBP6L9SH/U	MBP7L9SH/U			
14	2,986	5,702	150	Valve/Actuator Assembly				VH4R6HPSH/M	VH4R7HPBH/M
				Replacement Actuator (included in assembly)				MBP6HDSH/U	MBP7HDBH/U
16	3,988	8,243	150	Valve/Actuator Assembly				VH4S6HPSH/M	VH4S7HPBH/M
				Replacement Actuator (included in assembly)				MBP6HDSH/U	MBP7HDBH/U
				VH5 3-Way MIXING Configuration*					
5	361	688	150	Valve/Actuator Assembly	VH5K6UPSH/M	VH5K7UPBH/M			
				Replacement Actuator (included in assembly)	MBP6L9SH/U	MBP7L9SH/U			
6	546	1,041	150	Valve/Actuator Assembly	VH5L6LPSH/M	VH5L7LPBH/M			
				Replacement Actuator (included in assembly)	MBP6L9SH/U	MBP7L9SH/U			
8	1,001	1,911	150	Valve/Actuator Assembly	VH5M6LPSH/M	VH5M7LPBH/M			
				Replacement Actuator (included in assembly)	MBP6L9SH/U	MBP7L9SH/U			
10	1,673	3,194	150	Valve/Actuator Assembly	VH5N6LPSH/M	VH5N7LPBH/M			
				Replacement Actuator (included in assembly)	MBP6L9SH/U	MBP7L9SH/U			
12	2,319	4,428	150	Valve/Actuator Assembly	VH5P6LPSH/M	VH5P7LPBH/M			
				Replacement Actuator (included in assembly)	MBP6L9SH/U	MBP7L9SH/U			
14	2,986	5,702	150	Valve/Actuator Assembly				VH5R6HPSH/M	VH5R7HPBH/M
				Replacement Actuator (included in assembly)				MBP6HDSH/U	MBP7HDBH/U
16	3,988	8,243	150	Valve/Actuator Assembly				VH5S6HPSH/M	VH5S7HPBH/M
				Replacement Actuator (included in assembly)				MBP6HDSH/U	MBP7HDBH/U

* See diagram on page 194 for port configurations.

Product Selection - Valves

High Performance Butterfly Valves, 3-way MIXING Electronic Fail-Safe

VH3 / VH4 / VH5 – 2 to 3 inch

Common Features

- Electronic Fail-Safe Actuators
- 5-Year Warranty
- Fail-Safe Position Field Selectable
- Factory set to Normally Closed / Fail Closed
- ASME/ANSI Class 150 Flanges
- Max static pressure 285 psi (100°F)

Actuator Features		Electronic Fail-Safe	
Control Signal	Floating	•	
	2-Position SPDT	•	
	Modulating 2-10Vdc		•
Enclosure Rating	NEMA2	•	•
Power Supply Voltage	24Vac/Vdc	•	•
Aux Switch	Add-On	MB-NSR-SWITCH/U	MB-NSR-SWITCH/U
Feedback	2-10Vdc		•

Valve Size (inches)	Cv @ 60°	Cv @ 90°	Close-off (psi)	VH3 3-Way MIXING Configuration*		
2	52	102	150	Valve/Actuator Assembly	VH3F8LEN2/M	VH3F7LEF2/M
				Replacement Actuator (included in assembly)	MBE6LRN2/U	MBE7LRF2/U
2-1/2	75	143	150	Valve/Actuator Assembly	VH3G8LEN2/M	VH3G7LEF2/M
				Replacement Actuator (included in assembly)	MBE6LRN2/U	MBE7LRF2/U
3	117	223	150	Valve/Actuator Assembly	VH3H8LEN2/M	VH3H7LEF2/M
				Replacement Actuator (included in assembly)	MBE6LRN2/U	MBE7LRF2/U
				VH4 3-Way MIXING Configuration*		
2	52	102	150	Valve/Actuator Assembly	VH4F8LEN2/M	VH4F7LEF2/M
				Replacement Actuator (included in assembly)	MBE6LRN2/U	MBE7LRF2/U
2-1/2	75	143	150	Valve/Actuator Assembly	VH4G8LEN2/M	VH4G7LEF2/M
				Replacement Actuator (included in assembly)	MBE6LRN2/U	MBE7LRF2/U
3	117	223	150	Valve/Actuator Assembly	VH4H8LEN2/M	VH4H7LEF2/M
				Replacement Actuator (included in assembly)	MBE6LRN2/U	MBE7LRF2/U
				VH5 3-Way MIXING Configuration*		
2	52	102	150	Valve/Actuator Assembly	VH5F8LEN2/M	VH5F7LEF2/M
				Replacement Actuator (included in assembly)	MBE6LRN2/U	MBE7LRF2/U
2-1/2	75	143	150	Valve/Actuator Assembly	VH5G8LEN2/M	VH5G7LEF2/M
				Replacement Actuator (included in assembly)	MBE6LRN2/U	MBE7LRF2/U
3	117	223	150	Valve/Actuator Assembly	VH5H8LEN2/M	VH5H7LEF2/M
				Replacement Actuator (included in assembly)	MBE6LRN2/U	MBE7LRF2/U

* See diagram on page 194 for port configurations.

High Performance Butterfly Valves, 3-way DIVERTING Fail-in-place

VH6 / VH7 / VH8 – 2 to 3 inch

Common Features

- Fail-in-Place Actuators
- 5-Year Warranty
- ASME/ANSI Class 150 Flanges
- Max static pressure 285 psi (100°F)

				Actuator Features	Fail-In-Place		
				Control Signal	Floating	•	
					2-Position SPDT	•	
					Modulating 2-10Vdc		•
				Enclosure Rating	NEMA2	•	•
				Power Supply Voltage	24Vac/Vdc	•	•
				Aux Switch	Add-On	MB-NSR-SWITCH/U	MB-NSR-SWITCH/U
				Feedback	2-10Vdc		•
Valve Size (inches)	Cv @ 60°	Cv @ 90°	Close-off (psi)	VH6 3-Way DIVERTING Configuration*			
2	52	102	150	Valve/Actuator Assembly	VH6F6LPN2/M	VH6F7LPF2/M	
				Replacement Actuator (included in assembly)	MBP6LRN2/U	MBP7LRF2/U	
2-1/2	75	143	150	Valve/Actuator Assembly	VH6G6LPN2/M	VH6G7LPF2/M	
				Replacement Actuator (included in assembly)	MBP6LRN2/U	MBP7LRF2/U	
3	117	223	150	Valve/Actuator Assembly	VH6H6LPN2/M	VH6H7LPF2/M	
				Replacement Actuator (included in assembly)	MBP6LRN2/U	MBP7LRF2/U	
				VH7 3-Way DIVERTING Configuration*			
2	52	102	150	Valve/Actuator Assembly	VH7F6LPN2/M	VH7F7LPF2/M	
				Replacement Actuator (included in assembly)	MBP6LRN2/U	MBP7LRF2/U	
2-1/2	75	143	150	Valve/Actuator Assembly	VH7G6LPN2/M	VH7G7LPF2/M	
				Replacement Actuator (included in assembly)	MBP6LRN2/U	MBP7LRF2/U	
3	117	223	150	Valve/Actuator Assembly	VH7H6LPN2/M	VH7H7LPF2/M	
				Replacement Actuator (included in assembly)	MBP6LRN2/U	MBP7LRF2/U	
				VH8 3-Way DIVERTING Configuration*			
2	52	102	150	Valve/Actuator Assembly	VH8F6LPN2/M	VH8F7LPF2/M	
				Replacement Actuator (included in assembly)	MBP6LRN2/U	MBP7LRF2/U	
2-1/2	75	143	150	Valve/Actuator Assembly	VH8G6LPN2/M	VH8G7LPF2/M	
				Replacement Actuator (included in assembly)	MBP6LRN2/U	MBP7LRF2/U	
3	117	223	150	Valve/Actuator Assembly	VH8H6LPN2/M	VH8H7LPF2/M	
				Replacement Actuator (included in assembly)	MBP6LRN2/U	MBP7LRF2/U	

* See diagram on page 194 for port configurations.

VH6 / VH7 / VH8 – 4 inch

Common Features

- Fail-in-Place Actuators
- 5-Year Warranty
- ASME/ANSI Class 150 Flanges

				Actuator Features	Fail-In-Place		
				Control Signal	Floating	•	
					2-Position SPDT	•	
					Modulating 2-10Vdc		•
				Enclosure Rating	NEMA4X	•	•
				Heater Option	(for NEMA4X)	Built In	Built In
				Power Supply Voltage	24-240Vac/Vdc	•	•
				Aux Switch	Built In	•	•
				Feedback	2-10Vdc		•
Valve Size (inches)	Cv @ 60°	Cv @ 90°	Close-off (psi)	VH6 3-Way DIVERTING Configuration*			
4	224	435	150	Valve/Actuator Assembly	VH6J6UPSH/M	VH6J7UPBH/M	
				Replacement Actuator (included in assembly)	MBP6U6SH/U	MBP7U6BH/U	
				VH7 3-Way DIVERTING Configuration*			
4	224	435	150	Valve/Actuator Assembly	VH7J6UPSH/M	VH7J7UPBH/M	
				Replacement Actuator (included in assembly)	MBP6U6SH/U	MBP7U6BH/U	
				VH8 3-Way DIVERTING Configuration*			
4	224	435	150	Valve/Actuator Assembly	VH8J6UPSH/M	VH8J7UPBH/M	
				Replacement Actuator (included in assembly)	MBP6U6SH/U	MBP7U6BH/U	

* See diagram on page 194 for port configurations.

Product Selection - Valves

High Performance Butterfly Valves, 3-way DIVERTING Fail-in-place

VH6 / VH7 / VH8 – 5 to 16 inch

Common Features

- Fail-In-Place Actuators
- 2-Year Warranty
- ASME/ANSI Class 150 Flanges
- Max static pressure 285 psi (100°F)

Actuator Features		Fail-In-Place			
Control Signal	Floating	•		•	
	2-Position SPDT	•		•	
	Modulating 2-10Vdc		•		•
Enclosure Rating	NEMA4X	•	•	•	•
Heater Option	(for NEMA4X)	Built In	Built In	Built In	Built In
Power Supply Voltage	24Vac/Vdc	•	•		
	120Vac			•	•
Aux Switch	Built-In	•	•	•	•
Feedback	2-10Vdc		•		•

Valve Size (inches)	Cv @ 60°	Cv @ 90°	Close-off (psi)	VH6 3-Way DIVERTING Configuration*			
5	361	688	150	Valve/Actuator Assembly	VH6K6UPSH/M	VH6K7UPBH/M	
				Replacement Actuator (included in assembly)	MBP6L9SH/U	MBP7L9SH/U	
6	546	1,041	150	Valve/Actuator Assembly	VH6L6LPSH/M	VH6L7LPBH/M	
				Replacement Actuator (included in assembly)	MBP6L9SH/U	MBP7L9SH/U	
8	1,001	1,911	150	Valve/Actuator Assembly	VH6M6LPSH/M	VH6M7LPBH/M	
				Replacement Actuator (included in assembly)	MBP6L9SH/U	MBP7L9SH/U	
10	1,673	3,194	150	Valve/Actuator Assembly	VH6N6LPSH/M	VH6N7LPBH/M	
				Replacement Actuator (included in assembly)	MBP6L9SH/U	MBP7L9SH/U	
12	2,319	4,428	150	Valve/Actuator Assembly	VH6P6LPSH/M	VH6P7LPBH/M	
				Replacement Actuator (included in assembly)	MBP6L9SH/U	MBP7L9SH/U	
14	2,986	5,702	150	Valve/Actuator Assembly			VH6R6HPSH/M
				Replacement Actuator (included in assembly)			MBP6HDSH/U
16	3,988	8,243	150	Valve/Actuator Assembly			VH6S6HPSH/M
				Replacement Actuator (included in assembly)			MBP6HDSH/U
				VH7 3-Way DIVERTING Configuration*			
5	361	688	150	Valve/Actuator Assembly	VH7K6UPSH/M	VH7K7UPBH/M	
				Replacement Actuator (included in assembly)	MBP6L9SH/U	MBP7L9SH/U	
6	546	1,041	150	Valve/Actuator Assembly	VH7L6LPSH/M	VH7L7LPBH/M	
				Replacement Actuator (included in assembly)	MBP6L9SH/U	MBP7L9SH/U	
8	1,001	1,911	150	Valve/Actuator Assembly	VH7M6LPSH/M	VH7M7LPBH/M	
				Replacement Actuator (included in assembly)	MBP6L9SH/U	MBP7L9SH/U	
10	1,673	3,194	150	Valve/Actuator Assembly	VH7N6LPSH/M	VH7N7LPBH/M	
				Replacement Actuator (included in assembly)	MBP6L9SH/U	MBP7L9SH/U	
12	2,319	4,428	150	Valve/Actuator Assembly	VH7P6LPSH/M	VH7P7LPBH/M	
				Replacement Actuator (included in assembly)	MBP6L9SH/U	MBP7L9SH/U	
14	2,986	5,702	150	Valve/Actuator Assembly			VH7R6HPSH/M
				Replacement Actuator (included in assembly)			MBP6HDSH/U
16	3,988	8,243	150	Valve/Actuator Assembly			VH7S6HPSH/M
				Replacement Actuator (included in assembly)			MBP6HDSH/U
				VH8 3-Way DIVERTING Configuration*			
5	361	688	150	Valve/Actuator Assembly	VH8K6UPSH/M	VH8K7UPBH/M	
				Replacement Actuator (included in assembly)	MBP6L9SH/U	MBP7L9SH/U	
6	546	1,041	150	Valve/Actuator Assembly	VH8L6LPSH/M	VH8L7LPBH/M	
				Replacement Actuator (included in assembly)	MBP6L9SH/U	MBP7L9SH/U	
8	1,001	1,911	150	Valve/Actuator Assembly	VH8M6LPSH/M	VH8M7LPBH/M	
				Replacement Actuator (included in assembly)	MBP6L9SH/U	MBP7L9SH/U	
10	1,673	3,194	150	Valve/Actuator Assembly	VH8N6LPSH/M	VH8N7LPBH/M	
				Replacement Actuator (included in assembly)	MBP6L9SH/U	MBP7L9SH/U	
12	2,319	4,428	150	Valve/Actuator Assembly	VH8P6LPSH/M	VH8P7LPBH/M	
				Replacement Actuator (included in assembly)	MBP6L9SH/U	MBP7L9SH/U	
14	2,986	5,702	150	Valve/Actuator Assembly			VH8R6HPSH/M
				Replacement Actuator (included in assembly)			MBP6HDSH/U
16	3,988	8,243	150	Valve/Actuator Assembly			VH8S6HPSH/M
				Replacement Actuator (included in assembly)			MBP6HDSH/U

* See diagram on page 194 for port configurations.

High Performance Butterfly Valves, 3-way DIVERTING Electronic Fail-Safe

VH6 / VH7 / VH8 – 2 to 3 inch

Common Features

- Electronic Fail-Safe Actuators
- 5-Year Warranty
- Fail-Safe Position Field Selectable
- Factory set to Normally Closed / Fail Closed
- ASME/ANSI Class 150 Flanges
- Max static pressure 285 psi (100°F)

				Actuator Features	Electronic Fail-Safe	
				Control Signal	Floating	•
					2-Position SPDT	•
					Modulating 2-10Vdc	•
				Enclosure Rating	NEMA2	•
				Power Supply Voltage	24Vac/Vdc	•
				Aux Switch	Add-On	MB-NSR-SWITCH/U
				Feedback	2-10Vdc	•
Valve Size (inches)	Cv @ 60°	Cv @ 90°	Close-off (psi)	VH6 3-Way DIVERTING Configuration*		
2	52	102	150	Valve/Actuator Assembly	VH6F8LEN2/M	VH6F7LEF2/M
				Replacement Actuator (included in assembly)	MBE6LRN2/U	MBE7LRF2/U
2-1/2	75	143	150	Valve/Actuator Assembly	VH6G8LEN2/M	VH6G7LEF2/M
				Replacement Actuator (included in assembly)	MBE6LRN2/U	MBE7LRF2/U
3	117	223	150	Valve/Actuator Assembly	VH6H8LEN2/M	VH6H7LEF2/M
				Replacement Actuator (included in assembly)	MBE6LRN2/U	MBE7LRF2/U
				VH7 3-Way DIVERTING Configuration*		
2	52	102	150	Valve/Actuator Assembly	VH7F8LEN2/M	VH7F7LEF2/M
				Replacement Actuator (included in assembly)	MBE6LRN2/U	MBE7LRF2/U
2-1/2	75	143	150	Valve/Actuator Assembly	VH7G8LEN2/M	VH7G7LEF2/M
				Replacement Actuator (included in assembly)	MBE6LRN2/U	MBE7LRF2/U
3	117	223	150	Valve/Actuator Assembly	VH7H8LEN2/M	VH7H7LEF2/M
				Replacement Actuator (included in assembly)	MBE6LRN2/U	MBE7LRF2/U
				VH8 3-Way DIVERTING Configuration*		
2	52	102	150	Valve/Actuator Assembly	VH8F8LEN2/M	VH8F7LEF2/M
				Replacement Actuator (included in assembly)	MBE6LRN2/U	MBE7LRF2/U
2-1/2	75	143	150	Valve/Actuator Assembly	VH8G8LEN2/M	VH8G7LEF2/M
				Replacement Actuator (included in assembly)	MBE6LRN2/U	MBE7LRF2/U
3	117	223	150	Valve/Actuator Assembly	VH8H8LEN2/M	VH8H7LEF2/M
				Replacement Actuator (included in assembly)	MBE6LRN2/U	MBE7LRF2/U

* See diagram on page 194 for port configurations.

Submittal Data - Valves

Pneumatic Valve Actuators



Pneumatic actuators provide proportional control of steam or hot or cold liquids in HVAC systems by operating V5011, V5013 and VGF valve assemblies. Replacement devices are available for older Honeywell actuators.

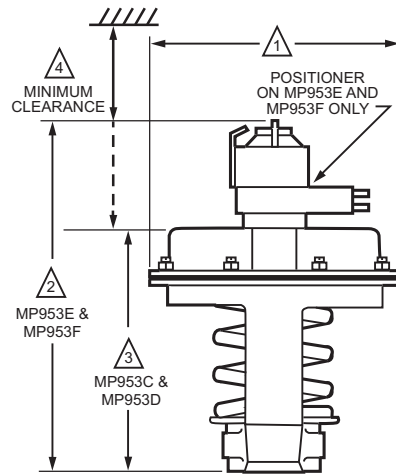
FEATURES

- Rolling diaphragm for long life and low hysteresis.
- Easily attached to valve.
- Can be installed after piping valve.
- Slide lock feature permits simple engagement to valve stem.
- Direct- or reverse-action control.
- Does not include positive positioner.

SPECIFICATIONS

Actuator Type	Valve
Fail Safe Mode	Spring Return
Air Connections	Dual barbed fitting for 5/32 in. O.D. and 1/4 in. O.D. plastic tubing
Temperature Range	0 F to 140 F (-18 C to +60 C)
Maximum Operating Pressure	(172 kPa) 25 psi
Humidity Range	5 to 95% RH

DIMENSIONS DIAGRAM



OPERATION SIZE NOMINAL DIA.	1	2	3	4
5 INCH	5-1/8 (130)	9-1/4 (235)	4-5/8 (117)	4-3/8 (111)
7-1/8 INCH	7-1/8 (181)	10-1/2 (267)	5-5/8 (143)	4-3/8 (111)
8 INCH	8-1/4 (210)	11-1/8 (283)	6-1/2 (165)	5-3/8 (137)
13 INCH	13-1/2 (343)	18-1/8 (460)	10 (254)	7-11/16 (195)

M13903

Submittal Data - Valves

Pneumatic Valve Actuators



Pneumatic actuators provide proportional control of steam or hot or cold liquids in HVAC systems by operating V5011, V5013 and VGF valve assemblies. Replacement devices are available for older Honeywell actuators.

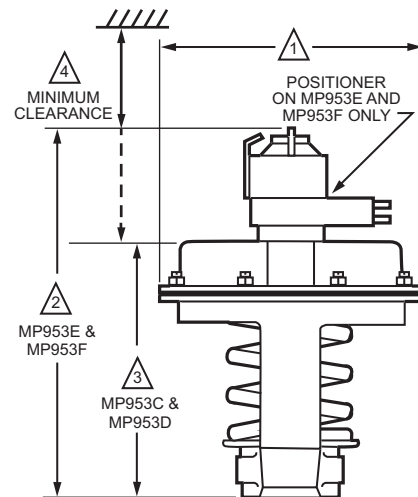
FEATURES

- Rolling diaphragm for long life and low hysteresis.
- Easily attached to valve.
- Can be installed after piping valve.
- Slide lock feature permits simple engagement to valve stem.
- Direct- or reverse-action control.
- Integral positive positioner relay provides positive positioning under varying load conditions.

SPECIFICATIONS

Actuator Type	Valve
Action	Direct Acting
Fail Safe Mode.....	Spring Return
Air Connections	Pilot: Barbed fitting for 5/32 in. O.D. plastic tubing Main: Barbed fitting for 1/4 in. O.D. plastic tubing
Temperature Range.....	0 F to 140 F (-18 C to +60 C)
Maximum Operating Pressure.....	(172 kPa) 25 psi
Humidity Range.....	5 to 95% RH

DIMENSIONS DIAGRAM



OPERATION SIZE NOMINAL DIA.	1	2	3	4
5 INCH	5-1/8 (130)	9-1/4 (235)	4-5/8 (117)	4-3/8 (111)
7-1/8 INCH	7-1/8 (181)	10-1/2 (267)	5-5/8 (143)	4-3/8 (111)
8 INCH	8-1/4 (210)	11-1/8 (283)	6-1/2 (165)	5-3/8 (137)
13 INCH	13-1/2 (343)	18-1/8 (460)	10 (254)	7-11/16 (195)

M13903

Submittal Data - Valves

Unitary Valve Actuators M6410; M7410



Cartridge Globe Valve Actuators are small electric actuators for individual room control that provide floating or modulating control of V5852, V5862 two-way or V5853, V5863 three-way valves.

FEATURES

- Suitable for Excel/IRC system or other controllers providing specified signals.
- Magnetic coupling for torque limitation independent of voltage supply and self-adjustment of the close-off port.
- No mounting tools required.
- Small size allows installation in limited space of fan coil units, induction units, and small reheaters or recoolers.
- Visual position indication (red pin).

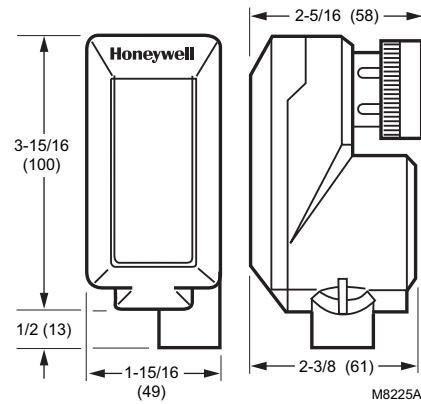
SPECIFICATIONS

Actuator Type	Valve
Fail Safe Mode	Stays in place
Cable Entry	Threaded conduit connector
Electrical Protection	Class I Insulation (24 Vac)
Electrical Connections	Plenum-rated cable
Ingress Protection Rating	IP42
Feedback	No
Frequency	50 Hz; 60 Hz
Manual operation	None (use valve dust cap)
Mounting	Threads onto V58XX valve bonnet
Number of Internal Auxiliary Switch	0
Stroke	1/4 in. (6 mm)
Supply Voltage	24 Vac +10/-30%
Timing; Nominal Driving @ 60 Hz (sec)	125 sec
Materials	Low Maintenance Plastic Housing
Operating Humidity Range (% RH)	5 to 95% RH
Medium Temperature	266 F Maximum (130 C Maximum)
Ambient Temperature Range	32 F to 122 F (0 C to 50 C)
Storage Temperature Range	-40 F to +158 F (-40 C to +70 C)
Weight	0.3125 lb (0.15 kg)
Includes	1/2 in. conduit hub

APPROVALS

Underwriters Laboratories, Inc..... UL94-5V

DIMENSIONS DIAGRAM



Unitary Valve Actuators M6435; M7435



Cartridge Globe Valve Spring Return Actuators are small electric actuators for individual room control that provide floating or modulating control of V5852, V5862 two-way or V5853, V5863 three-way valves.

FEATURES

- Stem actuator retracts up on power failure. Fail safe mode depends on valve seat rest position.
- Suitable for Excel/IRC system or other controllers providing specified signals.
- Magnetic coupling for torque limitation independent of voltage supply and self-adjustment of the close-off port.
- No mounting tools required.
- Compact size allows installation in limited space of fan coil units, induction units, and small reheaters or coolers.
- Visual position indication (red disk).

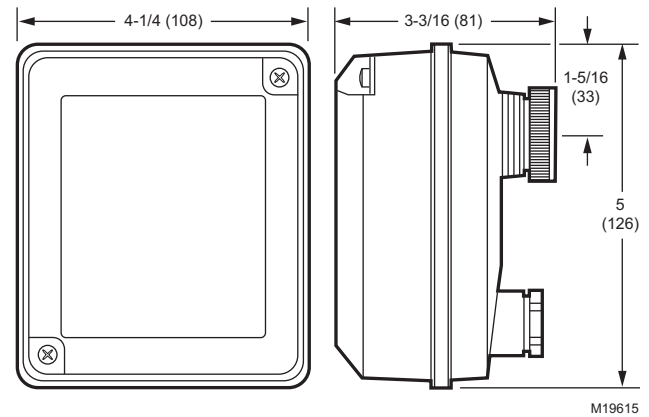
SPECIFICATIONS

Actuator Type	Valve
Fail Safe Mode	Spring Return, operator retracts up (Normally open for 1/2 in. and 3/4 in. V5852 and V5862. Normally closed for all other V58XX valves.)
Spring Return Direction	Stem up
Cable Entry	Threaded conduit connector
Electrical Protection	Class I Insulation (24 Vac)
Electrical Connections	Screw terminals
Ingress Protection Rating	IP54
Feedback	No
Frequency	50 Hz; 60 Hz
Manual operation	None (use valve dust cap)
Mounting	Threads onto V58XX valve bonnet
Number of Internal Auxiliary Switch	0
Stroke	1/4 in. (6 mm)
Supply Voltage	24 Vac +20%, -15%
Timing; Nominal Driving @ 60 Hz (sec)	50 sec
Spring Return Timing (Nominal (sec))	10 sec
Materials	Low Maintenance Plastic Housing
Operating Humidity Range (% RH)	5 to 95% RH
Medium Temperature	266 F Maximum (130 C Maximum)
Ambient Temperature Range	32 F to 122 F (0 C to 50 C)
Storage Temperature Range	-40 F to +158 F (-40 C to +70 C)
Weight	1.1 lb (0.5 kg)
Includes	1/2 in. conduit hub

APPROVALS

Underwriters Laboratories, Inc.UL94-5V

DIMENSIONS DIAGRAM



Submittal Data - Valves

Direct Coupled Valve Actuators, MVN



MVN 3Nm (27 lb-in.) Control Valve Actuator is used with the VBN2 2-way and the VBN3 3-way Control Ball Valves to control hot and chilled water with glycol solutions up to 50% in heating, ventilating and air conditioning (HVAC) systems to provide two position or modulating functions.

FEATURES

- Non-spring Return
- Floating and modulating
- Space saving, click-on installation – no tool required
- Extendable position indicator for easy commissioning
- Available with or without cable
- Compatible with control ball valves from 1/2 to 1-1/4 inches.
- Actuator can be mounted on the valve in any of four positions.

SPECIFICATIONS

Actuator Type	Valve
Rotational Stroke	90° ±3°
Fail Safe Mode	Non-spring return, Fail in place
Torque	27 lb-in. (3 Nm)
External Auxiliary Switches Available ..	No
Supply Voltage	24 Vac +20%, -15%, 24 Vdc
Power Consumption	5 VA - Modulating; 1.5 VA - Floating; 6 VA - Fast Acting SPDT
Environmental Rating	NEMA2
Frequency	50 Hz; 60 Hz
Mounting	Click-on installation – no tool required
Noise Rating at 1m (Maximum)	35 dB(A) max at 1 m [50 dB (A) for MVN643]
Materials	Plenum rated plastic housing
Operating Humidity Range (% RH)	5 to 95% RH, noncondensing
Ambient Temperature Range	-4 °F to 131 °F (-20 °C to 55 °C)
Storage Temperature Range	-40 °F to 176 °F (-40 °C to 80 °C)
Dimensions	See page 179
Timing	90 sec. for MVN613 and MVN713; 30 sec. for MVN643
Electrical Connections	Field wiring 18 to 20 AWG to screw terminals, located under the removable access cover.
Humidity Ratings	5% to 95% RH noncondensing
Design Life (at Rated Voltage)	60,000 cycles; 1 cycle = 0°...90°...0°
Cable Specification	18 AWG, Plenum Rated, 300 V, 10 A, 3 ft. length from end of access cover.
Environmental Protection Ratings	IP40
Approvals	UL/cUL; UL60730

DIMENSIONS DIAGRAM

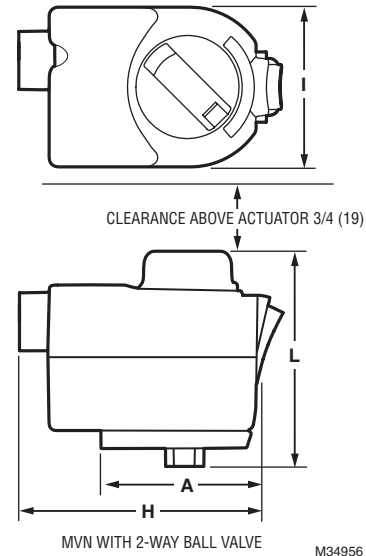


Table 1. Actuators and Accessories

Actuator	Description	Accessory
MVN613A0000	Floating control ball valve actuator	C1- 1 meter cable
MVN613L0000	Floating control ball valve actuator	
MVN643A0000	Fast acting SPDT control ball valve actuator	
MVN643L0000	Fast acting SPDT control ball valve actuator	
MVN713A0000	Modulating control ball valve actuator	
MVN713L0000	Modulating control ball valve actuator	

To order actuator with accessories order actuator part number + accessory. For example: MVN613A0000 + C1

Direct Coupled Valve Actuators, ML6420; ML7420



Direct Coupled Globe Valve Actuators provide floating or modulating control of chilled water, hot water or steam, and mount directly on VGF series, V5011 and V5013 globe valves from 1/2 to 3 inches.

FEATURES

- Easy and quick installation on valves with 1 3/8 in. bonnet and 3/4 in. stroke.
- No separate linkage required.
- Conduit connector standard.
- No adjustments required on linkage.
- Accurate valve positioning.
- Low power consumption.
- High close-off ratings.
- Force limiting end switches.
- Manual operator.
- Synchronous motor.
- Maintenance free.
- ML7420 has an internal selector plug that can be used to reverse the direction of action.

SPECIFICATIONS

Actuator Type	Valve
Fail Safe Mode	Stays in place
Cable Entry	Conduit connector and one knockout on actuator case
Electrical Protection	Class I Insulation (24 Vac)
Electrical Connections	Screw terminals
Ingress Protection Rating	IP54
Frequency	50 Hz; 60 Hz
Manual operation	Knob
Mounting	Directly on V5011/V5013 Globe Valves and VGF Flanged Globe Valves (3/4 in. or 20mm stroke)
Number of Internal Auxiliary Switch	0
Stroke	3/4 in. (20 mm)
Supply Voltage	24 Vac \pm 15%
Materials	ABS-FR Plastic, aluminum yoke
Operating Humidity Range (% RH)	5 to 95% RH
Medium Temperature	300 F Maximum (150 C Maximum)
Ambient Temperature Range	14 F to 122 F (-10 C to +50 C)
Storage Temperature Range	-40 F to +158 F (-40 C to +70 C)
Weight	2.9 lb (1.3 kg)
Includes	1/2 in. conduit hub; 1/2 in. flexible conduit adapter

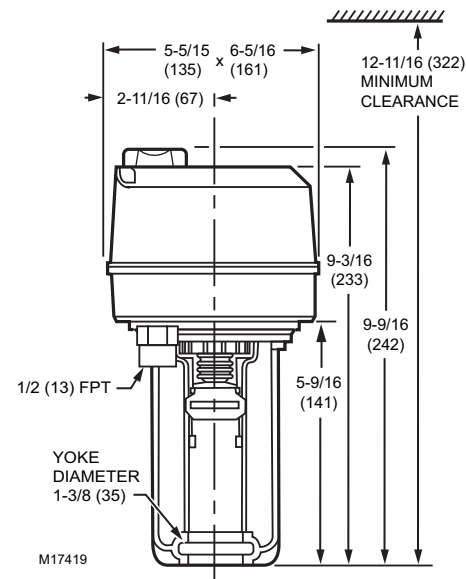
APPROVALS

Canadian Standards Association	Certified
CE	Listed
Underwriters Laboratories, Inc.	UL94-5V

ACCESSORIES

- 43196000-001—High Temperature Kit for actuators with 3/4 inch (20 mm) stroke, stem button attachment
- 43191679-111—Potentiometer, 10k ohm, for ML6425, ML7425
- 43191679-112—Potentiometer, 220 ohm for ML6425, ML7425
- 43191680-105—Dual Auxiliary Switch for CREVAL actuators

DIMENSIONS DIAGRAM



Submittal Data - Valves

Direct Coupled Valve Actuators, ML6421; ML7421



Direct Coupled Globe Valve Actuators provide floating or modulating control of chilled water, hot water or steam, and mount directly on VGF series, V5011 and V5013 valves. These Non-Spring Return High Force Actuators will operate 1-1/2 to 6 inch valves.

FEATURES

- Easy and quick installation on valves with 1 3/8 in. bonnet and 3/4 in. stroke, or with 1 7/8 in. bonnet and 1 1/2 in. stroke.
- High force for VGF Pressure-balanced valves.
- No separate linkage required.
- Conduit connector standard.
- No adjustments required on linkage.
- Accurate valve positioning.
- Low power consumption.
- High close-off ratings.
- Force limiting end switches.
- Manual operator.
- Synchronous motor.
- Maintenance free.

SPECIFICATIONS

Actuator Type	Valve
Fail Safe Mode.....	Stays in place
Cable Entry.....	Two knockout holes for 1/2 in. conduit standard on actuator case
Electrical Protection.....	Class I Insulation (24 Vac)
Electrical Connections.....	Screw terminals
Ingress Protection Rating	IP54
Frequency	50 Hz; 60 Hz
Manual operation.....	Knob
Mounting.....	Directly on V5011/V5013 Globe Valves and VGF Flanged Globe Valves
Number of Internal Auxiliary Switch	0
Materials.....	ABS Plastic
Operating Humidity Range (% RH)	5 to 95% RH
Medium Temperature	300 F Maximum (150 C Maximum)
Ambient Temperature Range	14 F to 122 F (-10 C to +50 C)
Storage Temperature Range	-40 F to +158 F (-40 C to +70 C)
Weight	5.1 lb (2.3 kg)
Includes.....	1/2 in. conduit hub; 1/2 in. flexible conduit adapter

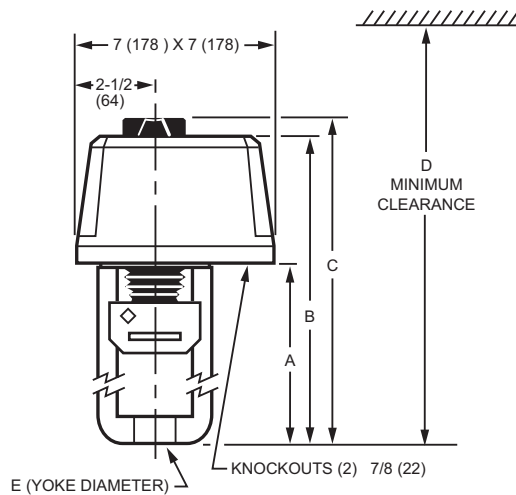
APPROVALS

Canadian Standards Association	Certified
CE.....	Recognized
Underwriters Laboratories, Inc.	UL94-5V

ACCESSORIES

- 43191679-101—Auxiliary Potentiometer for ML6421A
- 43191679-102—220 ohm Auxiliary Potentiometer for ML6421B
- 43191680-102—Dual Auxiliary Switch for CREVAL actuators
- 43196000-001—High Temperature Kit for actuators with 3/4 inch (20 mm) stroke, stem button attachment
- 43196000-038—High Temperature Kit for actuators with 1-1/2 inch (38 mm) stroke, stem button attachment

DIMENSIONS DIAGRAM



	ML6421A, ML7421A	ML6421B, ML7421B
A	5-5/8 (142)	8 (204)
B	9-3/8 (239)	11-7/8 (301)
C	10-3/8 (264)	12-3/4 (326)
D	14-1/4 (360)	16-7/8 (430)
E	1-3/8 (35)	1-7/8 (48)

M16827

Direct Coupled Valve Actuators, ML6425; ML7425



Direct Coupled Globe Valve Actuators provide floating and modulating control of chilled water, hot water and steam, and mount directly on VGF series, V5011 and V5013 globe valves. These Spring Return Actuators will operate 1/2 to 3 inch valves.

FEATURES

- Easy and quick installation on valves with 1 3/8 in. bonnet and 3/4 in. stroke.
- No separate linkage required.
- Conduit connector standard.
- No adjustments required on linkage.
- Accurate valve positioning.
- Low power consumption.
- High close-off ratings.
- Force limiting end switches.
- Internal manual operator.
- Synchronous motor.
- Maintenance free.

SPECIFICATIONS

Actuator Type	Valve
Fail Safe Mode	Stem down on power failure
Cable Entry	Conduit connector and one knockout on actuator case
Electrical Protection	Class I Insulation (24 Vac)
Electrical Connections	Screw terminals
Ingress Protection Rating	IP54
Frequency	50 Hz; 60 Hz
Manual operation	Manual override winding
Mounting	Directly on V5011/V5013 Globe Valves and VGF Flanged Globe Valves (3/4 in. or 20mm stroke)
Number of Internal Auxiliary Switch	0
Stroke	3/4 in. (20 mm)
Materials	ABS-FR Plastic, aluminum yoke
Operating Humidity Range (% RH)	5 to 95% RH
Medium Temperature	300 F Maximum (150 C Maximum)
Ambient Temperature Range	14 F to 122 F (-10 C to +50 C)
Storage Temperature Range	-40 F to +158 F (-40 C to +70 C)
Weight	5.1 lb (2.3 kg)
Includes	1/2 in. conduit hub; 1/2 in. flexible conduit adapter

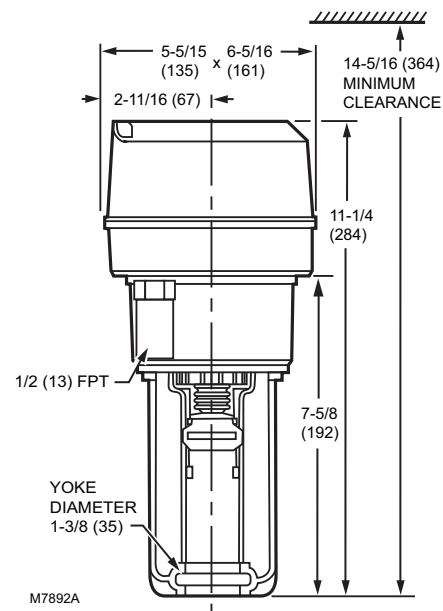
APPROVALS

CE	Recognized
Underwriters Laboratories, Inc.	UL94-5V

ACCESSORIES

- 43191679-111—Potentiometer, 10k ohm, for ML6425, ML7425
- 43191679-112—Potentiometer, 220 ohm for ML6425, ML7425
- 43191680-105—Dual Auxiliary Switch for CREVAL actuators
- 43196000-001—High Temperature Kit for actuators with 3/4 inch (20 mm) stroke, stem button attachment

DIMENSIONS DIAGRAM



Submittal Data - Valves

Direct Coupled Valve Actuators, ML6984



The ML6984 is a self-contained, self-adjusting, motorized linkage that mounts directly onto V5011 two-way or V5013 three-way valves and provides up to 25 mm (1") of linear travel (stem lift). For use with low voltage 3-wire SPDT Series 20 (on-off); Series 60 (floating) electromechanical (dry) contacts; or electronic (triac output) controllers (3-wire installation).

FEATURES

- Allows the use of one common transformer power supply for multiple actuators and controllers.
- Self-contained, motorized valve linkage.
- Linkage self-adjusts to valve stroke of 12 to 25 mm (1/2 to 1 in.).
- Multi-pose mounting.
- Strong valve seat closing force 160 lbf (710 N).
- Compact size for easy installation in confined area.
- One device for either 24 Vac or 28 Vdc power supply application.
- Electronic current sensing provides internal protection and positive full closing force.
- Field-addable position feedback/auxiliary switch module available (5-wire control wiring only).
- Compatible with 3-wire control systems.

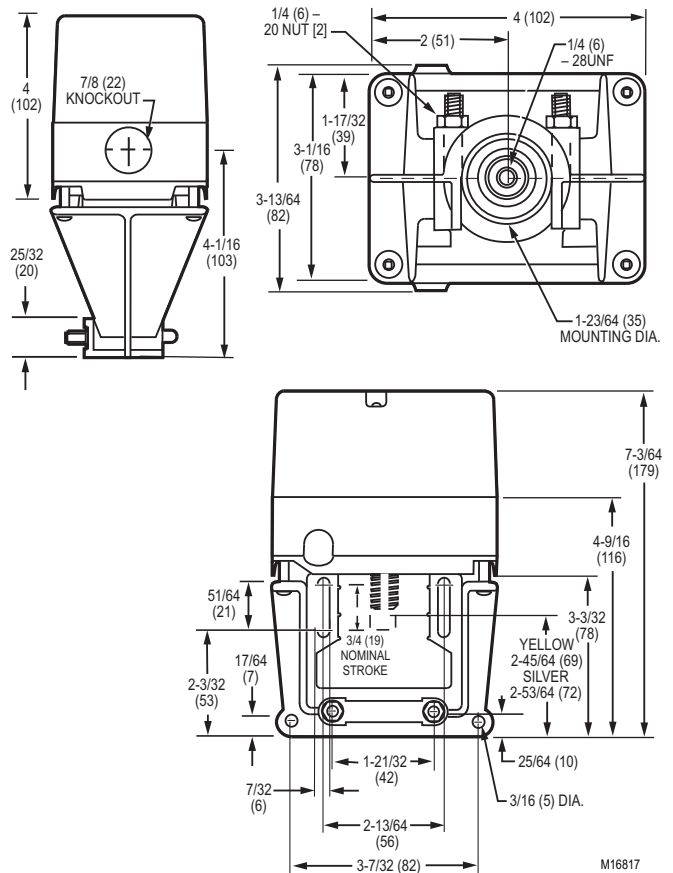
SPECIFICATIONS

Actuator Type	Valve
Fail Safe Mode	Stays in place
(Rated) Stem Force	160 lbf (710 N)
Cable Entry	7/8 in. hole for 1/2 in. conduit
External Auxiliary Switches Available	272630D
Electrical Protection	NEMA 3R
Electrical Connections	Screw terminals
Ingress Protection Rating	NEMA 3R, IP54 (mounted in vertical position)
Feedback	Position feedback available w/ 272630D; 2-10 Vdc
Frequency	50 Hz; 60 Hz
Manual operation	None
Mounting	Screws onto 1/4-28 UNF threaded valve stem
Number of Internal Auxiliary Switch	0
Stroke	1/2 to 1 in. (13 to 25 mm)
Supply Voltage	24 Vac; 28 Vdc
Materials	UV-stabilized plastic cover, aluminum base & yoke
Operating Humidity Range (% RH)	15 to 95% RH at 104 F (40 C)
Medium Temperature	300 F Maximum (150 C Maximum)
Ambient Temperature Range	32 F to 130 F (0 C to 50 C)
Temperature Ratings (Shipping)	-40 F to +150 F (-40 C to +65 C)
Storage Temperature Range	-40 F to +150 F (-40 C to +65 C)
Weight	2.2 lb (1 kg)
Includes	Screw terminals
Comments	3 or 5-wire operation. (3-wire required for XL10 controllers)

ACCESSORIES

- 272629A—Adapter Kit for mounting ML6984/ML7984 to V5045
- 272630D—Position feedback and SPDT pilot duty auxiliary switch

DIMENSIONS DIAGRAM



Direct Coupled Valve Actuators, ML7984



The ML7984 is a self-contained, self-adjusting, motorized linkage that mounts directly onto V5011 two-way or V5013 three-way valves and provides up to 25 mm (1") of linear stem travel. For use with Series 70 2-10Vdc, 4-20mA; Series 90 135 ohm; and Electronic (Super Mod) modulating signals controllers.

FEATURES

- Allows the use of one common transformer power supply for multiple actuators and controllers.
- Self-contained, motorized valve linkage.
- Linkage self-adjusts to valve stroke from 12 to 25 mm (1/2 - 1 in.).
- Multi-pose mounting.
- Strong valve seat closing force 160 lbf (710 N).
- Compact size for easy installation in confined area.
- One device for either Vac or Vdc power supply application.
- Electronic current sensing provides internal protection and positive full closing force.
- Field-addable position feedback/auxiliary switch module available.

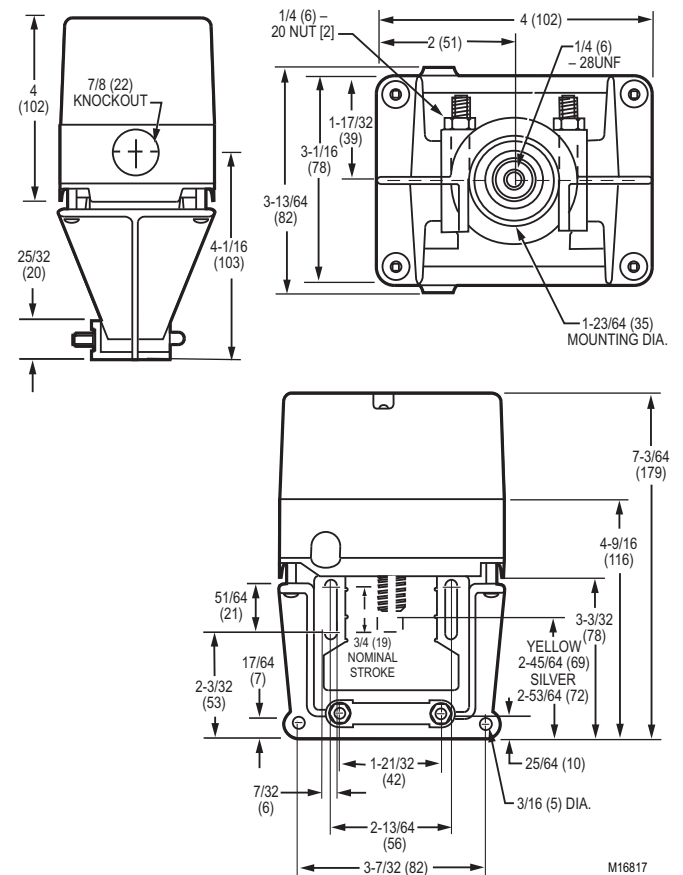
SPECIFICATIONS

Actuator Type	Valve
Fail Safe Mode	Stays in place
Cable Entry	7/8 in. hole for 1/2 in. conduit
External Auxiliary Switches Available	272630D
Electrical Protection	NEMA 3R
Electrical Connections	Screw terminals
Ingress Protection Rating	NEMA 3R, IP54 (mounted in vertical position)
Feedback	Position feedback available w/ 272630D; 2-10 Vdc
Frequency	50 Hz; 60 Hz
Manual operation	None
Mounting	Screws onto 1/4-28 UNF threaded valve stem
Number of Internal Auxiliary Switch	0
Stroke	1/2 to 1 in. (13 to 25 mm)
Supply Voltage	24 Vac; 28 Vdc
Materials	UV-stabilized plastic cover, aluminum base & yoke
Operating Humidity Range (% RH)	15 to 95% RH at 104 F (40 C)
Ambient Temperature Range	32 F to 130 F (0 C to 55 C)
Temperature Ratings (Shipping)	-40 F to +150 F (-40 C to +65 C)
Storage Temperature Range	-40 F to +150 F (-40 C to +65 C)
Weight	2.2 lb (1 kg)
Includes	Screw terminals
Comments	Direct/Reverse Acting Switch

ACCESSORIES:

- 272629A—Adapter Kit for mounting ML6984/ML7984 to V5045
- 272630D—Position feedback and SPDT pilot duty auxiliary switch

DIMENSIONS DIAGRAM



VALVES

Submittal Data - Valves

Unitary Valve, V5852; V5862



Two-way Cartridge Globe Valves control hot and/or chilled water for VAV terminal units, fan coil units, small reheaters and recoolers in electric/electronic temperature control systems. Used with the M6410 3-position floating Non-Spring Return Valve Actuator and the M7410 selectable 0 to 10 Vdc or 2 to 10 Vdc Non-Spring Return Actuator. The 1/2 in. and 3/4 in. valves are compatible with the

M6435 floating Spring Return Actuator, and the M7435 selectable 0 to 10 Vdc or 2 to 10 Vdc Spring Return Actuator. Larger valves (1 in. through 1-1/2 in.) are pressure balanced, which results in higher close-off pressures.

FEATURES

Long stroke allows wider range of control.

- Soft valve seat provides low leakage rate.
- Inserts for 1/2 in. and 3/4 in. valves are changeable without draining valve when used with an insert replacement tool.
- Brass body and Stainless Steel stem.
- Threaded plastic cover/manual handle allows manual operation.
- Easily installed in areas where space is limited.

SPECIFICATIONS

Valve Type	Cartridge Globe Valve
Body Pattern	Two-way
Controlled Fluid	Chilled or hot water with up to 50% Glycol. Not for use with steam or fuels.
Leakage Rating	1/2 in. and 3/4 in. valves: ANSI Class IV (0.01% of Cv maximum) 1 in., 1-1/4 in., 1-1/2 in valves: ANSI Class III (less than 0.02% of Cv)
Maximum Safe Operating Pressure.....	235 psi (1620 kPa)
Fluid Temperature Range	36 F to 230 F (2 C to 110 C)
Stem Travel	1/4 in. (6.4 mm)
Actuation:	Must be purchased separately
Materials	
(Body)	Brass
(Stem)	Stainless Steel
(Seat)	Brass
(Cartridge)	Brass
(Plug/Ball/Disc)	Brass

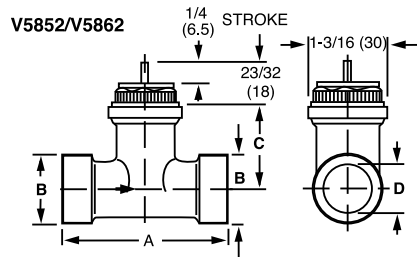
ACCESSORIES

- 0902807—Replacement Insert for 1/2 in. V5852/V5862, 1.9Cv
Interchangeable with 0902808
- 0902808—Replacement Insert for 1/2 in. V5852/V5862, 1.2 Cv
Interchangeable with 0902807
- 0902809—Replacement Insert for 1/2 in. V5852/V5862, 0.74 Cv
Interchangeable with 0902810 or 090212
- 0902810—Replacement Insert for 1/2 in. V5852/V5862, 0.47 Cv
Interchangeable with 0902809 or 090212

REPLACEMENT PARTS

- 0902812—Replacement Insert for 1/2 in. V5852/V5862, 0.19 Cv
Interchangeable with 0902809 or 090210
- 0902814—Replacement Insert for 3/4 in. V5852/V5862, 2.9 Cv
Interchangeable with 0902815
- 0902815—Replacement Insert for 3/4 in. V5852/V5862, 4.9 Cv
Interchangeable with 0902814
- 0903827—Replacement Packing for 1 in. V5862/63
- 0903828—Replacement Packing for 1-1/4 in. V5862/63
- 0903829—Replacement Packing for 1-1/2 in. V5862/63

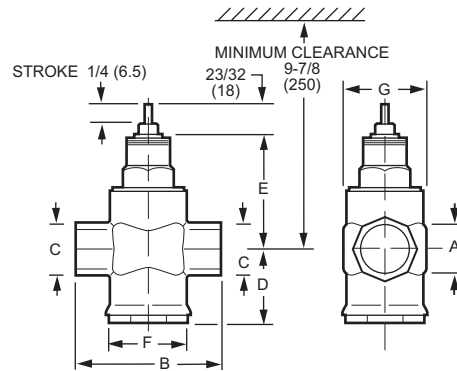
DIMENSIONS DIAGRAM



VALVE SIZE	A	B	C	D (NPT)	D (SWEAT)
1/2 (13)	3 (77)	3/4 (19)	1-5/16 (34)	1/2 (13)	5/8 (16)
3/4 (19)	3-1/2 (88)	1 (25)	1-1/4 (32)	3/4 (19)	7/8 (22)

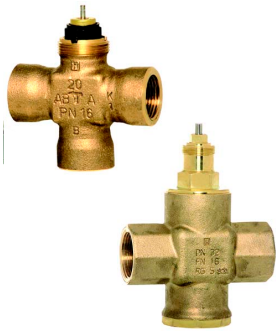
NOTE: SOLDER ENDS CONFORM TO ANSI B16-18.

M18917



VALVE SIZE A (NPT)	B	C	D	E	F	G
1 (25)	4-1/8 (105)	1-5/8 (41)	2-1/16 (53)	3-5/8 (92)	2 (50)	1-3/4 (44)
1-1/4 (32)	4-15/16 (125)	2 (50)	2-7/16 (62)	3-5/8 (92)	2-3/16 (55)	2-1/4 (57)
1-1/2 (38)	5-1/8 (130)	2-3/16 (55)	2-9/16 (65)	3-7/8 (98)	2-3/8 (60)	2-5/8 (67)

Unitary Valve, V5853; V5863



Three-way Cartridge Globe Valves control hot and/or chilled water for VAV terminal units, fan coil units, small reheaters and recoolers in electric/ electronic temperature control systems. Used with the M6410 3-position floating Non-Spring Return Valve Actuator and the M7410 selectable 0 to 10 Vdc or 2 to 10 Vdc Non-Spring Return Actuator. The 1/2 in. and 3/4 in. valves are also compatible with the M6435 floating Spring Return

Actuator, and the M7435 selectable 0 to 10 Vdc or 2 to 10 Vdc Spring Return Actuator.

FEATURES

- Long stroke allows wider range of control.
- Soft valve seat provides low leakage rate.
- Inserts for 1/2 in. and 3/4 in. valves are changeable without draining valve when used with an insert replacement tool.
- Brass body and stainless steel stem.
- Threaded plastic cover/manual handle allows manual operation.
- Easily installed in areas where space is limited.

SPECIFICATIONS

Valve Type Cartridge Globe Valve
 Body Pattern Three-way
 Controlled Fluid Chilled or hot water with up to 50% Glycol. Not for use with steam or fuels.
 Leakage Rating 1/2 in. and 3/4 in. valves: ANSI Class IV (0.01% of Cv maximum)
 1 in., 1-1/4 in., 1-1/2 in. valves: ANSI Class III (less than 0.02% of Cv)
 Maximum Safe Operating Pressure 235 psi (1620 kPa)
 Maximum Differential Pressure Ratings (Close-off) 34 psi (234 kPa)
 Fluid Temperature Range 36 F to 230 F (2 C to 110 C)
 Stem Travel 1/4 in. (6.4 mm)
 Actuation: Must be purchased separately

Materials

(Body) Brass
 (Stem) Stainless Steel
 (Seat) Brass
 (Cartridge) Brass
 (Plug/Ball/Disc) Brass

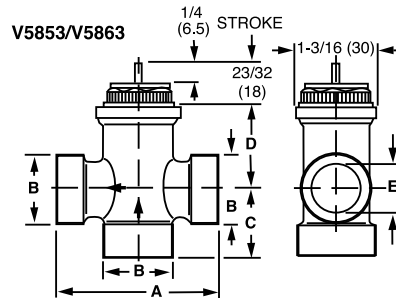
ACCESSORIES

0903827—Replacement Packing for 1 in. V5862/63

REPLACEMENT PARTS

0902821—Replacement Insert for 1/2 in. V5853/V5863, 0.29 Cv
 Interchangeable with 0902822 or 0902823 or 0902824
 0902822—Replacement Insert for 1/2 in. V5853/V5863, 0.47 Cv
 Interchangeable with 0902821 or 0902823 or 0902824
 0902823—Replacement Insert for 1/2 in. V5853/V5863, 0.74 Cv
 Interchangeable with 0902821 or 0902822 or 0902824
 0902824—Replacement Insert for 1/2 in. V5853/V5863, 1.2 Cv
 Interchangeable with 0902821 or 0902822 or 0902823
 0902825—Replacement Insert for 1/2 in. V5853/V5863, 1.9 Cv
 Interchangeable with 0902827
 0902827—Replacement Insert for 3/4 in. V5853/V5863, 4.9 Cv
 Interchangeable with 0902825
 0903827—Replacement Packing for 1 in. V5862/63
 0903828—Replacement Packing for 1-1/4 in. V5862/63
 0903829—Replacement Packing for 1-1/2 in. V5862/63

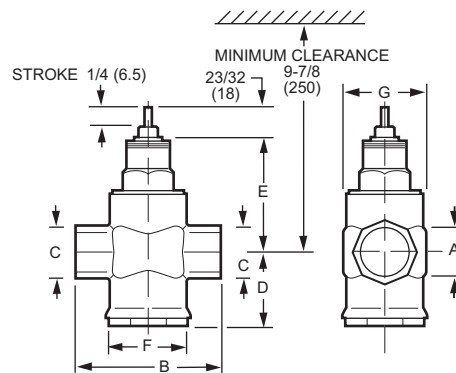
DIMENSIONS DIAGRAM



VALVE SIZE	A	B	C	D	E (NPT)	E (SWEAT)
1/2 (13)	3 (77)	3/4 (19)	1-5/16 (34)	1-5/16 (34)	1/2 (13)	5/8 (16)
3/4 (19)	3-1/2 (88)	1 (25)	1-1/2 (38)	1-1/4 (32)	3/4 (19)	7/8 (22)

NOTE: SOLDER ENDS CONFORM TO ANSI B16-18.

M18919



VALVE SIZE A (NPT)	B	C	D	E	F	G
1 (25)	4-1/8 (105)	1-5/8 (41)	2-1/16 (53)	3-5/8 (92)	2 (50)	1-3/4 (44)
1-1/4 (32)	4-15/16 (125)	2 (50)	2-7/16 (62)	3-5/8 (92)	2-3/16 (55)	2-1/4 (57)
1-1/2 (38)	5-1/8 (130)	2-3/16 (55)	2-9/16 (65)	3-7/8 (98)	2-3/8 (60)	2-5/8 (67)

Submittal Data - Valves

NPT Control Ball Valve, VBN2



The VBN2 Two-Way Control Ball Valves control hot and chilled water with glycol solutions up to 50% in heating, ventilating and air conditioning (HVAC) systems to provide two-position or modulating functions. These valve assemblies can be ordered with or without factory-mounted non-spring return or spring return actuators.

SPECIFICATIONS

Valve Type	Control Ball Valve
Body Pattern	Two-way
Connection Type	Female NPT
Controlled Fluid	Chilled or hot water with up to 50% Glycol. Not for use with steam or fuels.
Leakage Rating	ANSI Class IV (0.01% of Cv maximum)
Maximum Safe Operating Pressure	360 psi (2482 kPa)
Fluid Temperature Range	-22 F to +250 F (-30 C to +121 F)
Materials	
(Body)	Brass
(Seat)	Teflon® seals with EPDM O-rings
(Flow Control Insert)	Noryl®

FEATURES

- Sizes from 1/2 to 3 in. with internal (female) NPT connections.
- Equal percentage flow characteristic.
- Reduced B port CV for constant loop flow.
- Choice of factory-installed actuation: floating, modulating (2-10 V), spring return or non-spring return
- 2-Position, Spring Return Modulating/Floating.
- Field configurable for normally open or normally closed fail-safe position.
- Removable manual operating handle to control valve during installation or in an event of power failure.
- Actuator can be mounted on the valve in any of four orientations.
- Field-serviceable stem assembly.
- Wide range of CV choices from 0.33 to 266.
- Nickel-chrome plated brass or 316 stainless steel ball and stem.
- Valve installs in a globe valve “T” pattern, no extra elbows or piping required.
- Mixing or Diverting control for 3-way valves.
- ANSI Class IV seat leakage specification (0.01% of CV) for 3-way A port and ANSI Class III seat leakage specification (0.1% of CV) for 3-way B port.

Dimensional Diagrams - Valves

NPT Control Ball Valve, VBN2

DIMENSIONS DIAGRAM

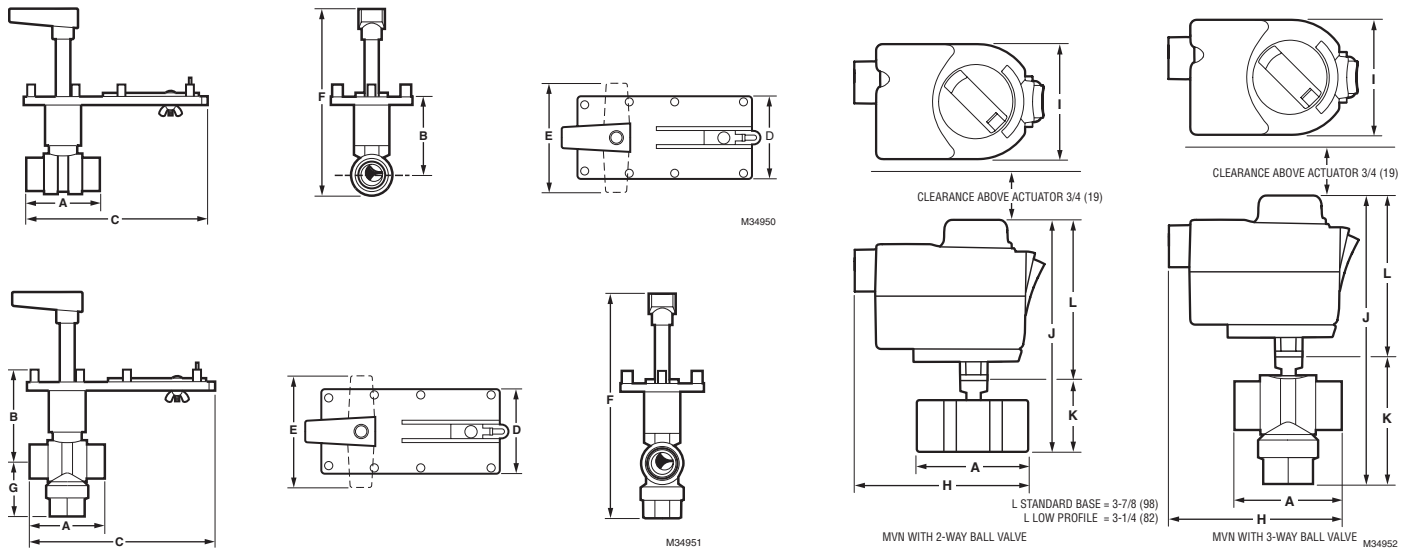


Table 7. VBN2 dimensions in inches (millimeters).

Pipe Size			C _y Designators	MVN, MN, AND MS ACTUATORS WITH 2-WAY BALL VALVE Dimensions in in. (mm)										Weight (valve only) lbs.	Replacement Stem Assembly**		
In.	(DN)	Code		A	B	C	D	E	Fms ^a	Fmn ^b	H	I	J (w/std)			J (w/low)	K
1/2	15	VBN2A	0.38, 0.68, 1.30, 2.00, 2.60, 4.70, 8.00, 11.70*	2-3/8 (60)	3-7/16 (87)	6-5/8 (168)	3 (76)	4 (102)	8-1/8 (206)	6-7/8 (175)			5-7/16 (139)	4-13/16 (123)	1-5/8 (41)	1	5112-19 5112-22(SS)
3/4	20	VBN2B	0.31, 0.63, 1.20, 2.50, 4.30, 7.40, 14.70*	2-3/8 (60)	3-7/16 (87)	6-7/16 (164)	3 (76)	4 (102)	8-1/8 (206)	6-7/8 (175)			5-7/16 (139)	4-13/16 (123)	1-5/8 (41)	1	
			10.10, 29.00*	2-5/8 (67)	3-11/16 (94)	6-1/2 (165)	3 (76)	4 (102)	8-5/16 (211)	7-1/16 (180)			5-5/8 (143)	5 (127)	1-13/16 (45)	1	
1	25	VBN2C	9.00	3-3/4 (95)	3-11/16 (94)	7-1/16 (179)	3 (76)	4 (102)	8-5/16 (211)	7-1/16 (180)	4-9/16 (116)	2-3/16 (71)	5-5/8 (143)	5 (127)	1-13/16 (45)	1	5112-20 5112-23(SS)
			4.40, 15.30, 26.00, 44.00, 54.00*	3-1/16 (77)	3-15/16 (100)	6-3/4 (171)	3 (76)	4 (102)	8-11/16 (221)	7-7/16 (189)			6 (152)	5-3/8 (137)	2-3/16 (55)	1.4	
1-1/4	32	VBN2D	4.40, 8.30, 14.90, 25.00, 41.00*	3(76)	3-15/16 (100)	6-11/16 (170)	3 (76)	4 (102)	8-11/16 (221)	7-7/16 (189)			6 (152)	5-3/8 (137)	2-1/8 (54)	1.4	5112-20 5112-23(SS)
			37.00, 102.00*	3-5/8 (92)	4-7/16 (113)	7 (178)	3 (76)	4 (102)	9-1/16 (231)	7-13/16 (198)			6-3/8 (162)	5-3/4 (146)	2-9/16 (64)	2.4	
1-1/2	40	VBN2E	23.00, 30.00, 74.00*	3-7/16 (87)	3-15/16 (100)	6-15/16 (176)	3 (76)	4 (102)	9-1/16 (231)	7-13/16 (198)						2.4	5112-21 5112-24(SS)
			41.00, 172.00*	4-1/16 (103)	5-3/16 (132)	7-1/16 (179)	3 (76)	4 (102)	8-7/8 (225)	7-5/8 (194)						3.2	
2	50	VBN2F	42.00, 108.00*	4(101)	3-3/4 (95)	7-3/16 (183)	3 (76)	4 (102)	8-7/8 (225)	7-5/8 (194)						3.2	5112-21 5112-24(SS)
			57.00, 71.00, 100.00, 210.00, 266.00*	4-15/16 (125)	4-1/16 (103)	7-7/16 (188)	3 (76)	4 (102)	10-1/2 (267)	9-1/4 (235)						5	
2-1/2	65	VBN2G	45.00, 55.00, 72.00, 101.00, 162.00, 202.00*	5-5/16 (135)	4-1/16 (103)	7-9/16 (192)	3 (76)	4 (102)	10-1/2 (267)	9-1/4 (235)						5.5	5112-21 5112-24(SS)
3	80	VBN2H	49.00, 63.00, 82.00, 124.00, 145.00*	5(127)	5-7/8 (149)	7-11/16 (196)	3 (76)	4 (102)	10-11/16 (271)	9-7/16 (240)						5.9	

^a For models using the MS direct coupled actuator.

^b For models using the MN direct coupled actuator.

* Indicates full port valve: no flow characterizing insert.

** Replacement stems available in brass or stainless steel--use accordingly to valve part number.

VALVES

Submittal Data - Valves

NPT Control Ball Valve, VBN3



The VBN3 Three-Way Control Ball Valves control hot and chilled water with glycol solutions up to 50% in heating, ventilating and air conditioning (HVAC) systems to provide two-position or modulating functions. These valve assemblies can be ordered with or without factory-mounted non-spring return or spring return actuators.

SPECIFICATIONS

Valve Type	Control Ball Valve
Body Pattern	Three-way
Flow Characteristic:	Linear (B-AB); Equal Percentage (A-AB)
Connection Type	Female NPT
Controlled Fluid	Chilled or hot water with up to 50% Glycol. Not for use with steam or fuels.
Leakage Rating	ANSI Class IV (0.01% of Cv maximum)
Maximum Safe Operating Pressure	360 psi (2482 kPa)
Fluid Temperature Range	-22 F to +250 F (-30 C to +121 F)
Materials	
(Body)	Brass
(Stem):	Brass
(Seat)	Teflon® seals with EPDM O- rings
(Plug/Ball/Disc):	Nickel-plated brass ball
(Flow Control Insert)	Noryl®

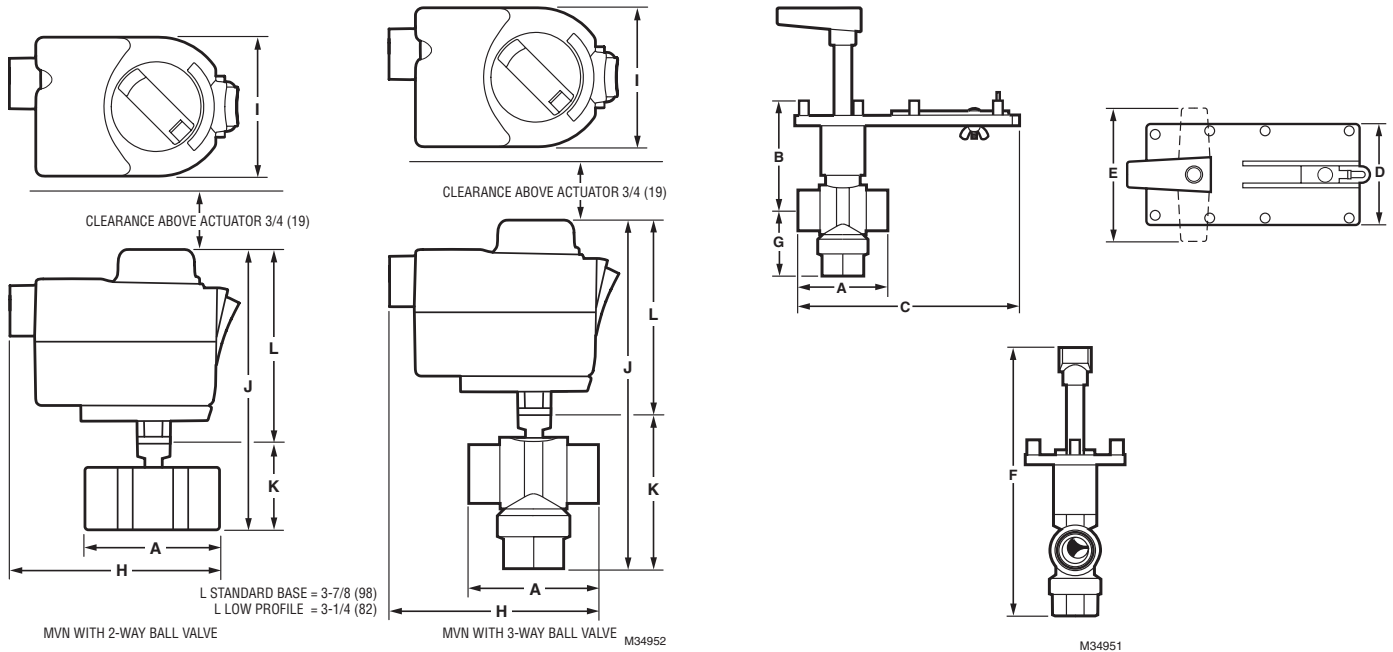
FEATURES

- Sizes from 1/2 to 2-1/2 inches with internal (female) NPT connections.
- Equal percentage or linear flow characteristics.
- Reduced B-port Cv for constant loop flow.
- Choice of four, factory-installed actuation control schemes: Floating, Modulating (2-10 V), Spring Return 2-Position, Spring Return Modulating/Floating.
- Field configurable for normally open or normally closed fail safe position.
- Removable manual operating handle to control valve during installation or in an event of power failure.
- ANSI Class IV seat leakage specification (0.01% of Cv).
- Optional NEMA 3R (IP54) rated enclosure for outdoor applications.
- Actuator can be mounted on the valve in any of four orientations.
- Wide Cv choices from 0.33 to 109.
- Valve installs in a globe valve "T" pattern, no extra elbows or piping required.
- Field-serviceable stem assembly.
- Nickel-chrome plated brass ball and stem.
- Mixing or Diverting control.

Dimensional Diagrams - Valves

NPT Control Ball Valve, VBN3

DIMENSIONS DIAGRAM

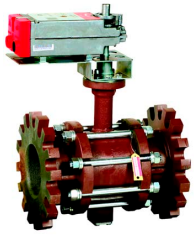


Pipe Size			C _v Designators	MVN WITH 3-WAY BALL VALVE											Weight (valve only) lbs.	Replacement Stem Assembly			
In.	(DN)	Code		Dimensions in in. (mm)															
			A	B	C	D	E	F	G	H	I	J (w/ std)	J (w/ low)	K					
1/2	15	VBN3A	0.33, 0.59, 1.00, 2.40, 4.30, 8.00	3-1/2 (89)	3-5/16 (84)	7 (178)	3 (76)	4 (102)	9-3/8 (238)	2-3/8 (60)					6-11/16 (170)	6-1/16 (154)	2-7/8 (72)	2.4	
3/4	20	VBN3B	0.40, 0.66, 1.30, 2.40, 3.80, 11.00*	2-13/16 (71)	3-5/16 (84)	6-1/2 (165)	3 (76)	4 (102)	8-13/16 (224)	2 (51)					6-1/8 (156)	5-1/2 (140)	2-5/16 (58)	2	5112-19
1	25	VBN3C	0.40, 0.65, 1.30, 2.30, 3.50	3-13/16 (97)	3-5/16 (84)	7-5/16 (185)	3 (76)	4 (102)	9-1/2 (241)	2-3/4 (70)					6-13/16 (173)	6-3/16 (157)	3 (75)	2.8	
			8.60, 22.00	3 (76)	3-13/16 (97)	6-13/16 (173)	3 (76)	4 (102)	9-13/16 (249)	2-5/8 (67)	4-9/16 (116)	2-13/16 (71)	7-1/8 (181)	6-1/2 (165)	3-5/16 (83)	2.6			
1-1/4	32	VBN3D	4.10, 8.70, 19.00*	3 (76)	3-13/16 (97)	6-13/16 (173)	3 (76)	4 (102)	9-13/16 (249)	2-1/2 (64)					7-1/8 (181)	6-1/2 (165)	3-5/16 (83)	2.5	5112-20
			12.70, 27.00, 34.00*	3-5/8 (91)	4 (102)	7-5/16 (185)	3 (76)	4 (102)	10-5/16 (262)	2-3/4 (70)				7-5/8 (194)	7 (178)	3-13/16 (96)	2.8		
1-1/2	40	VBN3E	4.00, 8.30, 13.40, 32.00*	4-5/16 (114)	4 (102)	7-13/16 (198)	3 (76)	4 (102)	10-13/16 (275)	3-1/4 (83)								3.3	
			24.00, 61.00	4 (102)	4-1/2 (114)	7-5/16 (185)	3 (76)	4 (102)	11 (279)	3-1/4 (83)								3.3	
2	50	VBN3F	24.00, 38.00, 57.00	4 (102)	4-1/2 (114)	7-5/16 (185)	3 (76)	4 (102)	11 (279)	3-1/4 (83)								3.3	
			83.00, 109.00	5 (127)	5-13/16 (147)	7-13/16 (198)	3 (76)	4 (102)	12-5/16 (313)	3-3/4 (95)								3.8	5112-21
2-1/2	65	VBN3G	38.00, 74.00, 100.00	5 (127)	5-13/16 (147)	7-13/16 (198)	3 (76)	4 (102)	12-5/16 (313)	3-3/4 (95)								3.8	

*Indicates full A-port: no flow characterizing insert.

Submittal Data - Valves

Flanged Control Ball Valve, VBF2



The VBF2 Two-Way Ball Valve Assemblies, with and without actuators, control hot and chilled water with glycol solutions up to 50% in closed loop heating, ventilating and air conditioning (HVAC) systems to provide two-position or modulating functions. These valve assemblies can be ordered with or without factory-mounted non-spring return or spring return direct-coupled actuators (DCA).

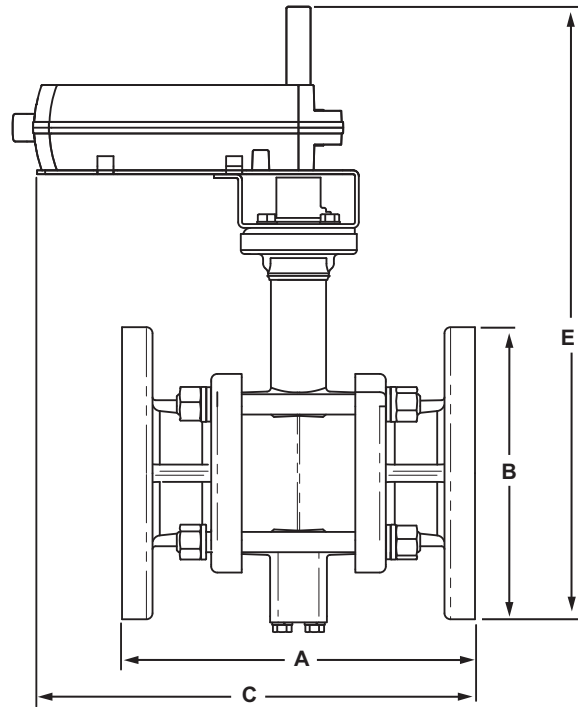
FEATURES

- Sizes from 4 to 6 inch with ANSI Class 125 flanged connections.
- Equal percentage or linear flow characteristics.
- Choice of four, factory-installed actuation control schemes: Floating, Modulating (2-10 V), Spring Return 24V 2-Position, Spring Return Modulating/Floating.
- Field configurable for normally open or normally closed fail safe position.
- Removable manual operating handle to control valve during installation or in an event of power failure.
- ANSI Class IV leakage specification (0.01% of Cv).
- Optional NEMA 3R (IP54) rated enclosure for outdoor applications.
- Option of four actuator mounting positions on the valve.
- Wide range of Cv choices from 91 to 650.
- Valve ball and stem 316 stainless steel.

SPECIFICATIONS

Valve Type	Control Ball Valve
Body Pattern	Two-way
Connection Type	Flanged
Flow Characteristic:.....	Equal Percentage
Controlled Fluid	Chilled or hot water with up to 50% Glycol. Not for use with steam or fuels.
Leakage Rating	ANSI Class IV (0.01% of Cv maximum)
Maximum Safe Operating Pressure	240 psi (1655 kPa)
Maximum Differential Pressure	
Ratings (Close-off)	70 psi (483 kPa)
Fluid Temperature Range	-22 F to +250 F (-30 C to +121 F)
Materials	
(Body).....	Cast Iron
(Stem).....	316 Stainless Steel
(Seat).....	Teflon®
(Plug/Ball/Disc).....	316 stainless steel

DIMENSIONS DIAGRAM



Size (in.)	Model Number	A in. (mm)	B in. (mm)	C in. (mm)	D (depth) (not shown) in. (mm)	E in. (mm)	Wt. lb (kg)
4	VBF2J	11 (278)	9 (229)	13-1/4 (337)	9 (229)	18-3/4 (476)	65 (31)
5	VBF2K	12-3/8 (352)	10 (254)	14-1/4 (362)	10 (254)	19 (483)	75 (34)
6	VBF2L	13-7/8 (352)	11 (278)	15-1/8 (384)	11 (278)	19-7/8 (505)	90 (41)

M13732

Flanged Control Ball Valve, VBF3



The VBF3 Three-Way Ball Valve Assemblies, with and without actuators, control hot and chilled water with glycol solutions up to 50% in closed loop heating, ventilating and air conditioning (HVAC) systems to provide two-position or modulating functions. These valve assemblies can be ordered with or without factory-mounted non-spring return or spring return direct-coupled actuators (DCA).

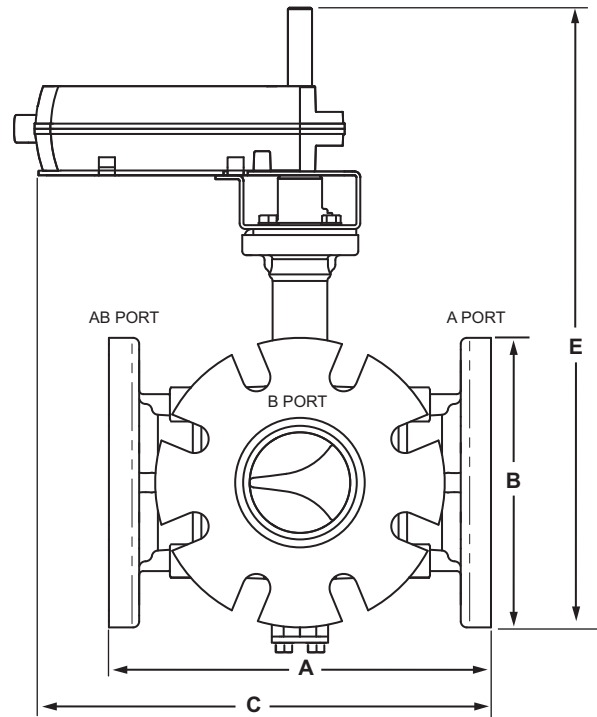
FEATURES

- Sizes from 4 to 6 inch with ANSI Class 125 flanged connections.
- Equal percentage or linear flow characteristics.
- Choice of four, factory-installed actuation control schemes: Floating, Modulating (2-10 V), Spring Return 24V 2-Position, Spring Return Modulating/Floating.
- Field configurable for normally open or normally closed fail safe position.
- Removable manual operating handle to control valve during installation or in an event of power failure.
- ANSI Class IV A-port seat leakage (0.01% of Cv).
- Optional NEMA 3R (IP54) rated enclosure for outdoor applications.
- Option of four actuator mounting positions on the valve.
- Wide range of Cv choices from 91 to 650.
- Valve ball and stem 316 stainless steel.
- Non-isolating mixing or diverting control.

SPECIFICATIONS

Valve Type	Control Ball Valve
Body Pattern	Three-way
Connection Type.....	Flanged
Flow Characteristic:.....	Linear (B-AB); Equal Percentage (A-AB)
Controlled Fluid	Chilled or hot water with up to 50% Glycol. Not for use with steam or fuels.
Leakage Rating	ANSI Class IV (A port only) B port ~2% leakage
Maximum Safe Operating Pressure.....	240 psi (1655 kPa)
Maximum Differential Pressure	
Ratings (Close-off).....	70 psi (483 kPa)
Fluid Temperature Range	-22 F to +250 F (-30 C to +121 F)
Materials	
(Body).....	Cast Iron
(Stem)	316 Stainless Steel
(Seat).....	Teflon®
(Plug/Ball/Disc).....	316 stainless steel

DIMENSIONS DIAGRAM

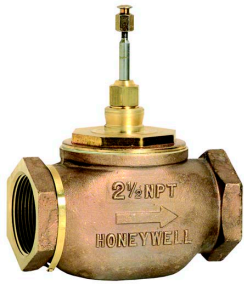


Size (in.)	Model Number	A in. (mm)	B in. (mm)	C in. (mm)	D (depth) (not shown) in. (mm)	E in. (mm)	Wt. lb (kg)
4	VBF3J	11-7/8 (278)	9 (229)	14-1/8 (337)	10-3/8 (229)	18-1/2 (470)	75 (34)
5	VBF3K	13-7/8 (352)	10 (254)	15-1/8 (362)	12 (254)	19-3/8 (483)	90 (41)
6	VBF3L	15-7/8 (403)	11 (278)	16-1/8 (410)	13-3/8 (521)	20-1/2 (521)	105 (48)

M13733A

Submittal Data - Valves

NPT Globe Valve, V5011F; V5011G



Used for two-position or modulating control of steam and water and glycol solutions (to 50 percent concentration) in heating or cooling systems.

FEATURES

- Sizes range from 2-1/2 to 3 inches.
- Direct acting
- High pressure steam models with stainless steel trim.
- Spring-loaded, self-adjusting packing.
- Stainless steel stem prevents corrosion.
- Valve designs provide equal percentage characteristics of flow for close control of water, and linear characteristic of flow for close control of steam or chilled water.
- Valves utilize direct mounting, electric or pneumatic linear valve actuators; Q5001 linkage with Modutrol Motor; or Q5020/Q5024 linkages with Direct Coupled Actuators to operate the valve.

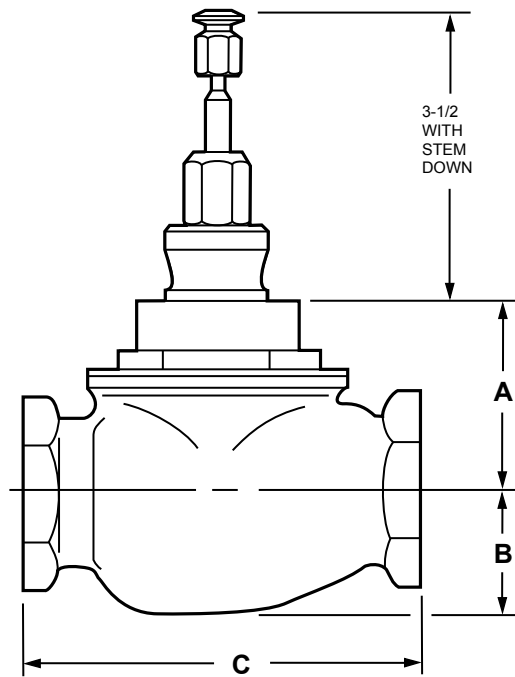
SPECIFICATIONS

Valve Type	Globe Valve
Body Pattern	Two-way, Straight-through
Connection Type	Female NPT
Leakage Rating	0.5% of Cv
Maximum Differential for Quiet Water Service	20 psid (138 kPa)
Fluid Temperature Range	40 F to 337 F (4 C to 169 C)
Stem Travel	3/4 in. (20 mm)
Bonnet Size:	1-3/8 in. (35 mm)
Valve Action:	Stem down to close
ANSI/ASME Rating:	150
Actuation:	Must be purchased separately
Materials	
(Body)	Red Brass
(Stem)	Stainless Steel
(Seat):	V5011F: Brass; V5011G: Stainless Steel
(Plug/Ball/Disc):	V5011F: Teflon disc; V5011G: Stainless steel plug with carbon-loaded Teflon disc
(Packing):	V5011F: Teflon and Nitrile; V5011G: Teflon Cone

APPROVALS

CRN Number 0C0861.9087YTN

DIMENSIONS DIAGRAM



V5011F,G

BODY STYLE	PIPE SIZE (in.)	DIMENSIONS					
		A		B		C	
		in	mm	in	mm	in	mm
V5011F,G THREADED DIRECT BODY	1/2	2	51	1-3/4	45	3-3/8	86
	3/4	1-3/4	45	1-3/4	45	3-3/8	86
	1	1-7/8	48	1-3/4	45	4-1/4	108
	1-1/4	2	51	1-5/8	42	4-7/8	124
	1-1/2	2-7/8	73	1-5/8	42	5-5/8	143
	2	3-1/8	80	2	51	5-5/8	143
	2-1/2	2-3/4	70	2-3/8	61	7-1/2	191
	3	3-1/8	80	2-5/8	67	8-7/8	226

M2804A

NPT Globe Valve, V5011N



Used for two-position or modulating control of steam and water and glycol solutions (to 50 percent concentration) in heating or cooling systems.

FEATURES

- Sizes range from 1/2 to 2 inches.
- Direct and reverse acting
- High pressure steam models with stainless steel trim
- Spring-loaded, self-adjusting packing.
- Stainless steel stem prevents corrosion.
- Valve designs provide equal percentage characteristics of flow for close control of water, and linear characteristic of flow for close control of steam or chilled water.
- Valves utilize direct mounting, electric or pneumatic linear valve actuators; Q5001 linkage with Modutrol Motor; or Q5020/Q5024 linkages with direct coupled rotary actuators to operate the valve.
- Not suitable for combustible gases.

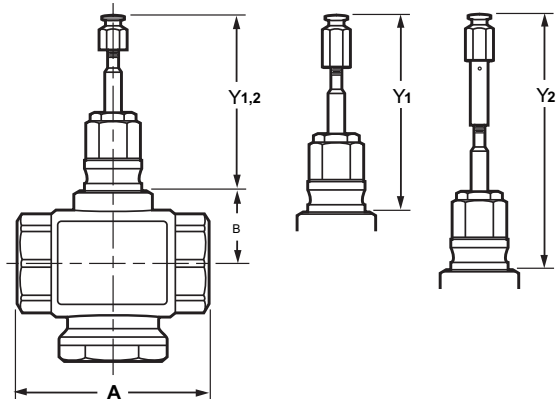
SPECIFICATIONS

Valve Type	Globe Valve
Body Pattern	Two-way
Connection Type	Female NPT
Leakage Rating	Seat: 0.05% of Cv
Maximum Differential f or Quiet Water Service	20 psid (138 kPa)
Maximum Differential Pressure Ratings (Close-off)	240 psi (1655 kPa)
Ambient Temperature Range	36 F to 248 F water (2 C to 120 C water)
Stem Travel	3/4 in. (20 mm)
Bonnet Size:	1-3/8 in. (35 mm)
ANSI/ASME Rating:	150
Actuation:	Must be purchased separately
Materials (Body)	Red Brass
(Stem)	Stainless Steel
(Packing)	Teflon

APPROVALS

CRN Number0C0861.9087YTN/0C0861.99

DIMENSIONS DIAGRAM



VALVE SIZE (IN)	A in. (mm)	B in. (mm)
1/2	3-1/4 (83)	1-9/16 (40)
3/4	4-1/16 (103)	
1	4-3/16 (106)	1-13/16 (47)
1-1/2	4-3/4 (120)	
2	5-1/4 (134)	

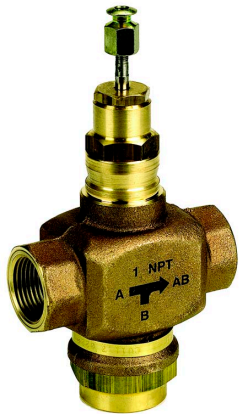
VALVE	Y1 in. (mm)	Y2 ^a in. (mm)
V5011N1XXX OR V5011N2XXX	3-1/2 (89)	5-1/4 (133)
V5011N3XXX	4-3/16 (107)	5-15/16 (151)

^aY2 WITH STEM EXTENSION FOR MP953C,E (8 IN. ONLY)

M17378A

Submittal Data - Valves

NPT Globe Valve, V5013N



The V5013N is a three-way threaded globe valve that controls hot water, cold water and glycol solutions (up to 50 percent concentration) in heating or cooling HVAC applications. The valves are used for mixing service to direct flow from one or two inlets to a common outlet in two-position or modulating control systems.

FEATURES

- Red brass body with NPT-threaded connections.
- Stainless steel stem and brass plug.
- Low seat leakage rating, < 0.05%.
- Spring-loaded, self adjusting packing.
- 50:1 rangeability per VDI/VDE 2173.
- Constant total flow throughout full stem travel.
- Accurate positioning to ensure state-of-the-art temperature control.
- Sizes range from 1/2 inch to 2 inches.
- Valves utilize direct mounting, electric or pneumatic valve actuators; Q5001 linkage with Modutrol Motor; or Q5020/Q5024 linkages with Direct Coupled Actuators to operate the valve.
- Repack and rebuild kits available for field servicing.
- Not suitable for combustible gases.

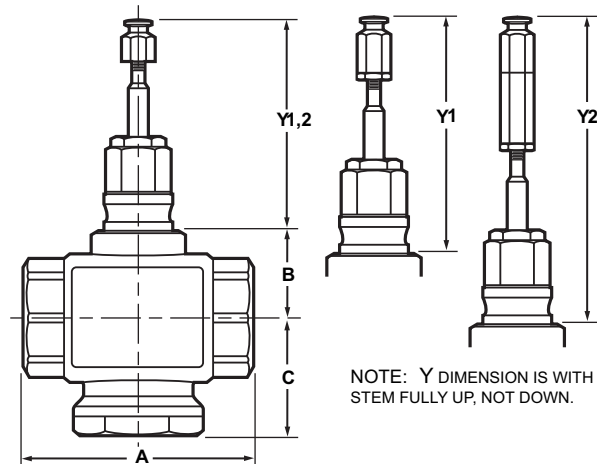
SPECIFICATIONS

Valve Type	Globe Valve
Body Pattern	Three-way mixing, A-B-AB porting
Flow Characteristic:.....	Linear (B-AB), Equal Percentage (A-AB)
Connection Type	Female NPT
Controlled Fluid	Chilled or hot water with up to 50% Glycol. Not for use with steam or fuels.
Leakage Rating	0.05% of Cv
Maximum Safe Operating Pressure	217 psi at 248 F (1500 kPa at 120 C)
Maximum Differential for Quiet Water Service	20 psid (138 kPa)
Maximum Differential Pressure	
Ratings (Close-off)	240 psi (1655 kPa)
Ambient Temperature Range	36 F to 248 F water (2 C to 120 C water)
Stem Travel.....	3/4 in. (20 mm)
Bonnet Size:	1-3/8 in. (35 mm)
Valve Action:.....	Mixing
ANSI/ASME Rating:	150
Actuation:	Must be purchased separately
Materials	
(Body).....	Red Brass
(Stem).....	Stainless Steel
(Plug/Ball/Disc).....	Brass
(Packing).....	Teflon/EPDM

APPROVALS

CRN Number 0C0861.9087YTN/0C0861.123

DIMENSIONS DIAGRAM



VALVE SIZE	A	B	C	STEM UP	
				Y ₁	Y ₂ ^a
1/2 (15)	3-1/4 (83)	1-9/16 (39.7)	2-9/16 (65)	4-3/16 (106)	5-15/16 (151)
3/4 (20)	3-1/4 (83)	1-9/16 (39.7)	2-9/16 (65)		
1 (25)	4-1/16 (103)	1-9/16 (39.7)	2-5/8 (66.5)		
1-1/4 (32)	4-3/16 (106)	1-9/16 (39.7)	2-7/8 (72.5)		
1-1/2 (40)	4-3/4 (120)	1-13/16 (46.5)	3 (77)		
2 (50)	5-1/4 (134)	1-13/16 (46.5)	3-5/16 (83.5)		

^a Y₂ WITH STEM EXTENSION FOR MP953C,E (8 IN. ONLY)

M12901A

Flanged Globe Valve, VGF2



VGF Flanged Globe Valves are used for 2-position or modulating control of steam, hot water or chilled water-glycol solutions up to 50 percent concentration in closed loop heating, ventilation and air conditioning (HVAC) systems. They can be operated by ML6420/6425, ML6421/7421 Electric Linear Actuators, MP953 Pneumatic Actuators, Modutrol™ Motors with Q5001 valve linkage or MN/MS Series

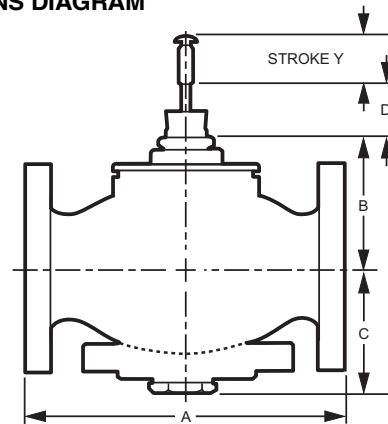
SPECIFICATIONS

Valve Type	Globe Valve
Valve Action:.....	Stem down to close
Body Pattern	Two-way
Connection Type	Flanged
Controlled Fluid	Steam; Chilled or hot water with up to 50% Glycol. Not for use with fuels
Fluid Temperature Range	20 F to 250 F, steam 337 F (-7 C to +120 C, steam 180 C)
Actuation:	Must be purchased separately
Stem Travel	
2-1/2 and 3 inch valves	3/4 in. (20 mm)
4 to 6 inch valves:	1-1/2 in. (39 mm)
Bonnet Size	
2-1/2 and 3 inch valves	1-3/8 in. (35 mm)
4 to 6 inch valves:	1-7/8 in. (47.6 mm)
Materials	
(Body).....	Cast Iron ASTM A126 Class B
(Stem).....	Stainless Steel
(Seat).....	Stainless Steel
(Cartridge).....	Stainless Steel
(Plug/Ball/Disc):.....	Stainless Steel
(Packing).....	Spring-loaded PTFE cone rings

FEATURES

- ANSI Class 125 and Class 250 cast iron bodies with flanged end connections
- Equal percentage and linear flow characteristics
- Face-to-face flange dimensions per ANSI/ISA S75.03 standard
- Sizes from 2-1/2 to 6 in.
- Stainless steel trim standard for long life span
- ANSI Class III or IV seat leakage
- Steam inlet pressure up to 100 psig and 337 F maximum temperature
- Self-adjusting packing
- Accurate positioning with equal percentage and linear flow characteristics to ensure precise temperature control
- Universal bonnet for direct-coupled electric and pneumatic actuators for easy mounting, or linkage coupled Modutrol™ Motors and MN/MS Series direct coupled actuators.
- Not suitable for combustible gasses.
- Valves utilize direct mounting valve actuators, Q5020/ Q5024 linkages with Direct Coupled Actuators or Pneumatic Valve Actuators to operate the valve.

DIMENSIONS DIAGRAM



▲ DOTTED LINE REPRESENTS ANSI 125 VALVE BONNET.

MODEL NUMBER	DIMENSIONS, IN. (MM)				
	A	B	C	E	Y
2-WAY VALVES, ANSI CLASS 125. STEM DOWN TO CLOSE. EQUAL PERCENTAGE OR LINEAR FLOW CHARACTERISTIC					
VGF21_S25	10-7/8 (276)	4-3/8 (112)	7 (178)	3-1/2 (89)	13/16 (20)
VGF21_S30	11-3/4 (298)	6-3/8 (161)	7-1/2 (191)		
VGF21_S40	13-7/8 (352)	5-7/8 (150)	9 (229)	5-1/4 (133)	1-1/2 (38)
VGF21_S50	15-3/4 (400)	6-3/16 (157)	10 (254)		
VGF21_S60	17-3/4 (451)	6-3/16 (157)	11 (279)		
2-WAY VALVES, ANSI CLASS 250. STEM DOWN TO CLOSE. EQUAL PERCENTAGE FLOW CHARACTERISTIC					
VGF22ES25	11-1/2 (292)	4-3/8 (112)	7-1/2 (191)	3-1/2 (89)	13/16 (20)
VGF22ES30	12-1/2 (318)	6-3/8 (161)	8-1/4 (210)		
VGF22ES40	14-1/2 (368)	5-7/8 (150)	10 (254)	5-1/4 (133)	1-1/2 (38)
VGF22ES50	16-5/8 (422)	6-3/16 (157)	11 (279)		
VGF22ES60	18-5/8 (473)	6-3/16 (157)	12-1/2 (318)		
2-WAY VALVES, PRESSURE-BALANCED, ANSI CLASS 125. STEM DOWN TO CLOSE. EQUAL PERCENTAGE OR LINEAR FLOW CHARACTERISTIC					
VGF21_P25	10-7/8 (276)	4-3/16 (107)	7 (178)	3-1/2 (89)	13/16 (20)
VGF21_P30	11-3/4 (298)	5-7/8 (150)	7-1/2 (191)		
VGF21_P40	13-7/8 (352)	5-7/8 (150)	9 (229)	5-1/4 (133)	1-1/2 (38)
VGF21_P50	15-3/4 (400)	6-1/8 (156)	10 (254)		
VGF21_P60	17-3/4 (451)	6-1/8 (156)	11 (279)		

M27603

Submittal Data - Valves

Flanged Globe Valve, VGF3



VGF Flanged Globe Valves are used for 2-position or modulating control of hot water or chilled water-glycol solutions up to 50% concentration in closed loop heating, ventilation and air conditioning (HVAC) systems. They can be operated by ML6984/7984, ML6420/6425, ML6421/7421 Electric Linear Actuators, MP953 Pneumatic Actuators, Modutrol™ Motors with Q5001 valve linkage or MN/MS Series Direct Coupled Actuators with Q5020 or Q5024 valve linkages. Three-way bodies are available in mixing or diverting style with equal percentage and

linear flow characteristics, respectively. For boiler/chiller bypass applications requiring tight close-off, use VGF31/32LD diverting valves. For outdoor temperature compensation of building supply water or modulating control of heat exchangers, use VGF31/32EM mixing valves.

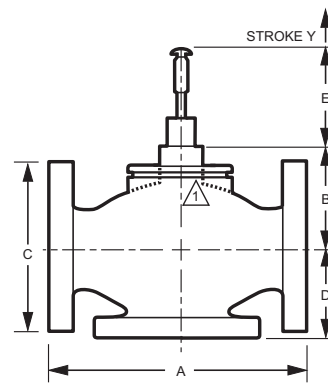
SPECIFICATIONS

Valve Type	Globe Valve
Body Pattern	Three-way
Connection Type	Flanged
Controlled Fluid	Chilled or hot water with up to 50% Glycol. Not for use with steam or fuels.
Leakage Rating	Port A seat leakage: 0.5%; Port B seat leakage 1.0%.
Maximum Safe Operating Pressure	175 psig at 130 F (66 C) (1206 kPa at 66 C (130 F))
Maximum Differential Pressure Ratings (Close-off)87 psi (599 kPa)
Fluid Temperature Range	20 F to 250 F (-7 C to +120 C)
Actuation:	Must be purchased separately
Stem Travel	
2-1/2 and 3 inch valves	3/4 in. (20 mm)
4 to 6 inch valves:	1-1/2 in. (39 mm)
Bonnet Size	
2-1/2 and 3 inch valves	1-3/8 in. (35 mm)
4 to 6 inch valves:	1-7/8 in. (47.6 mm)
Materials	
(Body)	Cast Iron ASTM A126 Class B
(Stem)	Stainless Steel
(Seat)	Stainless Steel
(Cartridge)	Stainless Steel
(Plug/Ball/Disc)	Stainless Steel
(Packing)	Spring-loaded PTFE cone rings

FEATURES

- ANSI Class 125 and Class 250 cast iron bodies with flanged end connections.
- Face-to-face flange dimensions per ANSI/ISA S75.03 standard.
- Sizes from 2-1/2 to 6 inches.
- Stainless steel trim standard for long life span.
- Self-adjusting packing.
- Accurate positioning with equal percentage and linear flow characteristics to ensure precise temperature control.
- Universal bonnet for direct-coupled electric and pneumatic actuators for easy mounting, or linkage coupled Modutrol™ Motors and MN/MS Series direct coupled actuators.
- Constant total flow throughout full plug travel (3-way diverting models).
- Not suitable for combustible gasses.
- Valves utilize direct mounting valve actuators, Q5020/ Q5024 linkages with Direct Coupled Actuators or Pneumatic Valve Actuators.

DIMENSIONS DIAGRAM



▲ DOTTED LINE REPRESENTS ANSI 125 VALVE BONNET.

MODEL NUMBER	DIMENSIONS, IN. (MM)					
	A	B	C	D	E	Y
3-WAY MIXING VALVES, ANSI CLASS 125. STEM UP TO CLOSE A-AB						
VGF31EM25	10-7/8 (276)	3 (76)	7 (178)	3-3/4 (95)	4-3/16 (107)	13/16 (20)
VGF31EM30	11-3/4 (298)	4-3/16 (107)	7-1/2 (191)	4-3/8 (111)		
VGF31EM40	13-7/8 (352)	5-8/16 (140)	9 (229)	5-1/8 (130)	6-11/16 (170)	1-1/2 (38)
VGF31EM50	15-3/4 (400)	5-3/8 (137)	10 (254)	5-3/4 (146)		
VGF31EM60	17-3/4 (451)	5-11/16 (145)	11 (279)	6-5/8 (168)		
3-WAY MIXING VALVES, ANSI CLASS 250. STEM UP TO CLOSE A-AB						
VGF32EM25	11-1/2 (292)	4-3/8 (112)	7-1/2 (191)	3-3/4 (95)	4-3/16 (107)	13/16 (20)
VGF32EM30	12-1/2 (318)	6-3/8 (161)	8-1/4 (210)	4-3/8 (111)		
VGF32EM40	14-1/2 (368)	5-7/8 (150)	10 (254)	5-1/8 (130)	6-11/16 (170)	1-1/2 (38)
VGF32EM50	16-5/8 (422)	6-3/16 (157)	11 (279)	5-3/4 (146)		
VGF32EM60	18-5/8 (473)	6-3/16 (157)	12-1/2 (318)	6-5/8 (168)		
3-WAY DIVERTING VALVES, ANSI CLASS 125. STEM DOWN TO CLOSE AB-A						
VGF31LD25	10-7/8 (276)	3 (76)	7 (178)	3-3/4 (95)	4-3/16 (107)	13/16 (20)
VGF31LD30	11-3/4 (298)	4-3/16 (107)	7-1/2 (191)	4-3/8 (111)		
VGF31LD40	13-7/8 (352)	5-8/16 (140)	9 (229)	5-1/8 (130)	6-11/16 (170)	1-1/2 (38)
VGF31LD50	15-3/4 (400)	5-3/8 (137)	10 (254)	5-3/4 (146)		
VGF31LD60	17-3/4 (451)	5-11/16 (145)	11 (279)	6-5/8 (168)		
3-WAY DIVERTING VALVES, ANSI CLASS 250. STEM DOWN TO CLOSE AB-A						
VGF32LD25	11-1/2 (292)	4-3/8 (112)	7-1/2 (191)	3-3/4 (95)	4-3/16 (107)	13/16 (20)
VGF32LD30	12-1/2 (318)	6-3/8 (161)	8-1/4 (210)	4-3/8 (111)		
VGF32LD40	14-1/2 (368)	5-7/8 (150)	10 (254)	5-1/8 (130)	6-11/16 (170)	1-1/2 (38)
VGF32LD50	16-5/8 (422)	6-3/16 (157)	11 (279)	5-3/4 (146)		
VGF32LD60	18-5/8 (473)	6-3/16 (157)	12-1/2 (318)	6-5/8 (168)		

Pressure Independent Control Valves, VRN



The VRN2 two-way pressure independent control ball valves maintain constant flow of hot or chilled water in closed loop heating, ventilating and air conditioning (HVAC) systems regardless of head pressure fluctuations above the minimum specified pressure drop. These valve assemblies can be used with Honeywell non-spring return or spring return direct coupled actuators (DCA) with minimum torque of 35 lb-in (4 Nm) on valve sizes up to 3 inches (DN80). The built-in differential pressure regulator makes fluid flow through the valve independent of changes in supply pressure, eliminating "hunting" by the control system, even at low coil flow. The pressure regulator virtually eliminates cavitation in the valve, and decouples the control valve from the effects of piping components such as reducers and elbows.

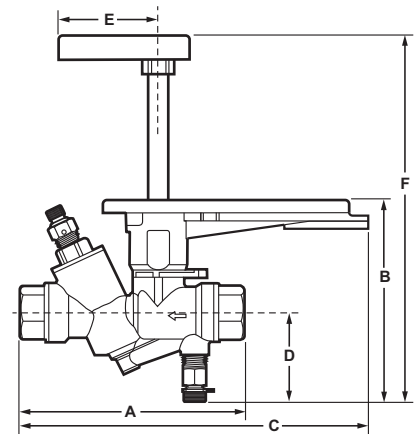
Pressure independent control valves are sized to match design coil flow regardless of coil size. VRN2 valves eliminate the need to balance the system for proper flow, and allow chillers to be operated at design temperature differential for maximum efficiency at every load condition. When used in a system with variable speed pump drives, 3-way valves and coil bypass lines are not required. In new construction, VRN2 valves perform better than reverse return piping designs without the extra materials these systems need.

Systems that utilize the capabilities of properly installed and monitored pressure independent control valves may qualify for LEED points. Pressure independent control requires less flow, enabling use of smaller piping, pumps and chillers.

FEATURES

- Sizes from 1/2 to 3 in. with internal (female) NPT connections.
- Controls hot or chilled water with up to 50% glycol.
- Regulated flow rates available from 1 to 95 gpm.
- Differential pressure regulator for constant pressure drop across valve seat.
- Positive pressure, rolling diaphragm regulator design for long service life for flow control accuracy of $\pm 5\%$ over specified control range.
- Equal percentage flow characteristic using patented flow control ball insert.
- Multiple regulated flow rates available per valve size.
- Patented ball seals require low operating torque.
- Nickel-chrome plated brass or stainless steel trim.
- Choice of factory-installed actuation using Honeywell N05/S05-series direct-coupled actuators: Floating, Modulating (2-10 V), Spring Return Modulating/Floating.
- Spring return actuators field-configurable for normally open or normally closed fail safe position.
- Actuators available with optional auxiliary switches.
- Removable, manual operating handle to control valve during installation or in an event of power failure.
- Upstream Test Port for venting or pressure gauge attachment.
- Three actuator orientations on the valve for cramped spaces.

DIMENSIONS DIAGRAM



VALVE SIZE (IN.)	DIMENSIONS IN INCHES (MM)						
	A	B	C	D	E	F _z ^a	F _s ^a
1/2	5-11/16 (145)	4-5/16 (109)	8-19/32 (218)	1 (26)	2-1/2 (64)	8-13/32 (213)	7-3/16 (182)
3/4							
1	5-29/32 (150)		8-45/64 (221)				
	9 (229)	4-19/32 (117)	10-57/64 (277)	1-5/8 (41)		9-13/32 (239)	8-3/16 (207)
1-1/4	8-3/32 (213)		10-19/32 (269)				
1-1/2	8-3/16 (208)		10-1/2 (267)				
	10 (254)	5-3/16 (132)	12-3/32 (307)	2-3/32 (53)		10-13/32 (264)	9-3/16 (232)
2	9-29/32 (251)		12 (305)				
2-1/2	10-9/32 (263)		12-3/16 (310)				
3	10-13/16 (274)		12-13/32 (314)				

^a LONG SHAFT SUPPLIED WITH "ZELIX" (Z) DIRECT COUPLED ACTUATORS; SHORT SHAFT SUPPLIED WITH "SALT" (S) NON-SPRING RETURN DCAS.

M31310A

SPECIFICATIONS

Valve Type	Dynamic pressure independent control valve
Body Pattern	2-way, straight-through
Pipe Connection Type	Female-NPT
Controlled Fluid	Chilled or hot water with up to 50% Glycol. Not for use with steam or fuels.
Valve Action	Quarter-turn rotary
Maximum Safe Operating Pressure	360 psi (2500 kPa)
Maximum Safe Operating Temperature	248 F (120 C)
Maximum Close-off Pressure	100 psid (690 kPa)
Fluid Temperature Range	-22 F to 250 F (-30 C to 121 C)
Ambient Temperature Range	14 F to 131 F (-10 C to 55 C)
Accuracy	$\pm 5\%$ over specified pressure range
Stem Travel	90 deg. rotation
Materials	
(Body)	Forged Brass ASTM B584
(Seat)	Teflon seals/EPDM O-rings
(Regulator)	Stainless Steel
(Packing)	Teflon seals/EPDM O-rings
(Diaphragm)	Hydrogenated Acrylonitrile Butadiene Rubber
Comments	No feedback signal Full port ball; No feedback

Submittal Data - Valves

Pressure Independent Control Valves, VRW



The VRW2 two-way pressure independent control valves maintain constant flow of hot and chilled water in closed-loop heating, ventilating and air conditioning (HVAC) systems regardless of head pressure fluctuations above minimum specified pressure drop. These valves come complete with proportional, stay-in-place or electronic fail safe actuators.

The built-in differential pressure regulator makes fluid flow through the valve independent of changes

in supply pressure, eliminating "hunting" by the control system, even at low coil flow. The pressure regulator virtually eliminates cavitation in the valve, and decouples the control valve from the effects of piping components such as reducers and elbows.

Pressure independent control valves are sized to match design coil flow regardless of coil size. VRW2 valves eliminate the need to balance the system for proper flow, and allow chillers to be operated at design temperature differential for maximum efficiency at every load condition. When used in a system with variable speed pump drives, 3-way valves and coil bypass lines are not required.

Systems that utilize the capabilities of properly installed, adjusted, and monitored pressure independent control valves may qualify for LEED points.

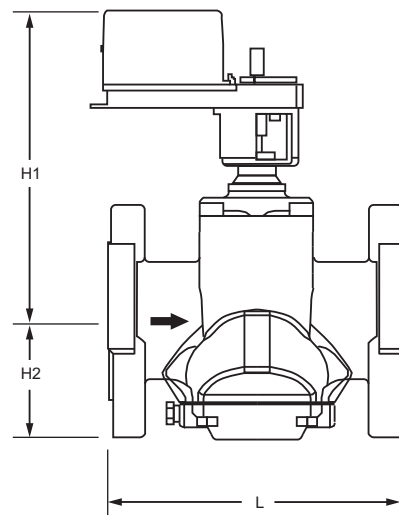
FEATURES

- Multi-sized bodies from 2-1/2 to 6 inch pipes with wafer flanged connections.
- Combination ANSI/ASME Class 150/300 flange connections.
- Controls hot or chilled water with up to 50% glycol.
- Regulated flow rates available from 40.7 to 468 gpm.
- Stainless steel pressure regulator maintains constant pressure drop across valve seat.
- Positive pressure, rolling diaphragm regulator design provides flow control accuracy of $\pm 5\%$ over specified pressure range.
- Equal percentage flow characteristic using multi turn, non-rising, characterized plug.
- High close-off rating.
- 50 discrete, selectable flow rates available per valve size.
- Stainless steel trim.
- Six-turn actuator with floating or modulating inputs available with stay-in-place or electronic fail safe action.
- Fail safe actuators field-configurable for normally open or normally closed power failure return position.
- Two Test Ports for venting or pressure gauge attachment.

SPECIFICATIONS

Valve Type	Wafer flanged dynamic pressure independent control valve
Body Pattern	2-way, straight-through
Flow Characteristic	Equal Percentage
Pipe Connection Type	Wafer flange
Controlled Fluid	Chilled or hot water with up to 50% Glycol. Not for use with steam or fuels.
Valve Action	Multi-turn linear
Leakage Rating	0.2% max.
Maximum Safe Operating Pressure	580 psig (4000 kPa)
Maximum Safe Operating Temperature	248 F (120 C)
Maximum Close-off Pressure	100 psid (700 kPa)
Fluid Temperature Range	-4 F to 248 F (-20 C to 120 C)
Ambient Temperature Range	14 F to 131 F (-10 C to 55 C)
Accuracy	$\pm 5\%$ over specified pressure range
Stem Travel	1 to 6 Rotations in 51 equal, field-selectable increments
ANSI/ ASME Class	150/300
Comments	2 - 10V position feedback signal
Materials	
(Body)	Ductile Iron, ASTM A536-65T, Class 60-45-18
(Stem)	Stainless Steel
(Seat)	316 Stainless steel
(Regulator)	316 Stainless steel
(Plug/Ball/Disc)	316 stainless steel
(Packing)	EPDM and Nitrile O-rings
(Diaphragm)	EPDM

DIMENSIONS DIAGRAM



L		H ₁		H ₂	
in.	mm	in.	mm	in.	mm
8 3/4	224	9 3/4	246	3 3/4	95
12 5/8	320	11 3/8	290	5 1/4	135
16 5/8	422	13 1/4	338	7 1/8	180

M31311

Resilient Seat Butterfly Valves, VR2



Resilient seat two-way valves provide control for HVAC applications including chilled water, hot water, cooling tower water and thermal storage systems. Valves are available in 2 in. to 24 in. assemblies with electric actuators. Spring return fail-safe actuators available on 2 in. and 2.5 in. assemblies, electronic fail-safe actuators available on 3 in. to 12 in. assemblies. NEMA 2 and NEMA 4X enclosures available on 5 in. and smaller assemblies, NEMA 4X standard on 6 in. and larger assemblies.

SPECIFICATIONS

Body Pattern	2 way
Valve Action.....	Quarter-turn rotary
Connection Type	Lugged
Controlled Fluid	Chilled or hot water with up to 60% Glycol. Not for use with steam or fuels.
Flow Characteristic.....	Modified Equal Percentage
Mounting	ANSI 125/150 Flanges
Cold Working Pressure.....	232 psi (1600 kPa)
Fluid Temperature Range.....	-22 F to 250 F (-30 C to 121 C)
Number of Flange Bolts	
For 2 in., 2-1/2 in., 3 in. valves:	4
For 4 in., 5 in., 6 in., 8 in., valves:	8
For 10 in., 12 in., 14 in. valves:	12
For 16 in., 18 in. valves:	16
For 20 in., 24 in. valves:	20
Flange Bolt Thread	
For 2 in., 2-1/2 in., 3 in. valves:	5/8 in.-11 pitch
For 4 in., 5 in., 6 in., 8 in., valves:	3/4 in.-10 pitch
For 10 in., 12 in., 14 in. valves:	7/8 in.-9 pitch
For 16 in., 18 in., 20 in., 24 in. valves: ..	1-1/8 in.-7 pitch
Materials	
(Body).....	2 in. to 6 in. and 14 in. to 24 in.: epoxy powder coated ductile iron ASTM A536. 8 in. to 12 in.: polyester powder coated ductile iron ASTM A536
(Shaft).....	2 in. to 6 in. and 14 in. to 24 in.: 416 stainless steel 8 in. to 12 in.: 420 stainless steel
(Seat).....	EPDM
(Disc).....	304 stainless steel

APPROVALS

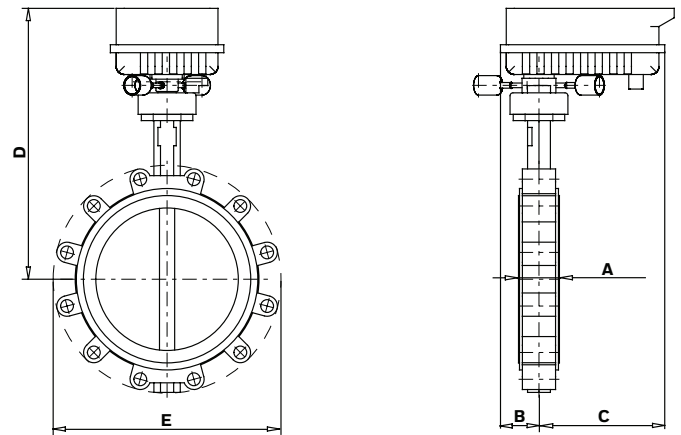
CE.....	Compliant
Underwriters Laboratories, Inc.....	C/US Listed, up to 12 in. assemblies
Canadian Standards Association.....	C/US Certified, 14 in. and larger assemblies

ACCESSORIES

- MB-IND-1 Position Indicator Small
- MB-IND-2 Position Indicator Large
- MB-NSR-SWITCH NSR DCA Aux Switch
- MB-NSR-N4HEAT NSR NEMA4 DCA Heater Kit
(Must be ordered with valve, factory installed)
- MB-SR-N4HEAT SR NEMA4 DCA Heater Kit
(Must be ordered with valve, factory installed)

DIMENSIONS DIAGRAM

(see Honeywell publication 31-00190EF for complete set of drawings)



Size		Dimensions, in. (mm)				
in.	DN	A	B	C	D	E
6	150	2.20 (56)	2.65 (67)	9.30 (236)	16.03 (407)	10.76 (273)
8	200	2.36 (60)	2.65 (67)	9.30 (236)	17.37 (441)	13.02 (331)
10	250	2.68 (68)	2.65 (67)	9.30 (236)	18.63 (473)	15.68 (398)
12	300	3.07 (78)	2.65 (67)	9.30 (236)	20.40 (518)	18.40 (467)

Submittal Data - Valves

Resilient Seat Butterfly Valves, VR3,4,5



Resilient seat three-way valves provide control for HVAC applications including chilled water, hot water, cooling tower water and thermal storage systems. Valves are available in 2 in. to 18 in. assemblies with electric actuators. Spring return fail-safe actuators available on 2 in. assemblies, electronic fail-safe actuators available on 2.5 in. to 12 in. assemblies. NEMA 2 and NEMA 4X enclosures available on 3 in. and smaller assemblies, NEMA 4X standard on 4 in. and larger assemblies.

SPECIFICATIONS

Body Pattern.....	3 way Mixing/Diverting
Valve Action.....	Quarter-turn rotary
Connection Type.....	Lugged
Controlled Fluid	Chilled or hot water with up to 60% Glycol. Not for use with steam or fuels.
Flow Characteristic.....	Modified Linear
Mounting.....	ANSI 125/150 Flanges
Cold Working Pressure.....	232 psi (1600 kPa)
Fluid Temperature Range	-22 F to 250 F (-30 C to 121 C)
Number of Flange Bolts	
For 2 in., 2-1/2 in., 3 in. valves:.....	4
For 4 in., 5 in., 6 in., 8 in., valves:.....	8
For 10 in., 12 in., 14 in. valves:.....	12
For 16 in., 18 in. valves:.....	16
Flange Bolt Thread	
For 2 in., 2-1/2 in., 3 in. valves:.....	5/8 in.-11 pitch
For 4 in., 5 in., 6 in., 8 in., valves:.....	3/4 in.-10 pitch
For 10 in., 12 in., 14 in. valves:.....	7/8 in.-9 pitch
For 16 in., 18 in. valves:.....	1-1/8 in.-7 pitch
Materials	
(Body).....	2 in. to 6 in. and 14 in. to 24 in.: epoxy powder coated ductile iron ASTM A536. 8 in. to 12 in.: polyester powder coated ductile iron ASTM A536
(Shaft).....	2 in. to 6 in. and 14 in. to 24 in.: 416 stainless steel 8 in. to 12 in.: 420 stainless steel
(Seat).....	EPDM
(Disc).....	304 stainless steel

APPROVALS

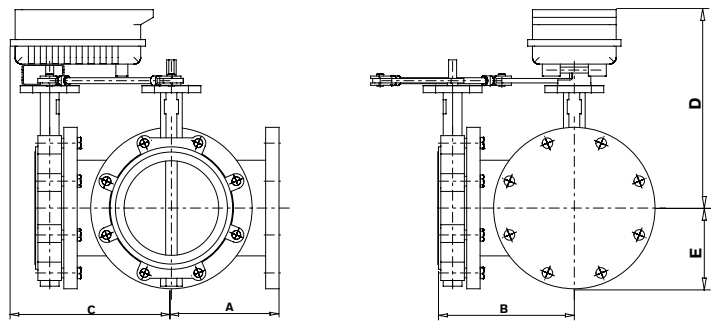
CE.....Compliant
Underwriters Laboratories, Inc.....C/US UL873, Plenum Rated

ACCESSORIES

MB-IND-1 Position Indicator Small
MB-IND-2 Position Indicator Large
MB-NSR-SWITCH NSR DCA Aux Switch
MB-NSR-N4HEAT NSR NEMA4 DCA Heater Kit (Must be ordered with valve, factory installed)
MB-SR-N4HEAT SR NEMA4 DCA Heater Kit (Must be ordered with valve, factory installed)

DIMENSIONS DIAGRAM

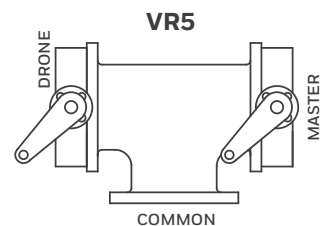
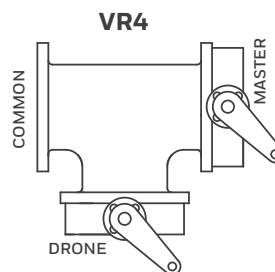
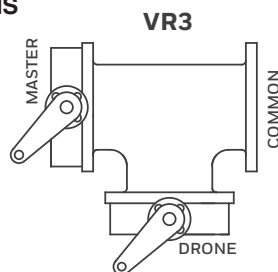
(see Honeywell publication 31-00190EF for complete set of drawings)



Size		Dimensions, in. (mm)				
in.	DN	A	B	C	D	E
3	80	5.50 (140)	7.56 (192)	8.89 (226)	14.97 (380)	3.75 (95)
4	100	6.50 (165)	8.55 (217)	11.13 (283)	14.22 (361)	4.50 (114)
5	125	7.50 (191)	9.70 (246)	12.05 (306)	14.74 (374)	5.00 (127)
6	150	8.00 (203)	10.20 (256)	12.55 (319)	15.25 (387)	5.50 (140)
8	200	9.00 (229)	11.36 (289)	13.47 (342)	16.59 (421)	6.75 (172)
10	250	11.00 (279)	13.68 (348)	15.31 (389)	17.85 (453)	8.00 (203)
12	300	12.00 (305)	15.07 (383)	16.12 (409)	19.62 (498)	9.50 (241)

3-WAY VALVE CONFIGURATIONS

(VR3, VR4 and VR5 valves are not flow directional. Can be used in both MIXING and DIVERTING applications.)



High Performance Butterfly Valves, VH2



High performance two-way valves provide control for HVAC applications including chilled water, hot water, cooling tower water, thermal storage systems and steam up to 50 psi. Valves are available in 2 in. to 24 in. assemblies with electric actuators. Spring return fail-safe actuators available on 2 in. to 4 in. assemblies, electronic fail-safe actuators available on 5 in. and 6 in. assemblies. NEMA 2 and NEMA 4X enclosures available on 4 in. and smaller assemblies, NEMA 4X standard on 5 in. and larger assemblies.

SPECIFICATIONS

Body Pattern	2 way
Valve Action.....	Quarter-turn rotary
Connection Type	Lugged
Controlled Fluid	Chilled or hot water with up to 60% Glycol, steam up to 50 psi. Not for use with fuels.
Flow Characteristic.....	Modified Equal Percent, unidirectional
Mounting	ASME/ANSI Class 150
Static Pressure Rating (max).....	285 psi at 100 F (1965 kPa at 38 C)
Fluid Temperature Range	-22 F to 400 F (-30 C to 204 C)
Number of Flange Bolts	
For 2 in., 2-1/2 in., 3 in. valves:	4
For 4 in., 5 in., 6 in., 8 in. valves:.....	8
For 10 in., 12 in., 14 in. valves:.....	12
For 16 in., 18 in. valves:	16
For 20 in., 24 in. valves:	20
Flange Bolt Thread	
For 2 in., 2-1/2 in., 3 in. valves:	5/8 in.-11 pitch
For 4 in., 5 in., 6 in., 8 in. valves:.....	3/4 in.-10 pitch
For 10 in., 12 in., 14 in. valves:.....	7/8 in.-9 pitch
For 16 in., 18 in., 20 in., 24 in. valves:..	1-1/8 in.-7 pitch
Materials	
(Body).....	Carbon steel full lug
(Shaft).....	17-4 PH stainless
(Seat).....	RTFE
(Disc).....	316 stainless steel

APPROVALS

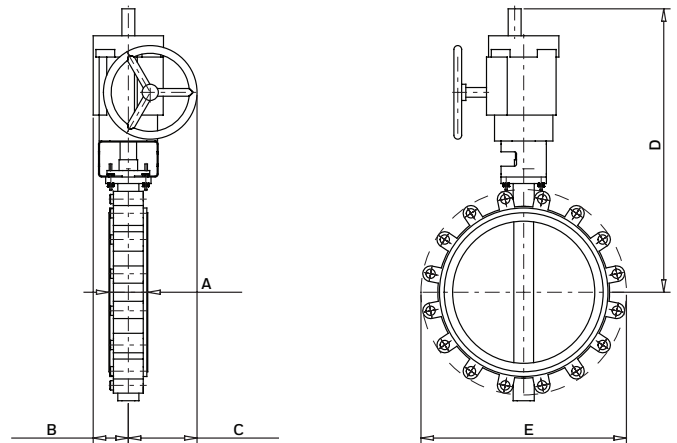
CE.....Compliant
 Underwriters Laboratories, Inc.....C/US Listed, up to 6 in. assemblies
 Canadian Standards Association..C/US Certified, 8 in. and larger assemblies

ACCESSORIES

MB-NSR-SWITCH NSR DCA Aux Switch

DIMENSIONS DIAGRAM

(see Honeywell publication 31-00191EF for complete set of drawings)



Size		Dimensions, in. (mm)				
in.	DN	A	B	C	D	E
8	200	2.48 (63.0)	4.40 (111.8)	7.13 (181.1)	23.14 (587.8)	13.17 (334.5)
10	250	2.81 (71.4)	4.40 (111.8)	7.13 (181.1)	23.89 (606.8)	15.89 (403.6)
12	300	3.22 (81.8)	4.40 (111.8)	7.13 (181.1)	27.49 (698.2)	18.62 (472.9)
14	350	3.22 (81.8)	4.40 (111.8)	7.13 (181.1)	28.10 (713.7)	20.75 (527.1)
16	400	4.22 (107.2)	4.27 (108.5)	8.35 (212.1)	33.13 (841.5)	22.89 (581.4)
18	450	4.71 (119.6)	4.27 (108.5)	8.35 (212.1)	34.44 (874.8)	24.96 (634.0)
20	500	5.25 (133.4)	8.59 (218.2)	7.20 (182.9)	41.32 (1049.5)	26.89 (683.0)
24	600	6.36 (161.5)	8.59 (218.2)	7.20 (182.9)	43.44 (1103.4)	31.28 (794.5)

Submittal Data - Valves

High Performance Butterfly Valves, VH3,4,5 Mixing and VH6,7,8 Diverting



High performance three-way valves provide control for HVAC applications including chilled water, hot water, cooling tower water and thermal storage systems. Valves are available in 2 in. to 16 in. assemblies with electric actuators. Electronic fail-safe actuators available on 2 in. to 3 in. assemblies. NEMA 2 and NEMA 4X enclosures available on 3 in. and smaller assemblies, NEMA 4X standard on 4 in. and larger assemblies.

SPECIFICATIONS

Body Pattern.....	3 way Mixing (VH3,4,5) 3 way Diverting (VH6,7,8)
Valve Action.....	Quarter-turn rotary
Connection Type.....	Lugged
Controlled Fluid.....	Chilled or hot water with up to 60% Glycol. Not for use with steam or fuels.
Flow Characteristic.....	Modified linear, unidirectional
Mounting.....	ASME/ANSI Class 150
Static Pressure Rating (max).....	285 psi at 100 F (1965 kPa at 38 C)
Fluid Temperature Range.....	-22 F to 400 F (-30 C to 204 C)
Number of Flange Bolts	
For 2 in., 2-1/2 in., 3 in. valves:.....	4
For 4 in., 5 in., 6 in., 8 in. valves:.....	8
For 10 in., 12 in., 14 in. valves:.....	12
For 16 in., valves:.....	16
Flange Bolt Thread	
For 2 in., 2-1/2 in., 3 in. valves:.....	5/8 in.-11 pitch
For 4 in., 5 in., 6 in., 8 in. valves:.....	3/4 in.-10 pitch
For 10 in., 12 in., 14 in. valves:.....	7/8 in.-9 pitch
For 16 in. valves:.....	1-1/8 in.-7 pitch
Materials	
(Body).....	Carbon steel full lug
(Shaft).....	17-4 PH Stainless steel
(Seat).....	RTFE
(Disc).....	316 Stainless steel

APPROVALS

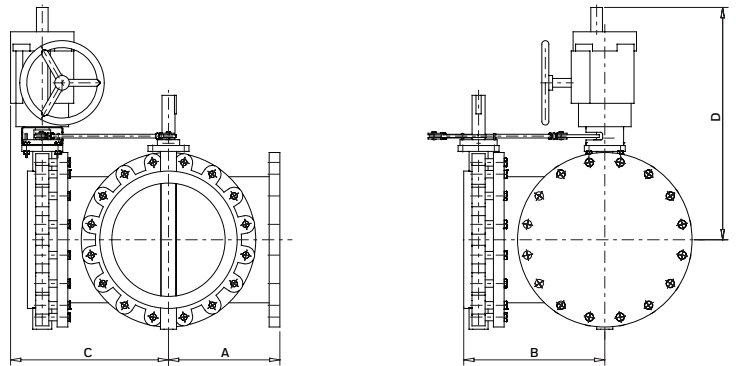
CE.....	Compliant
Underwriters Laboratories, Inc.....	C/US Listed, up to 4 in. assemblies
Canadian Standards Association.....	C/US Certified, 5 in. and larger assemblies

ACCESSORIES

MB-NSR-SWITCH NSR DCA Aux Switch

DIMENSIONS DIAGRAM

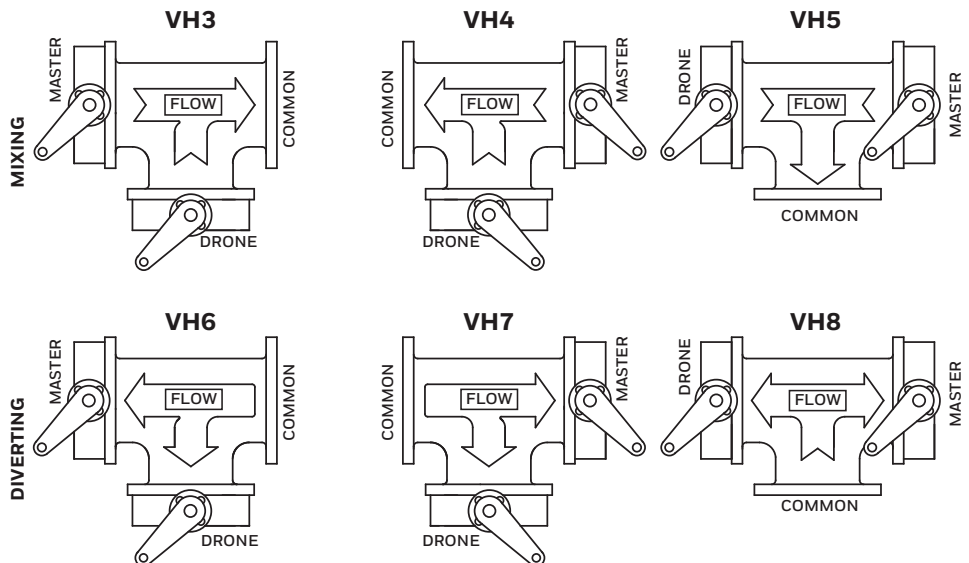
(see Honeywell publication 31-00191EF for complete set of drawings)



Size		Dimensions, in. (mm)			
in.	DN	A	B	C	D
6	150	8.00 (203)	18.29 (465)	11.25 (286)	17.92 (455)
8	200	9.00 (228.6)	11.50 (292.1)	14.65 (372.1)	23.14 (587.8)
10	250	11.00 (279.4)	13.81 (350.8)	16.80 (426.7)	23.90 (607.1)
12	300	12.00 (304.8)	15.22 (386.6)	18.01 (457.5)	25.65 (651.5)
14	350	14.00 (355.6)	17.62 (447.5)	20.08 (510.0)	29.84 (757.9)
16	400	15.00 (381.0)	19.00 (482.6)	21.27 (540.3)	31.29 (794.8)
18	450	16.50 (419.1)	21.00 (533.4)	23.02 (584.7)	32.60 (828.0)

3-WAY VALVE CONFIGURATIONS

(Valves are flow directional. **VH3**, **VH4** and **VH5** valves are for **MIXING** applications only. **VH6**, **VH7** and **VH8** are for **DIVERTING** applications only.)





The Q5001 Valve Linkage connects a Modutrol® Motor to a 2- or 3-way valve. It is used primarily on V5011 or V5013 steam and water valves.

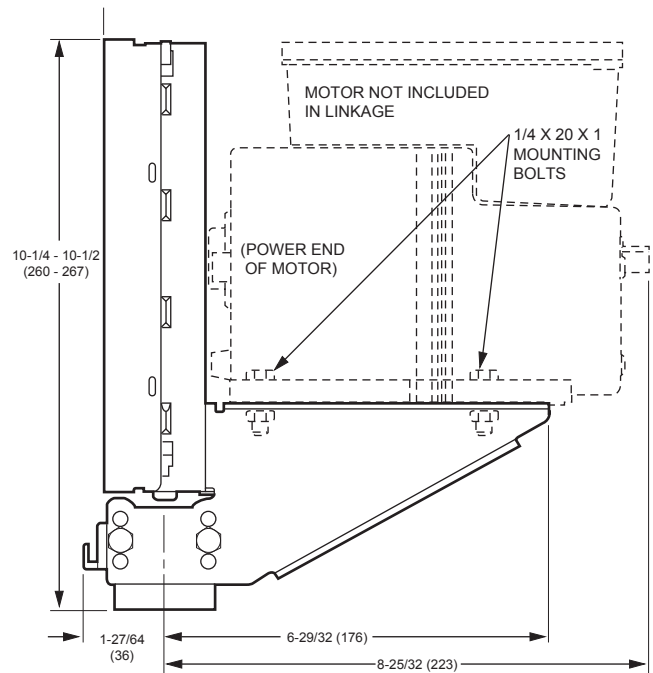
FEATURES

- Q5001 Valve Linkage is applicable to 2-Way or 3-Way valves in modulating or two-position service.
- Linkage requires no adjustment when used with Honeywell valves and Modutrol IV™ Motors.
- Q5001 Valve Linkage replaces Q601 and Q618 Valve Linkages.
- Linkage mounts directly to the valve bonnet; motor mounts to linkage bracket.
- Easy-to-read position indicator.
- Valve stem lift height cam selectable.
- Overtravel permits tight close-off without excessive motor strain.
- Available brackets make linkages adaptable to many valve bodies.
- Models available with 80 lb, 160 lb, and 320 lb stem force.
- Reversible cams on the Q5001 allow field selection of normally open or normally closed valve operation.
- All models have anti-spin clips.

SPECIFICATIONS

Linkage Type	Valve
Mounting	Linkage mounts directly to the valve bonnet; motor mounts on linkage bracket.
Used with Actuator	Modutrol Motor
Stem Force Rating	80 or 160 lbf (356 N or 712 N)
Ambient Temperature Range	-40 F to +150 F (-40 C to +66 C)

DIMENSIONS DIAGRAM



M13993

Submittal Data - Valves

Globe Valve Linkage, Q5020



The Q5020 Globe Valve Linkages connect a Honeywell direct coupled actuator (DCA) to a steam or water globe valve. The Q5020 Linkages are compatible with two-way and three-way globe valves up to 3 inch (DN80).

FEATURES

- Used with two-way and three-way globe valves in modulating or two-position service.
- Used with 25, 50, and 142 lb-in. spring return and 35, 70, 150, and 300 lb-in. non-spring return DCA.
- Quick and simple installation with no disassembly required.
- Heavy-duty steel rack and pinion construction and aluminum die-cast housing.
- Maintenance-free construction.
- Precision roller-bearing rack construction prevents premature valve packing wear and leakage.
- Flexible actuator mounting orientation.
- Adjustable manual override lever and valve position indicator.
- Can be mounted on specific non-Honeywell valves using a 32004629 Bonnet Adapter Kit.

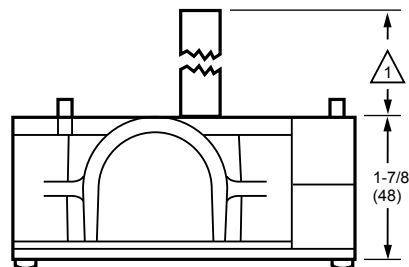
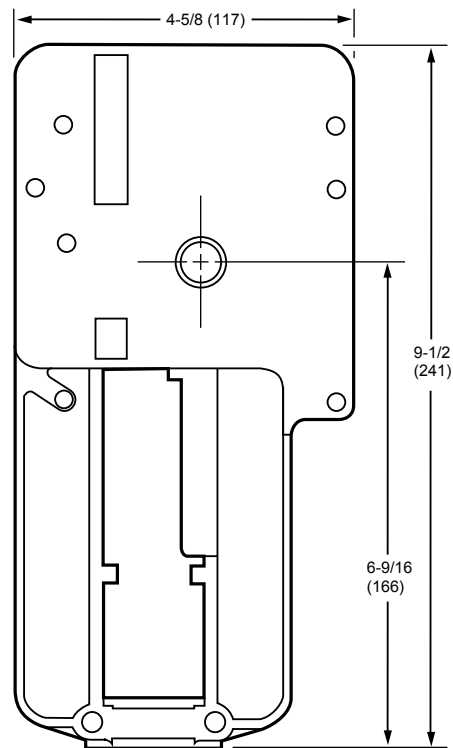
SPECIFICATIONS

Linkage Type..... Valve
 Mounting Linkage mounts directly to the valve bonnet; actuator mounts on linkage
 Used with Actuator Direct Coupled Actuator

ACCESSORIES

- 32004629-001—Bonnet adapter kit to adapt Siemens (Landis/Power) Flowrite 599 1/2 inch to 3 inch globe valves with Q5020A or Q5009B
- 32004629-002—Bonnet adapter kit to adapt Johnson VG7000 1/2 inch to 3/4 inch globe valves with Q5020D
- 32004629-003—Bonnet adapter kit to adapt Johnson VG7000 1 inch to 2 inch globe valves with Q5020A, Q5020B or Q5020D
- 32004629-004—Bonnet adapter kit to adapt Siebe VB7000 1/2 inch to 2 inch globe valves with Q5020D

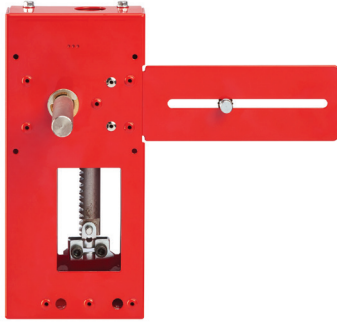
DIMENSIONS DIAGRAM



1 Q5020A,B,D: 4-7/16 (112)
 Q5020C: 3-7/8 (98)

M16346A

Globe Valve Linkage, Q5024



These easy to install linkage and bonnet/stem adapter combinations fit easily into most globe valve installations. Save time and money by replacing outdated electrical or pneumatic actuators with Honeywell MS and MN spring and non-spring return DCAs. When an expensive valve changeout isn't necessary, these retrofit linkages are used to modernize existing HVAC installations with high preforming DCAs. This enables integration of these components with a Building Management System.

FEATURES

- For use with 2-way and 3-way globe valves in modulating or two-position service.
- Models for single or dual actuators for higher close-off pressures.
- Heavy-duty steel rack and pinion construction and aluminum die-cast housing.
- Maintenance-free construction.
- Available for 1/2" through 6" globe valves made by most manufacturers.
- Used with Honeywell MS and MN Spring and Non-Spring Actuators.

SPECIFICATIONS

Linkage Type Valve
 Mounting..... Linkage mounts on the valve bonnet; actuator(s) mount on linkage
 Used with Actuator Direct Coupled Actuator
 Includes..... Anti-rotation pins
 Comments This linkage is not compatible with the 43196000 high temperature kits

ACCESSORIES

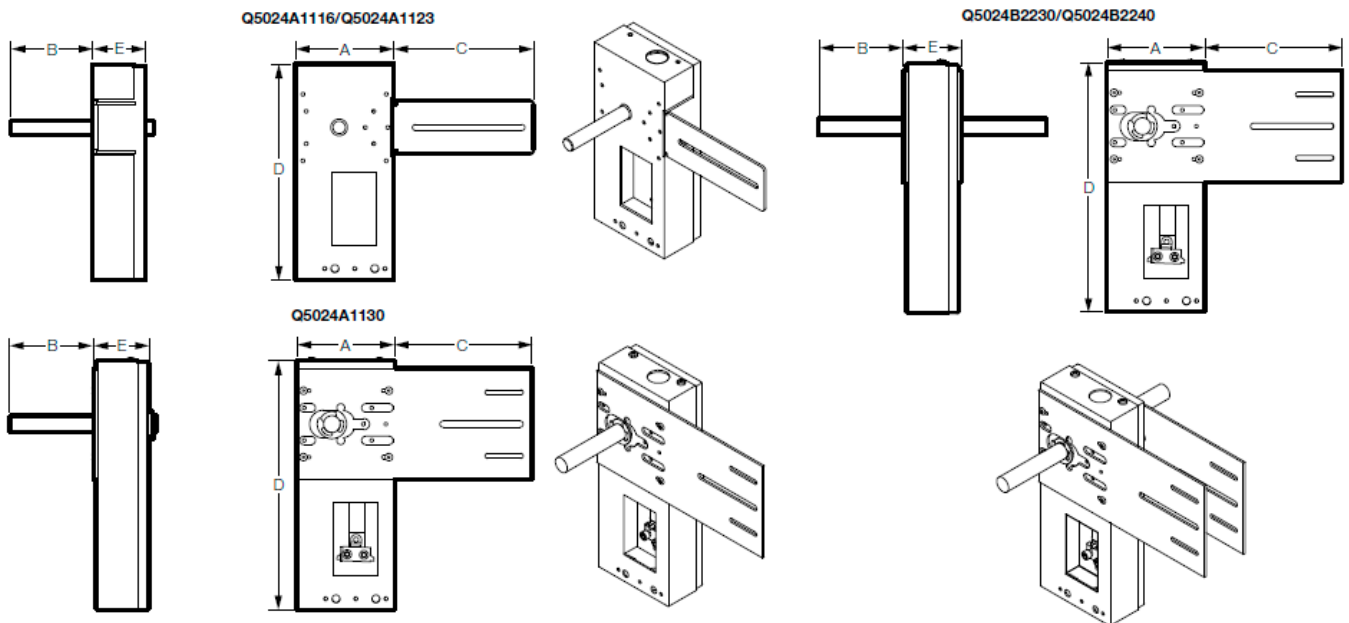
Stem and bonnet adapter needed for most valves, see form 38-00020

Models

Linkage	Actuator Qty	Valve Stroke
Q5024A1116	1	0.63" / 16 mm
Q5024A1123	1	0.91" / 23 mm
Q5024A1130	1	1.18" / 30 mm
Q5024B2230	2	1.18" / 30 mm
Q5024B2240	2	1.57" / 40 mm

Note: If the exact stroke is not available than round up to the next higher stroke.

DIMENSIONS DIAGRAM



Dimensions in Inches.

Linkage	A	B	C	D	D	Shaft Dia.
Q5024A1116 Q5024A1123	4-3/8"	3-1/2"	6-1/4"	9-1/2"	2-1/2"	16mm
Q5024A1130 Q5024B2230 Q5024B2240	4-3/8"	4"	6"	11"	2-3/8"	19mm

Submittal Data - Valves

Globe Valve Linkage, Q5024

LINKAGE SELECTION INSTRUCTION

When selecting your linkage look at the table below for the valve model list. Select the correct valve size to see the recommended linkage and bonnet adapter. Choose the correct actuator torque based on necessary close-off pressure. If model you are looking for is not listed fill out the Special Order Form located on page 207.

If you do not have the exact part number or valve size, measure the valve stroke and select the corresponding linkage from the table on the previous page. Next, select the appropriate bonnet adapter kit from the list on page 223. This kit includes variety of bonnet adapters for you to choose from at the job site.

Linkage and Actuator Selection.

Manufacturer	Valve Model	Single Actuator Linkage			
Honeywell	V5011 V5013	Valve Connection Size (inch)	Linkage		
		0.5	Use Q5020A1003 for single actuator applications on Honeywell valves 1/2" to 3".		
		0.75			
		1			
		1.25			
		1.5			
		2			
		2.5			
		3			
		Dual Actuator Linkage			
		Valve Connection Size (inch)	Linkage and Bonnet Adapter	Actuator Torque (lb-in)	
				350 (2 x 175)	600 (2 x 300)
				Close-Off (psi)	
	2	Q5024B2230 and HU5024-001	118		
	2.5		75	123	
	3		50	80	
	4	Q5024B2240 and HU5024-002	18	38	
	5		12	21	
	6		10	16	
VGF	Single Actuator Linkage	Valve Connection Size (inch)	Linkage		
		2.5	Use Q5020A1003 for single actuator applications on Honeywell valves 1/2" to 3".		
		3			
		Dual Actuator Linkage			
		Valve Connection Size (inch)	Linkage and Bonnet Adapter	Actuator Torque (lb-in)	
				350 (2 x 175)	600 (2 x 300)
			Close-Off (psi)		
	2.5	Q5024B2230 and HU5024-001	61	105	
	3		30	52	
	4	Q5024B2240 and HU5024-002	22	39	
	5		9	15	
	6		9	15	

Linkage and Actuator Selection. (Continued)

Manufacturer	Valve Model	Dual Actuator Linkage						
		Valve Connection Size (inch)	Linkage and Bonnet Adapter	Actuator Torque (lb-in)				
Honeywell (continued)	VGF Pressure Balanced			2.5	Q5024B2230 and HU5024-001	350 (2 x 175) 600 (2 x 300)		
		Close-Off (psi)						
		3		175	175			
		4	Q5024B2240 and HU5024-002	175	175			
		5		175	175			
		6		175	175			
		Johnson Control	V90AD-1C thru 7C V90DD-1C thru 7C	Single Actuator Linkage				
Valve Connection Size (inch)	Linkage and Bonnet Adapter			Actuator Torque (lb-in)				
				44	88	175	300	
Close-Off (psi)								
0.5	Q5024A1116 and JU5024-005			230	230			
0.75				165	230			
1	Q5024A1123 and JU5024-005			80	140			
1.5					65	140		
V90CA-1 thru 8	Q5024A1123 and JU5024-005			0.5	230	230		
				0.75	130	230		
			1	80	140	230		
			1.25	50	90	200		
			1.5		65	140		
			2		35	80	140	
			2.5	Q5024A1123 and JU5024-002			55	90
Dual Actuator Linkage								
Valve Connection Size (inch)	Linkage and Bonnet Adapter		Actuator Torque (lb-in)					
			350 (2 x 175)		600 (2 x 300)			
Close-Off (psi)								
3	Q5024B2230 and JU5024-002		50		80			

Submittal Data - Valves

Globe Valve Linkage, Q5024

Linkage and Actuator Selection. (Continued)

Manufacturer	Valve Model	Single Actuator Linkage						
		Valve Connection Size (inch)	Linkage and Bonnet Adapter	Actuator Torque (lb-in)				
Johnson Control (continued)	VG7000/2000 Series					44	88	175
				Close-Off (psi)				
		0.5	Q5024A1116 and JU5024-001	230	230			
		0.75		165	230			
		1	Q5024A1116 and JU5024-003	100	190			
		1.25		65	120			
		1.5	Q5024A1123 and JU5024-003		65	140		
		2			35	80	140	
		2.5	Q5024A1123 and JU5024-004			55	90	
		Dual Actuator Linkage						
			Valve Connection Size (inch)	Linkage and Bonnet Adapter	Actuator Torque (lb-in)			
					350 (2 x 175)	600 (2 x 300)		
					Close-Off (psi)			
			3	Q5024B2230 and JU5024-004	50		80	
			4		18		48	
			5	Q5024B2240 and JU5024-004	12		21	
			6		10		16	
		VTM Series VB-3752	Single Actuator Linkage					
				Valve Connection Size (inch)	Linkage and Bonnet Adapter	Actuator Torque (lb-in)		
						44	88	175
						Close-Off (psi)		
				0.5	Q5024A1116 and JU5024-005	230	230	
				0.75		165	230	
				1		100	190	
				1.25	Q5024A1123 and JU5024-005	50	90	
				1.5			65	140
				2			35	80
			2.5	Q5024A1123 and JU5024-002			55	
							90	
Dual Actuator Linkage								
			Valve Connection Size (inch)	Linkage and Bonnet Adapter	Actuator Torque (lb-in)			
					350 (2 x 175)	600 (2 x 300)		
					Close-Off (psi)			
			3	Q5024B2230 and JU5024-002	50		80	
			4		18		48	
		5	Q5024B2240 and JU5024-006	12		21		
		6		10		16		

Linkage and Actuator Selection. (Continued)

Manufacturer	Valve Model	Single Actuator Linkage					
		Valve Connection Size (inch)	Linkage and Bonnet Adapter	Actuator Torque (lb-in)			
Johnson Control (continued)	VB-3754-1 thru 8 VB-3970					44	88
		Close-Off (psi)					
		0.5	Q5024A1116 and JU5024-005	230	230		
		0.75		165	230		
		1	Q5024A1123 and JU5024-005	80	140		
		1.25		50	90	200	
		1.5			65	140	
		2			35	80	140
		2.5	Q5024A1123 and JU5024-002			55	90
		Dual Actuator Linkage					
				Actuator Torque (lb-in)			
				350 (2 x 175)		600 (2 x 300)	
				Close-Off (psi)			
	3	Q5024B2230 and JU5024-002	50			80	
	4		18			48	
	5	Q5024B2240 and JU5024-006	12			21	
	6		10			16	
	VB-3954-1 thru 7 VB-4324-1 thru 7 VB-4322	Single Actuator Linkage					
					Actuator Torque (lb-in)		
					44	88	175
Close-Off (psi)							
0.5		Q5024A1116 and JU5024-005	230	230			
0.75			165	230			
1		Q5024A1123 and JU5024-005	80	140			
1.25			50	90	200		
1.5				65	140		
2				35	80	140	
2.5		Q5024A1123 and JU5024-002			55	90	
Dual Actuator Linkage							
				Actuator Torque (lb-in)			
				350 (2 x 175)		600 (2 x 300)	
			Close-Off (psi)				
3	Q5024B2230 and JU5024-002	50			80		
4		18			48		
5	Q5024B2240 and JU5024-006	12			21		
6		10			16		

Submittal Data - Valves

Globe Valve Linkage, Q5024

Linkage and Actuator Selection. (Continued)

Manufacturer	Valve Model	Single Actuator Linkage					
		Valve Connection Size (inch)	Linkage and Bonnet Adapter	Actuator Torque (lb-in)			
Johnson Control (continued)	V-5462			2.5	Q5024A1123 and JU5024-006	44	88
		Close-Off (psi)					
						55	90
		Dual Actuator Linkage					
		Valve Connection Size (inch)	Linkage and Bonnet Adapter	Actuator Torque (lb-in)			
				350 (2 x 175)	600 (2 x 300)		
		Close-Off (psi)					
		3	Q5024B2230 and JU5024-006	50	80		
		4		18	48		
		5	Q5024B2240 and JU5024-006	12	21		
6	10	16					
Siemens Landis Powers	591 (3 way)	Single Actuator Linkage					
		Valve Connection Size (inch)	Linkage and Bonnet Adapter	Actuator Torque (lb-in)			
				44	88	175	300
		Close-Off (psi)					
		1.5	Q5024A1116 and GU5024-002		85		
		2			45		
		2.5	Q5024A1123 and GU5024-003			55	90
		3				35	65
		Dual Actuator Linkage					
		Valve Connection Size (inch)	Linkage and Bonnet Adapter	Actuator Torque (lb-in)			
350 (2 x 175)	600 (2 x 300)						
Close-Off (psi)							
4	Q5024B2230 and GU5024-003	18	48				
5		12	21				
6	GU5024-003	10	16				

Linkage and Actuator Selection. (Continued)

Manufacturer	Valve Model	Single Actuator Linkage					
Siemens Landis Powers (continued)	591 (2 way)	Valve Connection Size (inch)	Linkage and Bonnet Adapter	Actuator Torque (lb-in)			
				44	88	175	300
		Close-Off (psi)					
		1.5	Q5024A1130 and GU5024-002		50	105	
		2			30	60	105
		2.5	Q5024A1123 and GU5024-003			55	90
		3				35	65
		Dual Actuator Linkage					
		Valve Connection Size (inch)	Linkage and Bonnet Adapter	Actuator Torque (lb-in)			
				350 (2 x 175)		600 (2 x 300)	
	Close-Off (psi)						
	4	Q5024B2230 and GU5024-003		18	48		
	5			12	21		
	6	Q5024B2240 and GU5024-003		10	16		
	599 (Linkage Only: No Bonnet Adapter Necessary)	Single Actuator Linkage					
		Valve Connection Size (inch)	Linkage and Bonnet Adapter	Actuator Torque (lb-in)			
				44	88	175	300
		Close-Off (psi)					
		0.5	Q5024A1123		230	230	
		0.75			130	230	
1				80	140	230	
1.25				50	90	200	
1.5					65	140	
2					35	80	140
2.5						55	90
3						35	65
Dual Actuator Linkage							
Valve Connection Size (inch)		Linkage and Bonnet Adapter	Actuator Torque (lb-in)				
			350 (2 x 175)		600 (2 x 300)		
Close-Off (psi)							
4		Q5024B2240		18	38		
5				12	21		
6			10	16			
658	Single Actuator Linkage						
	Valve Connection Size (inch)	Linkage and Bonnet Adapter	Actuator Torque (lb-in)				
			44	88	175	300	
	Close-Off (psi)						
	0.5	Q5024A1116 and GU5024-001		230	230		
	0.75			165	230		
1			100	190			
1.25			65	120			

Submittal Data - Valves

Globe Valve Linkage, Q5024

Linkage and Actuator Selection. (Continued)

Manufacturer	Valve Model	Single Actuator Linkage						
		Valve Connection Size (inch)	Linkage and Bonnet Adapter	Actuator Torque (lb-in)				
				44	88	175	300	
				Close-Off (psi)				
Siebe Barber Colman Invensys	VB-111 Series	0.5	Q5024A1116 and BU5024-001	230	230			
		0.75		165	230			
		1		100	190			
		1.25		65	120			
	VB-921 Series	Single Actuator Linkage						
		Valve Connection Size (inch)	Linkage and Bonnet Adapter	Actuator Torque (lb-in)				
				44	88	175	300	
		Close-Off (psi)						
		0.5	Q5024A1116 and BU5024-001	230	230			
		0.75		165	230			
		1		100	190			
		1.25		65	120			
		1.5		Q5024A1130 and BU5024-002		50	105	
		2			30	60	105	
		Dual Actuator Linkage						
		Valve Connection Size (inch)	Linkage and Bonnet Adapter	Actuator Torque (lb-in)				
				350 (2 x 175)		600 (2 x 300)		
		Close-Off (psi)						
		2.5	Q5024B2230 and BU5024-003	75		123		
	3	Q5024B2240 and BU5024-003	37		60			
	VB-922 Series VB-925 Series VB-926 Series	Single Actuator Linkage						
		Valve Connection Size (inch)	Linkage and Bonnet Adapter	Actuator Torque (lb-in)				
				44	88	175	300	
		Close-Off (psi)						
		0.5	Q5024A1116 and BU5024-001	230	230			
		0.75		165	230			
		1		100	190			
1.25		65		120				
1.5		Q5024A1130 and BU5024-002			50	105		
2				30	60	105		
Dual Actuator Linkage								
Valve Connection Size (inch)		Linkage and Bonnet Adapter	Actuator Torque (lb-in)					
			350 (2 x 175)		600 (2 x 300)			
Close-Off (psi)								
2.5		Q5024B2230 and BU5024-003	75		123			
3		50		80				

Submittal Data - Valves

Globe Valve Linkage, Q5024

Linkage and Actuator Selection. (Continued)

Manufacturer	Valve Model	Single Actuator Linkage							
		Valve Connection Size (inch)	Linkage and Bonnet Adapter	Actuator Torque (lb-in)					
				44	88	175	300		
				Close-Off (psi)					
Siebe Barber Colman Invensys (continued)	VB-927 Series VB-928 Series	0.5	Q5024A1116 and BU5024-001	230	230				
		0.75		165	230				
		1		100	190				
		1.25		65	120				
		1.5	Q5024A1130 and BU5024-002		50	105			
		2			30	60	105		
		VB-931 Series	Single Actuator Linkage						
	Valve Connection Size (inch)		Linkage and Bonnet Adapter	Actuator Torque (lb-in)					
				44	88	175	300		
					Close-Off (psi)				
	0.5		Q5024A1116 and BU5024-001	230	230				
	0.75			165	230				
	1			100	190				
	1.25			65	120				
1.5	Q5024A1130 and BU5024-002			50	105				
2				30	60	105			
				Dual Actuator Linkage					
Valve Connection Size (inch)	Linkage and Bonnet Adapter	Actuator Torque (lb-in)							
		350 (2 x 175)		600 (2 x 300)					
				Close-Off (psi)					
2.5	Q5024B2230 and BU5024-003	75		123					
3		50		80					
4		18		38					

Submittal Data - Valves

Globe Valve Linkage, Q5024

Linkage and Actuator Selection. (Continued)

Manufacturer	Valve Model	Single Actuator Linkage							
		Valve Connection Size (inch)	Linkage and Bonnet Adapter	Actuator Torque (lb-in)					
				44	88	175	300		
				Close-Off (psi)					
Siebe Barber Colman Invensys (continued)	VB-932 Series	0.5	Q5024A1116 and BU5024-001	230	230				
		0.75		165	230				
		1		100	190				
		1.25		65	120				
		1.5	Q5024A1130 and BU5024-002		50	105			
		2			30	60	105		
		2.5	Q5024A1123 and WU5024-001			55	90		
		3				35	65		
						Dual Actuator Linkage			
				Valve Connection Size (inch)	Linkage and Bonnet Adapter	Actuator Torque (lb-in)			
						350 (2 x 175)		600 (2 x 300)	
						Close-Off (psi)			
				4	Q5024B2230 and WU5024-001	25		48	
			5	18		27			
			6	Q5024B2240 and WU5024-001	11		16		
		VB-7213 VB-7313	Single Actuator Linkage						
			Valve Connection Size (inch)	Linkage and Bonnet Adapter	Actuator Torque (lb-in)				
					44	88	175	300	
			Close-Off (psi)						
0.5			Q5024A1116 and BU5024-001	230	230				
0.75				165	230				
1				100	190				
1.25				65	120				
1.5					85				
2					45				
Belimo	G- series	Single Actuator Linkage							
		Valve Connection Size (inch)	Linkage and Bonnet Adapter	Actuator Torque (lb-in)					
				44	88	175	300		
		Close-Off (psi)							
		0.5	Q5024A1116 and BU5024-001	230	230				
		0.75		165	230				
		1		100	190				
1.25	65	120							
1.5		85							
2		45							

NOTE: If your valve is not listed above fill out Special Order Form located below.

NOTE: The listed close-off pressures are estimated numbers only.

NOTE: The information in this table is based on publicly available information as of the date of this publication. Honeywell is not liable if information is found to be incorrect

Submittal Data - Valves

SPECIAL ORDER FORM

This form is to be used if your existing valve is not listed in the selection chart located in the Globe Valve Linkage literature. Make photocopies of this form as needed and e-mail completed forms to Honeywell's Take off Service at takeoff.service@honeywell.com to ensure proper linkage compatibility. A separate form should be used for each valve when information is different for valve size or manufacturer. Please fill out form completely. Draw your own diagram using the space provided below if necessary.

Quantity: _____
 Valve Body Information: _____
 Figure No. (choose 1, 2, or 3 below): _____
 Manufacturer (if known): _____
 Model No. (if known): _____
 Valve Size: _____
 ___ 2 Way ___ 3 Way

Actuator (Mark all that apply):
 ___ On/Off ___ Tri-State ___ Modulating
 ___ Spring Return
 ___ 24 V ___ 120 V
 ___ Weather Proof Enclosure
 Approximate Close-Off Required: _____(PSI)

Valve Body Dimensions (see below for letter designations):

A = _____
 B = _____
 C = _____, _____ th/in
 D = _____, _____ th/in
 E = _____
 F = _____
 G = _____
 H = _____
 I = _____
 J = _____

Letter Designations (for above):

A = Height with stem down
 B = Length of neck
 C = Stem diameter and threads/inch
 D = Major diameter and threads/inch
 E = Lift (Stroke Length)
 F, G, H, I = Neck dimensions

Comments:

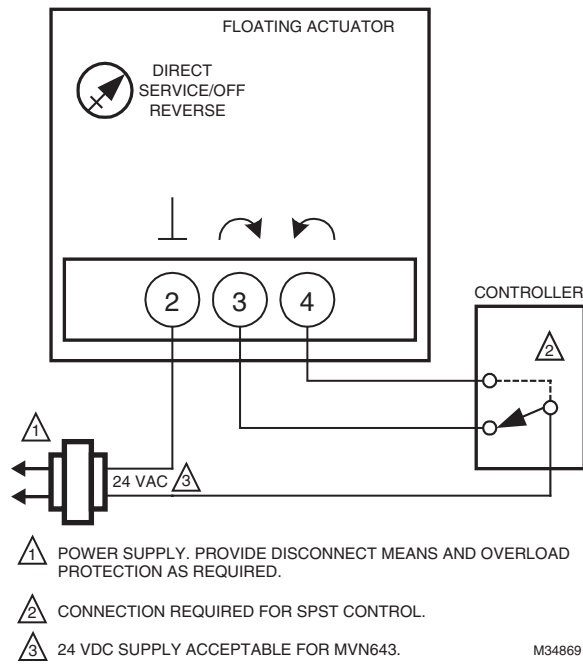
<p style="text-align: center;">FIGURE 1</p>	<p style="text-align: center;">FIGURE 2</p>
<p style="text-align: center;">FIGURE 3</p>	<p style="text-align: center;">Draw your own</p>

VALVES

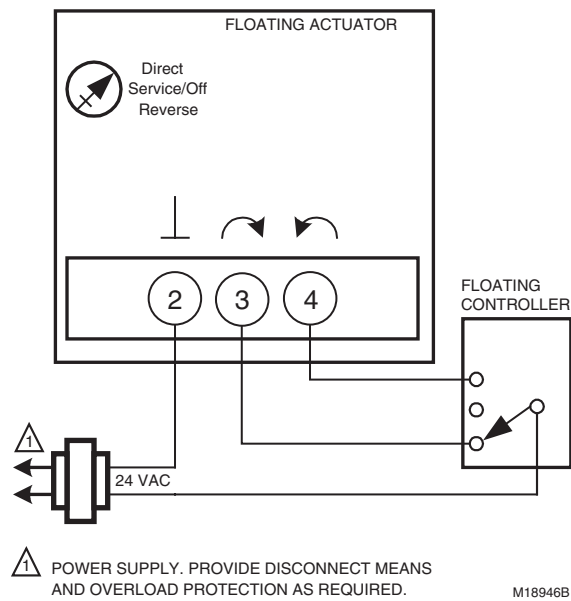
Wiring Diagrams - Valves

Ball Valve Actuators

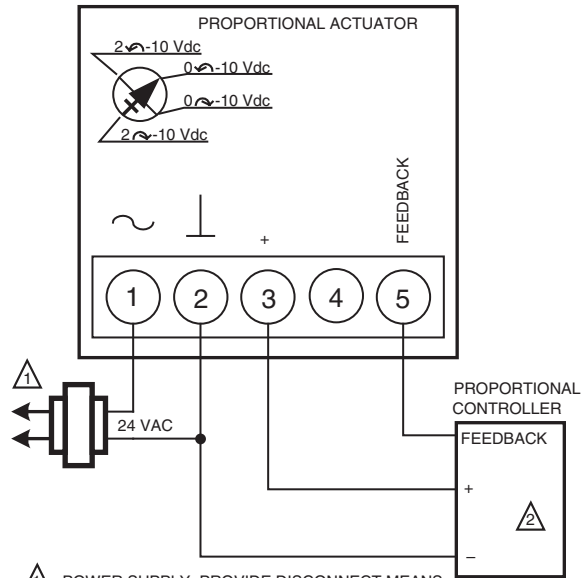
MN6105 with On/Off Control.



MN6105 with Floating Control.



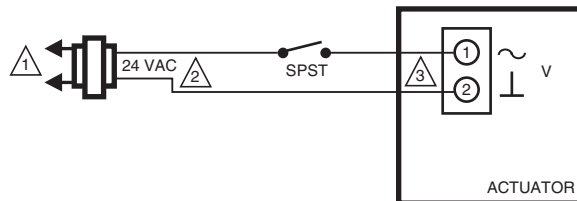
MN7505 with Modulating Control.



- 1 POWER SUPPLY. PROVIDE DISCONNECT MEANS AND OVERLOAD PROTECTION AS REQUIRED.
- 2 0(2)-10 VDC OF 0(4)-20 mA CONTROL SIGNAL ACCEPTABLE. SET CONTROL SIGNAL DIP SWITCH TO "OFF" FOR VOLTAGE. SET TO "ON" FOR CURRENT.

M18947B

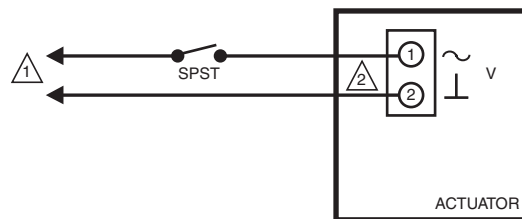
MS8105 with On/Off Control.



- 1 LINE VOLTAGE POWER SUPPLY. PROVIDE DISCONNECT MEANS AND OVERLOAD PROTECTION AS REQUIRED.

- 2 24 VDC SUPPLY ACCEPTABLE.

M34973



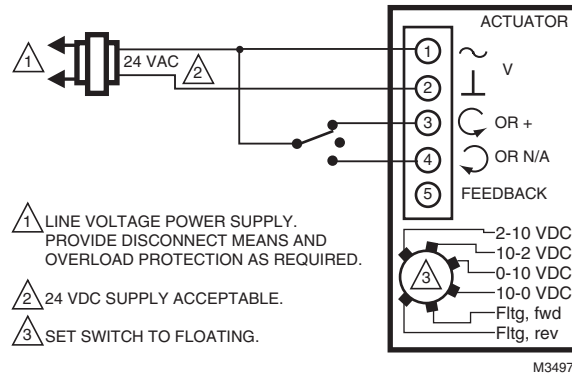
- 1 LINE VOLTAGE POWER SUPPLY. PROVIDE DISCONNECT MEANS AND OVERLOAD PROTECTION AS REQUIRED.

M34974

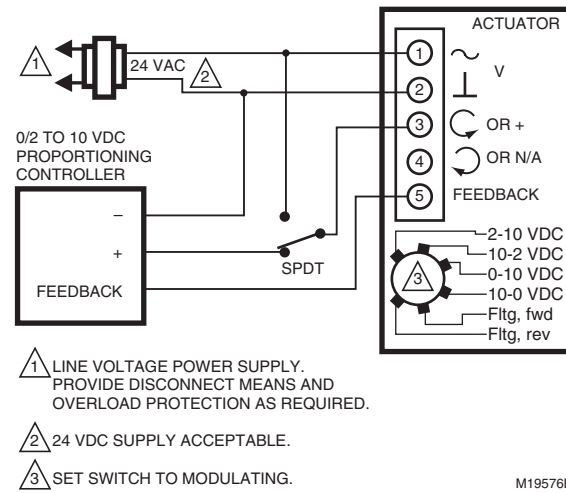
Wiring Diagrams - Valves

Ball Valve Actuators

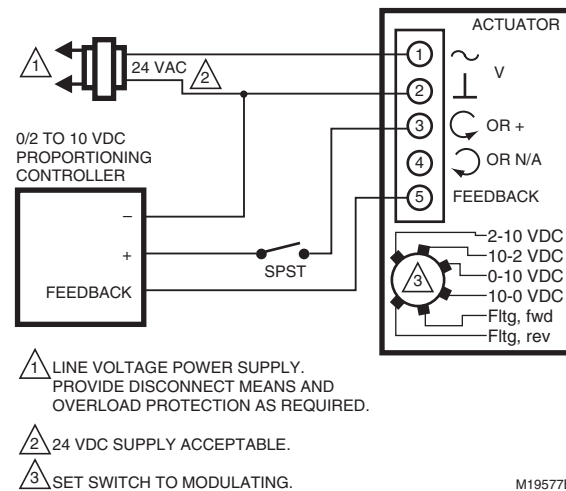
MS7505 with Floating Control (Floating mode setting).



MS7505 with override to full open (Modulating mode setting).



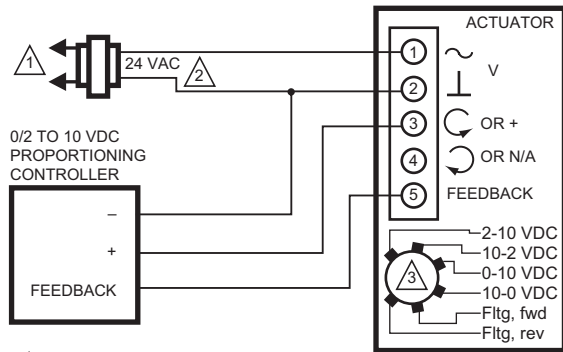
MS7505 with override to full closed (Modulating mode setting).



Wiring Diagrams - Valves

Ball Valve Actuators

MS7505 with Proportioning Controllers (Modulating mode setting).

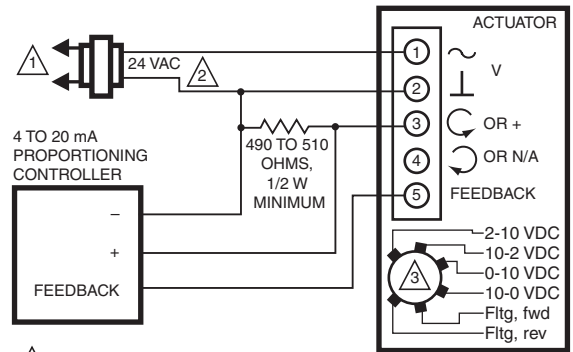


1 LINE VOLTAGE POWER SUPPLY. PROVIDE DISCONNECT MEANS AND OVERLOAD PROTECTION AS REQUIRED.

2 24 VDC SUPPLY ACCEPTABLE.

3 SET SWITCH TO MODULATING.

M34976



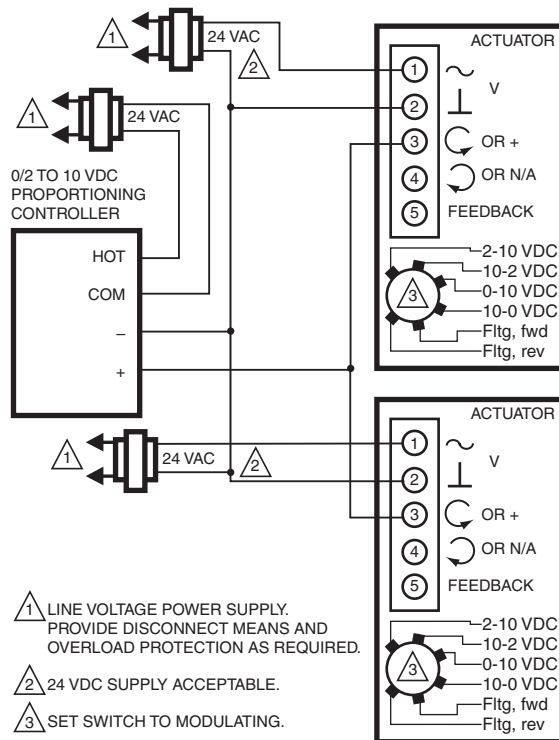
1 LINE VOLTAGE POWER SUPPLY. PROVIDE DISCONNECT MEANS AND OVERLOAD PROTECTION AS REQUIRED.

2 24 VDC SUPPLY ACCEPTABLE.

3 SET SWITCH TO MODULATING.

M34977

MS7505 with Proportioning controllers operating multiple actuators (Modulating mode setting).



1 LINE VOLTAGE POWER SUPPLY. PROVIDE DISCONNECT MEANS AND OVERLOAD PROTECTION AS REQUIRED.

2 24 VDC SUPPLY ACCEPTABLE.

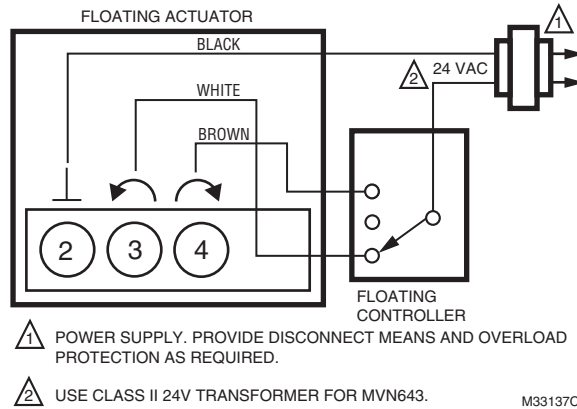
3 SET SWITCH TO MODULATING.

M34978

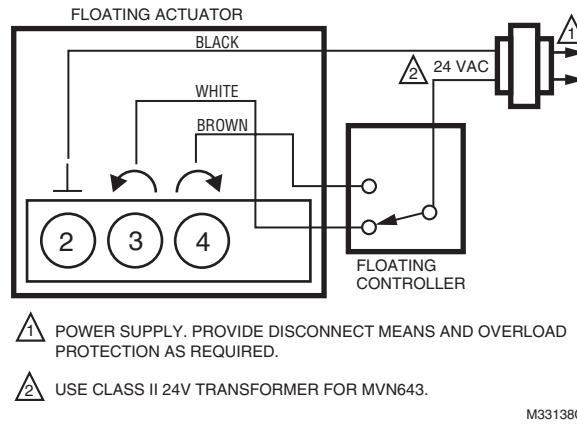
Wiring Diagrams - Valves

MVN Actuator

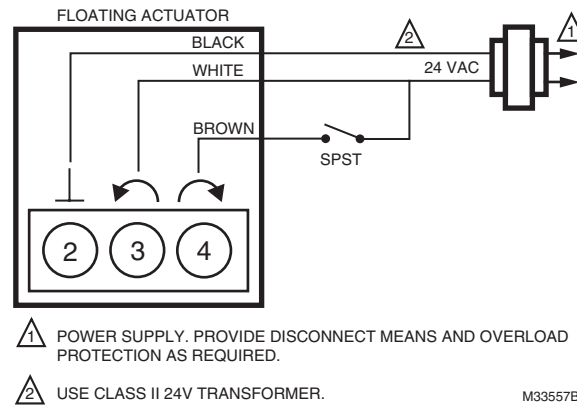
MVN613 or MVN643 with Floating Control.



MVN613 or MVN643 with 2 position or Floating Control.

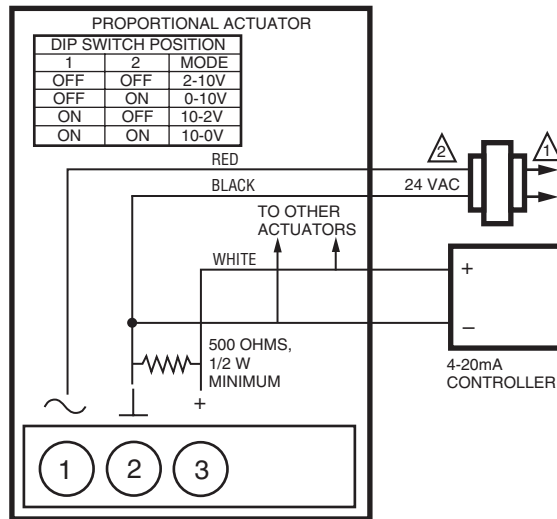


MVN643 with Two Position SPST Control.



MVN713 with 4-20mA Control.

PROPORTIONAL/MODULATING: 4-20mA CONTROLLER OUTPUT WITH 500Ω SERIES RESISTOR



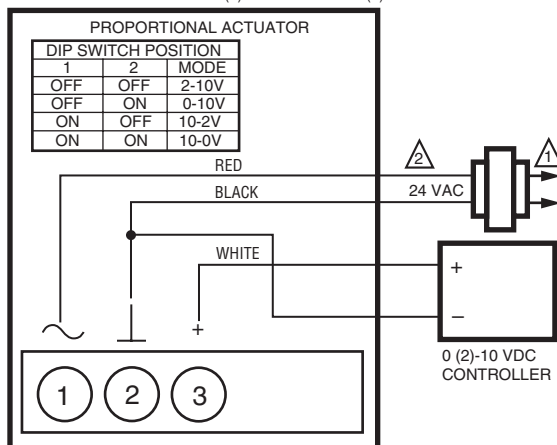
⚠️ POWER SUPPLY. PROVIDE DISCONNECT MEANS AND OVERLOAD PROTECTION AS REQUIRED.

⚠️ USE CLASS II 24V TRANSFORMER.

M33141B

MVN713 with 0 (2)-10 VDC Control.

PROPORTIONAL/MODULATING: 0(2)...10 VDC OR 10...0(2) VDC CONTROLLER OUTPUT



⚠️ POWER SUPPLY. PROVIDE DISCONNECT MEANS AND OVERLOAD PROTECTION AS REQUIRED.

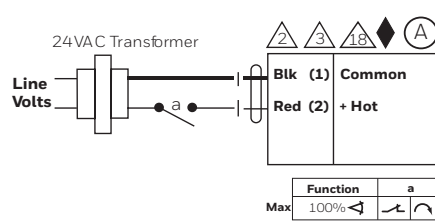
⚠️ 24 VDC SUPPLY ACCEPTABLE.

M33140A

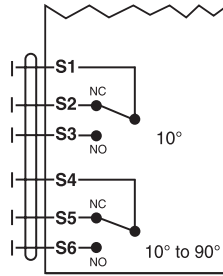
Wiring Diagrams - Valves

Butterfly Valve Actuators

Wiring for MBS8 actuators (Not all models have switches)



On/Off

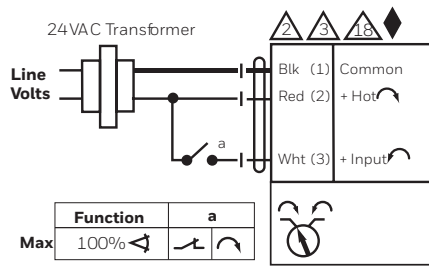


Auxiliary Switches

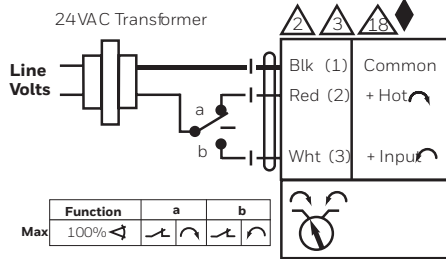
Notes:

- ◆ Meets cULus requirements without the need of an electrical ground connection
- Ⓐ Actuators with appliance cables are numbered.
- Ⓐ Actuators may be connected in parallel. Power consumption and input impedance must be observed.
- Ⓐ Actuators may also be powered by 24 VDC.
- Ⓐ Actuators with plenum rated cable do not have numbers on wires; use color codes instead.

Wiring for MBP6...2,4,5,A,R



On/Off

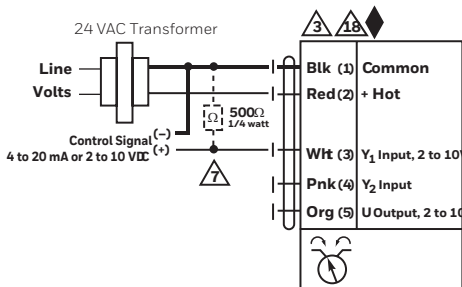


Floating Point

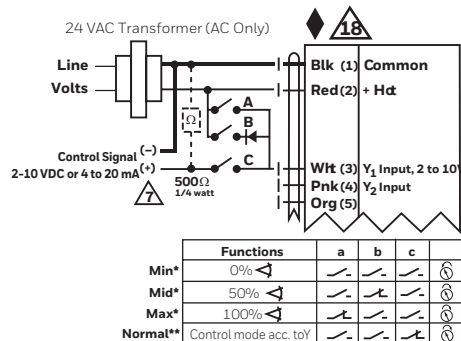
Notes:

- ◆ Meets cULus requirements without the need of an electrical ground connection
- Ⓐ Actuators may be connected in parallel. Power consumption and input impedance must be observed.
- Ⓐ Actuators may also be powered by 24 VDC.
- Ⓐ Actuators with plenum rated cable do not have numbers on wires; use color codes instead.

Wiring for MBS7...1,3 and MBP7...2,3,4,5,R actuators (Not all models have Switches)



VDC / 4 to 20 mA



Override Control Min, Mid, Max Postions

Notes:

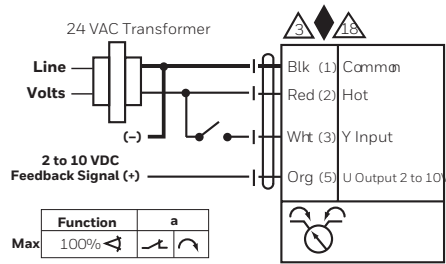
- ◆ Meets cULus requirements without the need of an electrical ground connection
- Ⓐ Actuators may also be powered by 24 VDC.
- Ⓐ A 500Ω resistor converts the 4 to 20 mA control signal to 2 to 10 VDC.
- Ⓐ Actuators with plenum rated cable do not have numbers on wires; use color codes instead.

* Default selectable 0-100%. See Configuration Data Sheet
 ** Customizable. See Configuration Data Sheet

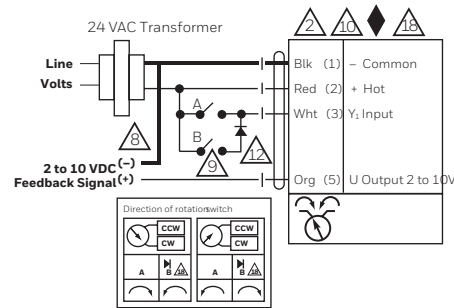
Wiring Diagrams - Valves

Butterfly Valve Actuators

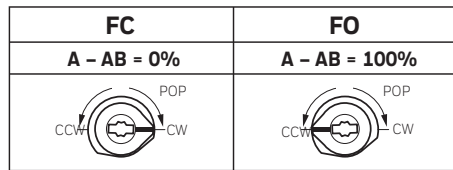
Wiring for MBE6...4,5,R actuators



On/Off



Floating Point

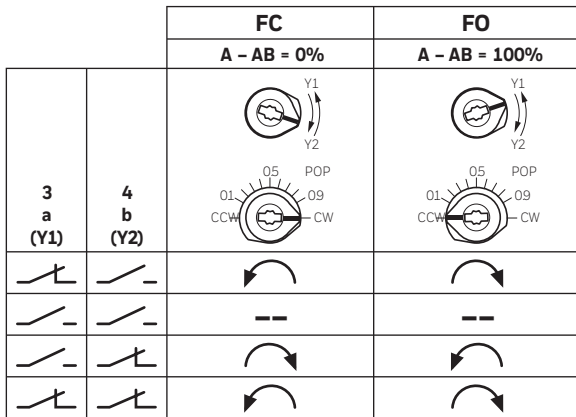


On/Off

24V AC/DC

Notes:

- ◆ Meets cULus requirements without the need of an electrical ground connection
- △2 Actuators may be connected in parallel. Power consumption and input impedance must be observed.
- △3 Actuators may also be powered by 24 VDC.
- △8 Control signal may be pulsed from either the Hot (Source) or Common (Sink) 24 VAC line.
- △9 Contact closures A & B also can be triacs. A & B should both be closed for the triac source and open for triac sink.
- △10 For triac sink the Common connection from the actuator must be connected to the Hot connection of the controller. Position feedback cannot be used with a triac sink controller. The actuator internal common reference is not compatible.
- △12 IN4004 or IN4007 diode. (IN4007 supplied)
- △18 Actuators with plenum rated cable do not have numbers on wires; use color codes instead.



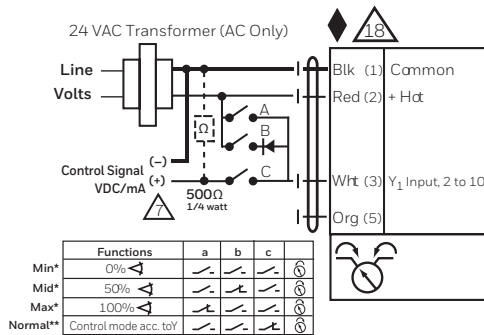
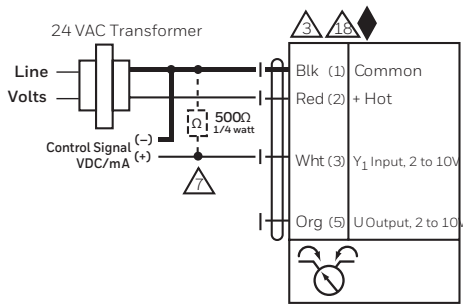
Floating Point

24V AC/DC

Wiring Diagrams - Valves

Butterfly Valve Actuators

Wiring for MBE7...4,5,R actuators



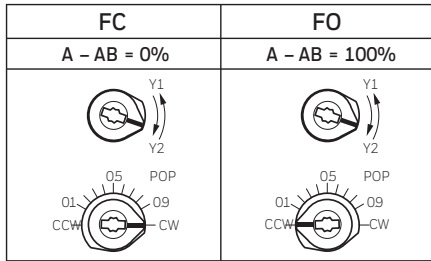
* Default selectable 0-100%. See Configuration Data Sheet.
** Customizable. See Configuration Data Sheet.

Notes:

- ◆ Meets cULus requirements without the need of an electrical ground connection
- ⚠️ Actuators may also be powered by 24 VDC.
- ⚠️ A 500Ω resistor converts the 4 to 20 mA control signal to 2 to 10 VDC.
- For triac sink the Common connection from the actuator must be connected to the Hot connection of the controller. Position feedback cannot be used with a triac sink controller. The actuator internal common reference is not compatible.
- ⚠️ Actuators with plenum rated cable do not have numbers on wires; use color codes instead.

VDC / 4 to 20 mA

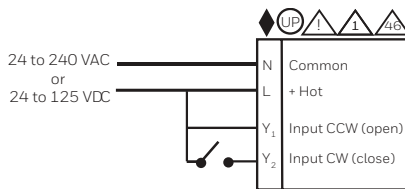
Override Control Min, Mid, Max Postions



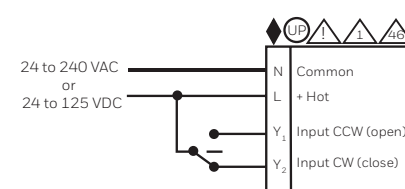
Modulating

24V AC/DC

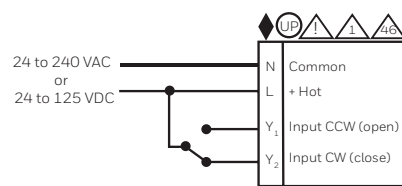
Wiring for MBP, E6...6,7,8 actuators



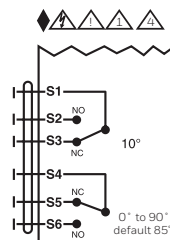
On/Off



Floating Point



On/Off



End Switches

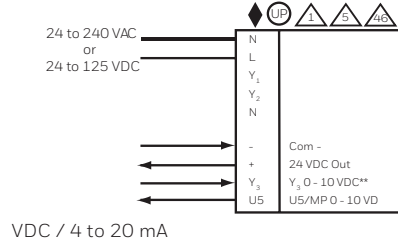
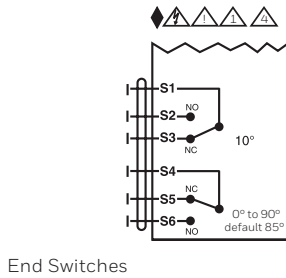
Notes:

- ◆ Meets cULus requirements without the need of an electrical ground connection.
- ⚠️ Provide overload protection and disconnect as required.
- ⚠️ Two built-in auxiliary switches (2x SPDT), for end position indication, interlock control, fan startup, etc.
- ⚠️ Actuators may be controlled in parallel. Current draw and input impedance must be observed
- Ⓢ Universal Power Supply (UP) models can be supplied with 24 VAC up to 240 VAC, or 24 VDC up to 125 VDC.
- ⚠️ 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

Wiring Diagrams - Valves

Butterfly Valve Actuators

Wiring for MBP, E7...6,7,8 actuators

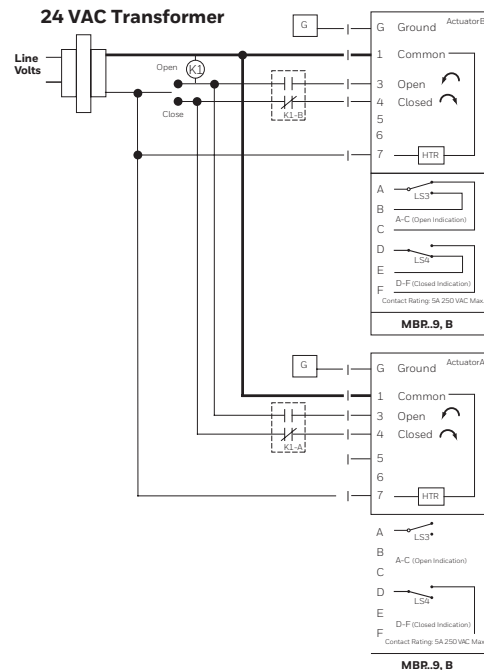
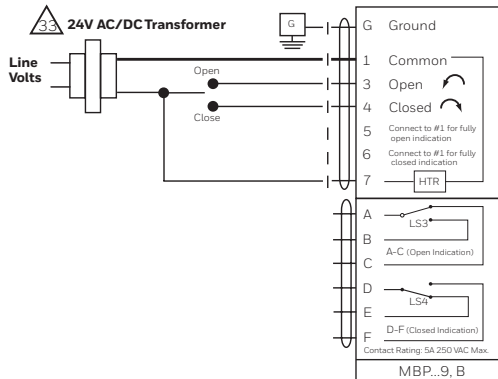


Notes:

- ◆ Meets cULus requirements without the need of an electrical ground connection.
- ⚠ Provide overload protection and disconnect as required.
- ⚠ Only connect common to neg. (-) leg of control circuits.
- ⚠ Two built-in auxiliary switches (2x SPDT), for end position indication, interlock control, fan startup, etc.
- ⚠ Actuators may be controlled in parallel. Current draw and input impedance must be observed.
- Ⓢ Universal Power Supply (UP) models can be supplied with 24 VAC up to 240 VAC, or 24 VDC up to 125 VDC.
- ⚠ 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.

Wiring for MBP6...9,B

24V AC/DC Transformer On/Off



⚠ Each actuator should be powered by a single, isolated control transformer.

✂ INSTALLATION NOTES

- Observe class 1 and class 2 wiring restrictions.
- Transformer sizing = MBP actuator draw X 1.25 (safety margin)

✂ INSTALLATION NOTES

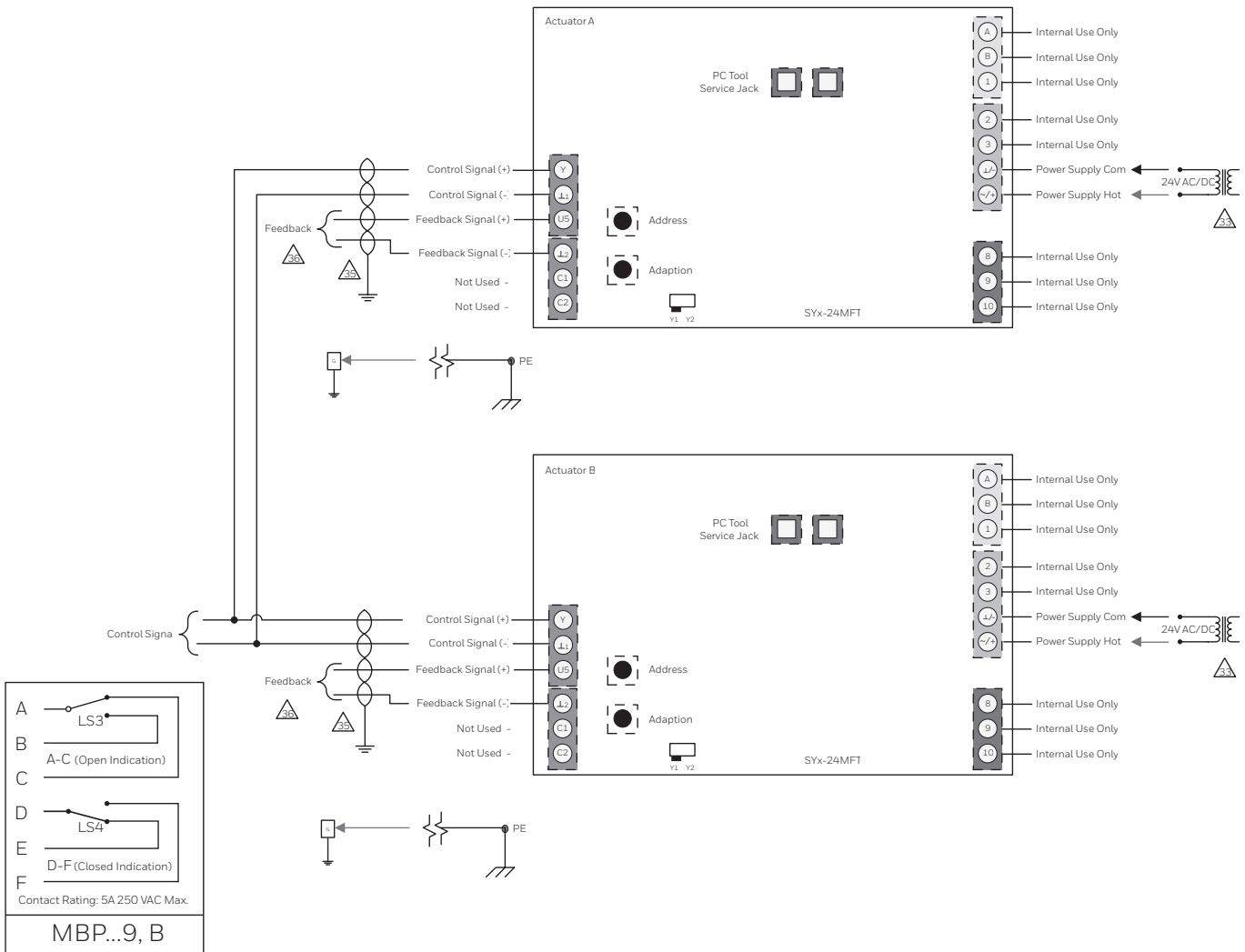
- Isolation relays must be used in parallel connection of multiple actuators using a common control signal input.
- "H" (L2) cannot be connected to terminal #3 and #4 simultaneously.
- Required: Terminal #7 needs to be field wired to enable heater circuit.

Wiring Diagrams - Valves

Butterfly Valve Actuators

Proportional, Multiple Wiring, 24V
MBP...9, B

Wiring for MBP7...9,B actuators



INSTALLATION NOTES



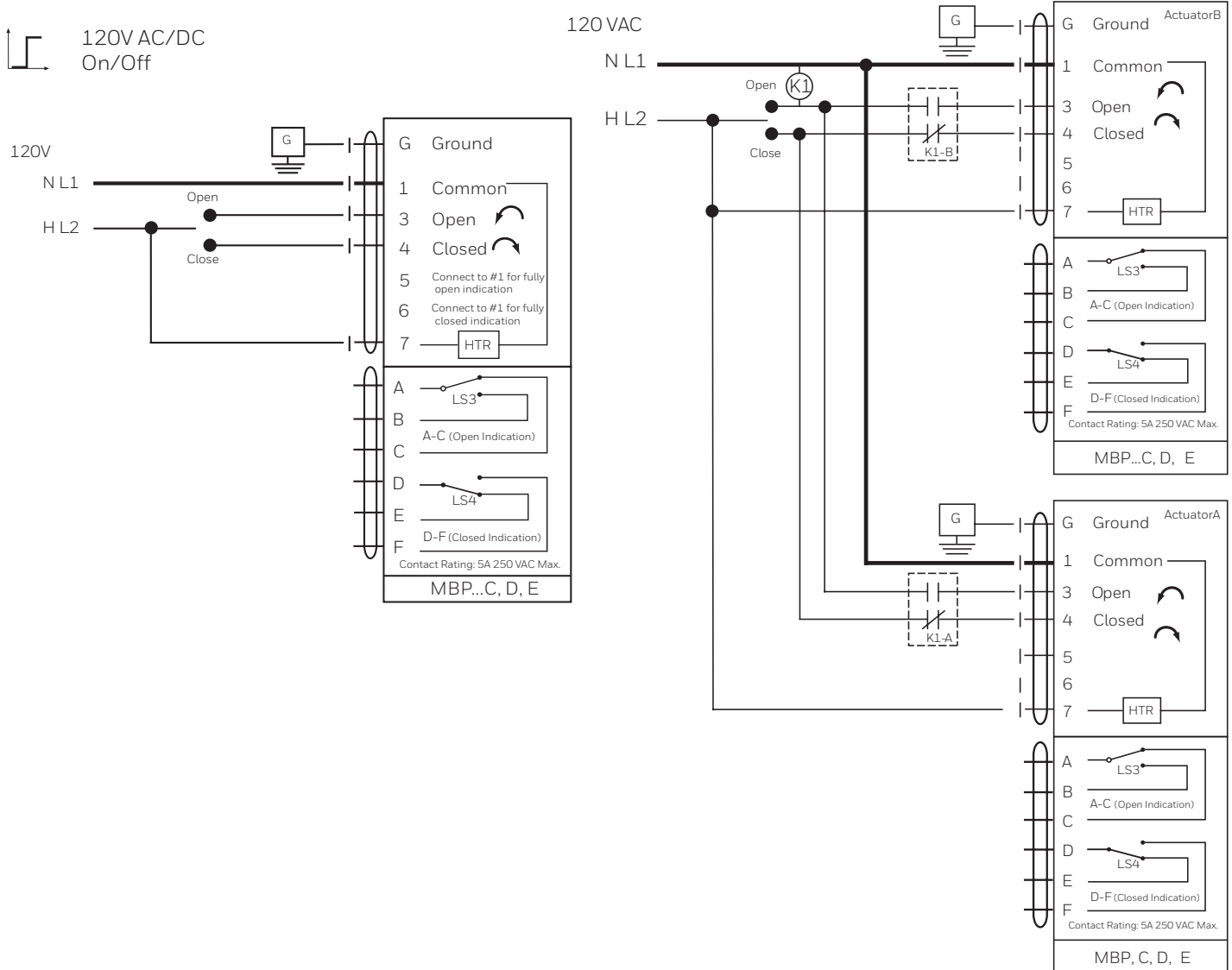
Each actuator should be powered by a single, isolated control transformer.

- Observe class 1 and class 2 wiring restrictions.
- Transformer sizing = MBP actuator draw X 1.25 (safety margin)

Wiring Diagrams - Valves

Butterfly Valve Actuators

Wiring for MBP6...C,D,E,F,G,H actuators



VALVES

INSTALLATION NOTES

- Observe class 1 and class 2 wiring restrictions.
- Transformer sizing = MBP actuator draw X 1.25 (safety margin)

INSTALLATION NOTES

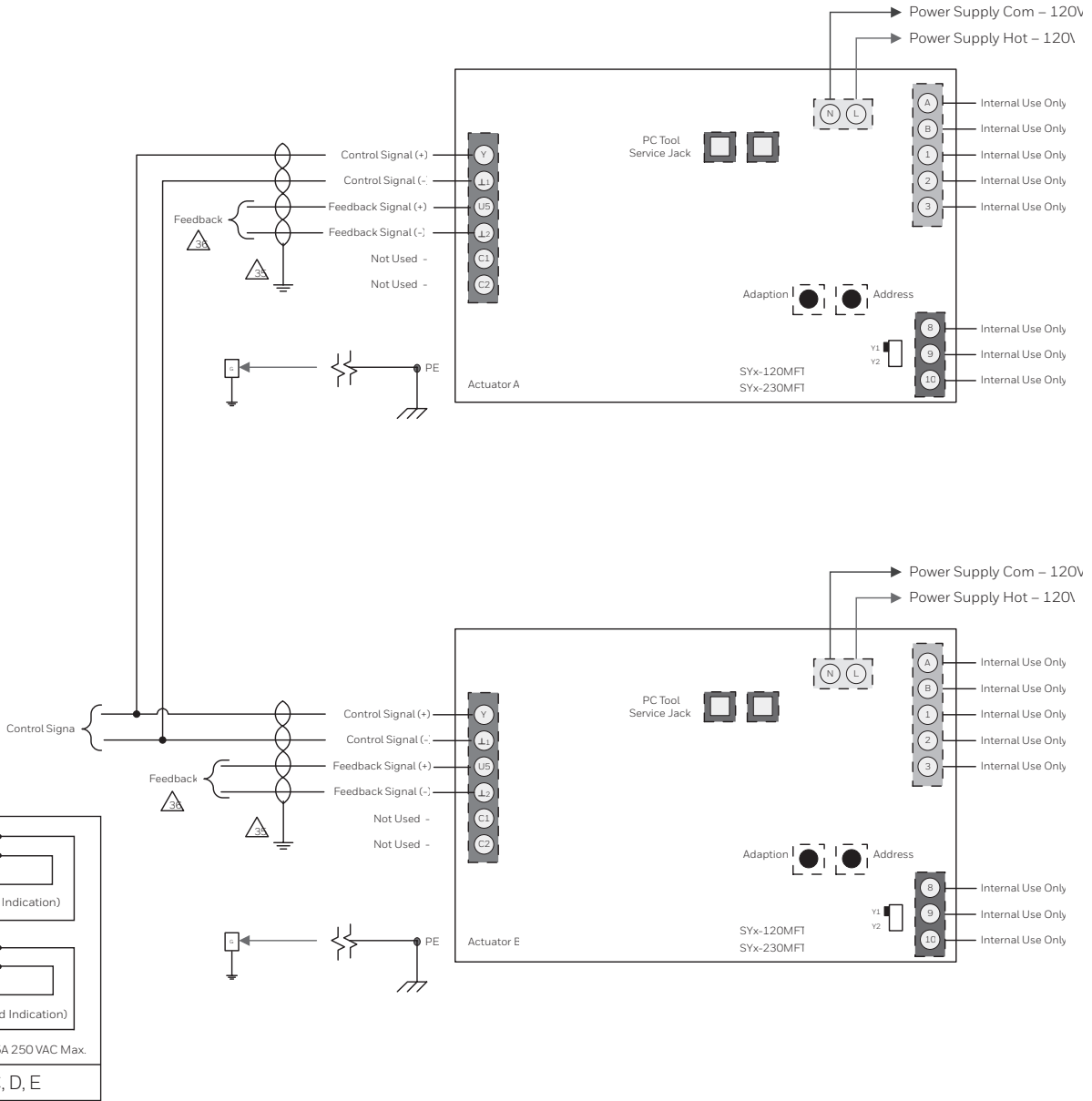
- Isolation relays must be used in parallel connection of multiple actuators using a common control signal input.
- "H" (L2) cannot be connected to terminal #3 and #4 simultaneously.
- Required: Terminal #7 needs to be field wired to enable heater circuit.

Wiring Diagrams - Valves

Butterfly Valve Actuators

Wiring for MBP7...C,D,E,F,G,H actuators

Proportional, Multiple Wiring, 120V
MBP...C, D, E



Each actuator should be powered by a single, isolated control transformer.

INSTALLATION NOTES

- Observe class 1 and class 2 wiring restrictions.
- Transformer sizing = MBP actuator draw X 1.25 (safety margin)

Accessories - Valves

Valve Actuator Accessories

Product Number	Description	Used With
127834A	Switch Assembly for Q607	Q607
272629A	Adapter Kit for mounting ML6984/ ML7984 to V5045	ML6984 or ML7984, V5045
272630D	Position feedback and SPDT pilot duty auxiliary switch	ML6984/ML7984 Series 4000 and higher (ML6984 in 5-wire mode only)
40003793-005	U-bolt bag assembly for ML6984 & ML7984.	ML6984 or ML7984
43191679-101	Auxiliary Potentiometer for ML6421A	ML6421A
43191679-102	220 ohm Auxiliary Potentiometer for ML6421B	ML6421B
43191679-111	Potentiometer, 10k ohm, for ML6425 only	ML6425
43191679-112	Potentiometer, 220 ohm for ML6425 only	ML6425
43191680-102	Dual Auxiliary Switch for ML6421, ML7421	ML6421, ML7421
43191680-105	Dual Auxiliary Switch for ML6425 Only	ML6425
43196000-001	High Temperature Kit for actuators with 3/4 inch (20 mm) stroke, stem button attachment	ML6420, ML6421, ML6425, ML7420, ML7421, or ML7425; ML6984; ML7984; Not compatible with Q5024
43196000-038	High Temperature Kit for actuators with 1-1/2 inch (38 mm) stroke, stem button attachment	ML6421, ML7421; Not compatible with Q5024

Accessories - Valves

Valve Actuator Accessories

Product Number	Description	Used With
5112-3R	Weather Enclosure Assembly	MN6105A1011, MN7505A2001, MS7505A2030, MS8105A1030
5112-24	Replacement SS Stem Kit	For VBN & VRN Valves. Refer to Table 7 on page 157 for specific models
5112-23	Replacement SS Stem Kit	For VBN & VRN Valves. Refer to Table 7 on page 157 for specific models
5112-22	Replacement Stem Kit	For VBN & VRN Valves. Refer to Table 7 on page 157 for specific models
5112-21	Replacement Stem Kit	For VBN & VRN Valves. Refer to Table 7 on page 157 for specific models
5112-20	Replacement Stem Kit	For VBN & VRN Valves. Refer to Table 7 on page 157 for specific models
5112-19	Replacement Stem Kit	For VBN & VRN Valves. Refer to Table 7 on page 157 for specific models
MVNAAA	Replacement Valve Adaptor	MVN613A0000, MVN643A0000, MVN713A0000
MVNAAL	Replacement Valve Adaptor, Low Profile	MVN613L0000, MVN643L0000, MVN713L0000
MVNAC7131	Replacement Cable with Terminal 1m, Modulation (RED, BLACK, WHITE)	MVN713A0000, MVN713L0000
MVNAC6131	Replacement Cable with Terminal 1m, Floating (RED, BLACK, WHITE)	MVN613A0000, MVN613L0000, MVN643A0000, MVN643L0000
MVNAT3	Replacement Screw type Terminal Block, Pluggable	MVN613A0000, MVN613L0000, MVN643A0000, MVN643L0000, MVN713A0000, MVN713L0000
5112-11	Replacement DCA Mounting Bracket for VBN2/3 Ball Valves	MN6105A1011, MN7505A2001, MS7505A2030, MS8105A1030
205860	Minimum position Potentiometer	MN6105A1011, MN7505A2001, MS7505A2030, MS8105A1030
32006306-001	Resistor Kit (500 ohm); converts 4-20 mA signal to 2-10 Vdc	MS7505A2030, MS8105A1030
Q7002B1009	Universal Interface Module	MN6105A1011, MN7505A2001, MS7505A2030, MS8105A1030
STRN-SCSA	Self-centering Shaft Adapter	MS7505A2030, MS8105A1030
32000085-001	Strain Relief Fitting (10 pack)	MN6105A1011, MN7505A2001, MS7505A2030, MS8105A1030
STRN-STRNRLF	Strain Relief Fitting (10 pack)	MS7505A2030, MS8105A1030

Accessories - Valves

Valve Linkage Accessories

Product Number	Description	Used With
220848A	1/2 in. Q5001 linkage cam assembly	Q5001
32004629-001	Bonnet adapter kit to adapt Seimens (Landis/Power) Flowrite 599 1/2 inch to 3 inch globe valves with Q5020A	Siemens valves; Q5020
32004629-002	Bonnet Adapter Kit, Johnson Controls 1/2 to 3/4 in., Q5020	Johnson valves; Q5020
32004629-003	Bonnet Adapter Kit, Johnson Controls 1 to 2 in., Q5020	Johnson valves; Q5020
32004629-004	Bonnet Adapter Kit, Siebe 1/2 to 2 in., Q5020	Siebe valves; Q5020
BU5024-001	Bonnet adapter 1-1/4" diameter-16 TPI with 1/4"-28 TPI stem adapter	Q5024 on Siebe, Barber Colman, Invensys Valves
BU5024-002	Bonnet adapter 1" diameter - 16 TPI with 1/4"-28 TPI and 5/16"-24 TPI stem adapters	Q5024 on Siebe, Barber Colman, Invensys Valves
BU5024-003	Bonnet adapter 1-1/4" diameter - 16 TPI with 1/2"-20 TPI stem adapter	Q5024 on Siebe, Barber Colman, Invensys Valves
WU5024-001	Bonnet adapter 1-3/8" diameter -18 TPI with 3/8"-24 TPI stem adapter	Q5024 on Siebe, Barber Colman, Invensys Valves
BU5024-NPTKIT	Globe Valve Adapter kit for Siebe, Barber Coleman, Invensys NPT Valves (1/2" - 2") Includes: BU5024-001, BU5024-002 bonnet adapters only and 1 of each 1/4"-28 TPI and 5/16"-24 TPI stem adapters	Q5024 on Siebe, Barber Colman, Invensys Valves
BU5024-FLGKIT	Globe Valve Adapter kit for Siebe, Barber Coleman, Invensys Flange Valves (2.5" - 6") Includes BU5024-003, WU5024-001 bonnet adapters only and 1 of each 3/8"-24 TPI and 1/2"-20 TPI stem adapters	Q5024 on Siebe, Barber Colman, Invensys Valves
GU5024-001	Bonnet adapter 1-5/16" diameter with 1/4"-28 TPI stem adapter	Q5024 on Siemens, Landis Powers Valves
GU5024-002	Bonnet adapter 1-3/32" diameter-14 with 3/8"-24 TPI and 1/4"-28 TPI stem adapters	Q5024 on Siemens, Landis Powers Valves
GU5024-003	Bonnet adapter 1-3/8" diameter - 20 TPI with 3/8"-24 and 1/4"-28 TPI stem adapters	Q5024 on Siemens, Landis Powers Valves
GU5024-KIT	Globe Valve Adapter kit for Siemens, Landis Powers (1/2" - 6") Includes GU5024-001, GU5024-002, GU5024-003 bonnet adapters only and 1 of each 1/4"-28 TPI and 3/8"-24 TPI stem adapters	Q5024 on Siemens, Landis Powers Valves
HU5024-001	Bonnet adapter 1-3/8" diameter with 1/4"-28 TPI stem adapter	Q5024 on Honeywell Valves
HU5024-002	Bonnet adapter 1-7/8" diameter with 7/16"-20 TPI stem adapter	Q5024 on Honeywell Valves
JU5024-001	Bonnet adapter 20mm diameter -1.5mm thread pitch with 1/4"-28 TPI stem adapter	Q5024 on Johnson Controls Valves
JU5024-002	Bonnet adapter 1-1/16" diameter-16 TPI with 3/8"-24 TPI stem adapter	Q5024 on Johnson Controls Valves
JU5024-003	Bonnet adapter 28mm diameter-1.5mm thread pitch with 1/4"-28 TPI stem adapter	Q5024 on Johnson Controls Valves
JU5024-004	Bonnet adapter 3/4" diameter-16 TPI with 3/8"-24 TPI stem adapter	Q5024 on Johnson Controls Valves
JU5024-005	Bonnet adapter 3/4" diameter- 18 TPI with 1/4"-28 TPI stem adapter	Q5024 on Johnson Controls Valves
JU5024-006	Bonnet adapter 1.59" diameter-14 TPI with 1/2"-20 TPI and 3/8"-24 TPI stem adapter	Q5024 on Johnson Controls Valves
JU5024-NPTKIT	Globe Valve Adapter kit for JCI NPT Valves (1/2" - 2") Includes: JU5024-001, JU5024-003, JU5024-005 bonnet adapters only and 1 of 1/4"-28 TPI stem adapter	Q5024 on Johnson Controls Valves
JU5024-FLGKIT	Globe Valve Adapter kit for JCI Flange Valves (2.5" - 6") Includes JU5024-002, JU5024-004 bonnet adapters only and 1 of each 3/8"-24 TPI and 1/2"-20 TPI stem adapters	Q5024 on Johnson Controls Valves

Accessories - Valves

Pneumatic Valve Actuator Accessories

Product Number	Description	Used With
14002039-001	MP953D Diaphragm Sleeve	MP953B,D,F
14002040-002	MP953D Diaphragm	MP953B,D,F
14003124-002	MP953B,D,F Diaphragm Repair Kit (includes 14002039-001 and 14002040-002)	MP953B,D,F
14004138-001	MP953B,F (Reverse Acting) Positive Positioner Retrofit Kit	MP953B,F
14004139-001	MP953A,E (Direct Acting, 8 in. and 13 in. diameter, 3/4 in. stroke) Positive Positioner Retrofit Kit	MP953A,E
14004140-001	MP953A,E (Direct Acting, 8 in. and 13 in. diameter, 1-1/2 in. stroke) Positive Positioner Retrofit Kit	MP953A,E
14004211-001	MP953E (8 in. and 13 in. diameter, 3/4 in. stroke) Feedback Spring Kit	MP953E
14004212-001	MP953E (8 in. and 13 in. diameter, 1-1/2 in. stroke) Feedback Spring Kit	MP953E
14004213-001	MP953F (Reverse Acting) Feedback Spring Kit	MP953F
14004214-001	MP953A,E (5 in. diameter) 3/4 inch stroke Positive Positioner Retrofit Kit	MP953A,E
14004298-001	Thread forming Screw, Size 4-40	MP953D,F
14004298-003	MP953C,E (5 in. dia.) and MP953B,D,F (7-1/8 in. dia.) Actuator Base Screw, size 1/4-20	MP953B,D,F; MP953C,E (5 in.)
14004577-001	MP953 A, C, and E (Direct Acting, 5 in. diameter) Yoke/Base Assembly	MP953A,C,E
14004578-001	MP953 B, D, and F (Reverse Acting, 7-1/8 in. diameter) Yoke/Base Assembly	MP953B,D,F
14004697-001	Stem extension for 13 in. MP953C,E with 3/4 in. Stroke	MP953C,E
310664	MP953A, C and E (5 in. and 8 in. models only) Tension Spring	MP953A,C,E
310665/0062	Spring Support for MP 953	MP953A,C,E (5 in.)
310668	MP953A, C and E (5 in. diameter) High Temperature Silicone Diaphragm - Old Style	MP953A,C,E
311393	White Spring, 4- 11 psi	MP953C,E
311616	MP953A, C and E (5 in. diameter) Main Spring (2-7 psi sp ring range - Brown)	MP953A,C,E (5 in.)
311618	MP953A, C and E (5 in. diameter) Main Spring (8-12 psi sp ring range - Gray)	MP953A,C,E (5 in.)
311749/0605	Cup diaphragm, 8 in. for MP95 3A, C, E	MP953A,C,E (8 in.)
311750	MP953A, C and E (8 in. diameter) Regular Temperature Neoprene Diaphragm - New Style	MP953A,C,E
311851/0062	Stem extension for 8 in. dia. 3/4 in. stroke MP953A,C,E	MP953A,C,E (8 in.)

Accessories - Valves

Pneumatic Valve Actuator Accessories

Product Number	Description	Used With
311852	Brown Spring for MP953A,C 3/4 inch stroke (8 inch diameter), 2-7 psi range	MP953A,C (8 in., 2-7 psi)
311855	Gray spring for MP953C (8 inch diameter), 8-12 psi range	MP953C
311863	Stem Retainer for the MP953C,E (8 in. diameter)	MP953C,E
312099	1-1/2 in. stroke Spider for 13 in. MP953C and E	MP953C,E
312203	Black Spring for MP953D,F for 8-13 psi range	MP953D,F
312466/0605	Stem Extension for MP953C1489, MP953C1471, MP953E1392, MP953E1400, and MP953E1418	MP953C,E
312471	White Spring for MP953C,E (13 in. dia. 1/2 in. stroke)	MP953C,E (13 in.)
312505	MP953A,C,E (13 in. diameter) regular temperature Neoprene diaphragm - New style	MP953A,C,E
312760	MP953A,C,E (5 in. diameter) regular temperature Neoprene diaphragm - New style	MP953A,C,E
312817	MP953 (5 in. diameter) Cover	MP953A,C,E
313745	MP953A,C,E (5 in. diameter) High Temperature Silicone Diaphragm - New style	MP953C (5 in.)
314153	MP953A, C and E (8 in. diameter) High Temperature Silicone Diaphragm - New Style	MP953A,C,E
314646A/0062	Plate, Spring for 13 in. diameter MP953A,C,E	MP953A,C,E
314650A	MP953B, D and F (Reverse Acting) Support Assembly (for Series-2 actuators only, use this Support Assembly and 316059A Yoke Assembly to Convert Series-1 MO/MP953)	MP953B,D,F
314651A	MP953B,D,F (Reverse Acting) yoke assembly for support assembly- with nylon insert for use with old style actuators not made with a Helicoil insert in yoke	MP953B,D,F
314683/0062	Stem Retainer for 13 in. diameter MP953A,C,E (Latches on Stem Button)	MP953A,C,E (13 in.)
315020	Cup for MP953C,E (13 inch diameter)	MP953C,E (13 in.)
316059A	MP953B, D and F (Reverse Acting) Yoke Assembly for Support Assembly- with helicoil insert	MP953B,D,F

Economizer Selection

The JADE™ economizer doesn't heat or cool anything. It simply brings in outdoor air to naturally lower a building's interior temperature. You don't need a certified programmer or installer to set up and operate the JADE economizer. JADE is designed to work seamlessly with existing and future roof top systems. The LCD screen delivers continuous messages, important diagnostics and system status.

Section 4: Economizers

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Product Selection - JADE™ Economizer

W7220



JADE economizers make energy saving easier for your customers. For buildings with less than 100,000 sq ft and stand-alone rooftop unit applications JADE delivers fresh air ventilation and energy savings. It is packed with features you'd expect in more expensive units, but it can be installed and configured by technicians without significant training.

- LCD screen delivers continuous messages, diagnostics and system status
- Color-coded wiring terminals make wiring easy
- Built-in freeze protection closes outdoor dampers to protect coils when outdoor temperatures drop
- Two-wire Sylk® bus communications enable simple wiring and enhanced diagnostics
- Demand control ventilation (DCV) saves energy with clean outside air without over ventilating and conditioning excess air
- UL Listed
- Title 24 and IECC2015 compliant

Y-Pack

Control Type	Kit Part Number	Kit Includes			
		Actuator	OA Sensor	MAT Sensor	CO2 Sensor
Dry Bulb with Black Motor	Y7220A7215	M7215A1008	C7250A1001	C7250A1001	
Dry Bulb with Non Communicating DCA	YL7220A7503	MS7503A2030	C7250A1001	C7250A1001	
Dry Bulb with Communicating 27 lb-in DCA	YL7220AJ3103	MS3103J1030	C7250A1001	C7250A1001	
Dry Bulb with Communicating 44 lb-in DCA	YL7220AJ3105	MS3105J3030	C7250A1001	C7250A1001	
Dry Bulb with Communicating 27 lb-in DCA and CO2 Wall Sensor without Display	YL7220ACW3103	MS3103J1030	C7250A1001	C7250A1001	C7632A1004
Enthalpy with Black Motor	Y7220S7215	M7215A1008	C7400S1000	C7250A1001	
Enthalpy with Black Motor and CO2 Wall Sensor with a Display	Y7220SCW7215	M7215A1008	C7400S1000	C7250A1001	C7232A1016
Enthalpy with Black Motor and CO2 Duct Sensor with a Display	Y7220SCD7215	M7215A1008	C7400S1000	C7250A1001	C7232B1014
Enthalpy with Non-Communicating DCA	YL7220S7503	MS7503A2030	C7400S1000	C7250A1001	
Enthalpy with Communicating 27 lb-in DCA	YL7220SJ3103	MS3103J1030	C7400S1000	C7250A1001	
Enthalpy with Communicating 44 lb-in DCA	YL7220SJ3105	MS3105J3030	C7400S1000	C7250A1001	
Enthalpy with Communicating 27 lb-in DCA and CO2 Wall Sensor with a Display	YL7220SCW3103	MS3103J1030	C7400S1000	C7250A1001	C7232A1016
Enthalpy with Communicating 27 lb-in DCA and CO2 Duct Sensor with a Display	YL7220SCD3103	MS3103J1030	C7400S1000	C7250A1001	C7232B1014

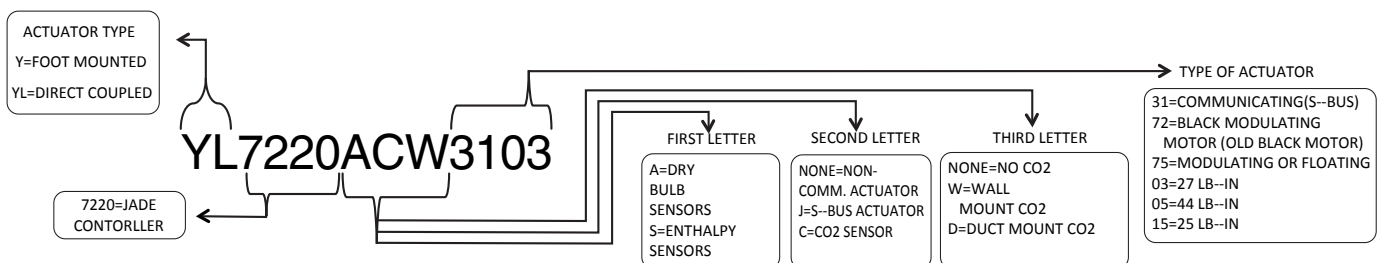
Sensors

	Function	OS Number
Mixed Air Temperature or Outdoor Air Temperature Sensor	MAT or OAT	C7250A1001
Outdoor Air or Return Air Enthalpy Sensor	OAE, RAE, RAT, DAT	C7400S1000
Wall Mount CO2 Sensor with Fixed Settings	CO2	C7632A1004
Wall Mount CO2 Sensor with Selectable Settings	CO2	C7232A1016
Duct Mount CO2 Sensor with Selectable Settings	CO2	C7232B1014

NOTE:
See pages 318-322 for sensor submittal data.

Accessories

Used With	Function	OS Number
C7400S1000, C7250A1001	2-pin edge connector (20 pack)	50048926-001
W7220A1000	6-pin edge connector (20 pack)	50048926-002
C7250A and C7400S Sensors	Duct mount kit	50053060-001
W7220A1000	PCMOD - Connects with PC to communicate with JADE	W7220-PCMOD



The JADE™ Economizer System is an expandable economizer control system, which includes a W7220 Economizer controller with an LCD and keypad. The W7220 can be configured with optional sensors. The W7220 controller is used as a standalone economizer wired directly to a commercial set back thermostat and sensors to provide Outdoor Air dry-bulb economizer control. Optional Sylk bus sensors can be connected to the controller for single or differential enthalpy control. An additional Return Air Sylk bus sensor can be added for differential dry bulb control.

SPECIFICATIONS

Electrical

Rated Voltage.....	20 to 30 Vac; 50/60 Hz Transformer:
	100 VA maximum
Nominal Power Consumption	
(at 24 Vac, 60 Hz).....	11.5 VA without sensors or actuators
Relay Digital Output Rating at	1.5A run;
30 Vac (maximum power from Class	3.5A inrush @ 0.45PF (200,000
2 input only).....	cycles) or 7.5A inrush @ 0.45PF
	(100,000 cycles)
External Sensors Power Output.....	21 Vdc +/- 5% @ 48mA

IMPORTANT

All inputs and outputs must be Class 2 wiring.

Inputs: sensors

Dry Bulb Temperature (optional) and	2-wire (18 to 22 AWG);
Mixed Air (required),	Temperature range -40 to 150 °F
C7250A.....	(-40 to 65 °C). Temperature accuracy
	-0°F/+2°F
Temperature and Humidity,	Temperature: range -40 to 150 °F
C7400S1000 (optional).....	(-40 to 65 °C)
	Temperature accuracy -0°F/+2°F
	Humidity: range 0 to 100% RH with
	5% accuracy.

NOTE: Up to three (3) SYLK Bus sensors may be connected to the JADE™ Economizer controller: outdoor air (OA), return air (RA) and discharge (supply) air (DA).

DCV (CO ₂) Sensor (C7232 or	
C7632).....	2-10 Vdc control signal;
4 Binary inputs	1-wire 24 Vac + common GND
	24 Vac power supply: 50/60Hz;

Outputs

Actuator signal	2-10 Vdc; Sylkbus output for
	Honeywell Sylkbus communicating
	actuators.
Exhaust fan, Y1, Y2 and	All Relay Outputs (at 30 Vac):
AUX1 O	Running: 1.5A maximum Inrush:
	7.5A maximum

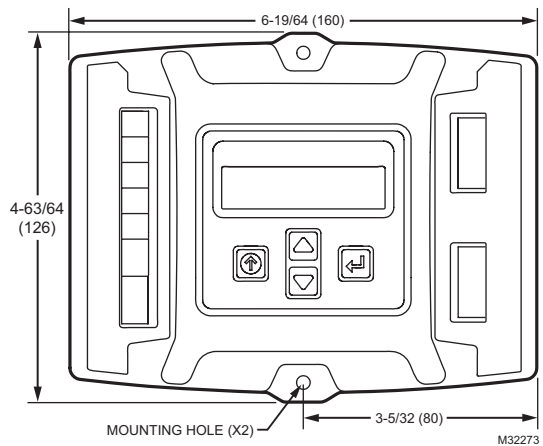
Environmental

Operating Temperature.....	-40 to 150 °F (-40 to 65 °C).
Storage Temperature.....	-40 to 150 °F (-40 to 65 °C)
Shipping Temperature.....	-40 to 150 °F (-40 to 65 °C)
Relative Humidity.....	5% to 95% RH non-condensing
Dimensions.....	Height: 4.98 inches (126.4 mm)
	Width: 6.3 inches (160 mm)
	Depth: 1.34 inches (34 mm)
Weight.....	0.58 lb. (0.265 kg)
Approvals	UL listed (XAPX) for USA and
	Canada.

FEATURES

- LCD Screen delivers continuous messages, important diagnostics feedback and system status.
- Color-coded wiring terminals help with easy installation.
- Built-in freeze protection closes the outdoor dampers to protect coils when temperatures drop.
- Two-wire Sylk™ bus communications enable simple integration and future expansion.
- On-board fault detection and diagnostics quickly identify sensor failures or loss of communication, saving time on service and commissioning.

DIMENSIONS DIAGRAM



Wiring Diagrams - JADE Economizer

W7220

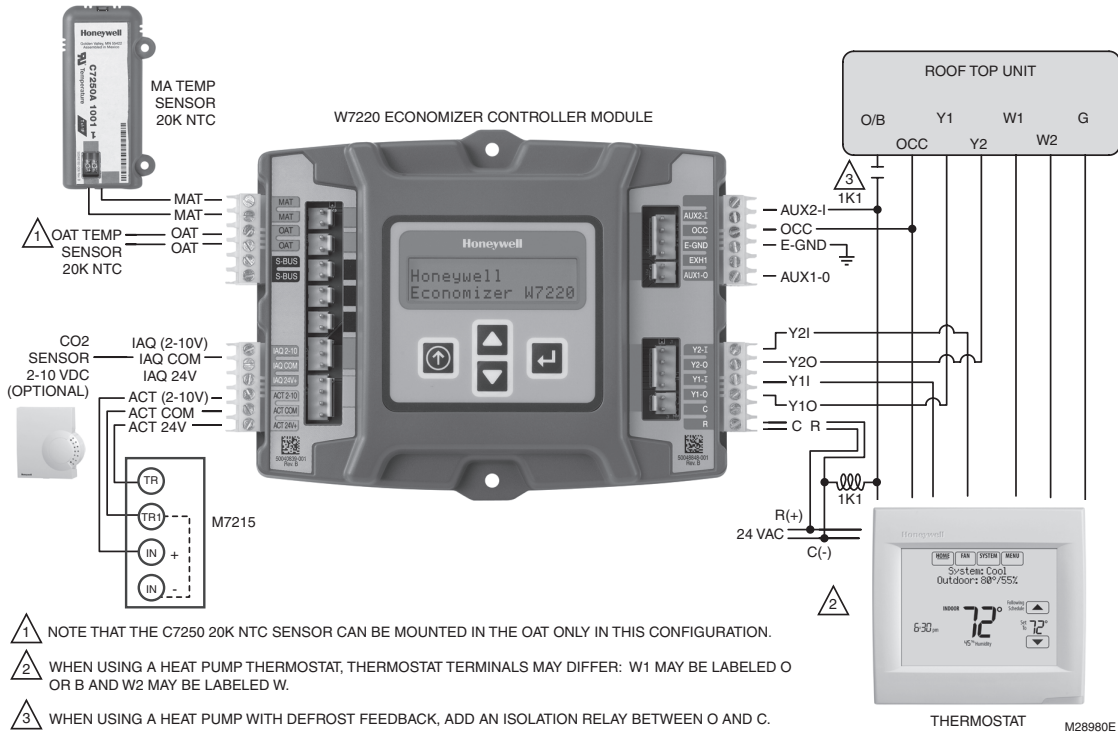


Fig 1. Standalone dry bulb Economizer configuration with black motor M7215.

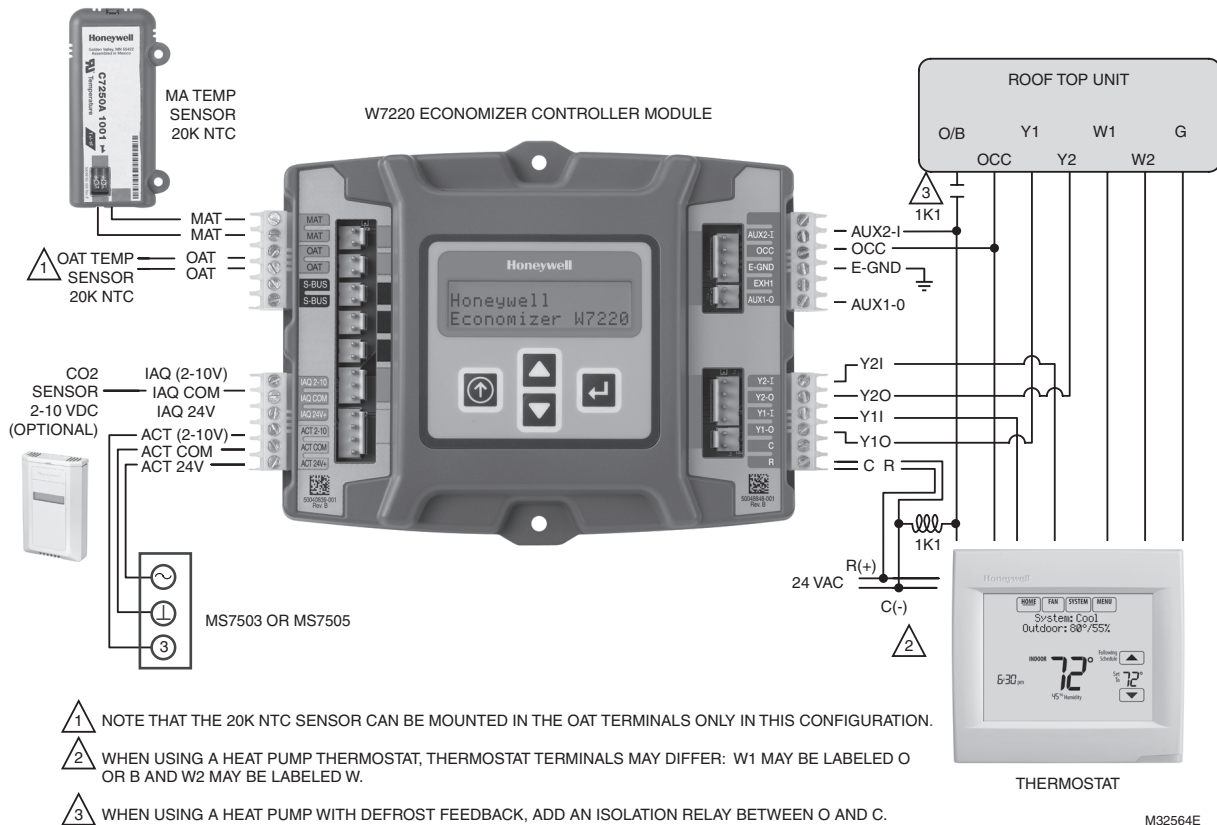


Fig 2. Standalone dry bulb Economizer configuration with Honeywell MS7503 or MS7505 Direct Coupled Actuator.

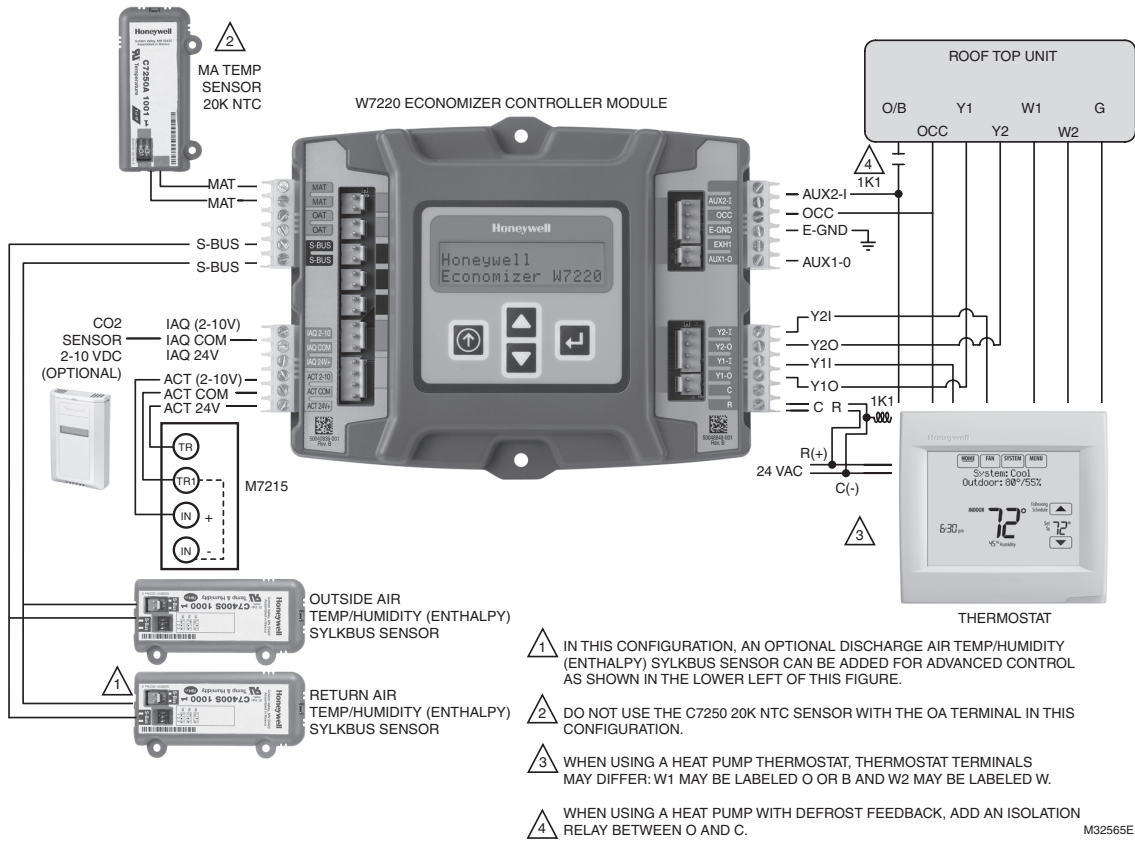


Fig 3. Economizer with Sylk Bus sensors for enthalpy configuration with Honeywell M7215 black motor.

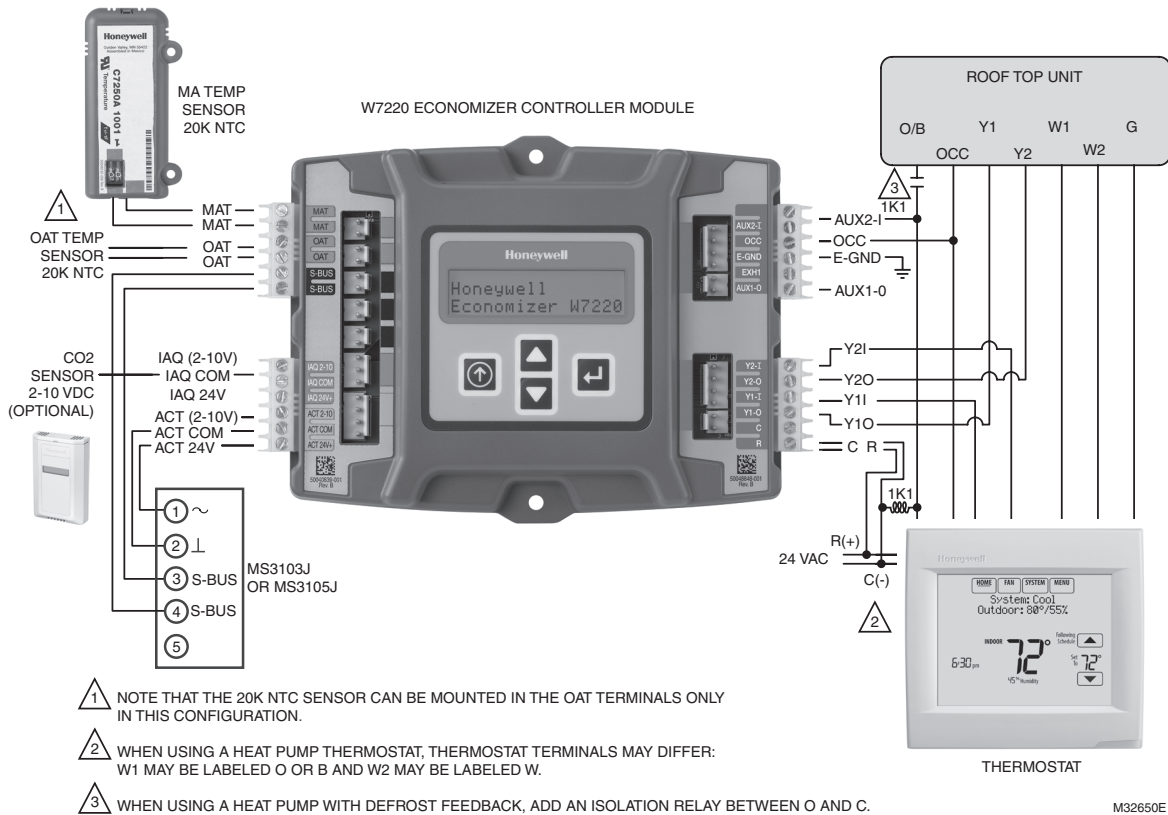


Fig 4. Standalone dry bulb Economizer configuration with Honeywell MS3103J or MS3105J communicating actuators.

Wiring Diagrams - JADE Economizer

W7220

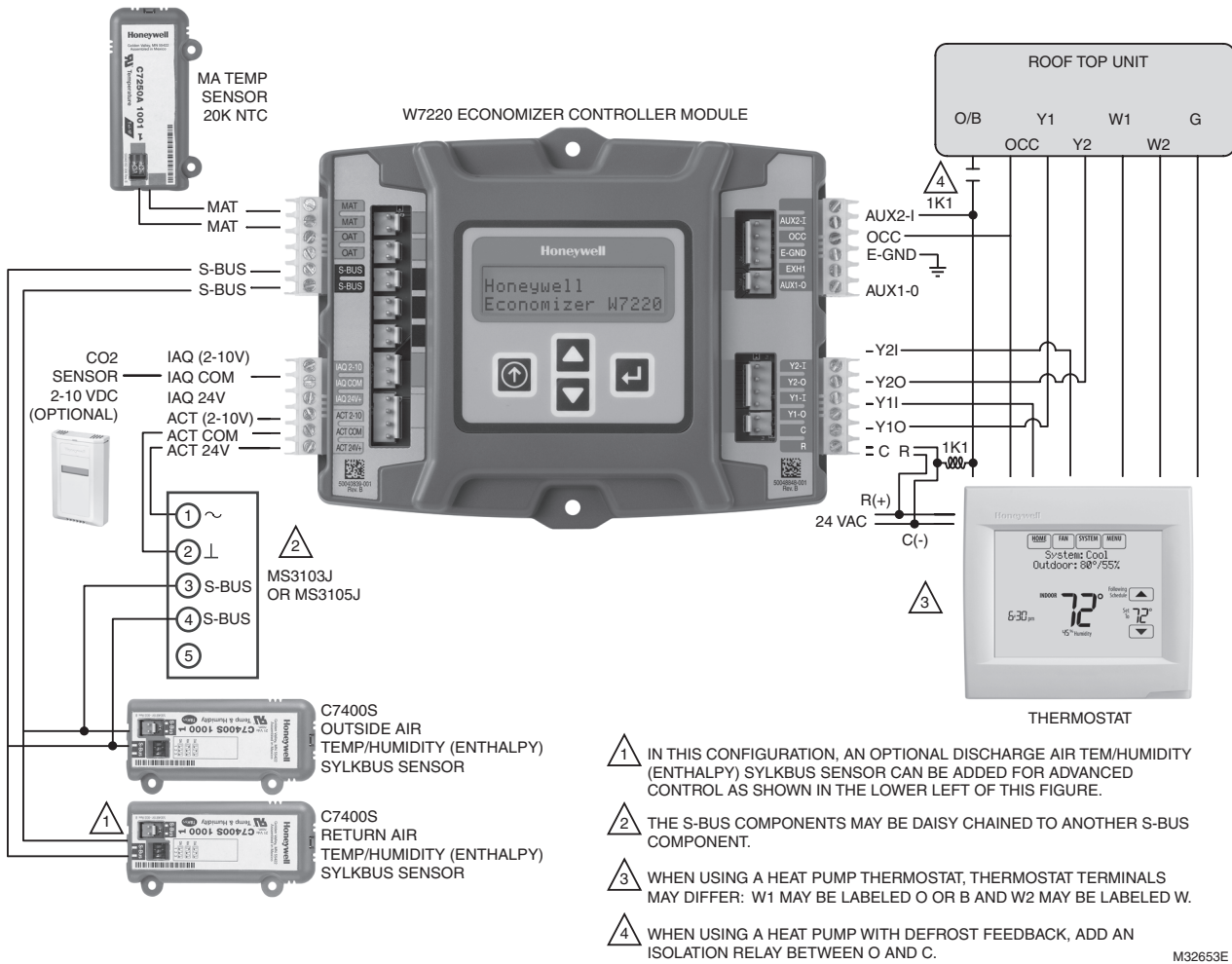


Fig 6. Economizer with Sylk bus sensor for enthalpy configuration with Honeywell MS3103 or MS3105 communicating actuators.

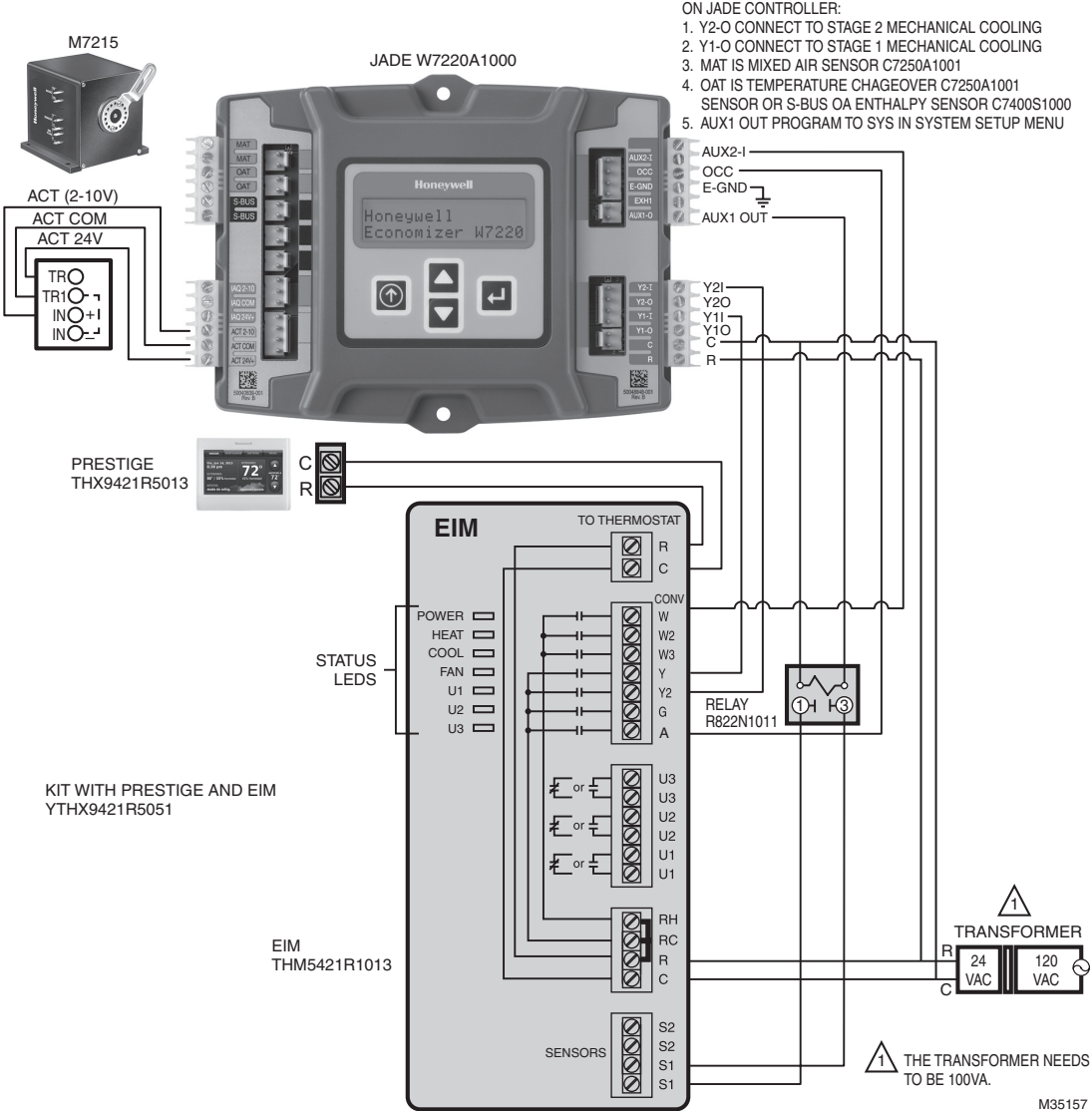


Fig 7. Prestige with EIM connected to JADE™ Economizer and M7215 Black Motor.

Wiring Diagrams - JADE Economizer

W7220

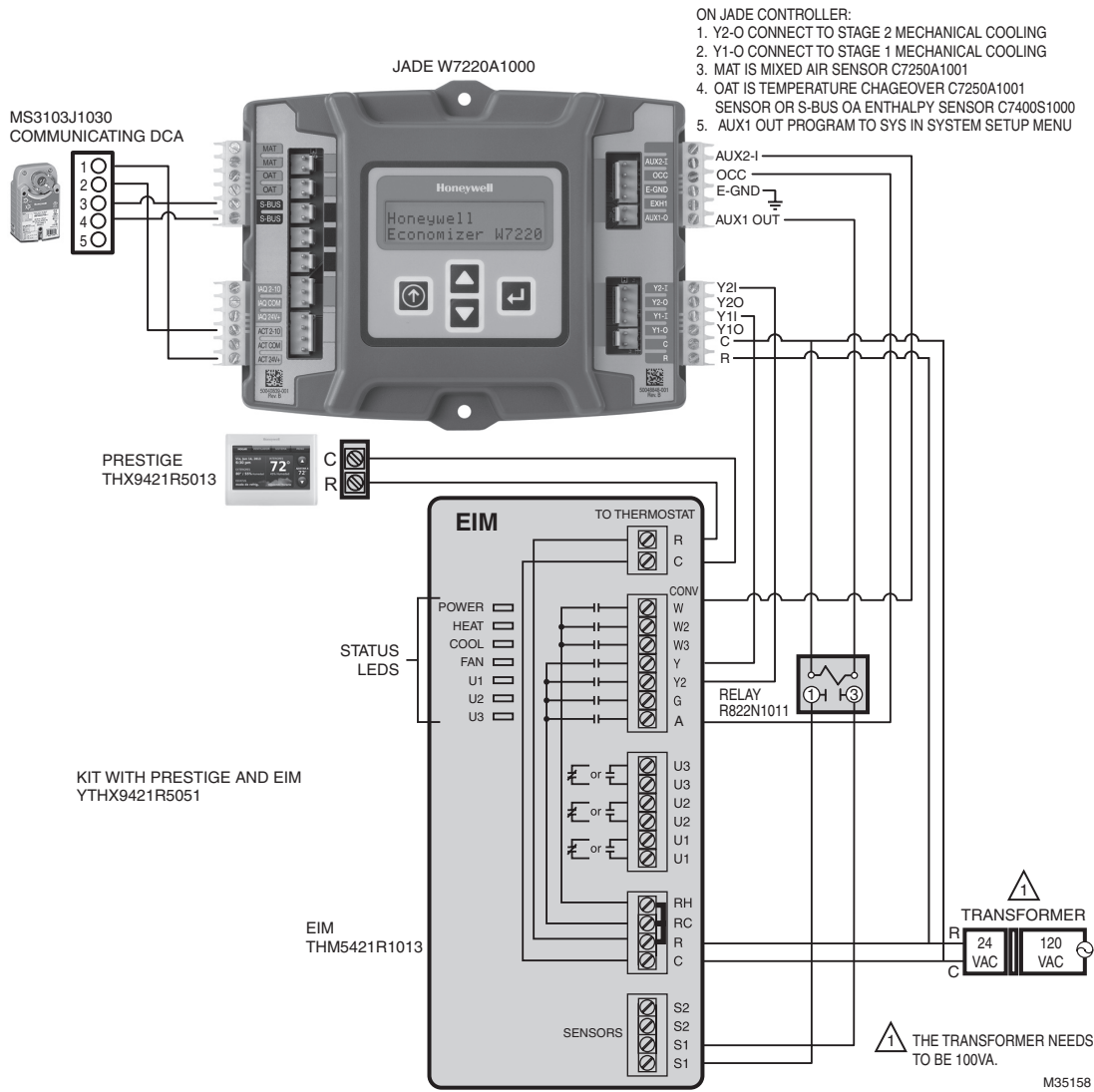
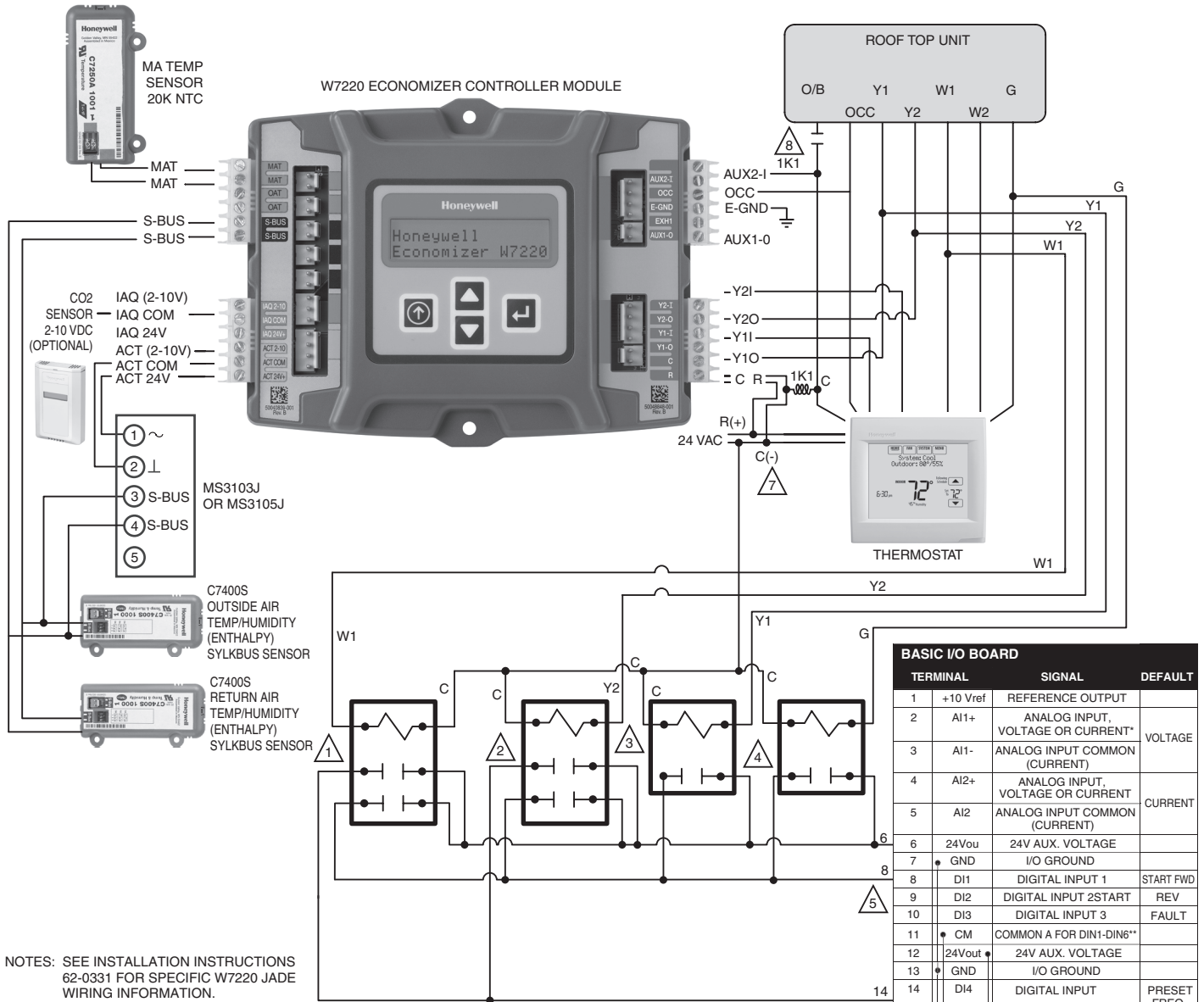


Fig 8. W7220 JADE™ Wired to a Prestige with EIM and MS3103 Communicating DCA.



NOTES: SEE INSTALLATION INSTRUCTIONS 62-0331 FOR SPECIFIC W7220 JADE WIRING INFORMATION.

- 1 RELAY 1, DPDT RELAY, NO CONTACTS ENERGIZE DIGITAL INPUT 4 FOR HIGH SPEED FAN WITH W1 CALL.
- 2 RELAY 2, DPST RELAY, NO CONTACTS ENERGIZE DIGITAL INPUT 4 FOR HIGH SPEED FAN WITH Y2 CALL.
- 3 RELAY 3, SPST RELAY, NO CONTACTS ENERGIZE DIGITAL INPUT 1 FOR LOW SPEED FAN WITH Y1 CALL.
- 4 RELAY 4, SPST RELAY, NO CONTACTS ENERGIZE DIGITAL INPUT 1 FOR LOW SPEED FAN WITH G CALL.
- 5 LOW SPEED FAN IS CONFIGURED BY SETTING "MINIMUM FREQUENCY" WITH PARAMETER M1.8 OF THE STARTUP WIZARD OF THE SMARTVFD HVAC.
- 6 HIGH SPEED FAN IS CONFIGURED BY SETTING "PRESET FREQUENCY 1" WITH PARAMETER M3.3.12 OF THE SMARTVFD HVAC.
- 7 WHEN USING A HEAT PUMP THERMOSTAT, THERMOSTAT TERMINALS MAY DIFFER: W1 MAY BE LABELED O OR B AND W2 MAY BE LABELED W.
- 8 WHEN USING A HEAT PUMP WITH DEFROST FEEDBACK, ADD AN ISOLATION RELAY BETWEEN O AND C.

I/O BOARD ON SMARTVFD HVAC DRIVE HVFDS

M35159A

Fig 9. W7220 JADE with the SmartVFD HVAC for Two Speed Fan Operation.

Variable Frequency Drives Selection

To pick the right drive for your motor application, first make sure that the motor is capable of handling the additional heat that is created when varying the speed of the drive with a frequency drive. Check the motor nameplate to make sure that the insulation class is F, H or higher. Older motors with class A or B insulation should not be used with a VFD.

From the motor nameplate you will need the following information: Hertz (50 or 60), Volts, Full Load Amps, Phases of power (single or 3-phase), and RPM.

Pick the Right VFD for the Application

- Drives are typically sized to match the horsepower rating of the motor, which will be accurate 95 percent of the time. But for greatest accuracy, drives should be sized based on the Full Load Amps or current draw of the motor. The VFD must have a slightly larger output current rating.
- The environment the drive will operate in is critical for selection. Honeywell offers NEMA 1, NEMA 12 (for dusty, dirtier environments) and NEMA 3R enclosures (for falling water or rain situations).
- Because of the complexity of VFDs, a clean, conditioned space with temperatures between 14° F and 104° F provides an environment for ideal operation. Some drives are rated as standard for a slightly larger temperature range as noted herein.
 - o VFDs can be de-rated for operation at higher temperatures and/or high altitudes within limits. See specific drive family for de-rating calculations. De-rating for altitude and ambient temperature is cumulative.
 - o Heaters are an option in order to keep your VFD at its recommended temperature when mounted outdoors or in an unconditioned space. Quoted as special.

Determine specific building requirements in regards to harmonics, RFI filtration, etc. Local codes and or jobsite requirements will vary driven by building electrical requirements and requirements by the utility for the condition of power at the point of common coupling to the building.

Section 5: Variable Frequency Drives

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Product Selection - VFDs

SmartVFD HVAC2 Standalone Drives



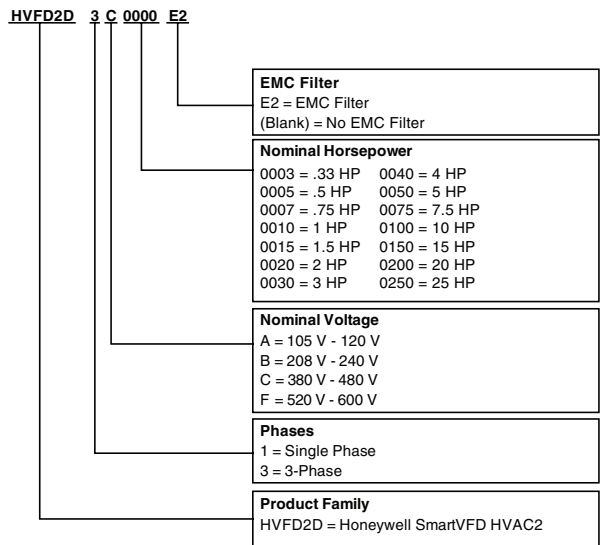
- 1 x 115 Vac input, 3 x 208/230 Vac output: 0.33 to 1.5 Nominal HP
- 1 x 208/230 Vac input, 3 x 208/230 Vac output: 0.33 to 3 Nominal HP
- 3 x 208/230 Vac: 0.33 to 3 Nominal HP
- 3 x 460 Vac: 0.5 to 7.5 Nominal HP
- 3 x 600 Vac: 1 to 7.5 Nominal HP
- NEMA 1 enclosure option

SmartVFD HVAC2 drives are designed to operate between 14 °F to 122 °F and 0-95% relative humidity, non-condensing.

The SmartVFD HVAC2 is a micro drive that lets you make the most of the available space in your control cabinet or it can be converted to a NEMA 1 enclosure. In addition, you choose only the features you require.

Model Nomenclature

Select the voltage, amps, control input/output, and filters you require.



Product Selection and Accessories - VFDs

SmartVFD HVAC2 Standalone Drives

SmartVFD HVAC2 Standalone Drives

Part Number	Nominal Voltage	Nom. HP (Nom. Current)	EMC Filter	Frame Size
HVFD2D1A0003 HVFD2D1A0005 HVFD2D1A0007 HVFD2D1A0010 HVFD2D1A0015	105-120V 1-phase in 230V 3-phase out	0.33 HP (1.7 A) 0.50 HP (2.4 A) 0.75 HP (2.8 A) 1 HP (3.7 A) 1.5 HP (4.8 A)	No Filter	MI2 MI2 MI2 MI2 MI3
HVFD2D1B0003E2 HVFD2D1B0005E2 HVFD2D1B0007E2 HVFD2D1B0010E2 HVFD2D1B0015E2 HVFD2D1B0020E2 HVFD2D1B0030E2	208-240V 1-phase in 3-phase out	0.33 HP (1.7 A) 0.50 HP (2.4 A) 0.75 HP (2.8 A) 1 HP (3.7 A) 1.5 HP (4.8 A) 2 HP (7 A) 3 HP (9.6 A)	EMC2	MI1 MI1 MI1 MI2 MI2 MI2 MI3
HVFD2D3B0003 HVFD2D3B0005 HVFD2D3B0007 HVFD2D3B0010 HVFD2D3B0015 HVFD2D3B0020 HVFD2D3B0030 HVFD2D3B0040 HVFD2D3B0050 HVFD2D3B0075 HVFD2D3B0100 HVFD2D3B0150	208-240V 3-phase in 3-phase out	0.33 HP (1.7 A) 0.50 HP (2.4 A) 0.75 HP (2.8 A) 1 HP (3.7 A) 1.5 HP (4.8 A) 2 HP (7 A) 3 HP (11 A) 4 HP (12.5 A) 5 HP (17.5 A) 7.5 HP (25 A) 10 HP (31 A) 15 HP (38 A)	No Filter	MI1 MI1 MI1 MI1 MI2 MI2 MI2 MI3 MI4 MI4 MI4 MI4 MI5 MI5
HVFD2D3C0005 HVFD2D3C0007 HVFD2D3C0010 HVFD2D3C0015 HVFD2D3C0020 HVFD2D3C0030 HVFD2D3C0040 HVFD2D3C0050 HVFD2D3C0075 HVFD2D3C0100 HVFD2D3C0150 HVFD2D3C0200 HVFD2D3C0250	380-480V 3-phase in 3-phase out	0.50 HP (1.3 A) 0.75 HP (1.9 A) 1 HP (2.4A) 1.5 HP (3.3 A) 2 HP (4.3 A) 3 HP (5.6 A) 4 HP (7.6 A) 5 HP (9 A) 7.5 HP (12 A) 10 HP (16 A) 15 HP (23 A) 20 HP (31 A) 25 HP (38 A)	No Filter	MI1 MI1 MI1 MI2 MI2 MI2 MI3 MI3 MI3 MI4 MI4 MI5 MI5
HVFD2D3C0005E2 HVFD2D3C0007E2 HVFD2D3C0010E2 HVFD2D3C0015E2 HVFD2D3C0020E2 HVFD2D3C0030E2 HVFD2D3C0040E2 HVFD2D3C0050E2 HVFD2D3C0075E2 HVFD2D3C0100E2 HVFD2D3C0150E2 HVFD2D3C0200E2 HVFD2D3C0250E2	380-480V 3-phase in 3-phase out	0.50 HP (1.3 A) 0.75 HP (1.9 A) 1 HP (2.4A) 1.5 HP (3.3 A) 2 HP (4.3 A) 3 HP (5.6 A) 4 HP (7.6 A) 5 HP (9 A) 7.5 HP (12 A) 10 HP (16 A) 15 HP (23 A) 20 HP (31 A) 25 HP (38 A)	EMC2	MI1 MI1 MI1 MI2 MI2 MI2 MI3 MI3 MI3 MI4 MI4 MI5 MI5
HVFD2D3F0010 HVFD2D3F0020 HVFD2D3F0030 HVFD2D3F0050 HVFD2D3F0075	520-600V 3-phase in 3-phase out	1 HP (1.7A) 2 HP (2.7A) 3 HP (3.9A) 5 HP (6.1A) 7.5 HP (9A)	No Filter	MI3 MI3 MI3 MI3 MI3

SmartVFD HVAC2

Accessories	Description
HVFD2DOPTFR123	Option board mounting kit HVAC2 MI1-MI3
HVFD2DOPTFR45	Option board mounting kit HVAC2 MI4-MI5
HVFDSDOPT6DI/U	Option board 6 x DI/DO, each I/O can be individually configured
HVFDSDOPT2RO1T/U	Option board 2 x Relay output + Thermistor
HVFDSDOPT1AI2AO/U	Option board 1 x AI, 2 x AO (isolated)
HVFDSDOPT3RO/U	Option board 3 x Relay output
HVFDSDOPT1R05DI/U	Option board 1 x RO, 5 x DI (42-240 VAC)
HVFDOPPTMP	Option board Temperature measurement (PT100, PT1000, NI1000, KTY84-130, KTY84-150, KTY84-131)
50021579-001/U	PT1000 Sensor probe (or T775-SENS-WR water resistant or T775-SENS-WT water tight)
HVFDCCNEMA1FR1	Nema 1 Kit MI1
HVFDCCNEMA1FR2	Nema 1 Kit MI2
HVFDCCNEMA1FR3	Nema 1 Kit MI3
HVFDCCNEMA1FR4	Nema 1 Kit MI4
HVFDCCNEMA1FR5	Nema 1 Kit MI5
HVFD2DMOUNTKIT	SmartVFD HVAC2 Door Mounting Kit
HVFDCCABLE/U	SmartVFD Commissioning Cable and USB Adaptor
HVFDCCMCA/U	Compact Commissioning Device
HVFDCCMCAKIT/U	Compact Commissioning Kit (Cable, USB Adaptor, and Device combined)
HVFD2DINSTALLMI4	HVAC2 Replacement Install Kit frame 4
HVFD2DINSTALLMI5	HVAC2 Replacement Install Kit frame 5
HVFD2DFANMI4	HVAC2 Replacement Fan HVFD2D frame 4
HVFD2DFANMI5	HVAC2 Replacement Fan HVFD2D frame 5

SmartVFD HVAC2 Frame Size

Frame Type	Dimensions, Approximate		Weight	
	(inch)	(mm)	(lb)	(kg)
MI1	6.2 x 2.6 x 3.9	157 x 66 x 99	1.2 lb	0.54 kg
MI2	7.7 x 3.5 x 4	196 x 90 x 102	1.2 lb	0.54 kg
MI3	10.2 x 3.9 x 4.3	251 x 100 x 109	2.2 lb	1 kg
MI4	6.5 x 14.3 x 6.5	165 x 370 x 165	18 lb	8 kg
MI5	6.5 x 16.3 x 8	165 x 414 x 202	22 lb	10 kg

Submittal Data - VFDs

SmartVFD HVAC2 Standalone Drives



The SmartVFD HVAC2 drive is a micro drive designed to fit in your enclosure or become a NEMA 1 enclosure whichever is required for your smaller frequency drive applications.

FEATURES

Modular Design

- NEMA 1 kit available
- Optional EMC filter
- Accessory PC interface

Easy to Install

- DIN-rail or screw mounting
- Zero clearance side-by-side mounting

Easy Communication

- Intuitive user interface
- Accessory PC interface
- Free PC Tool with optional adaptor turn your computer into a programming window to setup, control, monitor and diagnose in real time or for off-line editing and backup
- PI control
- Modbus RTU

Rugged, High Performance

- Plenum rated
- Optional EMC Filter on many models

Warranty

- 3 years

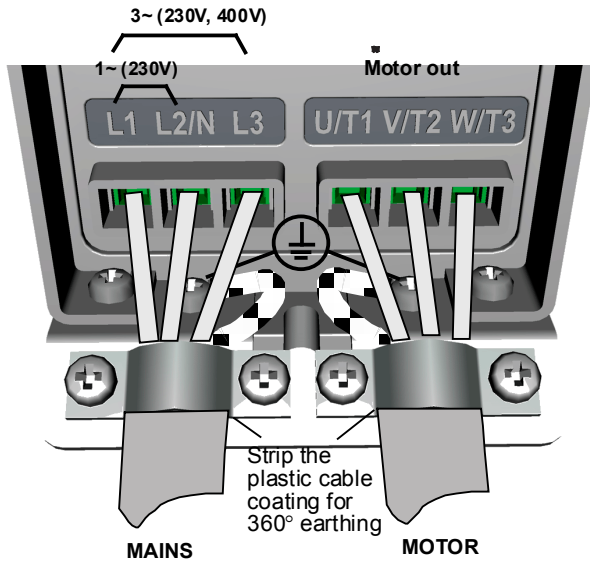
SmartVFD HVAC2 Technical Data

Mains connection	Input voltage U_m	115V, -15%...+10% 1~
		208...240V, -15%...+10% 1~
		208...240V, -15%...+10% 3~
380 - 480V, -15%...+10% 3~		
600V, -15%...+10% 3~		
Supply network	Input frequency	45...66 Hz
	Connection to mains	Once per minute or less (normal case)
Motor connection	Networks	SmartVFD HVAC2 (400V) cannot be used with corner grounded networks
	Short circuit current	Maximum short circuit current has to be < 50kA
	Output voltage	0 - U_m
Control connection	Output current	Continuous rated I_n at ambient temperature max. +122 °F (50 °C) (depends on the unit size) overload 1.5 x I_n max. 1 min/10 min
	Starting current/torque	Current 2 x I_n for 2 secs in every 20 sec period. Torque depends on motor
	Output frequency	0...320 Hz
	Frequency resolution	0,01 Hz
Control characteristics	Digital input	Positive, Logic1: 18...+30V, Logic0: 0...5V; Negative, Logic1: 0...10V, Logic0: 18...30V; Ri = 10KΩ (floating)
	Analogue input voltage	0...+10V, Ri = 250KΩ
	Analogue input current	0(4)...20mA, Ri ≤ 250Ω
	Analogue output	0...10V, RL ≥ 1KΩ; 0(4)...20mA, RL ≤ 500Ω, Selectable through microswitch
	Digital output	Open collector, max. load 35V/50mA (floating)
	Relay output	Switching load: 250Vac/3A, 24V DC 3A
Ambient conditions	Auxiliary voltage	±20%, max.load 50mA
	Control method	Frequency Control U/f Open Loop Sensorless Vector Control
	Switching frequency	1...16 kHz; Factory default 4 kHz
	Frequency reference	Resolution 0.01 Hz
	Field weakening point	30...320 Hz
	Acceleration time	0.1...3000 sec
	Deceleration time	0.1...3000 sec
	Braking torque	100%* T_n with brake option (only in 3~ drives sizes MI2-5) 30%* T_n without brake option
EMC	Ambient operating temperature	14 °F (-10 °C) (no frost)...+104/122 °F (+40/50 °C) (depends on the unit size); rated loadability I_n Side by side installation for MI1-3 it is always 104 °F (40 °C); For IP21/Nema1 option in MI1-3 the maximum temperature is also 104 °F (40 °C)
	Storage temperature	-40 °F (-40 °C)...+158 °F (+70 °C)
	Relative humidity	0...95% RH, non-condensing, non-corrosive, no dripping water
	Air quality: chemical vapors mech. particles	IEC 721-3-3, unit in operation, class 3C2 IEC 721-3-3, unit in operation, class 3S2
	Altitude	100% load capacity (no derating) up to 3281 ft. (1000 m). 1% derating for each 328 ft. (100 m) above 3281 ft. (1000 m); max. 6562 ft. (2000 m)
	Vibration: EN60068-2-6	3...150 Hz Displacement amplitude 1 (peak) mm at 3...15.8 Hz Max acceleration amplitude 1 G at 15.8...150 Hz
	Shock IEC 68-2-27	UPS Drop Test (for applicable UPS weights) Storage and shipping: max 15 G, 11 ms (in package)
	Enclosure class	IP20 for MI1-3, IP21 for MI4-5. With HVFDCDNEMA1xxx kit, IP21/NEMA1 for MI1-5.
	Pollution degree	PD2
	Immunity	Complies with EN50082-1, -2, EN61800-3
Standards	Emissions	230V: Complies with EMC category C2; With an internal RFI filter MI4&5 complies C2 with an optional DC choke and CM choke 400V: Complies with EMC category C2; With an internal RFI filter MI4&5 complies C2 with an optional DC choke and CM choke Both: No EMC emission protection (Honeywell level N); Without RFI filter
	Emissions	For EMC: EN61800-3, For safety: UL508C, EN61800-5
Certificates and manufacturer's declarations of conformity	Emissions	For safety: CE, UL, cUL, KC For EMC: CE, KC (see unit nameplate for more detailed approvals)

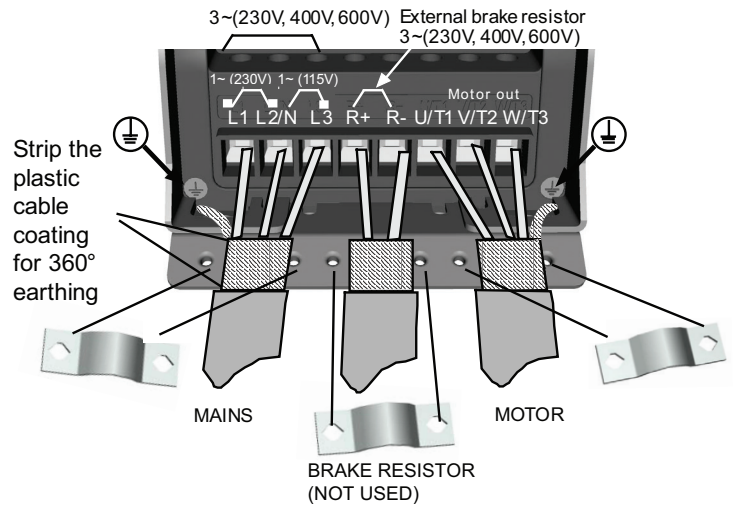
SmartVFD HVAC2 drives can be mounted side by side. Each drive requires 3.0 inches above and 2.0 inches below of free space, for cooling airflow circulation.

Power Wiring

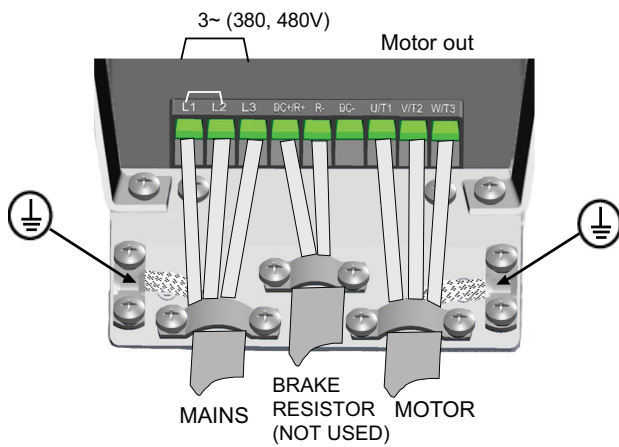
SmartVFD HVAC2 power connections, MI1



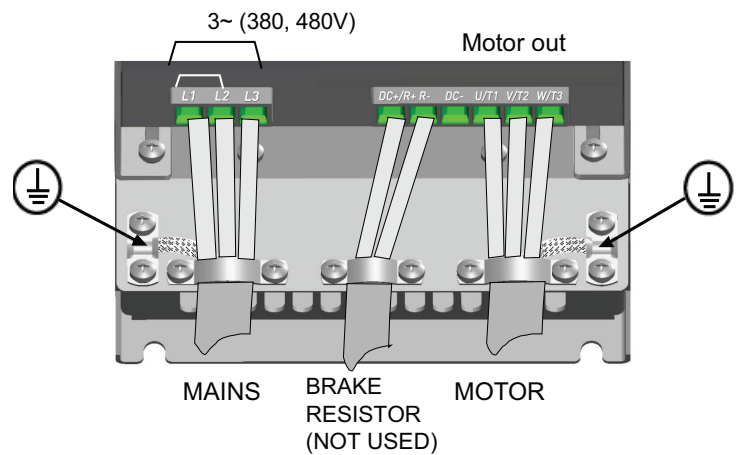
SmartVFD HVAC2 power connections, MI2 - MI3



SmartVFD HVAC2 power connections, MI4



SmartVFD HVAC2 power connections, MI4



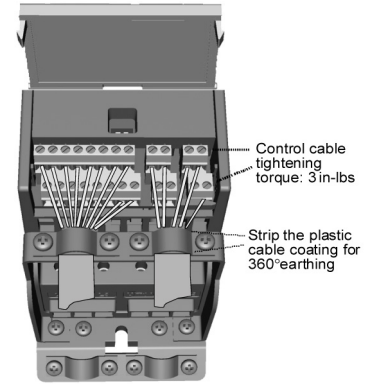
Wiring Diagrams - VFDs

SmartVFD HVAC2 Standalone Drives

Control Inputs and Outputs

1-10 kΩ	Terminal	Signal	Factory preset	Description
	1	+10 Vref		Ref. voltage out
	2	AI1	Freq. reference ^{P)}	Maximum load 10 mA
	3	GND		I/O signal ground
	6	24 Vout		24 V output for DI's
	7	DLC		Digital Input Common for DI1-DI6, refer to Table 22 on page 54 for DI sink type
	8	DI1	Start forward ^{P)}	Positive, Logic1: 18...30V, Logic0: 0...5V; Negative, Logic1: 0...10V, Logic0: 18...30V; Ri = 10KΩ (floating)
	9	DI2	Start reverse ^{P)}	
	10	DI3	Fault reset ^{P)}	
	A	A	RS485 signal A	FB Communication
	B	B	RS485 signal B	FB Communication
	4	AI2		Analog signal in 2
	5	GND		I/O signal ground
	13	DO-		Digital Output Common
	14	DI4		Digital input 4
	15	DI5		Digital input 5
	16	DI6		Digital input 6
	18	AO	Output frequency ^{P)}	Analog Output
	20	DO	Active = READY ^{P)}	Digital signal out
	22	RO1 NO	Active = RUN ^{P)}	Relay out 1
	23	RO1 CM		
	24	RO2 NC	Active = FAULT ^{P)}	Relay out 2
	25	RO2 CM		
	26	RO2 NO		

Control Wiring



SmartVFD HVAC2 General purpose application default I / O configuration and connections for control board P) = Programmable function



SmartVFD HVAC drives are designed to meet all your specification and communication requirements for variable torque HVAC applications.

- 3 x 208/230 Vac: 0.75 to 125 Nominal HP
- 3 x 480 Vac: 1.5 to 250 Nominal HP
- NEMA 1, NEMA 12, and NEMA 3R enclosure options
- Disconnect option
- Bypass options: 2 contactor, 3 contactor, or 3 contactor auto-bypass

Smart VFD drives may operate above 104+ °F or above 1000 meters above sea level if the current draw is de-rated. De-rating for temperature and altitude is cumulative.

De-rating for Temperature

For installations where the ambient temperature will be above 104 °F, (40 °C):

- De-rate the drive output current rating by 1.5% for every 1.8 °F, (1 °C)
- The maximum operating temperature is 122 °F, (50 °C)

Example:

Desire 9.0 Amps at 122 °F. De-rate = 15%

Calculate Amps needed: $X - (X \times .15) = 9$

10.6 Amps are required to provide 9 Amps at 122 °F.

De-rating for Altitude

For installations where ambient temperature will be above 1000 meters (3281 feet) above sea level:

- De-rate the drive output current rating by 1% for every 100 m (328 feet) over 1000 m (3281 feet)
- Maximum altitude is 4500 m (14764 feet) above sea level

If the drive will be mounted where both temperature and altitude de-rating apply, perform one calculation and use the result as the starting Amps for the second.

Note: I/O signals over 2000 meters must be 120 V or 24 V signals

Product Selection - VFDs

SmartVFD HVAC Standalone Drives

Model Nomenclature

HVFSD 3 C 0100 G 1 0 0 A

Product Family
 HVFSD = Honeywell SmartVFD HVAC
 HVFDSB = Honeywell SmartVFD BYPASS

Input Phase
 3 = Three Phase (3-in, 3-out)

Nominal Voltage
 A = 208/230 Vac Drive Alone, 208 Vac Bypass
 B = 230 Vac Bypass
 C = 480 Vac
 D = 600 Vac

Nominal Horsepower
 0007 = .75 Horse Power
 0010 = 1 Horse Power
 0100 = 10 Horse Power

A = Updated Control Board
 No A = Legacy Control Board

Options
 0 = Drive Only or No Special Options
 1 = Auto-Bypass
 3 = Auto-Bypass and HOA

Contactors
 0 = Drive Only
 1 = Disconnect Only
 2 = Two Contactor Bypass
 3 = Three Contactor Bypass

Enclosure Type
 1 = NEMA 1
 2 = NEMA 12
 3 = NEMA 3R

Interface
 T = Text KeyPad
 G = Graphic KeyPad

Product Number	Voltage	Horsepower	Frame Type	Type of Enclosure	Current Ratings	Dimensions, Approximate		Weight	
						(inch)	(mm)	(lb)	(kg)
HVFSD3A0007G100A	208 Vac/230 Vac	0.75 HP	4	NEMA 1	3.7A	5 x 12.9 x 7.5	127 x 327.66 x190.5	13.2 lb	5.98 kg
HVFSD3A0007G200A	208 Vac/230 Vac	0.75 HP	4	NEMA 12	3.7A	5 x 12.9 x 7.5	127 x 327.66 x190.5	13.2 lb	5.98 kg
HVFSD3A0007G300/U	208 Vac/230 Vac	0.75 HP	4	NEMA 3R	3.7A	20.5 x 20 x 10	520.7 x 508 x 254	39 lb	17.7 kg
HVFSD3A0010G100A	208 Vac/230 Vac	1 HP	4	NEMA 1	4.8A	5 x 12.9 x 7.5	127 x 327.66 x190.5	13.2 lb	5.98 kg
HVFSD3A0010G200A	208 Vac/230 Vac	1 HP	4	NEMA 12	4.8A	5 x 12.9 x 7.5	127 x 327.66 x190.5	13.2 lb	5.98 kg
HVFSD3A0010G300/U	208 Vac/230 Vac	1 HP	4	NEMA 3R	4.8A	20.5 x 20 x 10	520.7 x 508 x 254	39 lb	17.7 kg
HVFSD3A0015G100A	208 Vac/230 Vac	1.5 HP	4	NEMA 1	6.6A	5 x 12.9 x 7.5	127 x 327.66 x190.5	13.2 lb	5.98 kg
HVFSD3A0015G200A	208 Vac/230 Vac	1.5 HP	4	NEMA 12	6.6A	5 x 12.9 x 7.5	127 x 327.66 x190.5	13.2 lb	5.98 kg
HVFSD3A0015G300/U	208 Vac/230 Vac	1.5 HP	4	NEMA 3R	6.6A	20.5 x 20 x 10	520.7 x 508 x 254	39 lb	17.7 kg
HVFSD3A0020G100A	208 Vac/230 Vac	2 HP	4	NEMA 1	8A	5 x 12.9 x 7.5	127 x 327.66 x190.5	13.2 lb	5.98 kg
HVFSD3A0020G200A	208 Vac/230 Vac	2 HP	4	NEMA 12	8A	5 x 12.9 x 7.5	127 x 327.66 x190.5	13.2 lb	5.98 kg
HVFSD3A0020G300/U	208 Vac/230 Vac	2 HP	4	NEMA 3R	8A	20.5 x 20 x 10	520.7 x 508 x 254	39 lb	17.7 kg
HVFSD3A0030G100A	208 Vac/230 Vac	3 HP	4	NEMA 1	11A	5 x 12.9 x 7.5	127 x 327.66 x190.5	13.2 lb	5.98 kg
HVFSD3A0030G200A	208 Vac/230 Vac	3 HP	4	NEMA 12	11A	5 x 12.9 x 7.5	127 x 327.66 x190.5	13.2 lb	5.98 kg
HVFSD3A0030G300/U	208 Vac/230 Vac	3 HP	4	NEMA 3R	11A	20.5 x 20 x 10	520.7 x 508 x 254	39 lb	17.7 kg
HVFSD3A0050G100A	208 Vac/230 Vac	5 HP	5	NEMA 1	18A	5.7 x 16.5 x 8.4	144.78 x 419.1 x213.36	22 lb	9.97 kg
HVFSD3A0050G200A	208 Vac/230 Vac	5 HP	5	NEMA 12	18A	5.7 x 16.5 x 8.4	144.78 x 419.1 x213.36	22 lb	9.97 kg
HVFSD3A0050G300/U	208 Vac/230 Vac	5 HP	5	NEMA 3R	18A	20.5 x 24 x 10	520.7 x 609.6 x 254	58 lb	26.3 kg
HVFSD3A0075G100A	208 Vac/230 Vac	7.5 HP	5	NEMA 1	24A	5.7 x 16.5 x 8.4	144.78 x 419.1 x213.36	22 lb	9.97 kg
HVFSD3A0075G200A	208 Vac/230 Vac	7.5 HP	5	NEMA 12	24A	5.7 x 16.5 x 8.4	144.78 x 419.1 x213.36	22 lb	9.97 kg
HVFSD3A0075G300/U	208 Vac/230 Vac	7.5 HP	5	NEMA 3R	24A	20.5 x 24 x 10	520.7 x 609.6 x 254	58 lb	26.3 KG
HVFSD3A0100G100A	208 Vac/230 Vac	10 HP	5	NEMA 1	31A	5.7 x 16.5 x 8.4	144.78 x 419.1 x213.36	22 lb	9.97 kg
HVFSD3A0100G200A	208 Vac/230 Vac	10 HP	5	NEMA 12	31A	5.7 x 16.5 x 8.4	144.78 x 419.1 x 213.36	22 lb	9.97 kg
HVFSD3A0100G300/U	208 Vac/230 Vac	10 HP	5	NEMA 3R	31A	20.5 x 24 x 10	520.7 x 609.6 x 254	58 lb	26.3 kg
HVFSD3A0150G100A	208 Vac/230 Vac	15 HP	6	NEMA 1	48A	7.7 x 21.9 x 9	196 x 556 x 229	44.1 lb	20 kg
HVFSD3A0150G200A	208 Vac/230 Vac	15 HP	6	NEMA 12	48A	7.7 x 21.9 x 9	196 x 556 x 229	44.1 lb	20 kg
HVFSD3A0150G300/U	208 Vac/230 Vac	15 HP	6	NEMA 3R	48A	28.5 x 36 x 10	723.9 x 914.4 x 254	80 lb	36.3 kg
HVFSD3A0200G100A	208 Vac/230 Vac	20 HP	6	NEMA 1	62A	7.7 x 21.9 x 9	196 x 556 x 229	44.1 lb	20 kg
HVFSD3A0200G200A	208 Vac/230 Vac	20 HP	6	NEMA 12	62A	7.7 x 21.9 x 9	196 x 556 x 229	44.1 lb	20 kg
HVFSD3A0200G300/U	208 Vac/230 Vac	20 HP	6	NEMA 3R	62A	28.5 x 36 x 10	723.9 x 914.4 x 254	80 lb	36.3 kg
HVFSD3A0250G100A	208 Vac/230 Vac	25 HP	7	NEMA 1	75A	9.3 x 26 x 10.2	236 x 660 x259	82.7 lb	37.5 kg
HVFSD3A0250G200A	208 Vac/230 Vac	25 HP	7	NEMA 12	75A	9.3 x 26 x 10.2	236 x 660 x259	82.7 lb	37.5 kg
HVFSD3A0250G300/U	208 Vac/230 Vac	25 HP	7	NEMA 3R	75A	28.5 x 48 x 12	723.9 x 1219.2x 304.8	130 lb	59 kg
HVFSD3A0300G100A	208 Vac/230 Vac	30 HP	7	NEMA 1	88A	9.3 x 26 x 10.2	236 x 660 x259	82.7 lb	37.5 kg
HVFSD3A0300G200A	208 Vac/230 Vac	30 HP	7	NEMA 12	88A	9.3 x 26 x 10.2	236 x 660 x259	82.7 lb	37.5 kg
HVFSD3A0300G300/U	208 Vac/230 Vac	30 HP	7	NEMA 3R	88A	28.5 x 48 x 12	723.9 x 1219.2x 304.8	130 lb	59 kg
HVFSD3A0400G100A	208 Vac/230 Vac	40 HP	7	NEMA 1	105A	9.3 x 26 x 10.2	236 x 660 x259	82.7 lb	37.5 kg
HVFSD3A0400G200A	208 Vac/230 Vac	40 HP	7	NEMA 12	105A	9.3 x 26 x 10.2	236 x 660 x259	82.7 lb	37.5 kg
HVFSD3A0400G300/U	208 Vac/230 Vac	40 HP	7	NEMA 3R	105A	28.5 x 48 x 12	723.9 x 1219.2x 304.8	130 lb	59 kg
HVFSD3A0500G100A	208 Vac/230 Vac	50 HP	8	NEMA 1	140A	11.4 x 38 x 13.5	290 x 965 x 343	154.3 lb	70 kg
HVFSD3A0500G200A	208 Vac/230 Vac	50 HP	8	NEMA 12	140A	11.4 x 38 x 13.5	290 x 965 x 343	154.3 lb	70 kg
HVFSD3A0500G300/U	208 Vac/230 Vac	50 HP	8	NEMA 3R	140A	11.4 x 38 x 13.5	290 x 965 x 343	154.3 lb	70 kg
HVFSD3A0600G100A	208 Vac/230 Vac	60 HP	8	NEMA 1	170A	11.4 x 38 x 13.5	290 x 965 x 343	154.3 lb	70 kg

Product Number	Voltage	Horsepower	Frame Type	Type of Enclosure	Current Ratings	Dimensions, Approximate		Weight	
						(inch)	(mm)	(lb)	(kg)
HVFSD3A0600G200A	208 Vac/230 Vac	60 HP	8	NEMA 12	170A	11.4 x 38 x 13.5	290 x 965 x 343	154.3 lb	70 kg
HVFSD3A0600G300/U	208 Vac/230 Vac	60 HP	8	NEMA 3R	170A	11.4 x 38 x 13.5	290 x 965 x 343	154.3 lb	70 kg
HVFSD3A0750G100A	208 Vac/230 Vac	75 HP	8	NEMA 1	205A	11.4 x 38 x 13.5	290 x 965 x 343	154.3 lb	70 kg
HVFSD3A0750G200A	208 Vac/230 Vac	75 HP	8	NEMA 12	205A	11.4 x 38 x 13.5	290 x 965 x 343	154.3 lb	70 kg
HVFSD3A0750G300/U	208 Vac/230 Vac	75 HP	8	NEMA 3R	205A	11.4 x 38 x 13.5	290 x 965 x 343	154.3 lb	70 kg
HVFSD3A1000G100A	208 Vac/230 Vac	100 HP	9	NEMA 1	261A	18.9 x 45.3 x 14.4	480 x 1150 x 366	238.1 lb	108 kg
HVFSD3A1000G200A	208 Vac/230 Vac	100 HP	9	NEMA 12	261A	18.9 x 45.3 x 14.4	480 x 1150 x 366	238.1 lb	108 Kg
HVFSD3A1250G100A	208 Vac/230 Vac	125 HP	9	NEMA 1	310A	18.9 x 45.3 x 14.4	480 x 1150 x 366	238.1 lb	108 Kg
HVFSD3A1250G200A	208 Vac/230 Vac	125 HP	9	NEMA 12	310A	18.9 x 45.3 x 14.4	480 x 1150 x 366	238.1 lb	108 Kg
HVFSD3C0015G100A	460 Vac	1.5 HP	4	NEMA 1	3.4A	5 x 12.9 x 7.5	127 x 327.66 x190.5	13.2 lb	5.98 kg
HVFSD3C0015G200A	460 Vac	1.5 HP	4	NEMA 12	3.4A	5 x 12.9 x 7.5	127 x 327.66 x190.5	13.2 lb	5.98 kg
HVFSD3C0015G300/U	460 Vac	1.5 HP	4	NEMA 3R	3.4A	20.5 x 20 x 10	520.7 x 508 x 254	39 lb	17.7 kg
HVFSD3C0020G100A	460 Vac	2 HP	4	NEMA 1	4.8A	5 x 12.9 x 7.5	127 x 327.66 x190.5	13.2 lb	5.98 kg
HVFSD3C0020G200A	460 Vac	2 HP	4	NEMA 12	4.8A	5 x 12.9 x 7.5	127 x 327.66 x190.5	13.2 lb	5.98 kg
HVFSD3C0020G300/U	460 Vac	2 HP	4	NEMA 3R	4.8A	20.5 x 20 x 10	520.7 x 508 x 254	39 lb	17.7 kg
HVFSD3C0030G100A	460 Vac	3 HP	4	NEMA 1	5.6A	5 x 12.9 x 7.5	127 x 327.66 x190.5	13.2 lb	5.98 kg
HVFSD3C0030G200A	460 Vac	3 HP	4	NEMA 12	5.6A	5 x 12.9 x 7.5	127 x 327.66 x190.5	13.2 lb	5.98 kg
HVFSD3C0030G300/U	460 Vac	3 HP	4	NEMA 3R	5.6A	20.5 x 20 x 10	520.7 x 508 x 254	39 lb	17.7 kg
HVFSD3C0040G100A	460 Vac	4 HP	4	NEMA 1	8A	5 x 12.9 x 7.5	127 x 327.66 x190.5	13.2 lb	5.98 kg
HVFSD3C0040G200A	460 Vac	4 HP	4	NEMA 12	8A	5 x 12.9 x 7.5	127 x 327.66 x190.5	13.2 lb	5.98 kg
HVFSD3C0040G300/U	460 Vac	4 HP	4	NEMA 3R	8A	20.5 x 20 x 10	520.7 x 508 x 254	39 lb	17.7 kg
HVFSD3C0050G100A	460 Vac	5 HP	4	NEMA 1	9.6A	5 x 12.9 x 7.5	127 x 327.66 x190.5	13.2 lb	5.98 kg
HVFSD3C0050G200A	460 Vac	5 HP	4	NEMA 12	9.6A	5 x 12.9 x 7.5	127 x 327.66 x190.5	13.2 lb	5.98 kg
HVFSD3C0050G300/U	460 Vac	5 HP	4	NEMA 3R	9.6A	20.5 x 20 x 10	520.7 x 508 x 254	39 lb	17.7 kg
HVFSD3C0075G100A	460 Vac	7.5 HP	4	NEMA 1	12A	5 x 12.9 x 7.5	127 x 327.66 x190.5	13.2 lb	5.98 kg
HVFSD3C0075G200A	460 Vac	7.5 HP	4	NEMA 12	12A	5 x 12.9 x 7.5	127 x 327.66 x190.5	13.2 lb	5.98 kg
HVFSD3C0075G300/U	460 Vac	7.5 HP	4	NEMA 3R	12A	20.5 x 20 x 10	520.7 x 508 x 254	39 lb	17.7 kg
HVFSD3C0100G100A	460 Vac	10 HP	5	NEMA 1	16A	5.7 x 16.5 x 8.4	144.78 x 419.1 x213.36	22 lb	9.97 kg
HVFSD3C0100G200A	460 Vac	10 HP	5	NEMA 12	16A	5.7 x 16.5 x 8.4	144.78 x 419.1 x213.36	22 lb	9.97 kg
HVFSD3C0100G300/U	460 Vac	10 HP	5	NEMA 3R	16A	20.5 x 24 x 10	520.7 x 609.6 x 254	58 lb	26.3 kg
HVFSD3C0150G100A	460 Vac	15 HP	5	NEMA 1	23A	5.7 x 16.5 x 8.4	144.78 x 419.1 x213.36	22 lb	9.97 kg
HVFSD3C0150G200A	460 Vac	15 HP	5	NEMA 12	23A	5.7 x 16.5 x 8.4	144.78 x 419.1 x213.36	22 lb	9.97 kg
HVFSD3C0150G300/U	460 Vac	15 HP	5	NEMA 3R	23A	20.5 x 24 x 10	520.7 x 609.6 x 254	58 lb	26.3 kg
HVFSD3C0200G100A	460 Vac	20 HP	5	NEMA 1	31A	5.7 x 16.5 x 8.4	144.78 x 419.1 x213.36	22 lb	9.97 kg
HVFSD3C0200G200A	460 Vac	20 HP	5	NEMA 12	31A	5.7 x 16.5 x 8.4	144.78 x 419.1 x213.36	22 lb	9.97 kg
HVFSD3C0200G300/U	460 Vac	20 HP	5	NEMA 3R	31A	20.5 x 24 x 10.5	520.7 x 609.6 x 254	58 lb	26.3 kg
HVFSD3C0250G100A	460 Vac	25 HP	6	NEMA 1	38A	7.7 x 21.9 x 9	196 x 556 x229	44.1 lb	20 kg
HVFSD3C0250G200A	460 Vac	25 HP	6	NEMA 12	38A	7.7 x 21.9 x 9	196 x 556 x229	44.1 lb	20 kg
HVFSD3C0250G300/U	460 Vac	25 HP	6	NEMA 3R	38A	28.5 x 36 x 10.5	723.9 x 914.4 x 254	80 lb	36.3 kg
HVFSD3C0300G100A	460 Vac	30 HP	6	NEMA 1	46A	7.7 x 21.9 x 9	196 x 556 x229	44.1 lb	20 kg
HVFSD3C0300G200A	460 Vac	30 HP	6	NEMA 12	46A	7.7 x 21.9 x 9	196 x 556 x229	44 lb	20 kg
HVFSD3C0300G300/U	460 Vac	30 HP	6	NEMA 3R	46A	28.5 x 36 x 10.5	723.9 x 914.4 x 254	80 lb	36.3 kg
HVFSD3C0400G100A	460 Vac	40 HP	6	NEMA 1	61A	7.7 x 21.9 x 9	196 x 556 x229	44.1 lb	20 kg
HVFSD3C0400G200A	460 Vac	40 HP	6	NEMA 12	61A	7.7 x 21.9 x 9	196 x 556 x229	44.1 lb	20 kg
HVFSD3C0400G300/U	460 Vac	40 HP	6	NEMA 3R	61A	28.5 x 36 x 10.5	723.9 x 914.4 x 254	80 lb	36.3 kg
HVFSD3C0500G100A	460 Vac	50 HP	7	NEMA 1	72A	9.3 x 26 x 10.2	236 x 660 x259	82.7 lb	37.5 kg
HVFSD3C0500G200A	460 Vac	50 HP	7	NEMA 12	72A	9.3 x 26 x 10.2	236 x 660 x259	82.7 lb	37.5 kg
HVFSD3C0500G300/U	460 Vac	50 HP	7	NEMA 3R	72A	28.5 x 48 x 12.5	723.9 x 1219.2x 304.8	130 lb	59 kg
HVFSD3C0600G100A	460 Vac	60 HP	7	NEMA 1	87A	9.3 x 26 x 10.2	236 x 660 x259	82.7 lb	37.5 kg
HVFSD3C0600G200A	460 Vac	60 HP	7	NEMA 12	87A	9.3 x 26 x 10.2	236 x 660 x259	82.7 lb	37.5 kg
HVFSD3C0600G300/U	460 Vac	60 HP	7	NEMA 3R	87A	28.5 x 48 x 12.5	723.9 x 1219.2x 304.8	130 lb	59 kg
HVFSD3C0750G100A	460 Vac	75 HP	7	NEMA 1	105A	9.3 x 26 x 10.2	236 x 660 x259	82.7 lb	37.5 kg
HVFSD3C0750G200A	460 Vac	75 HP	7	NEMA 12	105A	9.3 x 26 x 10.2	236 x 660 x259	82.7 lb	37.5 kg
HVFSD3C0750G300/U	460 Vac	75 HP	7	NEMA 3R	105A	28.5 x 48 x 12.5	723.9 x 1219.2x 304.8	130 lb	59 kg
HVFSD3C1000G100A	460 Vac	100 HP	8	NEMA 1	140A	11.4 x 38 x 13.5	290 x 965 x 343	154.3 lb	70 kg
HVFSD3C1000G200A	460 Vac	100 HP	8	NEMA 12	140A	11.4 x 38 x 13.5	290 x 965 x 343	154.3 lb	70 kg
HVFSD3C1250G100A	460 Vac	125 HP	8	NEMA 1	170A	11.4 x 38 x 13.5	290 x 965 x 343	154.3 lb	70 kg
HVFSD3C1250G200A	460 Vac	125 HP	8	NEMA 12	170A	11.4 x 38 x 13.5	290 x 965 x 343	154.3 lb	70 kg
HVFSD3C1500G100A	460 Vac	150 HP	8	NEMA 1	205A	11.4 x 38 x 13.5	290 x 965 x 343	154.3 lb	70 kg
HVFSD3C1500G200A	460 Vac	150 HP	8	NEMA 12	205A	11.4 x 38 x 13.5	290 x 965 x 343	154.3 lb	70 kg
HVFSD3C2000G100A	460 Vac	200 HP	9	NEMA 1	261A	18.9 x 45.3 x 14.4	480 x 1150 x 366	238.1 lb	108 Kg
HVFSD3C2000G200A	460 Vac	200 HP	9	NEMA 12	261A	18.9 x 45.3 x 14.4	480 x 1150 x 366	238.1 lb	108 Kg
HVFSD3C2500G100A	460 Vac	250 HP	9	NEMA 1	310A	18.9 x 45.3 x 14.4	480 x 1150 x 366	238.1 lb	108 Kg
HVFSD3C2500G200A	460 Vac	250 HP	9	NEMA 12	310A	18.9 x 45.3 x 14.4	480 x 1150 x 366	238.1 lb	108 Kg
HVFSD3D0030G100A	600 Vac	3 HP	5	NEMA 1	3.9 A	5.7 x 16.5 x 8.4	144.78 x 419.1 x213.36	22 lb	9.97 kg
HVFSD3D0050G100A	600 Vac	5 HP	5	NEMA 1	6.1 A	5.7 x 16.5 x 8.4	144.78 x 419.1 x213.36	22 lb	9.97 kg
HVFSD3D0075G100A	600 Vac	7.5 HP	5	NEMA 1	9 A	5.7 x 16.5 x 8.4	144.78 x 419.1 x213.36	22 lb	9.97 kg

Product Selection - VFDs

SmartVFD HVAC Standalone Drives

Product Number	Voltage	Horsepower	Frame Type	Type of Enclosure	Current Ratings	Dimensions, Approximate		Weight	
						(inch)	(mm)	(lb)	(kg)
HVFSD3D0100G100A	600 Vac	10 HP	5	NEMA 1	11 A	5.7 x 16.5 x 8.4	144.78 x 419.1 x213.36	22 lb	9.97 kg
HVFSD3D0150G100A	600 Vac	15 HP	6	NEMA 1	18 A	7.7 x 21.9 x 9	196 x 556 x229	44.1 lb	20 kg
HVFSD3D0200G100A	600 Vac	20 HP	6	NEMA 1	22 A	7.7 x 21.9 x 9	196 x 556 x229	44.1 lb	20 kg
HVFSD3D0250G100A	600 Vac	25 HP	6	NEMA 1	27 A	7.7 x 21.9 x 9	196 x 556 x229	44.1 lb	20 kg
HVFSD3D0300G100A	600 Vac	30 HP	6	NEMA 1	34 A	7.7 x 21.9 x 9	196 x 556 x229	44.1 lb	20 kg
HVFSD3D0400G100A	600 Vac	40 HP	7	NEMA 1	41 A	9.3 x 26 x 10.2	236 x 660 x259	82.7 lb	37.5 kg
HVFSD3D0500G100A	600 Vac	50 HP	7	NEMA 1	52 A	9.3 x 26 x 10.2	236 x 660 x259	82.7 lb	37.5 kg
HVFSD3D0600G100A	600 Vac	60 HP	7	NEMA 1	62 A	9.3 x 26 x 10.2	236 x 660 x259	82.7 lb	37.5 kg
HVFSD3D0750G100A	600 Vac	75 HP	8	NEMA 1	80 A	11.4 x 38 x 13.5	290 x 965 x 343	154.3 lb	70 kg
HVFSD3D1000G100A	600 Vac	100 HP	8	NEMA 1	100 A	11.4 x 38 x 13.5	290 x 965 x 343	154.3 lb	70 kg
HVFSD3D1250G100A	600 Vac	125 HP	8	NEMA 1	125 A	11.4 x 38 x 13.5	290 x 965 x 343	154.3 lb	70 kg
HVFSD3D1500G100A	600 Vac	150 HP	9	NEMA 1	144 A	18.9 x 45.3 x 14.4	480 x 1150 x 366	238.1 lb	108 Kg
HVFSD3D2000G100A	600 Vac	200 HP	9	NEMA 12	208 A	18.9 x 45.3 x 14.4	480 x 1150 x 366	238.1 lb	108 Kg
HVFSD3D0030G200A	600 Vac	3 HP	5	NEMA 12	3.9 A	5.7 x 16.5 x 8.4	144.78 x 419.1 x213.36	22 lb	9.97 kg
HVFSD3D0050G200A	600 Vac	5 HP	5	NEMA 12	6.1 A	5.7 x 16.5 x 8.4	144.78 x 419.1 x213.36	22 lb	9.97 kg
HVFSD3D0075G200A	600 Vac	7.5 HP	5	NEMA 12	9 A	5.7 x 16.5 x 8.4	144.78 x 419.1 x213.36	22 lb	9.97 kg
HVFSD3D0100G200A	600 Vac	10 HP	5	NEMA 12	11 A	5.7 x 16.5 x 8.4	144.78 x 419.1 x213.36	22 lb	9.97 kg
HVFSD3D0150G200A	600 Vac	15 HP	6	NEMA 12	18 A	7.7 x 21.9 x 9	196 x 556 x229	44.1 lb	20 kg
HVFSD3D0200G200A	600 Vac	20 HP	6	NEMA 12	22 A	7.7 x 21.9 x 9	196 x 556 x229	44.1 lb	20 kg
HVFSD3D0250G200A	600 Vac	25 HP	6	NEMA 12	27 A	7.7 x 21.9 x 9	196 x 556 x229	44.1 lb	20 kg
HVFSD3D0300G200A	600 Vac	30 HP	6	NEMA 12	34 A	7.7 x 21.9 x 9	196 x 556 x229	44.1 lb	20 kg
HVFSD3D0400G200A	600 Vac	40 HP	7	NEMA 12	41 A	9.3 x 26 x 10.2	236 x 660 x259	82.7 lb	37.5 kg
HVFSD3D0500G200A	600 Vac	50 HP	7	NEMA 12	52 A	9.3 x 26 x 10.2	236 x 660 x259	82.7 lb	37.5 kg
HVFSD3D0600G200A	600 Vac	60 HP	7	NEMA 12	62 A	9.3 x 26 x 10.2	236 x 660 x259	82.7 lb	37.5 kg
HVFSD3D0750G200A	600 Vac	75 HP	8	NEMA 12	80 A	11.4 x 38 x 13.5	290 x 965 x 343	154.3 lb	70 kg
HVFSD3D1000G200A	600 Vac	100 HP	8	NEMA 12	100 A	11.4 x 38 x 13.5	290 x 965 x 343	154.3 lb	70 kg
HVFSD3D1250G200A	600 Vac	125 HP	8	NEMA 12	125 A	11.4 x 38 x 13.5	290 x 965 x 343	154.3 lb	70 kg
HVFSD3D1500G200A	600 Vac	150 HP	9	NEMA 12	144 A	18.9 x 45.3 x 14.4	480 x 1150 x 366	238.1 lb	108 Kg
HVFSD3D2000G200A	600 Vac	200 HP	9	NEMA 12	208 A	18.9 x 45.3 x 14.4	480 x 1150 x 366	238.1 lb	108 Kg

Accessory	Description	Drive Used with
32006630-001/U	LON Communication Card (NXOPTC4)	SMART
HVFSDOPT1AI2AO/U	1 x AI, 2 x AO (isolated, D- and E-slot compatible)	HVAC2 and SMART
HVFSDOPT1RO5DI/U	1 x RO, 5 x DI (42-240 VAC, D- and E-slot compatible)	HVAC2 and SMART
HVFSDOPT2RO1T/U	2 x RO + Thermistor (D- and E-slot compatible)	HVAC2 and SMART
HVFSDOPT3RO/U	3 x RO (D- and E-slot compatible)	HVAC2 and SMART
HVFSDOPT6DI/U	6 x DI / DO Programmable (D- and E-slot compatible)	HVAC2 and SMART
HVFOPTTEMP	Temperature Measurement Board	HVAC2 and SMART
HVFSDBATTERY/U	Battery Package, 5 pcs, for Real Time Clock (only for old control board)	SMART
HVFSDTRAINER/U	SmartVFD HVAC Training Demonstration Kit	SMART
HVFSDGRAPHICKP/U	SmartVFD HVAC Replacement Graphical Keypad	SMART
HVFSDMOUNTKIT/U	SmartVFD HVAC Panel Mount Kit for NEMA 12 Install 3 Meter Cable	SMART
HVFSDNEMA12FR4/U	SmartVFD HVAC NEMA 12 Kit Frame 4	SMART
HVFSDNEMA12FR5/U	SmartVFD HVAC NEMA 12 Kit Frame 5	SMART
HVFSDNEMA12FR6/U	SmartVFD HVAC NEMA 12 Kit Frame 6	SMART
HVFSDFLANGEFR4/U	SmartVFD HVAC Flange Mounting Kit for Frame 4	SMART
HVFSDFLANGEFR5/U	SmartVFD HVAC Flange Mounting Kit for Frame 5	SMART
HVFSDFLANGEFR6/U	SmartVFD HVAC Flange Mounting Kit for Frame 6	SMART
HVFSDFLANGEFR7/U	SmartVFD HVAC Flange Mounting Kit for Frame 7	SMART
HVFSDFANFR4/U	SmartVFD HVAC Frame 4 Replacement Fan	SMART
HVFSDFANFR5/U	SmartVFD HVAC Frame 5 Replacement Fan	SMART
HVFSDFANFR6/U	SmartVFD HVAC Frame 6 Replacement Fan	SMART
HVFSDFANFR7/U	SmartVFD HVAC Frame 7 Replacement Fan	SMART
HVFSDINSTALLFR4/U	SmartVFD HVAC Replacement Installation Accessories Frame 4	SMART
HVFSDINSTALLFR5/U	SmartVFD HVAC Replacement Installation Accessories Frame 5	SMART
HVFSDINSTALLFR6/U	SmartVFD HVAC Replacement Installation Accessories Frame 6	SMART
HVFDCCABLE/U	SmartVFD Compact Commissioning Cable and USB Adaptor	HVAC2 and SMART
HVFSDEXTENSION	Control Board Wire Extension	SMART



Submittal Data - VFDs

SmartVFD HVAC Standalone Drives



The SmartVFD HVAC is a variable frequency drive designed for use in HVAC applications to control the speed of HVAC pumps and fans in order to maximize energy efficiency. Smart VFD is also designed to run 3 phase standard and high efficiency induction motors by varying the output voltage and frequency.

The SmartVFD is easy to install, communicates effectively with building control systems to minimize energy consumption. The SmartVFD BYPASS is easy to specify, select, install and commission. It is the perfect complement to the advanced capabilities of the SmartVFD HVAC.

The SmartVFD BYPASS configurations make it easy for you to select the right bypass to complete your drive package. All configurations are available in NEMA 1, NEMA 12 and ventilated NEMA 3R.

FEATURES

Easy Communication

- Start-up Wizards—All you have to do is tell the VFD whether you have a pump or a fan, enter nominal motor information, and you are up and running
- Graphic Interface—The easy-to-use keypad and interface deliver menu-driven programming and monitoring for fast, uniform commissioning. It's also easy for the building owner or manager to learn and use, helping to reduce service calls. Plus, a manual is built into the keypad for easy access when needed.
- Built-In Communications—With BACnet®, N2 and Modbus built in, your customers will enjoy a lower total installed cost and reliable communications with the building management system.
- PC Software Wizards—Commissioning, programming and troubleshooting are all a snap thanks to these guided Startup and PID wizards.
- Built-In configurable inputs and outputs enable the flexibility to adapt to your application without additional external logic.

Built-in Protection

- 5% DC Choke for harmonic protection.
- Standard RFI Filter—Ensures that EMC/RFI requirements are met.
- Fire Mode for safe operation.
- Enclosure classes NEMA 1, NEMA 12 or NEMA 3R
- Bypass Options—Meet specifications and system critical applications with a comprehensive bypass offering.
- Motor Switch Ride-Through—Easy, fault-free maintenance.
- Overvoltage trip and undervoltage trip protection
- Ground fault protection
- Mains and motor phase supervisions
- Overcurrent and unit overtemperature protection
- Motor overload, motor stall and motor underload protection
- Short-circuit protection of +24V and +10V reference voltage

Smart Technology

- 6-pulse IGBT, PWM technology
- Intelligent cooling arrangement. Control and power airflow separated.
- Real-Time Clock—Battery included
- 98% Displacement Power Factor Rating
- 98.5% Efficiency at full load
- 0-320Hz output frequency capabilities

Compliance

- 100KA SCCR (Short Circuit Current Requirement) compliant
- EMC harmonics: EN 61000-3-12 compliant.
- EMC radio frequencies: EN 61800-3 Category C2 built in. Complies with radiated and conducted emissions.
- RoHS compliant, no electrolytic capacitors, no lead in the circuit boards.
- American Recovery and Reinvestment Act (ARRA)

Warranty

- 3 years
- Repair available

Table 1. General.

Communication	RS485	Standard: Modbus™ RTU, BACnet, N2
	Ethernet	Standard: Modbus/TCP, BACnet/IP
Software features	Energy-saving functions	<ul style="list-style-type: none"> Real-time clock for timed functions Energy monitor for kWh monitoring Sleep function to minimize downtime energy
	Protections	<ul style="list-style-type: none"> Overload and underload protections (e.g. broken fan and dry pump) Motor thermal protection Missing phase detection Automatic reset to avoid interruption of the process
Process control	2 * PID	For process control
	Multipump	For replacing the pump controller
	Flying start	For tripless catching of spinning fan
Human interfaces	Keypad	Graphical display with built-in manual and wizards.
	PC Tools	<ul style="list-style-type: none"> PC Commissioning Tool for easy commissioning, monitoring, and troubleshooting. Energy Savings calculator to estimate cost avoidance. Product selection tool for selecting VFD and bypass, and creating submittal documents.

Table 2. I/O Connections. (Continued)

Table 2. I/O Connections.

Basic I/O Board		
Terminal		Signal
1	+10	Reference output
2	AI1+	Analogue input, voltage or current
3	AI1-	Analogue input common (current)
4	AI2+	Analogue input, voltage or current
5	AI2-	Analogue input common (current)
6	24	24 V aux. voltage
7	GND	I/O ground
8	DI1	Digital input 1
9	DI2	Digital input 2
10	DI3	Digital input 3
11	CM	Common A for DI1-DI6
12	24	24 V aux. voltage
13	GND	I/O ground
14	DI4	Digital input 4
15	DI5	Digital input 5
16	DI6	Digital input 6
17	CM	Common A for DI1-DI6

Basic I/O Board		
Terminal		Signal
18	AO1+	Analogue signal (+output)
19	AO-/GND	Analogue output common
30	+24	24 V auxiliary input voltage
A	RS485	Differential receiver/transmitter
B	RS485	Differential receiver/transmitter

Table 3. I/O Connections, Relay Board 2.

Relay Board 2		
Terminal		Signal
21	Relay output 1*	Switching capacity 24VDC/8A
22		250VAC/8A
23		125VDC/0.4A Min. switching load 5V/10mA
24	Relay output 2*	Switching capacity 24VDC/8A
25		250VAC/8A
26		125VDC/0.4A Min. switching load 5V/10mA
28	Thermistor input	Rtrip = 4.7 kΩ (PTC); Measuring
29		voltage 3.5V

Submittal Data - VFDs

SmartVFD HVAC Standalone Drives

Table 4. SmartVFD HVAC Technical Specifications.

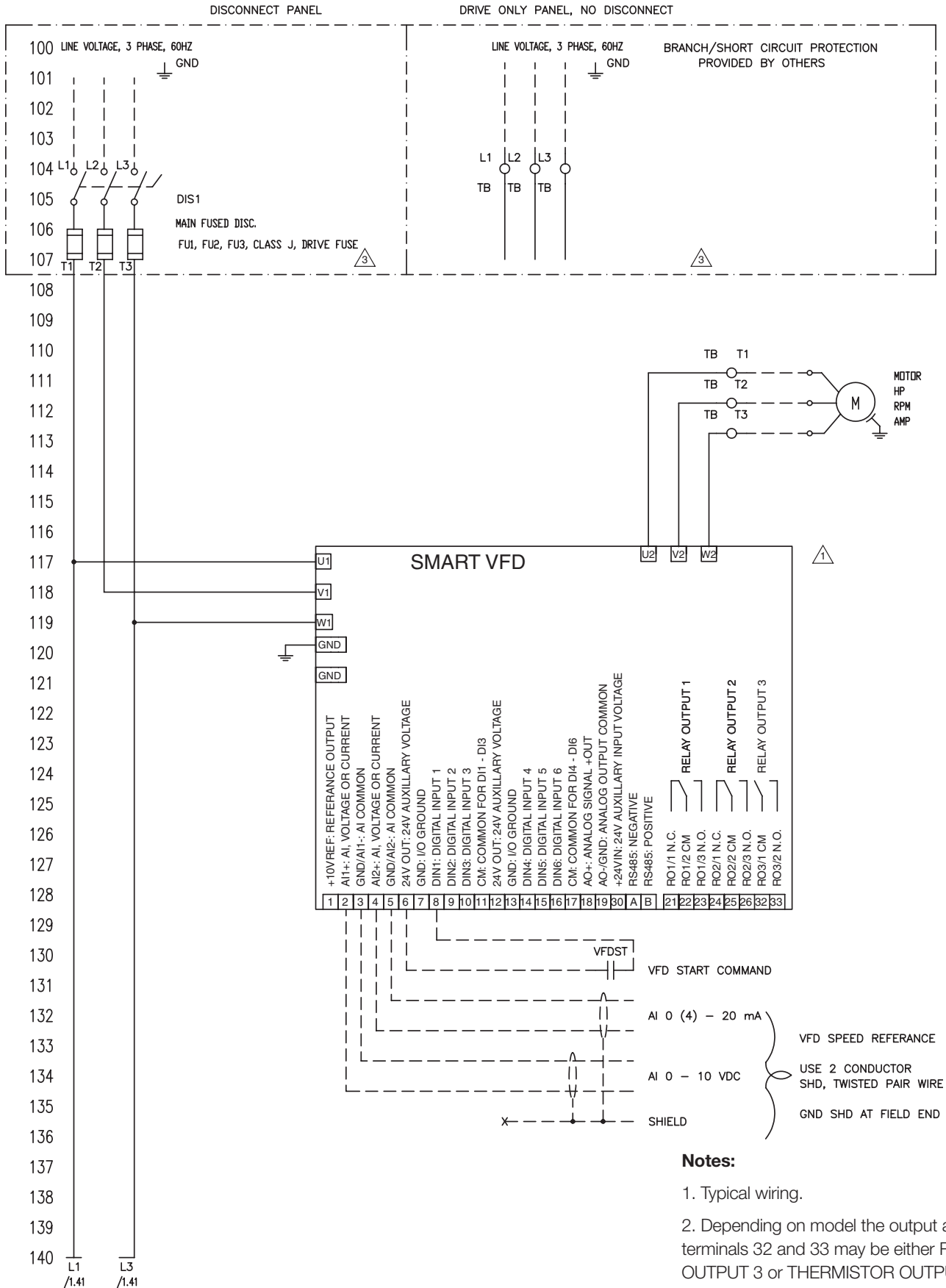
Mains connection	Input voltage U_{in}	208...240V; 380...480V; -10%...+10%
	Input frequency	47...66 Hz
	Connection to mains	Once per minute or less
	Starting delay	4 s (Frame4 to Frame6); 6 s (Frame7 to Frame9)
Motor connection	Output voltage	0- U_{in}
	Continuous output current	I_L : Ambient temperature max. +104°F, overload 1.1 x I_L (1 min./10 min.)
	Starting current	I_S for 2 s every 20 s
	Output frequency	0...320 Hz (standard)
	Frequency resolution	0.01 Hz
Control characteristics	Switching frequency (see parameter M3.1.2.1)	1.5...10 kHz; Defaults: 6 kHz (Frame4-6), 4 kHz (Frame7), 3 kHz (Frame8-9) Automatic switching frequency derating in case of overheating.
	<u>Frequency reference</u>	
	Analogue input	Resolution 0.1% (10-bit), accuracy $\pm 1\%$
	Panel reference	Resolution 0.01 Hz
	Field weakening point	8...320 Hz
	Acceleration time	0.1...3000 sec
Ambient conditions	Ambient operating temperature	Frame4-Frame9: I_L : 14°F (no frost)...+104°F
	Storage temperature	-40°F...+158°F
	Relative humidity	0 to 95% R_H , non-condensing, non-corrosive
	Air quality: chemical vapors mechanical particles	IEC 60721-3-3, unit in operation, class 3C2 IEC 60721-3-3, unit in operation, class 3S2
	Altitude	100% load capacity (no derating) up to 3,280 ft. (1,000 m) 1-% derating for each 328 ft. (100 m) above 3,280 ft. (1,000 m) Max. altitudes: 208...240V : 14,764 ft. (4,500 m) (TN and IT systems) 380...480V : 9,842 ft. (TN and IT systems)
	Vibration EN61800-5-1/ EN60068-2-6	5...150 Hz Displacement amplitude 1 mm (peak) at 5...15.8 Hz (Frame4...Frame9) Max acceleration amplitude 1 G at 15.8...150 Hz (Frame4...Frame9)
	Shock EN61800-5-1 EN60068-2-27	UPS Drop Test (for applicable UPS weights) Storage and shipping: max 15 G, 11 ms (in package)
	Enclosure class	IP21/NEMA 1 standard in entire kW/HP range IP54/NEMA 12 option Note: Keypad required for IP54/NEMA 12
EMC (at default settings)	Immunity	Fulfils EN61800-3 (2004), first and second environment
	Emissions	Depend on EMC level. +EMC2: EN61800-3 (2004), Category C2 Honeywell Smart VFD HVAC will be delivered with class C2 EMC filtering, if not otherwise specified. Honeywell Smart VFD HVAC can be modified for IT-networks.
Emissions	Average noise level (cooling fan) sound power level in dB(A)	Frame4: 65 Frame7: 77 Frame5: 70 Frame8: 86 Frame6: 77 Frame9: 87
Safety		EN 61800-5-1 (2007), CE, cUL; (see unit nameplate for more detailed approvals)

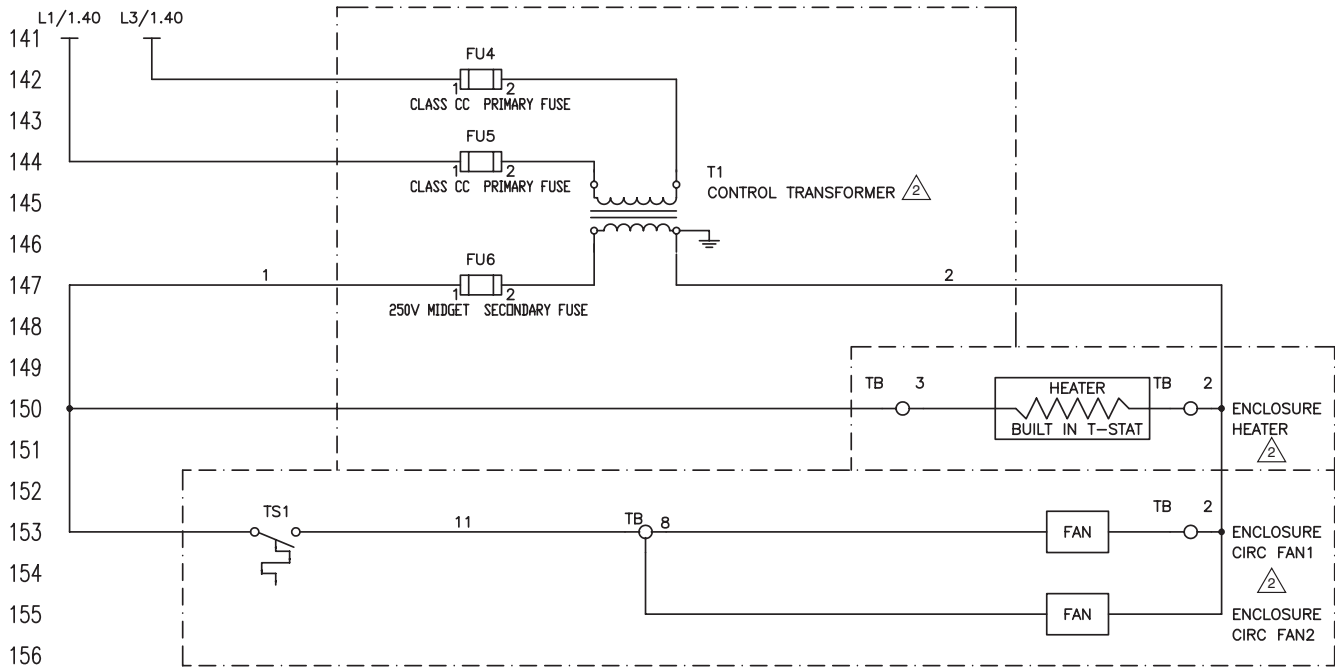
Table 4. SmartVFD HVAC Technical Specifications. (Continued)

Protections	Overvoltage trip limit	Yes
	Undervoltage trip limit	Yes
	Ground fault protection	In case of ground fault in motor or motor cable, only the drive is protected.
	Mains supervision	Yes
	Motor phase supervision	Trips if any of the output phases is missing.
	Overcurrent protection	Yes
	Unit overtemperature protection	Yes
	Motor overload protection	Yes
	Motor stall protection	Yes
	Motor underload protection	Yes
	Short-circuit protection of +24V and +10V reference voltages	Yes

Wiring Diagrams - VFDs

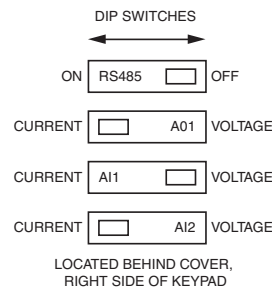
SmartVFD HVAC Standalone Drives





NOTES:

- 1. ALL PANELS SHIPPED WITH VFD DEFAULT PROGRAMMING PARAMETERS. SET DIP SWITCHES AS NEEDED.
- 2. TS1, ENCLOSURE FAN1 STANDARD ON ALL NEMA 3R PANELS. ENCLOSURE FAN2 ON 30HP, 40HP, AND 100HP AT 480V. HEATER IS OPTIONAL ON ALL NEMA 3R PANELS. TRANSFORMER ONLY REQUIRED ON 3R MODELS.
- 3. DISCONNECT PANEL HAS FUSED MAIN DISCONNECT. DRIVE ONLY PANEL HAS WIRE TERMINALS. ON DRIVE ONLY PANEL, CUSTOMER IS RESPONSIBLE FOR BRANCH CIRCUIT AND SHORT CIRCUIT PROTECTION.



ALL WIRING: USE COPPER WIRE ONLY SUITABLE FOR MIN. 75 DEG. C, FIELD WIRING, NEC CLASS 1.

MOTOR AND FEEDER WIRE SIZE MUST BE IN ACCORDANCE WITH NEC.

- FIELD WIRE
- WIRE INSIDE C/PNL
- OPTION

TYPICAL WIRING.

DEPENDING ON MODEL, THE OUTPUT ACROSS TERMINALS 32 AND 33 MAY BE EITHER RELAY OUTPUT 3 OR THERMISTOR INPUT.

Notes (continued from previous page):

1. Typical wiring.
2. NEMA 3R enclosures include a circulation fan(s). Integral enclosure heaters and/or cooling are available as special options.

Product Selection - VFDs

SmartVFD HVAC Drives with Bypass and/or Disconnect



The SmartVFD BYPASS is easy to specify, select, install and commission and is the perfect complement to the advanced capabilities of the SmartVFD family. For the drive features, model number nomenclature and model accessories refer to the SmartVFD HVAC drive section immediately preceding this section.

Disconnect and/or Bypass Features

Our five configurations make it easy to select the right bypass to complete your drive package. All bundles are available in NEMA 1, NEMA 12 and ventilated NEMA 3R.

SmartVFD Disconnect Option

- Adds a fused disconnect to the VFD.

SmartVFD 2-Contactor Bypass Option

Provides an economical means of bypassing the VFD.

- No Main Disconnect
- Freeze/Fire/Smoke Interlock

SmartVFD 3-Contactor Bypass Option

During commissioning, the TEST position enables power-up of the VFD without sending power to the motor.

- In Bypass mode, the VFD is isolated from the power supply
- Fused Disconnect
- Freeze/Fire/Smoke Interlock

SmartVFD 3-Contactor Auto-Bypass Option

All the features of the 3-Contactor bypass plus:

- Any VFD fault will automatically send the bypass to bypass mode
- A contact closure sends the bypass to bypass mode
- Dry contacts indicate when the bypass is in bypass mode, alerting the building management system

SmartVFD HVAC Drives with Bypass and/or Disconnect

Voltage: 208 Vac; **Configuration:** Drive with Fused Disconnect; **Auto Bypass:** No; **Disconnect Type:** Fused; **Pilot Lights:** None

Product Number	Horsepower	Frame Type	Type of Enclosure	Current Ratings	Drive Input Disconnect	Drive Input Fuses	Dimensions, Approximate		Weight	
							(inch)	(mm)	(lb)	(kg)
HVFDSB3A0007G110/U	0.75 HP	4	NEMA 1	3.7A	Yes	Yes	8.6 x 31.9 x 9.6	227 x 811 x 245	33 lb	15 kg
HVFDSB3A0007G210/U	0.75 HP	4	NEMA 12	3.7A	No	—	12 x 36 x 8.8	305 x 914 x 224	40 lb	18.1 kg
HVFDSB3A0007G310/U	0.75 HP	4	NEMA 3R	3.7A	No	—	20.5 x 20 x 10	520.7 x 508 x 254	43 lb	19.5 kg
HVFDSB3A0010G110/U	1 HP	4	NEMA 1	4.8A	Yes	Yes	8.6 x 31.9 x 9.6	227 x 811 x 245	33 lb	15 kg
HVFDSB3A0010G210/U	1 HP	4	NEMA 12	4.8A	No	—	12 x 36 x 8.8	305 x 914 x 224	40 lb	18.1 kg
HVFDSB3A0010G310/U	1 HP	4	NEMA 3R	4.8A	No	—	20.5 x 20 x 10	520.7 x 508 x 254	43 lb	19.5 kg
HVFDSB3A0015G110/U	1.5 HP	4	NEMA 1	6.6A	Yes	Yes	8.6 x 31.9 x 9.6	227 x 811 x 245	33 lb	15 kg
HVFDSB3A0015G210/U	1.5 HP	4	NEMA 12	6.6A	No	—	12 x 37.5 x 11	304.8 x 952.5 x 279.4	40 lb	18.1 kg
HVFDSB3A0015G310/U	1.5 HP	4	NEMA 3R	6.6A	No	—	20.5 x 20 x 12	520.7 x 508 x 304.8	43 lb	19.5 kg
HVFDSB3A0020G110/U	2 HP	4	NEMA 1	8A	Yes	Yes	8.6 x 31.9 x 9.6	227 x 811 x 245	33 lb	15 kg
HVFDSB3A0020G210/U	2 HP	4	NEMA 12	8A	No	—	12 x 37.5 x 11	304.8 x 952.5 x 279.4	40 lb	18.1 kg
HVFDSB3A0020G310/U	2 HP	4	NEMA 3R	8A	No	—	20.5 x 20 x 12	520.7 x 508 x 304.8	43 lb	19.5 kg
HVFDSB3A0030G110/U	3 HP	4	NEMA 1	11A	Yes	Yes	8.6 x 31.9 x 9.6	227 x 811 x 245	33 lb	15 kg
HVFDSB3A0030G210/U	3 HP	4	NEMA 12	11A	No	—	12 x 37.5 x 11	304.8 x 952.5 x 279.4	40 lb	18.1 kg
HVFDSB3A0030G310/U	3 HP	4	NEMA 3R	11A	No	—	20.5 x 20 x 12	520.7 x 508 x 304.8	43 lb	19.5 kg
HVFDSB3A0050G110/U	5 HP	5	NEMA 1	18A	Yes	Yes	8.9 x 34.7 x 19.6	226.06 x 881.38 x 261.62	43 lb	19.5 kg
HVFDSB3A0050G210/U	5 HP	5	NEMA 12	18A	No	—	12 x 41 x 11	304.8 x 1041.4 x 279.4	72 lb	32.7 kg
HVFDSB3A0050G310/U	5 HP	5	NEMA 3R	18A	No	—	20.5 x 24 x 12	520.7 x 609.6 x 304.8	61 lb	27.7 kg
HVFDSB3A0075G110/U	7.5 HP	5	NEMA 1	24A	Yes	Yes	8.9 x 34.7 x 9.6	226.06 x 881.38 x 261.62	43 lb	19.5 kg
HVFDSB3A0075G210/U	7.5 HP	5	NEMA 12	24A	No	—	12 x 41 x 11	304.8 x 1041.4 x 279.4	72 lb	32.7 kg
HVFDSB3A0075G310/U	7.5 HP	5	NEMA 3R	24A	No	—	20.5 x 24 x 12	520.7 x 609.6 x 304.8	61 lb	27.7 kg
HVFDSB3A0100G110/U	10 HP	5	NEMA 1	31A	Yes	Yes	8.9 x 34.7 x 10.3	226.06 x 881.38 x 261.62	43 lb	19.5 kg
HVFDSB3A0100G210/U	10 HP	5	NEMA 12	31A	No	—	12 x 41 x 11	304.8 x 1041.4 x 279.4	72 lb	32.7 kg
HVFDSB3A0100G310/U	10 HP	5	NEMA 3R	31A	No	—	20.5 x 24 x 12	520.7 x 609.6 x 304.8	61 lb	27.7 kg
HVFDSB3A0150G110/U	15 HP	6	NEMA 1	48A	Yes	Yes	12.4 x 45 x 10.1	315 x 1143 x 257	60 lb	27.68 kg
HVFDSB3A0150G210/U	15 HP	6	NEMA 12	48A	No	—	12 x 46.5 x 13	04.8 x 1181.1 x 330.2	120 lb	54.43 kg
HVFDSB3A0150G310/U	15 HP	6	NEMA 3R	48A	No	—	28.5 x 36 x 12	723.9 x 914.4 x 304.8	188 lb	39.92 kg
HVFDSB3A0200G110/U	20 HP	6	NEMA 1	62A	Yes	Yes	12.4 x 45 x 10.1	315 x 1143 x 257	60 lb	27.68 kg
HVFDSB3A0200G210/U	20 HP	6	NEMA 12	62A	No	—	12 x 46.5 x 13	304.8 x 1181.1 x 330.2	120 lb	54.43 kg
HVFDSB3A0200G310/U	20 HP	6	NEMA 3R	62A	No	—	28.5 x 36 x 12	723.9 x 914.4 x 304.8	88 lb	39.92 kg
HVFDSB3A0250G110/U	25 HP	7	NEMA 1	75A	Yes	Yes	20.8 x 51.7 x 13.3	529 x 1313 x 292	140 lb	63.5 kg
HVFDSB3A0250G210/U	25 HP	7	NEMA 12	75A	No	—	16 x 50.5 x 13.5	406.4 x 1282.7 x 342.9	149 lb	67.59 kg
HVFDSB3A0250G310/U	25 HP	7	NEMA 3R	75A	No	—	28.5 x 48 x 14	711.2 x 1219.2 x 355.6	242 lb	109.8 kg
HVFDSB3A0300G110/U	30 HP	7	NEMA 1	88A	Yes	Yes	20.8 x 51.7 x 13.3	529 x 1313 x 292	140 lb	63.5 kg
HVFDSB3A0300G210/U	30 HP	7	NEMA 12	88A	No	—	16 x 50.5 x 13.5	406.4 x 1282.7 x 342.9	160 lb	72.57 kg
HVFDSB3A0300G310/U	30 HP	7	NEMA 3R	88A	No	—	28.5 x 48 x 14	711.2 x 1219.2 x 355.6	149 lb	67.59 kg
HVFDSB3A0400G110/U	40 HP	7	NEMA 1	105A	Yes	Yes	20.8 x 51.7 x 13.3	529 x 1313 x 292	140 lb	63.5 kg
HVFDSB3A0400G210/U	40 HP	7	NEMA 12	105A	No	—	16 x 50.5 x 13.5	406.4 x 1282.7 x 342.9	175 lb	79.38 kg
HVFDSB3A0400G310/U	40 HP	7	NEMA 3R	105A	No	—	28.5 x 48 x 14	711.2 x 1219.2 x 355.6	149 lb	67.59 kg
HVFDSB3A0500G110/U	50 HP	8	NEMA 1	140A	Yes	Yes	25 x 60 x 15.3	635 x 1524 x 388	250 lb	113.4 kg
HVFDSB3A0500G210/U	50 HP	8	NEMA 12	140A	Yes	Yes	40.5 x 60 x 14	1028.7 x 1524 x 355.6	280 lb	127.01 kg
HVFDSB3A0500G310/U	50 HP	8	NEMA 3R	140A	Yes	Yes	48 x 36 x 16	1219 x 914 x 406	149 lb	67.59 Kg
HVFDSB3A0600G110/U	60 HP	8	NEMA 1	170A	Yes	Yes	25 x 60 x 15.3	635 x 1524 x 388	250 lb	113.4 kg
HVFDSB3A0600G210/U	60 HP	8	NEMA 12	170A	Yes	Yes	40.5 x 60 x 14	1028.7 x 1524 x 355.6	280 lb	127.01 kg
HVFDSB3A0600G310/U	60 HP	8	NEMA 3R	170A	Yes	Yes	48 x 36 x 16	1219 x 914 x 406	149 lb	67.59 Kg
HVFDSB3A0750G110/U	75 HP	8	NEMA 1	205A	Yes	Yes	25 x 60 x 15.3	635 x 1524 x 388	250 lb	113.4 kg
HVFDSB3A0750G210/U	75 HP	8	NEMA 12	205A	Yes	Yes	40.5 x 60 x 14	1028.7 x 1524 x 355.6	280 lb	127.01 kg
HVFDSB3A0750G310/U	75 HP	8	NEMA 3R	205A	Yes	Yes	48 x 36 x 16	1219 x 914 x 406	149 lb	67.59 Kg

Product Selection - VFDs

SmartVFD HVAC Drives with Bypass and/or Disconnect

Voltage: 208 Vac; **Configuration:** Drive with 2 Contactor Bypass; **Auto Bypass:** No; **Disconnect Type:** None; **Pilot Lights:** None

Product Number	Horsepower	Frame Type	Type of Enclosure	Current Ratings	Drive Input Disconnect	Drive Input Fuses	Dimensions, Approximate		Weight	
							(inch)	(mm)	(lb)	(kg)
HVFD3A0007G120/U	0.75 HP	4	NEMA 1	3.7A	No	—	8.9 x 31.9 x 10.4	226 x 811 x 263	38 lb	17.2 kg
HVFD3A0007G220/U	0.75 HP	4	NEMA 12	3.7A	Yes	Yes	16 x 36 x 8.8	406.4 x 914.4 x 223.52	64 lb	29 kg
HVFD3A0007G320/U	0.75 HP	4	NEMA 3R	3.7A	Yes	Yes	24.5 x 24 x 10	623 x 610 x 254	83 lb	37.7 kg
HVFD3A0010G120/U	1 HP	4	NEMA 1	4.8A	No	—	8.9 x 31.9 x 10.4	226 x 811 x 263	38 lb	17.2 kg
HVFD3A0010G220/U	1 HP	4	NEMA 12	4.8A	Yes	Yes	16 x 36 x 8.8	406.4 x 914.4 x 223.52	64 lb	29 kg
HVFD3A0010G320/U	1 HP	4	NEMA 3R	4.8A	Yes	Yes	24.5 x 24 x 10	623 x 610 x 254	83 lb	37.7 kg
HVFD3A0015G120/U	1.5 HP	4	NEMA 1	6.6A	No	—	8.9 x 31.7 x 10.7	226 x 805 x 272	38 lb	17.2 kg
HVFD3A0015G220/U	1.5 HP	4	NEMA 12	6.6A	Yes	Yes	16 x 37.5 x 11	406.4 x 952.5 x 279.4	55 lb	25 kg
HVFD3A0015G320/U	1.5 HP	4	NEMA 3R	6.6A	Yes	Yes	24.5 x 24 x 10.5	622.3 x 609.6 x 266.7	49 lb	22.2 kg
HVFD3A0020G120/U	2 HP	4	NEMA 1	8A	No	—	8.9 x 31.7 x 10.7	226.06 x 810.26 x 243.84	38 lb	17.2 kg
HVFD3A0020G220/U	2 HP	4	NEMA 12	8A	Yes	Yes	16 x 37.5 x 11	406.4 x 952.5 x 279.4	55 lb	25 kg
HVFD3A0020G320/U	2 HP	4	NEMA 3R	8A	Yes	Yes	24.5 x 24 x 10.5	622.3 x 609.6 x 266.7	49 lb	22.2 kg
HVFD3A0030G120/U	3 HP	4	NEMA 1	11A	No	—	8.9 x 31.9 x 9.6	226.06 x 810.26 x 243.84	38 lb	17.2 kg
HVFD3A0030G220/U	3 HP	4	NEMA 12	11A	Yes	Yes	16 x 37.5 x 11	406.4 x 952.5 x 279.4	55 lb	25 kg
HVFD3A0030G320/U	3 HP	4	NEMA 3R	11A	Yes	Yes	24.5 x 24 x 10.5	622.3 x 609.6 x 266.7	49 lb	22.2 kg
HVFD3A0050G120/U	5 HP	5	NEMA 1	18A	No	—	8.9 x 34.7 x 10.4	226 x 881 x 263	50 lb	21.8 kg
HVFD3A0050G220/U	5 HP	5	NEMA 12	18A	Yes	Yes	16 x 41 x 11	406 x 1041.4 x 279.4	70 lb	31.6 kg
HVFD3A0050G320/U	5 HP	5	NEMA 3R	18A	Yes	Yes	24.5 x 24 x 10.5	622.3 x 609.6 x 266.7	72 lb	32.7 kg
HVFD3A0075G120/U	7.5 HP	5	NEMA 1	24A	No	—	8.9 x 34.7 x 10.4	226 x 881 x 263	50 lb	22.7 kg
HVFD3A0075G220/U	7.5 HP	5	NEMA 12	24A	Yes	Yes	16 x 41 x 11	406 x 1041.4 x 279.4	70 lb	31.8 kg
HVFD3A0075G320/U	7.5 HP	5	NEMA 3R	24A	Yes	Yes	24.5 x 24 x 10.5	622.3 x 609.6 x 266.7	72 lb	32.7 kg
HVFD3A0100G120/U	10 HP	5	NEMA 1	31A	No	—	8.9 x 34.7 x 10.5	226.06 x 881.38 x 266.7	50 lb	22.7 kg
HVFD3A0100G220/U	10 HP	5	NEMA 12	31A	Yes	Yes	16 x 45 x 11	406 x 1143 x 279.4	84 lb	38.1 kg
HVFD3A0100G320/U	10 HP	5	NEMA 3R	31A	Yes	Yes	24.5 x 24 x 10.5	622.3 x 609.6 x 266.7	72 lb	32.7 kg
HVFD3A0150G120/U	15 HP	6	NEMA 1	48A	No	—	12.4 x 45 x 11.3	314 x 1143 x 287	59 lb	27 kg
HVFD3A0150G220/U	15 HP	6	NEMA 12	48A	Yes	Yes	16 x 50.5 x 13	406.4 x 1282.7 x 256.54	125 lb	56.7 kg
HVFD3A0150G320/U	15 HP	6	NEMA 3R	48A	Yes	Yes	28.5 x 36 x 10.5	723.9 x 914.4 x 266.7	118 lb	53.52 kg
HVFD3A0200G120/U	20 HP	6	NEMA 1	62A	No	—	12.4 x 45 x 11.3	314 x 1143 x 287	59 lb	27 kg
HVFD3A0200G220/U	20 HP	6	NEMA 12	62A	Yes	Yes	20 x 54.5 x 13	508 x 1384.3 x 330.2	140 lb	63.5 kg
HVFD3A0200G320/U	20 HP	6	NEMA 3R	62A	Yes	Yes	28.5 x 36 x 10.5	723.9 x 914.4 x 266.7	118 lb	53.52 kg
HVFD3A0250G120/U	25 HP	7	NEMA 1	75A	No	—	20.9 x 51.7 x 13.3	530.86 x 1313.18 x 337	149 lb	68 kg
HVFD3A0250G220/U	25 HP	7	NEMA 12	75A	Yes	Yes	20 x 58.5 x 13.5	508 x 1485.9 x 342.9	160 lb	72.57 kg
HVFD3A0250G320/U	25 HP	7	NEMA 3R	75A	Yes	Yes	28.5 x 48 x 12.5	711.2 x 1219.2 x 317.5	185 lb	83.91 kg
HVFD3A0300G120/U	30 HP	7	NEMA 1	88A	No	—	20.9 x 51.7 x 13.3	530.86 x 1313.18 x 337	149 lb	68 kg
HVFD3A0300G220/U	30 HP	7	NEMA 12	88A	Yes	Yes	24 x 65.5 x 13.5	609 x 1663.7 x 342.9	175 lb	79.38 kg
HVFD3A0300G320/U	30 HP	7	NEMA 3R	88A	Yes	Yes	28.5 x 48 x 12.5	711.2 x 1219.2 x 317.5	185 lb	83.91 kg
HVFD3A0400G120/U	40 HP	7	NEMA 1	105A	No	—	20.9 x 51.7 x 13.3	530.86 x 1313.18 x 337	149 lb	68 kg
HVFD3A0400G220/U	40 HP	7	NEMA 12	105A	Yes	Yes	30 x 70.5 x 13.5	762 x 1790.7 x 342.9	200 lb	90.72 kg
HVFD3A0400G320/U	40 HP	7	NEMA 3R	105A	Yes	Yes	28.5 x 48 x 12.5	711.2 x 1219.2 x 317.5	185 lb	83.91 kg
HVFD3A0500G120/U	50 HP	8	NEMA 1	140A	No	—	25 x 60 x 15.2	635 x 1524 x 386.08	250 lb	113.4 kg
HVFD3A0500G220/U	50 HP	8	NEMA 12	140A	No	—	40.5 x 60 x 12.5	1028.7 x 1524 x 317.5	350 lb	158.75 kg
HVFD3A0500G320/U	50 HP	8	NEMA 3R	140A	No	—	60 x 41 x 14	1524 x 1041 x 356	185 lb	83.91 kg
HVFD3A0600G120/U	60 HP	8	NEMA 1	170A	No	—	25 x 60 x 16.2	635 x 1524 x 386.08	265 lb	120.2 kg
HVFD3A0600G220/U	60 HP	8	NEMA 12	170A	No	—	40.5 x 60 x 12.5	1028.7 x 1524 x 317.5	350 lb	158.75 kg
HVFD3A0600G320/U	60 HP	8	NEMA 3R	170A	No	—	60 x 41 x 14	1524 x 1041 x 356	185 lb	83.91 kg
HVFD3A0750G120/U	75 HP	8	NEMA 1	205A	No	—	25 x 60 x 15.2	635 x 1524 x 386.08	280 lb	127.01 kg
HVFD3A0750G220/U	75 HP	8	NEMA 12	205A	No	—	40.5 x 60 x 12.5	1028.7 x 1524 x 317.5	350 lb	158.75 kg
HVFD3A0750G320/U	75 HP	8	NEMA 3R	205A	No	—	60 x 41 x 14	1524 x 1041 x 356	185 lb	83.91 kg

SmartVFD HVAC Drives with Bypass and/or Disconnect

Voltage: 208 Vac; **Configuration:** Drive with 3 Contactor Bypass; **Auto Bypass:** No; **Disconnect Type:** Fused; **Drive Input Fuses:** Yes; **Pilot Lights:** None

Product Number	Horsepower	Frame Type	Type of Enclosure	Current Ratings	Dimensions, Approximate		Weight	
					(inch)	(mm)	(lb)	(kg)
HVFDSB3A0007G130/U	0.75 HP	4	NEMA 1	3.7A	8.9 x 38.7 x 10.4	226 x 988 x 264	46 lb	21 kg
HVFDSB3A0007G230/U	0.75 HP	4	NEMA 12	3.7A	16 x 36 x 8.8	406.4 x 914.4 x 223.52	66 lb	29.9 kg
HVFDSB3A0007G330/U	0.75 HP	4	NEMA 3R	3.7A	24.5 x 24 x 10	623 x 610 x 254	85 lb	38.6 kg
HVFDSB3A0010G130/U	1 HP	4	NEMA 1	4.8A	8.9 x 38.7 x 10.7	226 x 983 x 272	44 lb	20 kg
HVFDSB3A0010G230/U	1 HP	4	NEMA 12	4.8A	16 x 36 x 8.8	406.4 x 914.4 x 223.52	66 lb	29.9 kg
HVFDSB3A0010G330/U	1 HP	4	NEMA 3R	4.8A	24.5 x 24 x 10	623 x 610 x 254	85 lb	38.6 kg
HVFDSB3A0015G130/U	1.5 HP	4	NEMA 1	6.6A	8.9 x 38.7 x 10.4	226 x 988 x 264	46 lb	21 kg
HVFDSB3A0015G230/U	1.5 HP	4	NEMA 12	6.6A	16 x 37.5 x 11in.	406.4 x 952.5 x 279.4	55 lb	25 kg
HVFDSB3A0015G330/U	1.5 HP	4	NEMA 3R	6.6A	24.5 x 24 x 12	622.3 x 609.6 x 304.8	54 lb	24.5 kg
HVFDSB3A0020G130/U	2 HP	4	NEMA 1	8A	8.9 x 38.7 x 10.4	226 x 988 x 264	46 lb	21 kg
HVFDSB3A0020G230/U	2 HP	4	NEMA 12	8A	16 x 37.5 x 11	406.4 x 952.5 x 279.4	55 lb	25 kg
HVFDSB3A0020G330/U	2 HP	4	NEMA 3R	8A	24.5 x 24 x 12	622.3 x 609.6 x 304.8	54 lb	24.5 kg
HVFDSB3A0030G130/U	3 HP	4	NEMA 1	11A	8.9 x 38.7 x 10.4	226 x 988 x 264	46 lb	21 kg
HVFDSB3A0030G230/U	3 HP	4	NEMA 12	11A	16 x 37.5 x 11	406.4 x 952.5 x 279.4	55 lb	25 kg
HVFDSB3A0030G330/U	3 HP	4	NEMA 3R	11A	24.5 x 24 x 12	622.3 x 609.6 x 304.8	54 lb	24.5 kg
HVFDSB3A0050G130/U	5 HP	5	NEMA 1	18A	8.9 x 41.7 x 10.4	226 x 1059 x 264	56 lb	25 kg
HVFDSB3A0050G230/U	5 HP	5	NEMA 12	18A	16 x 41 x 11	406 x 1041.4 x 279.4	70 lb	31.8 kg
HVFDSB3A0050G330/U	5 HP	5	NEMA 3R	18A	28.5 x 30 x 12	723.9 x 762 x 304.8	78 lb	35.4 kg
HVFDSB3A0075G130/U	7.5 HP	5	NEMA 1	24A	8.9 x 41.7 x 10.4	226 x 1059 x 264	57 lb	26 kg
HVFDSB3A0075G230/U	7.5 HP	5	NEMA 12	24A	16 x 41 x 11	406 x 1041.4 x 279.4	70 lb	31.8 kg
HVFDSB3A0075G330/U	7.5 HP	5	NEMA 3R	24A	28.5 x 30 x 12	723.9 x 762 x 304.8	78 lb	35.4 kg
HVFDSB3A0100G130/U	10 HP	5	NEMA 1	31A	8.9 x 41.7 x 10.4	226 x 1059 x 264	60 lb	27 kg
HVFDSB3A0100G230/U	10 HP	5	NEMA 12	31A	16 x 45 x 11	406 x 1143 x 279.4	84 lb	38.1 kg
HVFDSB3A0100G330/U	10 HP	5	NEMA 3R	31A	28.5 x 30 x 12	723.9 x 762 x 304.8	78 lb	35.4 kg
HVFDSB3A0150G130/U	15 HP	6	NEMA 1	48A	12.4 x 55 x 11.3	315 x 1397 x 287	95 lb	43 kg
HVFDSB3A0150G230/U	15 HP	6	NEMA 12	48A	20 x 54 x 10.8	406.4 x 1282.7 x 256.54	125 lb	56.7 kg
HVFDSB3A0150G330/U	15 HP	6	NEMA 3R	48A	34.5 x 36 x 12	867.3 x 914.4 x 304.8	124 lb	56.25 kg
HVFDSB3A0200G130/U	20 HP	6	NEMA 1	62A	12.4 x 55 x 11.3	315 x 1397 x 287	99 lb	45 kg
HVFDSB3A0200G230/U	20 HP	6	NEMA 12	62A	20 x 54.5 x 13	508 x 1384.3 x 330.2	140 lb	63.5 kg
HVFDSB3A0200G330/U	20 HP	6	NEMA 3R	62A	34.5 x 36 x 12	867.3 x 914.4 x 304.8	124 lb	56.25 kg
HVFDSB3A0250G130/U	25 HP	7	NEMA 1	75A	20.8 x 59.2 x 13.3	530 x 1499 x 337	135 lb	61.3 kg
HVFDSB3A0250G230/U	25 HP	7	NEMA 12	75A	20 x 58.5 x 13.5	508 x 1485.9 x 342.9	160 lb	72.57 kg
HVFDSB3A0250G330/U	25 HP	7	NEMA 3R	75A	28.5 x 48 x 14	711.2 x 1219.2 x 355.6	193 lb	87.54 kg
HVFDSB3A0300G130/U	30 HP	7	NEMA 1	88A	20.8 x 59.2 x 13.3	530 x 1499 x 337	150 lb	68.2 kg
HVFDSB3A0300G230/U	30 HP	7	NEMA 12	88A	24 x 65.5 x 13.5	609 x 1663.7 x 342.9	175 lb	79.38 kg
HVFDSB3A0300G330/U	30 HP	7	NEMA 3R	88A	28.5 x 48 x 14	711.2 x 1219.2 x 355.6	193 lb	87.54 kg
HVFDSB3A0400G130/U	40 HP	7	NEMA 1	105A	20.8 x 59.2 x 13.3	530 x 1499 x 337	170 lb	77.1 kg
HVFDSB3A0400G230/U	40 HP	7	NEMA 12	105A	30 x 70.5 x 13.5	762 x 1790.7 x 342.9	200 lb	90.72 kg
HVFDSB3A0400G330/U	40 HP	7	NEMA 3R	105A	40.4 x 48 x 12	711.2 x 1219.2 x 355.6	193 lb	87.54 kg
HVFDSB3A0500G130/U	50 HP	8	NEMA 1	140A	25 x 70.01 x 16.2	635 x 1780 x 411	286 lb	130 kg
HVFDSB3A0500G230/U	50 HP	8	NEMA 12	140A	40.5 x 60 x 14	1028.7 x 1524 x 355.6	369 lb	167.38 kg
HVFDSB3A0500G330/U	50 HP	8	NEMA 3R	140A	60 x 41 x 14	1524 x 1041 x 356	193 lb	87.54 kg
HVFDSB3A0600G130/U	60 HP	8	NEMA 1	170A	25 x 70.01 x 16.2	635 x 1780 x 411	295 lb	134 kg
HVFDSB3A0600G230/U	60 HP	8	NEMA 12	170A	40.5 x 60 x 14	1028.7 x 1524 x 355.6	369 lb	167.38 kg
HVFDSB3A0600G330/U	60 HP	8	NEMA 3R	170A	60 x 41 x 14	1524 x 1041 x 356	193 lb	87.54 kg
HVFDSB3A0750G130/U	75 HP	8	NEMA 1	205A	25 x 70.01 x 16.2	635 x 1780 x 411	331 lb	150 kg
HVFDSB3A0750G230/U	75 HP	8	NEMA 12	205A	40.5 x 60 x 14	1028.7 x 1524 x 355.6	369 lb	167.38 kg
HVFDSB3A0750G330/U	75 HP	8	NEMA 3R	205A	60 x 41 x 14	1524 x 1041 x 356	193 lb	87.54 kg

Product Selection - VFDs

SmartVFD HVAC Drives with Bypass and/or Disconnect

Voltage: 208 Vac; **Configuration:** Drive with 3 Contactor Bypass and Auto Bypass; **Auto Bypass:** Yes; **Disconnect Type:** Fused;
Drive Input Fuses: Yes; **Pilot Lights:** Yes

Product Number	Horsepower	Frame Type	Type of Enclosure	Current Ratings	Dimensions, Approximate		Weight	
					(inch)	(mm)	(lb)	(kg)
HVFD3A0007G131/U	0.75 HP	4	NEMA 1	3.7A	8.9 x 38.9 x 10.4	226 x 988 x 264	46 lb	20.9 kg
HVFD3A0007G231/U	0.75 HP	4	NEMA 12	3.7A	16 x 36 x 8.8	406.4 x 914.4 x 223.52	66 lb	29.9 kg
HVFD3A0007G331/U	0.75 HP	4	NEMA 3R	3.7A	24.5 x 24 x 10	623 x 610 x 254	85 lb	38.6 kg
HVFD3A0010G131/U	1 HP	4	NEMA 1	4.8A	8.9 x 38.9 x 10.4	226 x 988 x 254	46 lb	20.9 kg
HVFD3A0010G231/U	1 HP	4	NEMA 12	4.8A	16 x 36 x 8.8	406.4 x 914.4 x 223.52	66 lb	29.9 kg
HVFD3A0010G331/U	1 HP	4	NEMA 3R	4.8A	24.5 x 24 x 10	623 x 610 x 254	85 lb	38.6 kg
HVFD3A0015G131/U	1.5 HP	4	NEMA 1	6.6A	8.9 x 38.9 x 10.4	226 x 988 x 264	46 lb	20.9 kg
HVFD3A0015G231/U	1.5 HP	4	NEMA 12	6.6A	16 x 37.5 x 11	406.4 x 952.5 x 279.4	55 lb	25 kg
HVFD3A0015G331/U	1.5 HP	4	NEMA 3R	6.6A	24.5 x 24 x 12i	622.3 x 609.6 x 304.8	54 lb	24.5 kg
HVFD3A0020G131/U	2 HP	4	NEMA 1	8A	8.9 x 38.9 x 10.4	226 x 988 x 264	46 lb	20.9 kg
HVFD3A0020G231/U	2 HP	4	NEMA 12	8A	16 x 37.5 x 11	406.4 x 952.5 x 279.4	55 lb	25 kg
HVFD3A0020G331/U	2 HP	4	NEMA 3R	8A	24.5 x 24 x 12	622.3 x 609.6 x 304.8	54 lb	24.5 kg
HVFD3A0030G131/U	3 HP	4	NEMA 1	11A	8.9 x 38.9 x 10.4	226 x 988 x 264	46 lb	20.9 kg
HVFD3A0030G231/U	3 HP	4	NEMA 12	11A	16 x 37.5 x 11	406.4 x 952.5 x 279.4	55 lb	25 kg
HVFD3A0030G331/U	3 HP	4	NEMA 3R	11A	24.5 x 24 x 12	622.3 x 609.6 x 304.8	54 lb	24.5 kg
HVFD3A0050G131/U	5 HP	5	NEMA 1	18A	8.9 x 41.7 x 10.4	226 x 1059 x 264	56 lb	25.4 kg
HVFD3A0050G231/U	5 HP	5	NEMA 12	18A	16 x 41 x 11	406 x 1041.4 x 279.4	70 lb	31.8 kg
HVFD3A0050G331/U	5 HP	5	NEMA 3R	18A	28.5 x 30 x 12	723.9 x 762 x 304.8	78 lb	35.4 kg
HVFD3A0075G131/U	7.5 HP	5	NEMA 1	24A	8.9 x 38.9 x 10.4	226 x 988 x 264	58 lb	26 kg
HVFD3A0075G231/U	7.5 HP	5	NEMA 12	24A	16 x 41 x 11	406 x 1041.4 x 279.4	70 lb	31.8 kg
HVFD3A0075G331/U	7.5 HP	5	NEMA 3R	24A	28.5 x 24 x 10	724 x 610 x 254	125 lb	56.7 kg
HVFD3A0100G131/U	10 HP	5	NEMA 1	31A	8.9 x 38.9 x 10.4	226 x 988 x 264	60 lb	27.2 kg
HVFD3A0100G231/U	10 HP	5	NEMA 12	31A	16 x 45 x 11	406 x 1143 x 279.4	84 lb	38.1 kg
HVFD3A0100G331/U	10 HP	5	NEMA 3R	31A	28.5 x 30 x 12	723.9 x 762 x 304.8	78 lb	35.4kg
HVFD3A0150G131/U	15 HP	6	NEMA 1	48A	12.4 x 55 x 11.3	315 x 1397 x 287	95 lb	43 kg
HVFD3A0150G231/U	15 HP	6	NEMA 12	48A	16 x 50.5 x 13	406.4 x 1282.7 x 256.54	125 lb	56.7 kg
HVFD3A0150G331/U	15 HP	6	NEMA 3R	48A	34.5 x 36 x 12	867.3 x 914.4 x 304.8	124 lb	56.25 kg
HVFD3A0200G131/U	20 HP	6	NEMA 1	62A	12.4 x 55 x 11.3	315 x 1397 x 287	99 lb	45 kg
HVFD3A0200G231/U	20 HP	6	NEMA 12	62A	20 x 54.5 x 13	508 x 1384.3 x 330.2	140 lb	63.5 kg
HVFD3A0200G331/U	20 HP	6	NEMA 3R	62A	34.5 x 36 x 12	867.3 x 914.4 x 304.8	124 lb	56.25 kg
HVFD3A0250G131/U	25 HP	7	NEMA 1	75A	20.8 x 59 x 13.3	529 x 1499 x 337	135 lb	61 kg
HVFD3A0250G231/U	25 HP	7	NEMA 12	75A	20 x 58.5 x 13.5	508 x 1485.9 x 342.9	160 lb	72.57 kg
HVFD3A0250G331/U	25 HP	7	NEMA 3R	75A	28.5 x 48 x 14	711.2 x 1219.2 x 355.6	193 lb	87.54 kg
HVFD3A0300G131/U	30 HP	7	NEMA 1	88A	20.8 x 59 x 13.3	529 x 1499 x 337	150 lb	68.2 kg
HVFD3A0300G231/U	30 HP	7	NEMA 12	88A	24 x 65.5 x 13.5	609 x 1663.7 x 342.9	175 lb	79.38 kg
HVFD3A0300G331/U	30 HP	7	NEMA 3R	88A	28.5 x 48 x 14	711.2 x 1219.2 x 355.6	193 lb	87.54 kg
HVFD3A0400G131/U	40 HP	7	NEMA 1	105A	20.8 x 59 x 13.3	529 x 1499 x 337	170 lb	77.1 kg
HVFD3A0400G231/U	40 HP	7	NEMA 12	105A	30 x 70.5 x 13.5	762 x 1790.7 x 342.9	200 lb	90.72 kg
HVFD3A0400G331/U	40 HP	7	NEMA 3R	105A	28.5 x 48 x 14	711.2 x 1219.2 x 355.6	326 lb	87.54 kg
HVFD3A0500G131/U	50 HP	8	NEMA 1	140A	25 x 70 x 16.2	635 x 1778 x 411	286 lb	130 kg
HVFD3A0500G231/U	50 HP	8	NEMA 12	140A	40.5 x 60 x 14	1028.7 x 1524 x 355.6	369 lb	167.38 kg
HVFD3A0500G331/U	50 HP	8	NEMA 3R	140A	60 x 41 x 14	1524 x 1041 x 356	193 lb	87.54 kg
HVFD3A0600G131/U	60 HP	8	NEMA 1	170A	25 x 70 x 16.2	635 x 1778 x 411	295 lb	134 kg
HVFD3A0600G231/U	60 HP	8	NEMA 12	170A	40.5 x 60 x 14	1028.7 x 1524 x 355.6	369 lb	167.38 kg
HVFD3A0600G331/U	60 HP	8	NEMA 3R	170A	60 x 41 x 14	1524 x 1041 x 356	193 lb	87.54 kg
HVFD3A0750G131/U	75 HP	8	NEMA 1	205A	25 x 70 x 16.2	635 x 1778 x 411	331 lb	150 kg
HVFD3A0750G231/U	75 HP	8	NEMA 12	205A	40.5 x 60 x 14	1028.7 x 1524 x 355.6	369 lb	167.38 kg
HVFD3A0750G331/U	75 HP	8	NEMA 3R	205A	60 x 41 x 14	1524 x 1041 x 356	193 lb	87.54 kg

SmartVFD HVAC Drives with Bypass and/or Disconnect

Voltage: 230 Vac; **Configuration:** Drive with Fused Disconnect; **Auto Bypass:** No; **Disconnect Type:** Fused; **Pilot Lights:** None

Product Number	Horsepower	Frame Type	Type of Enclosure	Current Ratings	Drive Input Disconnect	Drive Input Fuses	Dimensions, Approximate		Weight	
							(inch)	(mm)	(lb)	(kg)
HVFD3B0007G110/U	0.75 HP	4	NEMA 1	3.7A	Yes	Yes	8.9 x 31.9 x 9.6	226 x 811 x 245	33 lb	15 kg
HVFD3B0007G210/U	0.75 HP	4	NEMA 12	3.7A	No	—	12 x 37.5 x 11	305 x 914 x 224	51 lb	23.1 kg
HVFD3B0007G310/U	0.75 HP	4	NEMA 3R	3.7A	No	—	20.5 x 20 x 12	520.7 x 508 x 304.8	43 lb	19.5 kg
HVFD3B0010G110/U	1 HP	4	NEMA 1	4.8A	Yes	Yes	8.9 x 31.9 x 9.6	226 x 811 x 245	33 lb	15 kg
HVFD3B0010G210/U	1 HP	4	NEMA 12	4.8A	No	—	12 x 37.5 x 11	304.8 x 952.5 x 279.4	40 lb	18.14 kg
HVFD3B0010G310/U	1 HP	4	NEMA 3R	4.8A	No	—	20.5 x 20 x 12	520.7 x 508 x 304.8	43 lb	19.5 kg
HVFD3B0015G110/U	1.5 HP	4	NEMA 1	6.6A	Yes	Yes	8.9 x 31.9 x 9.6	226 x 811 x 245	33 lb	15 kg
HVFD3B0015G210/U	1.5 HP	4	NEMA 12	6.6A	No	—	12 x 37.5 x 11	304.8 x 952.5 x 279.4	40 lb	18.14 kg
HVFD3B0015G310/U	1.5 HP	4	NEMA 3R	6.6A	No	—	20.5 x 20 x 12	520.7 x 508 x 304.8	43 lb	19.5 kg
HVFD3B0020G110/U	2 HP	4	NEMA 1	8A	Yes	Yes	8.9 x 31.9 x 9.6	226 x 811 x 245	33 lb	15 kg
HVFD3B0020G210/U	2 HP	4	NEMA 12	8A	No	—	12 x 37.5 x 11	304.8 x 952.5 x 279.4	40 lb	18.14 kg
HVFD3B0020G310/U	2 HP	4	NEMA 3R	8A	No	—	20.5 x 20 x 12	520.7 x 508 x 304.8	43 lb	19.5 kg
HVFD3B0030G110/U	3 HP	4	NEMA 1	11A	Yes	Yes	8.9 x 31.9 x 9.6	226 x 811 x 245	33 lb	15 kg
HVFD3B0030G210/U	3 HP	4	NEMA 12	11A	No	—	12 x 37.5 x 11	304.8 x 952.5 x 279.4	40 lb	18.14 kg
HVFD3B0030G310/U	3 HP	4	NEMA 3R	11A	No	—	20.5 x 20 x 12	520.7 x 508 x 304.8	43 lb	19.5 kg
HVFD3B0050G110/U	5 HP	5	NEMA 1	18A	Yes	Yes	8.9 x 34.5 x 9.6	226 x 876 x 245	43 lb	19.5 kg
HVFD3B0050G210/U	5 HP	5	NEMA 12	18A	No	—	12 x 41 x 11	304.8 x 1041.4 x 279.4	72 lb	32.66 kg
HVFD3B0050G310/U	5 HP	5	NEMA 3R	18A	No	—	20.5 x 24 x 12	520.7 x 609.6 x 304.8	61 lb	27.67 kg
HVFD3B0075G110/U	7.5 HP	5	NEMA 1	24A	Yes	Yes	8.9 x 34.5 x 9.6	226 x 876 x 245	50 lb	23 kg
HVFD3B0075G210/U	7.5 HP	5	NEMA 12	24A	No	—	12 x 41 x 11	304.8 x 1041.4 x 279.4	72 lb	32.66 kg
HVFD3B0075G310/U	7.5 HP	5	NEMA 3R	24A	No	—	20.5 x 24 x 12	520.7 x 609.6 x 304.8	61 lb	27.67 kg
HVFD3B0100G110/U	10 HP	5	NEMA 1	31A	Yes	Yes	8.9 x 34.5 x 9.6	226 x 876 x 245	50 lb	23 kg
HVFD3B0100G210/U	10 HP	5	NEMA 12	31A	No	—	12 x 41 x 11	304.8 x 1041.4 x 279.4	72 lb	32.66 kg
HVFD3B0100G310/U	10 HP	5	NEMA 3R	31A	No	—	20.5 x 24 x 12	520.7 x 609.6 x 304.8	61 lb	27.67 kg
HVFD3B0150G110/U	15 HP	6	NEMA 1	48A	Yes	Yes	12.4 x 45 x 10.1	315 x 1143 x 257	55 lb	25 kg
HVFD3B0150G210/U	15 HP	6	NEMA 12	48A	No	—	12 x 46.5 x 13	304.8 x 1181.1 x 330.2	120 lb	54.43 kg
HVFD3B0150G310/U	15 HP	6	NEMA 3R	48A	No	—	28.5 x 36 x 12	723.9 x 914.4 x 304.8	88 lb	39.92 kg
HVFD3B0200G110/U	20 HP	6	NEMA 1	62A	Yes	Yes	12.4 x 45 x 10.1	315 x 1143 x 257	59 lb	27 kg
HVFD3B0200G210/U	20 HP	6	NEMA 12	62A	No	—	12 x 46.5 x 13	304.8 x 1181.1 x 330.2	120 lb	54.43 kg
HVFD3B0200G310/U	20 HP	6	NEMA 3R	62A	No	—	28.5 x 36 x 12	723.9 x 914.4 x 304.8	88 lb	39.92 kg
HVFD3B0250G110/U	25 HP	6	NEMA 1	75A	Yes	Yes	20.8 x 51.7 x 13.3	530 x 1313 x 326	140 lb	63.5 kg
HVFD3B0250G210/U	25 HP	6	NEMA 12	75A	No	—	16 x 50.5 x 13.5	406.4 x 1282.7 x 342.9	145 lb	65.77 kg
HVFD3B0250G310/U	25 HP	6	NEMA 3R	75A	No	—	28.5 x 48 x 14	711.2 x 1219.2 x 355.6	149 lb	67.59 kg
HVFD3B0300G110/U	30 HP	7	NEMA 1	88A	Yes	Yes	20.8 x 51.7 x 13.3	530 x 1313 x 326	140 lb	63.5 kg
HVFD3B0300G210/U	30 HP	7	NEMA 12	88A	No	—	16 x 50.5 x 13.5	406.4 x 1282.7 x 342.9	160 lb	72.57 kg
HVFD3B0300G310/U	30 HP	7	NEMA 3R	88A	No	—	28.5 x 48 x 14	711.2 x 1219.2 x 355.6	149 lb	67.59 kg
HVFD3B0400G110/U	40 HP	7	NEMA 1	105A	Yes	Yes	20.8 x 51.7 x 13.3	530 x 1313 x 326	140 lb	63.5 kg
HVFD3B0400G210/U	40 HP	7	NEMA 12	105A	No	—	16 x 50.5 x 13.5	406.4 x 1282.7 x 342.9	175 lb	79.38 kg
HVFD3B0400G310/U	40 HP	7	NEMA 3R	105A	No	—	28.5 x 48 x 14	711.2 x 1219.2 x 355.6	149 lb	67.59 kg
HVFD3B0500G110/U	50 HP	8	NEMA 1	140A	Yes	Yes	25 x 60 x 15.3	635 x 1524 x 388	250 lb	113.4 kg
HVFD3B0500G210/U	50 HP	8	NEMA 12	140A	Yes	Yes	40.5 x 60 x 14	1028.7 x 1524 x 355.6	280 lb	127.00 kg
HVFD3B0500G310/U	50 HP	8	NEMA 3R	140A	Yes	Yes	48 x 36 x 16	1219 x 914 x 406	149 lb	67.59 kg
HVFD3B0600G110/U	60 HP	8	NEMA 1	170A	Yes	Yes	25 x 60 x 15.3	635 x 1524 x 388	265 lb	120 kg
HVFD3B0600G210/U	60 HP	8	NEMA 12	170A	Yes	Yes	40.5 x 60 x 14	1028.7 x 1524 x 355.6	280 lb	127.00 kg
HVFD3B0600G310/U	60 HP	8	NEMA 3R	170A	Yes	Yes	48 x 36 x 16	1219 x 914 x 406	149 lb	67.59 kg
HVFD3B0750G110/U	75 HP	8	NEMA 1	205A	Yes	Yes	25 x 60 x 15.3	635 x 1524 x 388	280 lb	127 kg
HVFD3B0750G210/U	75 HP	8	NEMA 12	205A	Yes	Yes	40.5 x 60 x 14	1028.7 x 1524 x 355.6	280 lb	127.00 kg
HVFD3B0750G310/U	75 HP	8	NEMA 3R	205A	Yes	Yes	48 x 36 x 16	1219 x 914 x 406	149 lb	67.59 kg

Product Selection - VFDs

SmartVFD HVAC Drives with Bypass and/or Disconnect

Voltage: 230 Vac; **Configuration:** Drive with 2 Contactor Bypass; **Auto Bypass:** No; **Disconnect Type:** None; **Pilot Lights:** None

Product Number	Horsepower	Frame Type	Type of Enclosure	Current Ratings	Drive Input Disconnect	Drive Input Fuses	Dimensions, Approximate		Weight	
							(inch)	(mm)	(lb)	(kg)
HVFD3B3B0007G120/U	0.75 HP	4	NEMA 1	3.7A	No	—	8.9 x 31.9 x 10.4	226 x 811 x 264	38 lb	17.2 kg
HVFD3B3B0007G220/U	0.75 HP	4	NEMA 12	3.7A	Yes	Yes	16 x 37.5 x 11	406.4 x 952.5 x 279.4	55 lb	24.95 kg
HVFD3B3B0007G320/U	0.75 HP	4	NEMA 3R	3.7A	Yes	Yes	24.5 x 24 x 10.5	622.3 x 609.6 x 266.7	49 lb	22.23 kg
HVFD3B3B0010G120/U	1 HP	4	NEMA 1	4.8A	No	—	8.9 x 31.9 x 10.4	226 x 811 x 264	38 lb	17.24 kg
HVFD3B3B0010G220/U	1 HP	4	NEMA 12	4.8A	Yes	Yes	16 x 37.5 x 11	406.4 x 952.5 x 279.4	55 lb	24.95 kg
HVFD3B3B0010G320/U	1 HP	4	NEMA 3R	4.8A	Yes	Yes	24.5 x 24 x 10.5	622.3 x 609.6 x 266.7	49 lb	22.23 kg
HVFD3B3B0015G120/U	1.5 HP	4	NEMA 1	6.6A	No	—	8.9 x 31.9 x 10.4	226 x 811 x 264	38 lb	17.2 kg
HVFD3B3B0015G220/U	1.5 HP	4	NEMA 12	6.6A	Yes	Yes	16 x 37.5 x 11	406.4 x 952.5 x 279.4	55 lb	24.95 kg
HVFD3B3B0015G320/U	1.5 HP	4	NEMA 3R	6.6A	Yes	Yes	24.5 x 24 x 10.5	622.3 x 609.6 x 266.7	49 lb	22.23 kg
HVFD3B3B0020G120/U	2 HP	4	NEMA 1	8A	No	—	8.9 x 31.9 x 10.4	226 x 811 x 264	38 lb	17.2 kg
HVFD3B3B0020G220/U	2 HP	4	NEMA 12	8A	Yes	Yes	16 x 37.5 x 11	406.4 x 952.5 x 279.4	55 lb	24.95 kg
HVFD3B3B0020G320/U	2 HP	4	NEMA 3R	8A	Yes	Yes	24.5 x 24 x 10.5	622.3 x 609.6 x 266.7	49 lb	22.23 kg
HVFD3B3B0030G120/U	3 HP	4	NEMA 1	11A	No	—	8.9 x 31.9 x 10.4	226 x 811 x 264	38 lb	17.2 kg
HVFD3B3B0030G220/U	3 HP	4	NEMA 12	11A	Yes	Yes	16 x 37.5 x 11	406.4 x 952.5 x 279.4	55 lb	24.95 kg
HVFD3B3B0030G320/U	3 HP	4	NEMA 3R	11A	Yes	Yes	24.5 x 24 x 10.5	622.3 x 609.6 x 266.7	49 lb	22.23 kg
HVFD3B3B0050G120/U	5 HP	5	NEMA 1	18A	No	—	8.9 x 34.5 x 10.4	226 x 876 x 264	48 lb	21.7 kg
HVFD3B3B0050G220/U	5 HP	5	NEMA 12	18A	Yes	Yes	16 x 41 x 11	406 x 1041.4 x 279.4	70 lb	31.75 kg
HVFD3B3B0050G320/U	5 HP	5	NEMA 3R	18A	Yes	Yes	24.5 x 24 x 10.5	622.3 x 609.6 x 266.7	72 lb	32.66 kg
HVFD3B3B0075G120/U	7.5 HP	5	NEMA 1	24A	No	—	8.9 x 34.5 x 10.4	226 x 876 x 264	50 lb	23 kg
HVFD3B3B0075G220/U	7.5 HP	5	NEMA 12	24A	Yes	Yes	16 x 41 x 11	406 x 1041.4 x 279.4	70 lb	31.75 kg
HVFD3B3B0075G320/U	7.5 HP	5	NEMA 3R	24A	Yes	Yes	24.5 x 24 x 10.5	622.3 x 609.6 x 266.7	72 lb	32.66 kg
HVFD3B3B0100G120/U	10 HP	5	NEMA 1	31A	No	—	8.9 x 34.5 x 10.4	226 x 876 x 264	50 lb	23 kg
HVFD3B3B0100G220/U	10 HP	5	NEMA 12	31A	Yes	Yes	16 x 45 x 11	406 x 1143 x 279.4	84 lb	38.1 kg
HVFD3B3B0100G320/U	10 HP	5	NEMA 3R	31A	Yes	Yes	24.5 x 24 x 10.5	622.3 x 609.6 x 266.7	72 lb	32.66 kg
HVFD3B3B0150G120/U	15 HP	6	NEMA 1	48A	No	—	12.4 x 45 x 11.3	315 x 1143 x 287	60 lb	27.2 kg
HVFD3B3B0150G220/U	15 HP	6	NEMA 12	48A	Yes	Yes	16 x 50.5 x 13	406.4 x 1282.7 x 256.54	125 lb	56.7 kg
HVFD3B3B0150G320/U	15 HP	6	NEMA 3R	48A	Yes	Yes	28.5 x 36 x 10.5	723.9 x 914.4 x 266.7	118 lb	53.52 kg
HVFD3B3B0200G120/U	20 HP	6	NEMA 1	62A	No	—	12.4 x 45 x 11.3	315 x 1143 x 287	60 lb	27.2 kg
HVFD3B3B0200G220/U	20 HP	6	NEMA 12	62A	Yes	Yes	20 x 54.5 x 13	508 x 1384.3 x 330.2	140 lb	63.5 kg
HVFD3B3B0200G320/U	20 HP	6	NEMA 3R	62A	Yes	Yes	28.5 x 36 x 10.5	723.9 x 914.4 x 266.7	118 lb	53.52 kg
HVFD3B3B0250G120/U	25 HP	7	NEMA 1	75A	No	—	20.9 x 51.7 x 13.3	530.86 x 1313 x 338	149 lb	68 kg
HVFD3B3B0250G220/U	25 HP	7	NEMA 12	75A	Yes	Yes	24 x 64 x 13.3	508 x 1485.9 x 342.9	160 lb	73 kg
HVFD3B3B0250G320/U	25 HP	7	NEMA 3R	75A	Yes	Yes	28.5 x 48 x 12.5	711.2 x 1219.2 x 317.5	185 lb	83.91 kg
HVFD3B3B0300G120/U	30 HP	7	NEMA 1	88A	No	—	20.9 x 51.7 x 13.3	530.86 x 1313 x 338	149 lb	68 kg
HVFD3B3B0300G220/U	30 HP	7	NEMA 12	88A	Yes	Yes	24 x 65.5 x 13.5	609 x 1663.7 x 342.9	175 lb	79.38 kg
HVFD3B3B0300G320/U	30 HP	7	NEMA 3R	88A	Yes	Yes	28.5 x 48 x 12.5	711.2 x 1219.2 x 317.5	185 lb	83.91 kg
HVFD3B3B0400G120/U	40 HP	7	NEMA 1	105A	No	—	20.9 x 51.7 x 13.3	530.86 x 1313 x 338	149 lb	68 kg
HVFD3B3B0400G220/U	40 HP	7	NEMA 12	105A	Yes	Yes	30 x 70.5 x 13.5	762 x 1790.7 x 342.9	200 lb	90.72 kg
HVFD3B3B0400G320/U	40 HP	7	NEMA 3R	105A	Yes	Yes	28.5 x 48 x 12.5	711.2 x 1219.2 x 317.5	185 lb	83.91 kg
HVFD3B3B0500G120/U	50 HP	8	NEMA 1	140A	No	—	25 x 60 x 15.2	635 x 1524 x 386.08	250 lb	113.4 kg
HVFD3B3B0500G220/U	50 HP	8	NEMA 12	140A	No	—	40.5 x 60 x 12.5	1028.7 x 1524 x 317.5	350 lb	158.76 kg
HVFD3B3B0500G320/U	50 HP	8	NEMA 3R	140A	No	—	60 x 41 x 14	1524 x 1041 x 356	185 lb	83.91 kg
HVFD3B3B0600G120/U	60 HP	8	NEMA 1	170A	No	—	25 x 60 x 15.2	635 x 1524 x 386.08	265 lb	120.2 kg
HVFD3B3B0600G220/U	60 HP	8	NEMA 12	170A	No	—	40.5 x 60 x 12.5	1028.7 x 1524 x 317.5	350 lb	158.76 kg
HVFD3B3B0600G320/U	60 HP	8	NEMA 3R	170A	No	—	60 x 41 x 14	1524 x 1041 x 356	185 lb	83.91 kg
HVFD3B3B0750G120/U	75 HP	8	NEMA 1	205A	No	—	25 x 60 x 15.2	635 x 1524 x 386.08	280 lb	127.01 kg
HVFD3B3B0750G220/U	75 HP	8	NEMA 12	205A	No	—	40.5 x 60 x 12.5	1028.7 x 1524 x 317.5	350 lb	158.76 kg
HVFD3B3B0750G320/U	75 HP	8	NEMA 3R	205A	No	—	60 x 41 x 14	1524 x 1041 x 356	185 lb	83.91 kg

SmartVFD HVAC Drives with Bypass and/or Disconnect

Voltage: 230 Vac; **Configuration:** Drive with 3 Contactor Bypass; **Auto Bypass:** No; **Disconnect Type:** Fused; **Drive Input Fuses:** Yes; **Pilot Lights:** Yes

Product Number	Horsepower	Frame Type	Type of Enclosure	Current Ratings	Dimensions, Approximate		Weight	
					(inch)	(mm)	(lb)	(kg)
HVFDSB3B0007G130/U	0.75 HP	4	NEMA 1	3.7A	8.9 x 38.9 x 10.3	226.06 x 988.06 x 261.62	44 lb	19.96 kg
HVFDSB3B0007G230/U	0.75 HP	4	NEMA 12	3.7A	16 x 37.5 x 11	406.4 x 952.5 x 279.4	55 lb	24.95 kg
HVFDSB3B0007G330/U	0.75 HP	4	NEMA 3R	3.7A	24.5 x 24 x 12	622.3 x 609.6 x 304.8	54 lb	24.49 kg
HVFDSB3B0010G130/U	1 HP	4	NEMA 1	4.8A	8.9 x 38.9 x 10.3	226.06 x 988.06 x 261.62	44 lb	19.96 kg
HVFDSB3B0010G230/U	1 HP	4	NEMA 12	4.8A	16 x 37.5 x 11	406.4 x 952.5 x 279.4	55 lb	24.95 kg
HVFDSB3B0010G330/U	1 HP	4	NEMA 3R	4.8A	24.5 x 24 x 12	622.3 x 609.6 x 304.8	54 lb	24.49 kg
HVFDSB3B0015G130/U	1.5 HP	4	NEMA 1	6.6A	8.9 x 38.9 x 10.3	226.06 x 988.06 x 261.62	44 lb	19.96 kg
HVFDSB3B0015G230/U	1.5 HP	4	NEMA 12	6.6A	16 x 37.5 x 11	406.4 x 952.5 x 279.4	55 lb	24.95 kg
HVFDSB3B0015G330/U	1.5 HP	4	NEMA 3R	6.6A	24.5 x 24 x 12	622.3 x 609.6 x 304.8	54 lb	24.49 kg
HVFDSB3B0020G130/U	2 HP	4	NEMA 1	8A	8.9 x 38.9 x 10.3	226.06 x 988.06 x 261.62	44 lb	19.96 kg
HVFDSB3B0020G230/U	2 HP	4	NEMA 12	8A	16 x 37.5 x 11	406.4 x 952.5 x 279.4	55 lb	24.95 kg
HVFDSB3B0020G330/U	2 HP	4	NEMA 3R	8A	24.5 x 24 x 12	622.3 x 609.6 x 304.8	54 lb	24.49 kg
HVFDSB3B0030G130/U	3 HP	4	NEMA 1	11A	8.9 x 38.9 x 10.3	226.06 x 988.06 x 261.62	44 lb	19.96 kg
HVFDSB3B0030G230/U	3 HP	4	NEMA 12	11A	16 x 37.5 x 11	406.4 x 952.5 x 279.4	55 lb	24.95 kg
HVFDSB3B0030G330/U	3 HP	4	NEMA 3R	11A	24.5 x 24 x 12	622.3 x 609.6 x 304.8	54 lb	24.49 kg
HVFDSB3B0050G130/U	5 HP	5	NEMA 1	18A	8.9 x 41.7 x 10.3	226.06 x 1059.1 x 261.62	55 lb	24.95 kg
HVFDSB3B0050G230/U	5 HP	5	NEMA 12	18A	16 x 41 x 11	406 x 1041.4 x 279.4	70 lb	31.75 kg
HVFDSB3B0050G330/U	5 HP	5	NEMA 3R	18A	28.5 x 30 x 12	723.9 x 762 x 304.8	78 lb	35.38 kg
HVFDSB3B0075G130/U	7.5 HP	5	NEMA 1	24A	8.9 x 41.7 x 10.3	226.06 x 1059.1 x 261.62	57 lb	25.85 kg
HVFDSB3B0075G230/U	7.5 HP	5	NEMA 12	24A	16 x 41 x 11	406 x 1041.4 x 279.4	70 lb	31.75 kg
HVFDSB3B0075G330/U	7.5 HP	5	NEMA 3R	24A	28.5 x 30 x 12	723.9 x 762 x 304.8	78 lb	35.38 kg
HVFDSB3B0100G130/U	10 HP	5	NEMA 1	31A	8.9 x 41.7 x 10.8	226.06 x 1059.1 x 274.32	59.5 lb	26.99 kg
HVFDSB3B0100G230/U	10 HP	5	NEMA 12	31A	16 x 45 x 11	406 x 1143 x 279.4	84 lb	38.1 kg
HVFDSB3B0100G330/U	10 HP	5	NEMA 3R	31A	28.5 x 24 x 10	723.9 x 762 x 304.8	78 lb	35.38 kg
HVFDSB3B0150G130/U	15 HP	6	NEMA 1	48A	12.4 x 55 x 11.3	315 x 1397 x 287	98 lb	44.5 kg
HVFDSB3B0150G230/U	15 HP	6	NEMA 12	48A	16 x 50.5 x 13	406.4 x 1282.7 x 256.54	125 lb	56.7 kg
HVFDSB3B0150G330/U	15 HP	6	NEMA 3R	48A	34.5 x 36 x 12	867.3 x 914.4 x 304.8	124 lb	56.25 kg
HVFDSB3B0200G130/U	20 HP	6	NEMA 1	62A	12.4 x 55 x 11.3	315 x 1397 x 287	98 lb	44.5 kg
HVFDSB3B0200G230/U	20 HP	6	NEMA 12	62A	20 x 54.5 x 13	508 x 1384.3 x 330.2	140 lb	63.5 kg
HVFDSB3B0200G330/U	20 HP	6	NEMA 3R	62A	34.5 x 36 x 12	867.3 x 914.4 x 304.8	124 lb	56.25 kg
HVFDSB3B0250G130/U	25 HP	7	NEMA 1	75A	20.9 x 59.2 x 13.3	530 x 1503 x 338	135 lb	61.3 kg
HVFDSB3B0250G230/U	25 HP	7	NEMA 12	75A	20 x 58.5 x 13.5	508 x 1485.9 x 342.9	160 lb	72.57 kg
HVFDSB3B0250G330/U	25 HP	7	NEMA 3R	75A	28.5 x 48 x 14	711.2 x 1219.2 x 355.6	193 lb	87.54 kg
HVFDSB3B0300G130/U	30 HP	7	NEMA 1	88A	20.9 x 59.2 x 13.3	530 x 1503 x 338	150 lb	68.2 kg
HVFDSB3B0300G230/U	30 HP	7	NEMA 12	88A	24 x 65.5 x 13.5	609 x 1663.7 x 342.9	175 lb	79.38 kg
HVFDSB3B0300G330/U	30 HP	7	NEMA 3R	88A	28.5 x 48 x 14	711.2 x 1219.2 x 355.6	193 lb	87.54 kg
HVFDSB3B0400G130/U	40 HP	7	NEMA 1	105A	20.9 x 59.2 x 13.3	530.86 x 1503 x 338	170 lb	77.1 kg
HVFDSB3B0400G230/U	40 HP	7	NEMA 12	105A	30 x 70.5 x 13.5	762 x 1790.7 x 342.9	200 lb	90.72 kg
HVFDSB3B0400G330/U	40 HP	7	NEMA 3R	105A	28.5 x 48 x 14	711.2 x 1219.2 x 355.6	193 lb	87.54 kg
HVFDSB3B0500G130/U	50 HP	8	NEMA 1	140A	25 x 70 x 16.2	635 x 1778 x 411	286 lb	130 kg
HVFDSB3B0500G230/U	50 HP	8	NEMA 12	140A	40.5 x 60 x 14	1028.7 x 1524 x 355.6	369 lb	167.38 kg
HVFDSB3B0500G330/U	50 HP	8	NEMA 3R	140A	60 x 41 x 14	1524 x 1041 x 356	193 lb	87.54 kg
HVFDSB3B0600G130/U	60 HP	8	NEMA 1	170A	25 x 70 x 16.2	635 x 1778 x 411	295 lb	134 kg
HVFDSB3B0600G230/U	60 HP	8	NEMA 12	170A	40.5 x 60 x 14	1028.7 x 1524 x 355.6	369 lb	167.38 kg
HVFDSB3B0600G330/U	60 HP	8	NEMA 3R	170A	60 x 41 x 14	1524 x 1041 x 356	193 lb	87.54 kg
HVFDSB3B0750G130/U	75 HP	8	NEMA 1	205A	25 x 70 x 16.2	635 x 1778 x 411	331 lb	150 kg
HVFDSB3B0750G230/U	75 HP	8	NEMA 12	205A	40.5 x 60 x 14	1028.7 x 1524 x 355.6	369 lb	167.38 kg
HVFDSB3B0750G330/U	75 HP	8	NEMA 3R	205A	60 x 41 x 14	1524 x 1041 x 356	193 lb	87.54 kg

Product Selection - VFDs

SmartVFD HVAC Drives with Bypass and/or Disconnect

Voltage: 230 Vac; **Configuration:** Drive with 3 Contactor Bypass and Auto Bypass; **Auto Bypass:** Yes; **Disconnect Type:** Fused; **Drive Input Fuses:** Yes; **Pilot Lights:** Yes

Product Number	Horsepower	Frame Type	Type of Enclosure	Current Ratings	Dimensions, Approximate		Weight	
					(inch)	(mm)	(lb)	(kg)
HVFD3B3B0007G131/U	0.75 HP	4	NEMA 1	3.7A	8.9 x 38.7 x 10.4	226 x 983 x 264	44 lb	20 kg
HVFD3B3B0007G231/U	0.75 HP	4	NEMA 12	3.7A	16 x 37.5 x 11	406.4 x 952.5 x 279.4	55 lb	24.95 kg
HVFD3B3B0007G331/U	0.75 HP	4	NEMA 3R	3.7A	24.5 x 24 x 12	622.3 x 609.6 x 304.8	54 lb	24.49 kg
HVFD3B3B0010G131/U	1 HP	4	NEMA 1	4.8A	8.9 x 38.7 x 10.4	226 x 983 x 264	44 lb	20kg
HVFD3B3B0010G231/U	1 HP	4	NEMA 12	4.8A	16 x 37.5 x 11	406.4 x 952.5 x 279.4	55 lb	24.95 kg
HVFD3B3B0010G331/U	1 HP	4	NEMA 3R	4.8A	24.5 x 24 x 12	622.3 x 609.6 x 304.8	54 lb	24.49 kg
HVFD3B3B0015G131/U	1.5 HP	4	NEMA 1	6.6A	8.9 x 38.7 x 10.4	226 x 983 x 264	46 lb	20 kg
HVFD3B3B0015G231/U	1.5 HP	4	NEMA 12	6.6A	16 x 37.5 x 11	406.4 x 952.5 x 279.4	55 lb	24.95 kg
HVFD3B3B0015G331/U	1.5 HP	4	NEMA 3R	6.6A	24.5 x 24 x 12	622.3 x 609.6 x 304.8	54 lb	24.49 kg
HVFD3B3B0020G131/U	2 HP	4	NEMA 1	8A	8.9 x 38.7 x 10.4	226 x 983 x 264	44 lb	20 kg
HVFD3B3B0020G231/U	2 HP	4	NEMA 12	8A	16 x 37.5 x 11	406.4 x 952.5 x 279.4	55 lb	24.95 kg
HVFD3B3B0020G331/U	2 HP	4	NEMA 3R	8A	24.5 x 24 x 12	622.3 x 609.6 x 304.8	54 lb	24.49 kg
HVFD3B3B0030G131/U	3 HP	4	NEMA 1	11A	8.9 x 38.7 x 10.4	226 x 983 x 264	44 lb	20 kg
HVFD3B3B0030G231/U	3 HP	4	NEMA 12	11A	16 x 37.5 x 11	406.4 x 952.5 x 279.4	55 lb	24.95 kg
HVFD3B3B0030G331/U	3 HP	4	NEMA 3R	11A	24.5 x 24 x 12	622.3 x 609.6 x 304.8	54 lb	24.49 kg
HVFD3B3B0050G131/U	5 HP	5	NEMA 1	18A	8.9 x 41.5 x 10.4	226 x 1054 x 264	55 lb	24.9 kg
HVFD3B3B0050G231/U	5 HP	5	NEMA 12	18A	16 x 44 x 8.8	406 x 1041.4 x 279.4	70 lb	31.75 kg
HVFD3B3B0050G331/U	5 HP	5	NEMA 3R	18A	28.5 x 30 x 12	723.9 x 762 x 304.8	78 lb	35.38 kg
HVFD3B3B0075G131/U	7.5 HP	5	NEMA 1	24A	8.9 x 41.5 x 10.4	226 x 1054 x 264	58 lb	26 kg
HVFD3B3B0075G231/U	7.5 HP	5	NEMA 12	24A	16 x 41 x 11	406 x 1041.4 x 279.4	70 lb	31.75 kg
HVFD3B3B0075G331/U	7.5 HP	5	NEMA 3R	24A	28.5 x 30 x 12	723.9 x 762 x 304.8	78 lb	35.38 kg
HVFD3B3B0100G131/U	10 HP	5	NEMA 1	31A	8.9 x 41.5 x 10.4	226 x 1054 x 264	60 lb	27.2 kg
HVFD3B3B0100G231/U	10 HP	5	NEMA 12	31A	16 x 45 x 11	406 x 1143 x 279.4	84 lb	38.1 kg
HVFD3B3B0100G331/U	10 HP	5	NEMA 3R	31A	28.5 x 30 x 12	723.9 x 762 x 304.8	78 lb	35.38 kg
HVFD3B3B0150G131/U	15 HP	6	NEMA 1	48A	12.4 x 55 x 11.3	315 x 1397 x 287	98 lb	44.5 kg
HVFD3B3B0150G231/U	15 HP	6	NEMA 12	48A	16 x 50.5 x 13	406.4 x 1282.7 x 256.54	125 lb	56.7 kg
HVFD3B3B0150G331/U	15 HP	6	NEMA 3R	48A	34.5 x 36 x 12	867.3 x 914.4 x 304.8	124 lb	56.25 kg
HVFD3B3B0200G131/U	20 HP	6	NEMA 1	62A	12.4 x 55 x 11.3	315 x 1397 x 287	105 lb	47.6 kg
HVFD3B3B0200G231/U	20 HP	6	NEMA 12	62A	20 x 54.5 x 13	508 x 1384.3 x 330.2	140 lb	63.5 kg
HVFD3B3B0200G331/U	20 HP	6	NEMA 3R	62A	34.5 x 36 x 12	867.3 x 914.4 x 304.8	124 lb	56.25 kg
HVFD3B3B0250G131/U	25 HP	7	NEMA 1	75A	20.9 x 59.2 x 13.3	530 x 1503 x 338	135 lb	61.3 kg
HVFD3B3B0250G231/U	25 HP	7	NEMA 12	75A	20 x 58.5 x 13.5	508 x 1485.9 x 342.9	160 lb	72.57 kg
HVFD3B3B0250G331/U	25 HP	7	NEMA 3R	75A	28.5 x 48 x 14	711.2 x 1219.2 x 355.6	193 lb	87.54 kg
HVFD3B3B0300G131/U	30 HP	7	NEMA 1	88A	20.9 x 59.2 x 13.3	530 x 1503 x 338	150 lb	68.2 kg
HVFD3B3B0300G231/U	30 HP	7	NEMA 12	88A	24 x 65.5 x 13.5	609 x 1663.7 x 342.9	175 lb	79.38 kg
HVFD3B3B0300G331/U	30 HP	7	NEMA 3R	88A	28.5 x 48 x 14	711.2 x 1219.2 x 355.6	193 lb	87.54 kg
HVFD3B3B0400G131/U	40 HP	7	NEMA 1	105A	20.9 x 59.2 x 13.3	530.86 x 14503 x 338	170 lb	77.1 kg
HVFD3B3B0400G231/U	40 HP	7	NEMA 12	105A	30 x 70.5 x 13.5	762 x 1790.7 x 342.9	200 lb	90.72 kg
HVFD3B3B0400G331/U	40 HP	7	NEMA 3R	105A	28.5 x 48 x 14	711.2 x 1219.2 x 355.6	193 lb	87.54 kg
HVFD3B3B0500G131/U	50 HP	8	NEMA 1	140A	25 x 70 x 16.2	635 x 1778 x 411	286 lb	130 kg
HVFD3B3B0500G231/U	50 HP	8	NEMA 12	140A	40.5 x 60 x 14	1028.7 x 1524 x 355.6	369 lb	167.38 kg
HVFD3B3B0500G331/U	50 HP	8	NEMA 3R	140A	60 x 41 x 14.	1524 x 1041 x 356	193 lb	87.54 kg
HVFD3B3B0600G131/U	60 HP	8	NEMA 1	170A	25 x 70 x 16.2	635 x 1778 x 411	295 lb	134 kg
HVFD3B3B0600G231/U	60 HP	8	NEMA 12	170A	40.5 x 60 x 14	1028.7 x 1524 x 355.6	369 lb	167.38 kg
HVFD3B3B0600G331/U	60 HP	8	NEMA 3R	170A	60 x 41 x 14	1524 x 1041 x 356	193 lb	87.54 kg
HVFD3B3B0750G131/U	75 HP	8	NEMA 1	205A	25 x 70 x 16.2	635 x 1778 x 411	331 lb	150 kg
HVFD3B3B0750G231/U	75 HP	8	NEMA 12	205A	40.5 x 60 x 14	1028.7 x 1524 x 355.6	369 lb	167.38 kg
HVFD3B3B0750G331/U	75 HP	8	NEMA 3R	205A	60 x 41 x 14	1524 x 1041 x 356	193 lb	87.54 kg

SmartVFD HVAC Drives with Bypass and/or Disconnect

Voltage: 460 Vac; **Configuration:** Drive with Fused Disconnect; **Auto Bypass:** No; **Disconnect Type:** Fused; **Pilot Lights:** None

Product Number	Horsepower	Frame Type	Type of Enclosure	Current Ratings	Drive Input Disconnect	Drive Input Fuses	Dimensions, Approximate		Weight	
							(Inch)	(mm)	(lb)	(kg)
HVFD3C0015G110/U	1.5 HP	4	NEMA 1	3.4A	Yes	Yes	8.9 x 31.7 x 9.6	226 x 805 x 244	33 lb	15 kg
HVFD3C0015G210/U	1.5 HP	4	NEMA 12	3.4A	No	—	12 x 37.5 x 11	304.8 x 952.5 x 279.4	40 lb	18.14 kg
HVFD3C0015G310/U	1.5 HP	4	NEMA 3R	3.4A	No	—	20.5 x 20 x 12	520.7 x 208 x 304.8	43 lb	19.5 kg
HVFD3C0020G110/U	2 HP	4	NEMA 1	4.8A	Yes	Yes	8.9 x 31.9 x 10.3	226.06 x 810.26 x 261.62	33 lb	14.97 kg
HVFD3C0020G210/U	2 HP	4	NEMA 12	4.8A	No	—	8.9 x 38.9 x 10.3	226.06 x 810.26 x 261.62	40 lb	18.14 kg
HVFD3C0020G310/U	2 HP	4	NEMA 3R	4.8A	No	—	16 x 37.5 x 11	304.8 x 952.5 x 279.4	43 lb	19.5 kg
HVFD3C0030G110/U	3 HP	4	NEMA 1	5.6A	Yes	Yes	8.9 x 31.9 x 10.3	226.06 x 810.26 x 261.62	33 lb	14.97 kg
HVFD3C0030G210/U	3 HP	4	NEMA 12	5.6A	No	—	12 x 37.5 x 11	304.8 x 952.5 x 279.4	40 lb	18.14 kg
HVFD3C0030G310/U	3 HP	4	NEMA 3R	5.6A	No	—	20.5 x 20 x 12	520.7 x 208 x 304.8	43 lb	19.5 kg
HVFD3C0040G110/U	4 HP	4	NEMA 1	8A	Yes	Yes	8.9 x 31.9 x 10.3	226.06 x 810.26 x 261.62	33 lb	14.97 kg
HVFD3C0040G210/U	4 HP	4	NEMA 12	8A	No	—	12 x 37.5 x 11	304.8 x 952.5 x 279.4	40 lb	18.14 kg
HVFD3C0040G310/U	4 HP	4	NEMA 3R	8A	No	—	20.5 x 20 x 12	520.7 x 208 x 304.8	43 lb	19.5 kg
HVFD3C0050G110/U	5 HP	4	NEMA 1	9.6A	Yes	Yes	8.9 x 31.9 x 10.3	226.06 x 810.26 x 261.62	33 lb	14.97 kg
HVFD3C0050G210/U	5 HP	4	NEMA 12	9.6A	No	—	12 x 37.5 x 11	304.8 x 952.5 x 279.4	40 lb	18.14 kg
HVFD3C0050G310/U	5 HP	4	NEMA 3R	9.6A	No	—	20.5 x 20 x 12	520.7 x 208 x 304.8	43 lb	19.5 kg
HVFD3C0075G110/U	7.5 HP	4	NEMA 1	12A	Yes	Yes	8.9 x 31.9 x 10.3	226.06 x 810.26 x 261.62	33 lb	14.97 kg
HVFD3C0075G210/U	7.5 HP	4	NEMA 12	12A	No	—	12 x 37.5 x 11	304.8 x 952.5 x 279.4	40 lb	18.14 kg
HVFD3C0075G310/U	7.5 HP	4	NEMA 3R	12A	No	—	20.5 x 20 x 12	520.7 x 208 x 304.8	43 lb	19.5 kg
HVFD3C0100G110/U	10 HP	5	NEMA 1	16A	Yes	Yes	8.9 x 34.7 x 10.3	226.06 x 881.38 x 261.62	43 lb	19.5 kg
HVFD3C0100G210/U	10 HP	5	NEMA 12	16A	No	—	12 x 41 x 11	304.8 x 1041.4 x 279.4	72 lb	32.66 kg
HVFD3C0100G310/U	10 HP	5	NEMA 3R	16A	No	—	20.5 x 24 x 12	520.7 x 609.6 x 304.8	61 lb	27.67 kg
HVFD3C0150G110/U	15 HP	5	NEMA 1	23A	Yes	Yes	8.9 x 34.7 x 10.3	6.06 x 881.38 x 261.62	43 lb	19.5 kg
HVFD3C0150G210/U	15 HP	5	NEMA 12	23A	No	—	12 x 41 x 11	304.8 x 1041.4 x 279.4	72 lb	32.66 kg
HVFD3C0150G310/U	15 HP	5	NEMA 3R	23A	No	—	20.5 x 24 x 12	520.7 x 609.6 x 304.8	61 lb	27.67 kg
HVFD3C0200G110/U	20 HP	5	NEMA 1	31A	Yes	Yes	8.9 x 34.7 x 10.3	226.06 x 881.38 x 261.62	43 lb	19.5 kg
HVFD3C0200G210/U	20 HP	5	NEMA 12	31A	No	—	12 x 41 x 11	304.8 x 1041.4 x 279.4	72 lb	32.66 kg
HVFD3C0200G310/U	20 HP	5	NEMA 3R	31A	No	—	20.5 x 24 x 12	520.7 x 609.6 x 304.8	61 lb	27.67 kg
HVFD3C0250G110/U	25 HP	6	NEMA 1	38A	Yes	Yes	12.4 x 45.1 x 11.3	314.96 x 1145.5 x 287.02	50 lb	22.68 kg
HVFD3C0250G210/U	25 HP	6	NEMA 12	38A	No	—	12 x 46.5 x 13	304.8 x 1181.1 x 330.2	120 lb	54.43 kg
HVFD3C0250G310/U	25 HP	6	NEMA 3R	38A	No	—	28.5 x 36 x 10.5	723.9 x 914.4 x 266.7	118 lb	53.52 kg
HVFD3C0300G110/U	30 HP	6	NEMA 1	46A	Yes	Yes	12.4 x 45.1 x 11.3	314.96 x 1145.5 x 287.02	50 lb	22.68 kg
HVFD3C0300G210/U	30 HP	6	NEMA 12	46A	No	—	12 x 46.5 x 13	304.8 x 1181.1 x 330.2	120 lb	54.43 kg
HVFD3C0300G310/U	30 HP	6	NEMA 3R	46A	No	—	28.5 x 36 x 12	723.9 x 914.4 x 304.8	88 lb	39.92 kg
HVFD3C0400G110/U	40 HP	6	NEMA 1	61A	Yes	Yes	12.4 x 45.1 x 11.3	314.96 x 1145.5 x 287.02	50 lb	22.68 kg
HVFD3C0400G210/U	40 HP	6	NEMA 12	61A	No	—	12 x 46.5 x 13	304.8 x 1181.1 x 330.2	136 lb	61.69 kg
HVFD3C0400G310/U	40 HP	6	NEMA 3R	61A	No	—	28.5 x 36 x 12	723.9 x 914.4 x 304.8	88 lb	39.92 kg
HVFD3C0500G110/U	50 HP	7	NEMA 1	72A	Yes	Yes	20.8 x 51.5 x 13.2	528.32 x 1308.1 x 335.28	100 lb	45.36 kg
HVFD3C0500G210/U	50 HP	7	NEMA 12	72A	No	—	16 x 50.5 x 13.5	406.4 x 1282.7 x 342.9	145 lb	65.77 kg
HVFD3C0500G310/U	50 HP	7	NEMA 3R	72A	No	—	28.5 x 48 x 14	723.9 x 1219.2 x 355.6	149 lb	67.59 kg
HVFD3C0600G110/U	60 HP	7	NEMA 1	87A	Yes	Yes	20.8 x 51.5 x 13.2	528.32 x 1308.1 x 335.28	100 lb	45.36 kg
HVFD3C0600G210/U	60 HP	7	NEMA 12	87A	No	—	16 x 50.5 x 13.5	406.4 x 1282.7 x 342.9	160 lb	72.57 kg
HVFD3C0600G310/U	60 HP	7	NEMA 3R	87A	No	—	28.5 x 48 x 14	723.9 x 1219.2 x 355.6	149 lb	67.59 kg
HVFD3C0750G110/U	75 HP	7	NEMA 1	105A	Yes	Yes	20.8 x 51.5 x 13.2	528.32 x 1308.1 x 335.28	100 lb	45.36 kg
HVFD3C0750G210/U	75 HP	7	NEMA 12	105A	No	—	16 x 50.5 x 13.5	406.4 x 1282.7 x 342.9	193 lb	87.54 kg
HVFD3C0750G310/U	75 HP	7	NEMA 3R	105A	No	—	28.5 x 48 x 14	723.9 x 1219.2 x 355.6	149 lb	67.59 kg
HVFD3C1000G110/U	100 HP	8	NEMA 1	140A	Yes	Yes	25 x 60 x 16.2	635 x 1524 x 411.48	200 lb	90.72 kg
HVFD3C1000G210/U	100 HP	8	NEMA 12	140A	Yes	Yes	20 x 64 x 15.1	508 x 1625.6 x 383.5	280 lb	127.00 kg
HVFD3C1000G310/U	100 HP	8	NEMA 3R	140A	Yes	Yes	40.5 x 60 x 14	1028.7 x 1524 x 355.6	340 lb	154.22 kg
HVFD3C1250G110/U	120 HP	8	NEMA 1	170A	Yes	Yes	25 x 60 x 16.2	635 x 1524 x 411.5	265 lb	120.2 kg
HVFD3C1250G210/U	120 HP	8	NEMA 12	170A	Yes	Yes	20 x 64 x 15.1	508 x 1625.6 x 383.5	280 lb	127.00 kg
HVFD3C1250G310/U	120 HP	8	NEMA 3R	170A	Yes	Yes	48 x 36 x 16	1219 x 914 x 406	375 lb	170.1 kg
HVFD3C1500G110/U	150 HP	8	NEMA 1	205A	Yes	Yes	25 x 60 x 16.2	635 x 1524 x 411.5	280 lb	127 kg
HVFD3C1500G210/U	150 HP	8	NEMA 12	205A	Yes	Yes	20 x 64 x 15.1	508 x 1625.6 x 383.5	280 lb	127.00 kg
HVFD3C1500G310/U	150 HP	8	NEMA 3R	205A	Yes	Yes	48 x 36 x 16	1219 x 914 x 406	375 lb	170.1 kg

Product Selection - VFDs

SmartVFD HVAC Drives with Bypass and/or Disconnect

Voltage: 460 Vac; **Configuration:** Drive with 2 Contactor Bypass; **Auto Bypass:** No; **Disconnect Type:** Fused; **Pilot Lights:** None

Product Number	Horsepower	Frame Type	Type of Enclosure	Current Ratings	Drive Input Disconnect	Drive Input Fuses	Dimensions, Approximate		Weight	
							(inch)	(mm)	(lb)	(kg)
HVFSB3C0015G120/U	1.5 HP	4	NEMA 1	3.4A	No	—	8.9 x 319. x 9.6	226.06 x 805.18 x 243.84	38 lb	17.24 kg
HVFSB3C0015G220/U	1.5 HP	4	NEMA 12	3.4A	Yes	Yes	16 x 37.5 x 11	406.4 x 952.5 x 279.4	53 lb	24.04 kg
HVFSB3C0015G320/U	1.5 HP	4	NEMA 3R	3.4A	Yes	Yes	24.5 x 24 x 10.5	622.3 x 609.6 x 266.7	49 lb	22.23 kg
HVFSB3C0020G120/U	2 HP	4	NEMA 1	4.8A	No	—	8.9 x 319. x 9.6	226.06 x 805.18 x 243.84	38 lb	17.24 kg
HVFSB3C0020G220/U	2 HP	4	NEMA 12	4.8A	Yes	Yes	12 x 37.5 x 11	304.8 x 952.5 x 279.4	53 lb	24.04 kg
HVFSB3C0020G320/U	2 HP	4	NEMA 3R	4.8A	Yes	Yes	20.5 x 20 x 12	520.7 x 208 x 304.8	49 lb	22.23 kg
HVFSB3C0030G120/U	3 HP	4	NEMA 1	5.6A	No	—	8.9 x 319. x 9.6	226.06 x 805.18 x 243.84	38 lb	17.24 kg
HVFSB3C0030G220/U	3 HP	4	NEMA 12	5.6A	Yes	Yes	16 x 37.5 x 11	406.4 x 952.5 x 279.4	53 lb	24.04 kg
HVFSB3C0030G320/U	3 HP	4	NEMA 3R	5.6A	Yes	Yes	24.5 x 24 x 10.5	622.3 x 609.6 x 266.7	49 lb	22.23 kg
HVFSB3C0040G120/U	4 HP	4	NEMA 1	8A	No	—	8.9 x 319. x 9.6	226.06 x 805.18 x 243.84	38 lb	17.24 kg
HVFSB3C0040G220/U	4 HP	4	NEMA 12	8A	Yes	Yes	16 x 37.5 x 11	406.4 x 952.5 x 279.4	53 lb	24.04 kg
HVFSB3C0040G320/U	4 HP	4	NEMA 3R	8A	Yes	Yes	24.5 x 24 x 10.5	622.3 x 609.6 x 266.7	49 lb	22.23 kg
HVFSB3C0050G120/U	5 HP	4	NEMA 1	9.6A	No	—	8.9 x 319. x 9.6	226.06 x 805.18 x 243.84	38 lb	17.24 kg
HVFSB3C0050G220/U	5 HP	4	NEMA 12	9.6A	Yes	Yes	16 x 37.5 x 11	406.4 x 952.5 x 279.4	53 lb	24.04 kg
HVFSB3C0050G320/U	5 HP	4	NEMA 3R	9.6A	Yes	Yes	24.5 x 24 x 10.5	622.3 x 609.6 x 266.7	49 lb	22.23 kg
HVFSB3C0075G120/U	7.5 HP	4	NEMA 1	12A	No	—	8.9 x 319. x 9.6	226.06 x 805.18 x 243.84	38 lb	17.24 kg
HVFSB3C0075G220/U	7.5 HP	4	NEMA 12	12A	Yes	Yes	16 x 37.5 x 11	406.4 x 952.5 x 279.4	53 lb	24.04 kg
HVFSB3C0075G320/U	7.5 HP	4	NEMA 3R	12A	Yes	Yes	24.5 x 24 x 10.5	622.3 x 609.6 x 266.7	49 lb	22.23 kg
HVFSB3C0100G120/U	10 HP	4	NEMA 1	16A	No	—	8.9 x 34.7 x 9.6	226.06 x 876.3 x 243.84	48 lb	21.77 kg
HVFSB3C0100G220/U	10 HP	5	NEMA 12	16A	Yes	Yes	16 x 44 x 8.8	406.4 x 1041.4 x 279.4	64 lb	29.03 kg
HVFSB3C0100G320/U	10 HP	5	NEMA 3R	16A	Yes	Yes	24.5 x 24 x 10.5	622.3 x 609.6 x 266.7	72 lb	32.66 kg
HVFSB3C0150G120/U	15 HP	5	NEMA 1	23A	No	—	8.9 x 34.7 x 9.6	226.06 x 876.3 x 243.84	50 lb	22.68 kg
HVFSB3C0150G220/U	15 HP	5	NEMA 12	23A	Yes	Yes	16 x 41 x 11	406.4 x 1041.4 x 279.4	64 lb	29.03 kg
HVFSB3C0150G320/U	15 HP	5	NEMA 3R	23A	Yes	Yes	24.5 x 24 x 10.5	622.3 x 609.6 x 266.7	72 lb	32.66 kg
HVFSB3C0200G120/U	20 HP	5	NEMA 1	31A	No	—	8.9 x 34.7 x 9.6	226.06 x 876.3 x 243.84	50 lb	22.68 kg
HVFSB3C0200G220/U	20 HP	5	NEMA 12	31A	Yes	Yes	16 x 45 x 11	406.4 x 1143 x 279.4	76 lb	34.47 kg
HVFSB3C0200G320/U	20 HP	5	NEMA 3R	31A	Yes	Yes	24.5 x 24 x 10.5	622.3 x 609.6 x 266.7	72 lb	32.66 kg
HVFSB3C0250G120/U	25 HP	6	NEMA 1	38A	No	—	12.4 x 45.1 x 10.1	314.96 x 1143 x 256.54	55 lb	24.95 kg
HVFSB3C0250G220/U	25 HP	6	NEMA 12	38A	Yes	Yes	16 x 50.5 x 13	406.4 x 1282.7 x 330.2	120 lb	54.43 kg
HVFSB3C0250G320/U	25 HP	6	NEMA 3R	38A	Yes	Yes	34.5 x 36 x 10	876.3 x 914.4 x 254	194 lb	88.2 kg
HVFSB3C0300G120/U	30 HP	6	NEMA 1	46A	No	—	12.4 x 45.1 x 10.1	314.96 x 1143 x 256.54	59 lb	26.76 kg
HVFSB3C0300G220/U	30 HP	6	NEMA 12	46A	Yes	Yes	16 x 50.5 x 13	406.4 x 1282.7 x 330.2	120 lb	54.43 kg
HVFSB3C0300G320/U	30 HP	6	NEMA 3R	46A	Yes	Yes	28.5 x 36 x 10.5	723.9 x 914.4 x 266.7	118 lb	53.52 kg
HVFSB3C0400G120/U	40 HP	6	NEMA 1	61A	No	—	12.4 x 45.1 x 10.1	314.96 x 1143 x 256.54	59 lb	26.76 kg
HVFSB3C0400G220/U	40 HP	6	NEMA 12	61A	Yes	Yes	16 x 50.5 x 13	406.4 x 1282.7 x 330.2	136 lb	61.69 kg
HVFSB3C0400G320/U	40 HP	6	NEMA 3R	61A	Yes	Yes	28.5 x 36 x 10.5	723.9 x 914.4 x 266.7	118 lb	53.52 kg
HVFSB3C0500G120/U	50 HP	7	NEMA 1	72A	No	—	20.8 x 51.5 x 12.2	530.86 x 1313.18 x 309.88	169 lb	76.66 kg
HVFSB3C0500G220/U	50 HP	7	NEMA 12	72A	Yes	Yes	20 x 58.5 x 13.5	508 x 1485.9 x 342.9	150 lb	68.04 kg
HVFSB3C0500G320/U	50 HP	7	NEMA 3R	72A	Yes	Yes	28.5 x 48 x 12.5	723.9 x 1219.2 x 317.5	185 lb	83.91 kg
HVFSB3C0600G120/U	60 HP	7	NEMA 1	87A	No	—	20.8 x 51.5 x 12.2	530.86 x 1313.18 x 309.88	179 lb	81.19 kg
HVFSB3C0600G220/U	60 HP	7	NEMA 12	87A	Yes	Yes	20 x 58.5 x 13.5	508 x 1485.9 x 342.9	165 lb	74.84 kg
HVFSB3C0600G320/U	60 HP	7	NEMA 3R	87A	Yes	Yes	28.5 x 48 x 12.5	723.9 x 1219.2 x 317.5	185 lb	83.91 kg
HVFSB3C0750G120/U	75 HP	7	NEMA 1	105A	No	—	20.8 x 51.5 x 12.2	530.86 x 1313.18 x 309.88	189 lb	85.73 kg
HVFSB3C0750G220/U	75 HP	7	NEMA 12	105A	Yes	Yes	20 x 58.5 x 13.5	508 x 1485.9 x 342.9	193 lb	87.54 kg
HVFSB3C0750G320/U	75 HP	7	NEMA 3R	105A	Yes	Yes	28.5 x 48 x 12.5	723.9 x 1219.2 x 317.5	185 lb	83.91 kg
HVFSB3C1000G120/U	100 HP	8	NEMA 1	140A	No	—	25 x 60 x 15.2	635 x 1524 x 386.08	250 lb	113.4 kg
HVFSB3C1000G220/U	100 HP	8	NEMA 12	140A	No	—	56 x 48 x 15.1	1422 x 1219 x 384	350 lb	158.76 kg
HVFSB3C1000G320/U	100 HP	8	NEMA 3R	140A	No	—	40.5 x 60 x 12.5	1028.7 x 1524 x 317.5	430 lb	195.04 kg
HVFSB3C1250G120/U	120 HP	8	NEMA 1	170A	No	—	25 x 60 x 16.2	635 x 1524 x 411.5	265 lb	120.2 kg
HVFSB3C1250G220/U	120 HP	8	NEMA 12	170A	No	—	56 x 48 x 15.1	1422 x 1219 x 384	350 lb	158.76 kg
HVFSB3C1250G320/U	120 HP	8	NEMA 3R	170A	No	—	60 x 41 x 14	1524 x 1041 x 356	451 lb	204.6 kg
HVFSB3C1500G120/U	150 HP	8	NEMA 1	205A	No	—	25 x 60 x 16.2	635 x 1524 x 411.5	280 lb	127 kg
HVFSB3C1500G220/U	150 HP	8	NEMA 12	205A	No	—	56 x 48 x 15.1	1422 x 1219 x 384	350 lb	158.76 kg
HVFSB3C1500G320/U	150 HP	8	NEMA 3R	205A	No	—	60 x 41 x 14	1524 x 1041 x 356	451 lb	204.6 kg

SmartVFD HVAC Drives with Bypass and/or Disconnect

Voltage: 460 Vac; **Configuration:** Drive with 3 Contactor Bypass; **Auto Bypass:** No; **Disconnect Type:** Fused; **Drive Input Fuses:** Yes; **Pilot Lights:** Yes

Product Number	Horsepower	Frame Type	Type of Enclosure	Current Ratings	Dimensions, Approximate		Weight	
					(inch)	(mm)	(lb)	(kg)
HVFD3B3C0015G130/U	1.5 HP	4	NEMA 1	3.4A	8.9 x 38.9 x 10.3	226.06 x 810.26 x 261.62	44 lb	19.96 kg
HVFD3B3C0015G230/U	1.5 HP	4	NEMA 12	3.4A	16 x 37.5 x 11	304.8 x 952.5 x 279.4	53 lb	24.04 kg
HVFD3B3C0015G330/U	1.5 HP	4	NEMA 3R	3.4A	24.5 x 24 x 12	622.3 x 609.6 x 304.8	54 lb	24.49 kg
HVFD3B3C0020G130/U	2 HP	4	NEMA 1	4.8A	8.9 x 38.9 x 10.3	226.06 x 810.26 x 261.62	44 lb	19.96 kg
HVFD3B3C0020G230/U	2 HP	4	NEMA 12	4.8A	16 x 37.5 x 11	406.4 x 952.5 x 279.4	53 lb	24.04 kg
HVFD3B3C0020G330/U	2 HP	4	NEMA 3R	4.8A	24.5 x 24 x 10.5	622.3 x 609.6 x 266.7	54 lb	24.49 kg
HVFD3B3C0030G130/U	3 HP	4	NEMA 1	5.6A	8.9 x 38.9 x 10.3	226.06 x 810.26 x 261.62	44 lb	19.96 kg
HVFD3B3C0030G230/U	3 HP	4	NEMA 12	5.6A	16 x 37.5 x 11	304.8 x 952.5 x 279.4	53 lb	24.04 kg
HVFD3B3C0030G330/U	3 HP	4	NEMA 3R	5.6A	24.5 x 24 x 12	622.3 x 609.6 x 304.8	54 lb	24.49 kg
HVFD3B3C0040G130/U	4 HP	4	NEMA 1	8A	8.9 x 38.9 x 10.3	226.06 x 810.26 x 261.62	44 lb	19.96 kg
HVFD3B3C0040G230/U	4 HP	4	NEMA 12	8A	16 x 37.5 x 11	304.8 x 952.5 x 279.4	53 lb	24.04 kg
HVFD3B3C0040G330/U	4 HP	4	NEMA 3R	8A	24.5 x 24 x 12	622.3 x 609.6 x 304.8	54 lb	24.49 kg
HVFD3B3C0050G130/U	5 HP	4	NEMA 1	9.6A	8.9 x 38.9 x 10.3	226.06 x 810.26 x 261.62	44 lb	19.96 kg
HVFD3B3C0050G230/U	5 HP	4	NEMA 12	9.6A	16 x 37.5 x 11	304.8 x 952.5 x 279.4	53 lb	24.04 kg
HVFD3B3C0050G330/U	5 HP	4	NEMA 3R	9.6A	24.5 x 24 x 12	622.3 x 609.6 x 304.8	54 lb	24.49 kg
HVFD3B3C0075G130/U	7.5 HP	4	NEMA 1	12A	8.9 x 38.9 x 10.3	226.06 x 810.26 x 261.62	44 lb	19.96 kg
HVFD3B3C0075G230/U	7.5 HP	4	NEMA 12	12A	16 x 37.5 x 11	406.4 x 952.5 x 279.4	53 lb	24.04 kg
HVFD3B3C0075G330/U	7.5 HP	4	NEMA 3R	12A	24.5 x 24 x 12	622.3 x 609.6 x 304.8	54 lb	24.49 kg
HVFD3B3C0100G130/U	10 HP	5	NEMA 1	16A	8.9 x 41.7 x 10.3	226.06 x 881.38 x 261.62	55 lb	24.95 kg
HVFD3B3C0100G230/U	10 HP	5	NEMA 12	16A	16 x 41 x 11	406.4 x 1041.4 x 279.4	64 lb	29.03 kg
HVFD3B3C0100G330/U	10 HP	5	NEMA 3R	16A	28.5 x 30 x 12	723.9 x 762 x 304.8	78 lb	35.38 kg
HVFD3B3C0150G130/U	15 HP	5	NEMA 1	23A	8.9 x 41.7 x 10.3	226.06 x 881.38 x 261.62	57 lb	25.85 kg
HVFD3B3C0150G230/U	15 HP	5	NEMA 12	23A	16 x 41 x 11	406.4 x 1041.4 x 279.4	64 lb	29.03 kg
HVFD3B3C0150G330/U	15 HP	5	NEMA 3R	23A	28.5 x 30 x 12	723.9 x 762 x 304.8	78 lb	35.38 kg
HVFD3B3C0200G130/U	20 HP	5	NEMA 1	31A	8.9 x 41.7 x 10.8	226.06 x 881.38 x 274.32	59 lb	26.76 kg
HVFD3B3C0200G230/U	20 HP	5	NEMA 12	31A	16 x 45 x 11	406.4 x 1143 x 279.4	76 lb	34.47 kg
HVFD3B3C0200G330/U	20 HP	5	NEMA 3R	31A	28.5 x 30 x 12	723.9 x 762 x 304.8	78 lb	35.38 kg
HVFD3B3C0250G130/U	25 HP	6	NEMA 1	38A	12.4 x 55.2 x 11.3	314.96 x 1145.5 x 287.02	94.5 lb	42.86 kg
HVFD3B3C0250G230/U	25 HP	6	NEMA 12	38A	16 x 50.5 x 13	406.4 x 1282.7 x 330.2	120 lb	54.43 kg
HVFD3B3C0250G330/U	25 HP	6	NEMA 3R	38A	34.5 x 36 x 12	723.9 x 914.4 x 304.8	124 lb	56.25 kg
HVFD3B3C0300G130/U	30 HP	6	NEMA 1	46A	12.4 x 55.2 x 11.3	314.96 x 1145.5 x 287.02	98.5 lb	44.68 kg
HVFD3B3C0300G230/U	30 HP	6	NEMA 12	46A	16 x 50.5 x 13	406.4 x 1282.7 x 330.2	120 lb	54.43 kg
HVFD3B3C0300G330/U	30 HP	6	NEMA 3R	46A	34.5 x 36 x 12	723.9 x 914.4 x 304.8	124 lb	56.25 kg
HVFD3B3C0400G130/U	40 HP	6	NEMA 1	61A	12.4 x 55.2 x 11.3	314.96 x 1145.5 x 287.02	105.5 lb	47.85 kg
HVFD3B3C0400G230/U	40 HP	6	NEMA 12	61A	16 x 50.5 x 13	406.4 x 1282.7 x 330.2	136 lb	61.69 kg
HVFD3B3C0400G330/U	40 HP	6	NEMA 3R	61A	34.5 x 36 x 12	723.9 x 914.4 x 304.8	124 lb	56.25 kg
HVFD3B3C0500G130/U	50 HP	7	NEMA 1	72A	20.8 x 59 x 13.2	528.32 x 1308.1 x 335.28	175 lb	79.38 kg
HVFD3B3C0500G230/U	50 HP	7	NEMA 12	72A	20 x 58.5 x 13.5	508 x 1485.9 x 342.9	150 lb	68.04 kg
HVFD3B3C0500G330/U	50 HP	7	NEMA 3R	72A	40.5 x 48 x 14	1028.7 x 1219.2 x 355.6	193 lb	87.54 kg
HVFD3B3C0600G130/U	60 HP	7	NEMA 1	87A	20.8 x 59 x 13.2	528.32 x 1308.1 x 335.28	184 lb	83.46 kg
HVFD3B3C0600G230/U	60 HP	7	NEMA 12	87A	20 x 58.5 x 13.5	508 x 1485.9 x 342.9	165 lb	74.84 kg
HVFD3B3C0600G330/U	60 HP	7	NEMA 3R	87A	40.5 x 48 x 14	1028.7 x 1219.2 x 355.6	193 lb	87.54 kg
HVFD3B3C0750G130/U	75 HP	7	NEMA 1	105A	20.8 x 59 x 13.2	528.32 x 1308.1 x 335.28	195 lb	88.45 kg
HVFD3B3C0750G230/U	75 HP	7	NEMA 12	105A	20 x 58.5 x 13.5	508 x 1485.9 x 342.9	193 lb	87.54 kg
HVFD3B3C0750G330/U	75 HP	7	NEMA 3R	105A	40.5 x 48 x 14	1028.7 x 1219.2 x 355.6	193 lb	87.54 kg
HVFD3B3C1000G130/U	100 HP	8	NEMA 1	140A	25 x 70 x 16.2	635 x 1524 x 411.48	285 lb	129.27 kg
HVFD3B3C1000G230/U	100 HP	8	NEMA 12	140A	56 x 48 x 15.1	1422 x 1219 x 384	369 lb	158.76 kg
HVFD3B3C1000G330/U	100 HP	8	NEMA 3R	140A	40.4 x 60 x 12	1026 x 1524 x 304.8	470 lb	213.2 kg
HVFD3B3C1250G130/U	120 HP	8	NEMA 1	170A	56 x 48 x 15.1	1422 x 1219 x 384	369 lb	167.4 kg
HVFD3B3C1250G230/U	120 HP	8	NEMA 12	170A	56 x 48 x 15.1	1422 x 1219 x 384	369 lb	158.76 kg
HVFD3B3C1250G330/U	120 HP	8	NEMA 3R	170A	40.4 x 60 x 12	1026 x 1524 x 304.8	470 lb	213.2 kg
HVFD3B3C1500G130/U	150 HP	8	NEMA 1	205A	56 x 48 x 15.1	1422 x 1219 x 384	369 lb	167.4 kg
HVFD3B3C1500G230/U	150 HP	8	NEMA 12	205A	56 x 48 x 15.1	1422 x 1219 x 384	369 lb	158.76 kg
HVFD3B3C1500G330/U	150 HP	8	NEMA 3R	205A	40.4 x 60 x 12	1026 x 1524 x 304.8	470 lb	213.2 kg

Product Selection - VFDs

SmartVFD HVAC Drives with Bypass and/or Disconnect

Voltage: 460 Vac; **Configuration:** Drive with 3 Contactor Bypass and Auto Bypass; **Auto Bypass:** Yes; **Disconnect Type:** Fused; **Drive Input Fuses:** Yes; **Pilot Lights:** Yes

Product Number	Horsepower	Frame Type	Type of Enclosure	Current Ratings	Dimensions, Approximate		Weight	
					(inch)	(mm)	(lb)	(kg)
HVFD3B3C0015G131/U	1.5 HP	4	NEMA 1	3.4A	8.9 x 38.9 x 10.3	226.06 x 810.26 x 261.62	46 lb	20.87 kg
HVFD3B3C0015G231/U	1.5 HP	4	NEMA 12	3.4A	16 x 37.5 x 11	304.8 x 952.5 x 279.4	53 lb	24.04 kg
HVFD3B3C0015G331/U	1.5 HP	4	NEMA 3R	3.4A	24.5 x 24 x 12	622.3 x 609.6 x 304.8	54 lb	24.49 kg
HVFD3B3C0020G131/U	2 HP	4	NEMA 1	8A	8.9 x 38.7 x 10.7	226.06 x 982.98 x 271.78	Call Customer Care	
HVFD3B3C0020G231/U	2 HP	4	NEMA 12	4.8A	16 x 37.5 x 11	304.8 x 952.5 x 279.4	53 lb	24.04 kg
HVFD3B3C0020G331/U	2 HP	4	NEMA 3R	4.8A	24.5 x 24 x 12	622.3 x 609.6 x 304.8	54 lb	24.49 kg
HVFD3B3C0030G131/U	3 HP	4	NEMA 1	5.6A	8.9 x 38.9 x 10.3	226.06 x 810.26 x 261.62	46 lb	20.87 kg
HVFD3B3C0030G231/U	3 HP	4	NEMA 12	5.6A	16 x 37.5 x 11	304.8 x 952.5 x 279.4	53 lb	24.04 kg
HVFD3B3C0030G331/U	3 HP	4	NEMA 3R	5.6A	24.5 x 24 x 12	622.3 x 609.6 x 304.8	54 lb	24.49 kg
HVFD3B3C0040G131/U	4 HP	4	NEMA 1	8A	8.9 x 38.9 x 10.3	226.06 x 810.26 x 261.62	46 lb	20.87 kg
HVFD3B3C0040G231/U	4 HP	4	NEMA 12	8A	16 x 37.5 x 11	304.8 x 952.5 x 279.4	53 lb	24.04 kg
HVFD3B3C0040G331/U	4 HP	4	NEMA 3R	8A	24.5 x 24 x 12	622.3 x 609.6 x 304.8	54 lb	24.49 kg
HVFD3B3C0050G131/U	5 HP	4	NEMA 1	9.6A	8.9 x 38.9 x 10.3	226.06 x 810.26 x 261.62	46 lb	20.87 kg
HVFD3B3C0050G231/U	5 HP	4	NEMA 12	9.6A	16 x 37.5 x 11	304.8 x 952.5 x 279.4	53 lb	24.04 kg
HVFD3B3C0050G331/U	5 HP	4	NEMA 3R	9.6A	24.5 x 24 x 12	622.3 x 609.6 x 304.8	54 lb	24.49 kg
HVFD3B3C0075G131/U	7.5 HP	4	NEMA 1	12A	8.9 x 38.9 x 10.3	226.06 x 810.26 x 261.62	46 lb	20.87 kg
HVFD3B3C0075G231/U	7.5 HP	4	NEMA 12	12A	16 x 37.5 x 11	406.4 x 952.5 x 279.4	53 lb	24.04 kg
HVFD3B3C0075G331/U	7.5 HP	4	NEMA 3R	12A	24.5 x 24 x 12	622.3 x 609.6 x 304.8	54 lb	24.49kg
HVFD3B3C0100G131/U	10 HP	5	NEMA 1	16A	8.9 x 41.7 x 10.3	226.06 x 881.38 x 261.62	55 lb	25.4 kg
HVFD3B3C0100G231/U	10 HP	5	NEMA 12	16A	16 x 41 x 11	406.4 x 1041.4 x 279.4	64 lb	29.03 kg
HVFD3B3C0100G331/U	10 HP	5	NEMA 3R	16A	28.5 x 30 x 12	723.9 x 762 x 304.8	78 lb	35.38 kg
HVFD3B3C0150G131/U	15 HP	5	NEMA 1	23A	8.9 x 41.7 x 10.3	226.06 x 881.38 x 261.62	56 lb	25.4 kg
HVFD3B3C0150G231/U	15 HP	5	NEMA 12	23A	16 x 41 x 11	406.4 x 1041.4 x 279.4	64 lb	29.03 kg
HVFD3B3C0150G331/U	15 HP	5	NEMA 3R	23A	28.5 x 30 x 12	723.9 x 762 x 304.8	78 lb	35.38 kg
HVFD3B3C0200G131/U	20 HP	5	NEMA 1	31A	8.9 x 41.7 x 10.8	226.06 x 881.38 x 274.32	60 lb	27.22 kg
HVFD3B3C0200G231/U	20 HP	5	NEMA 12	31A	16 x 45 x 11	406.4 x 1143 x 279.4	76 lb	34.47 kg
HVFD3B3C0200G331/U	20 HP	5	NEMA 3R	31A	28.5 x 30 x 12	723.9 x 762 x 304.8	78 lb	35.38 kg
HVFD3B3C0250G131/U	25 HP	6	NEMA 1	38A	12.4 x 55.2 x 11.3	314.96 x 1145.5 x 287.02	96.5 lb	43.77 kg
HVFD3B3C0250G231/U	25 HP	6	NEMA 12	38A	16 x 50.5 x 13	406.4 x 1282.7 x 330.2	120 lb	54.43 kg
HVFD3B3C0250G331/U	25 HP	6	NEMA 3R	38A	34.5 x 36 x 12	723.9 x 914.4 x 304.8	124 lb	56.25 kg
HVFD3B3C0300G131/U	30 HP	6	NEMA 1	46A	12.4 x 55.2 x 11.3	314.96 x 1145.5 x 287.02	100.5 lb	45.59 kg
HVFD3B3C0300G231/U	30 HP	6	NEMA 12	46A	16 x 50.5 x 13	406.4 x 1282.7 x 330.2	120 lb	54.43 kg
HVFD3B3C0300G331/U	30 HP	6	NEMA 3R	46A	34.5 x 36 x 12	723.9 x 914.4 x 304.8	124 lb	56.25 kg
HVFD3B3C0400G131/U	40 HP	6	NEMA 1	61A	12.4 x 55.2 x 11.3	314.96 x 1145.5 x 287.02	107.5 lb	48.76 kg
HVFD3B3C0400G231/U	40 HP	6	NEMA 12	61A	16 x 50.5 x 13	406.4 x 1282.7 x 330.2	136 lb	61.69 kg
HVFD3B3C0400G331/U	40 HP	6	NEMA 3R	61A	34.5 x 36 x 12	723.9 x 914.4 x 304.8	124 lb	56.25 kg
HVFD3B3C0500G131/U	50 HP	7	NEMA 1	72A	20.8 x 59 x 13.2	528.32 x 1308.1 x 335.28	177 lb	80.29 kg
HVFD3B3C0500G231/U	50 HP	7	NEMA 12	72A	20 x 58.5 x 13.5	508 x 1485.9 x 342.9	150 lb	68.04 kg
HVFD3B3C0500G331/U	50 HP	7	NEMA 3R	72A	40.5 x 48 x 14	1028.7 x 1219.2 x 355.6	193 lb	87.54 kg
HVFD3B3C0600G131/U	60 HP	7	NEMA 1	87A	20.8 x 59 x 13.2	528.32 x 1308.1 x 335.28	186 lb	84.37 kg
HVFD3B3C0600G231/U	60 HP	7	NEMA 12	87A	20 x 58.5 x 13.5	508 x 1485.9 x 342.9	165 lb	74.84 kg
HVFD3B3C0600G331/U	60 HP	7	NEMA 3R	87A	40.5 x 48 x 14	1028.7 x 1219.2 x 355.6	193 lb	87.54 kg
HVFD3B3C0750G131/U	75 HP	7	NEMA 1	105A	20.8 x 59 x 13.2	528.32 x 1308.1 x 335.28	197 lb	89.36 kg
HVFD3B3C0750G231/U	75 HP	7	NEMA 12	105A	20 x 58.5 x 13.5	508 x 1485.9 x 342.9	193 lb	87.54 kg
HVFD3B3C0750G331/U	75 HP	7	NEMA 3R	105A	40.5 x 48 x 14	1028.7 x 1219.2 x 355.6	193 lb	87.54 kg
HVFD3B3C1000G131/U	100 HP	8	NEMA 1	140A	25 x 70 x 16.2	635 x 1524 x 411.48	287 lb	130.18 kg
HVFD3B3C1000G231/U	100 HP	8	NEMA 12	140A	56 x 48 x 15.1	1422 x 1219 x 384	369 lb	158.76 kg
HVFD3B3C1000G331/U	100 HP	8	NEMA 3R	140A	40.4 x 60 x 12	1026 x 1524 x 304.8	470 lb	213.2 kg
HVFD3B3C1250G131/U	120 HP	8	NEMA 1	170A	56 x 48 x 15.1	1422 x 1219 x 384	369 lb	167.4 kg
HVFD3B3C1250G231/U	120 HP	8	NEMA 12	170A	56 x 48 x 15.1	1422 x 1219 x 384	369 lb	158.76 kg
HVFD3B3C1250G331/U	120 HP	8	NEMA 3R	170A	40.4 x 60 x 12	1026 x 1524 x 304.8	470 lb	213.2 kg
HVFD3B3C1500G131/U	150 HP	8	NEMA 1	205A	56 x 48 x 15.1	1422 x 1219 x 384	369 lb	167.4 kg
HVFD3B3C1500G231/U	150 HP	8	NEMA 12	205A	56 x 48 x 15.1	1422 x 1219 x 384	369 lb	158.76 kg
HVFD3B3C1500G331/U	150 HP	8	NEMA 3R	205A	40.4 x 60 x 12	1026 x 1524 x 304.8	470 lb	213.2 kg

Submittal Data - VFDs

SmartVFD HVAC Drives with Bypass and/or Disconnect



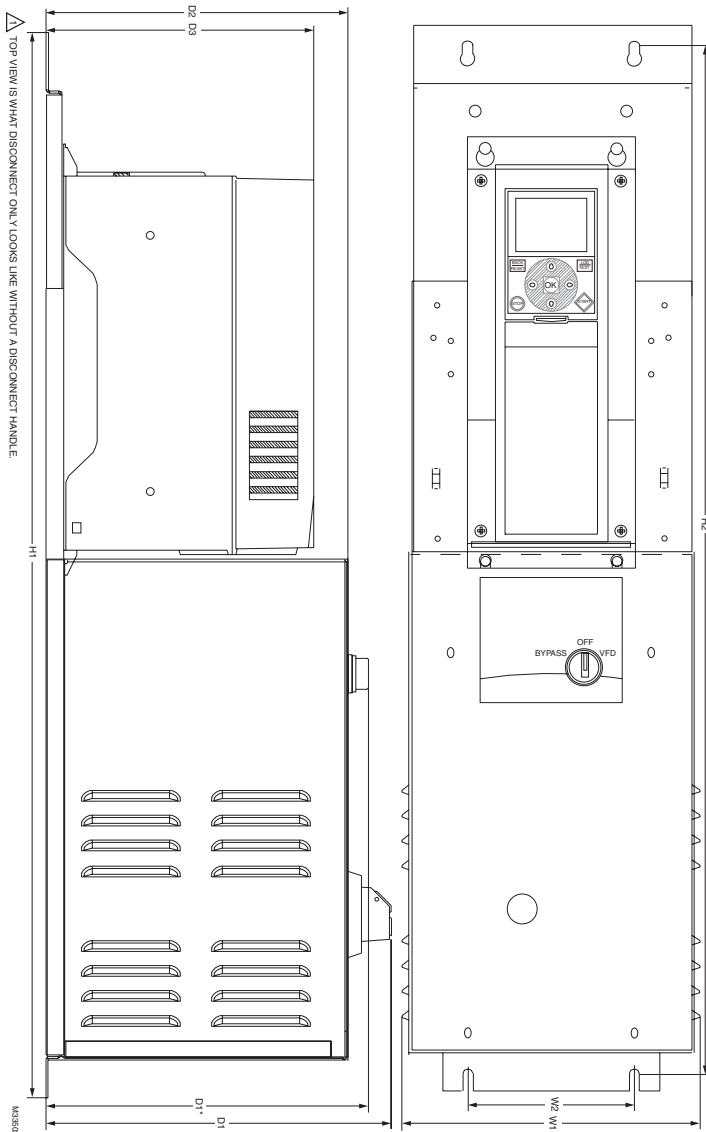
SmartVFD Drives are available in four configurations with bypass and/or disconnect as explained below. All configurations are available in NEMA 1, NEMA 12 and ventilated NEMA 3R.

Dimensional Drawings for SmartVFD HVAC Drives with Bypass and/or Disconnect

The following are the dimensional drawings and data for NEMA 1 drives with bypass and/or disconnect.

Refer to www.customer.honeywell.com for dimensional drawings for NEMA 12 or NEMA 3R models.

NEMA 1, SmartVFD HVAC Drive with 2-Contactor Bypass, No Disconnect



FEATURES

SmartVFD with Disconnect

- Fused Disconnect with no bypass

SmartVFD with 2-Contactor Bypass

Provides an economical means of bypassing the VFD.

- No Main Disconnect
- Freeze/Fire/Smoke Interlock

SmartVFD with 3-Contactor Bypass

Commission and test the VFD without affecting the operation of the motor. Provide additional bypass control capabilities with Auto bypass.

- Fused Disconnect
- Freeze/Fire/Smoke Interlock
- TEST position powers the VFD without sending power to the motor

SmartVFD with 3-Contactor Auto Bypass

SmartVFD with 3-Contactor Bypass plus VFD will automatically send the bypass into BYPASS mode:

- A contact closure sends the bypass into BYPASS mode
- Dry contacts indicate when the bypass is in BYPASS mode and can be used to alert the building management system.

Warranty

- 3 Years
- Repair Available

Refer to SmartVFD HVAC Standalone Drive Submittal Data herein for data regarding the included SmartVFD HVAC drive.

SmartVFD HVAC Drives with Bypass and/or Disconnect

NEMA 1, SmartVFD HVAC Drive with 2-Contactor Bypass, No Disconnect

Frame Size 4

Frame Size	HP and Voltage			Configuration	Dimensions							Weight Lb.
	208/230 VAC	460 VAC	600 VAC		W1	W2	H1	H2	D1	D2	D3	
4	0.75-4HP	1.5-7.5HP		Disconnect	8.92	4.98	31.91	30.8	10.36	9.04	8.01	33
*depth of 2 CONT only				2-Contractor	8.92	4.98	31.91	30.8	*9.64	9.04	8.01	38

Frame Size 5

Frame Size	HP and Voltage			Configuration	Dimensions							Weight Lb.
	5HP	10HP			W1	W2	H1	H2	D1	D2	D3	
5				Disconnect	8.92	4.98	34.72	33.61	10.36	9.04	8.96	43
* depth of 2 CONT only				2-Contractor	8.92	4.98	34.72	33.61	*9.64	9.04	8.96	48
5	7.5HP	15HP		Disconnect	8.92	4.98	34.72	33.61	10.36	9.04	8.96	43
				2-Contractor	8.92	4.98	34.72	33.61	*9.64	9.04	8.96	50
5	10HP	20HP		Disconnect	8.92	4.98	34.72	33.61	10.36	9.04	8.96	43
				2-Contractor	8.92	4.98	34.72	33.61	*9.64	9.04	8.96	50

Frame Size 6

Frame Size	HP and Voltage			Configuration	Dimensions							Weight Lb.
					W1	W2	H1	H2	D1	D2	D3	
6		25HP		Disconnect	12.42	4.98	45.17	43.9	11.31	9.57		50
* depth of 2 CONT only				2-Contractor	12.42	4.98	45.17	43.9	*10.1	9.57		55
6	15HP	30HP		Disconnect	12.42	4.98	45.17	43.9	11.31	9.57		50
				2-Contractor	12.42	4.98	45.17	43.9	*10.1	9.57		59
6	20HP	40HP		Disconnect	12.42	4.98	45.17	43.9	11.31	9.57		50
				2-Contractor	12.42	4.98	45.17	43.9	*10.1	9.57		59

Frame Size 7

Frame Size	HP and Voltage		Configuration	Dimensions							Weight Lb.
	208/230 Vac	460Vac		W1	W2	H1	H2	D1	D2		
7	25HP	50HP	Disconnect	20.84	20.09	51.57	47.5	13.28	11.44	130	
* depth of 2 CONT only			2-Contractor	20.84	20.09	51.57	47.5	*12.28	11.44	130	
7	30HP	60HP	Disconnect	20.84	20.09	51.57	47.5	13.28	11.44	141	
			2-Contractor	20.84	20.09	51.57	47.5	*12.28	11.44	141	
7	40HP	75HP	Disconnect	20.84	20.09	51.57	47.5	13.28	11.44	149	
			2-Contractor	20.84	20.09	51.57	47.5	*12.28	11.44	149	

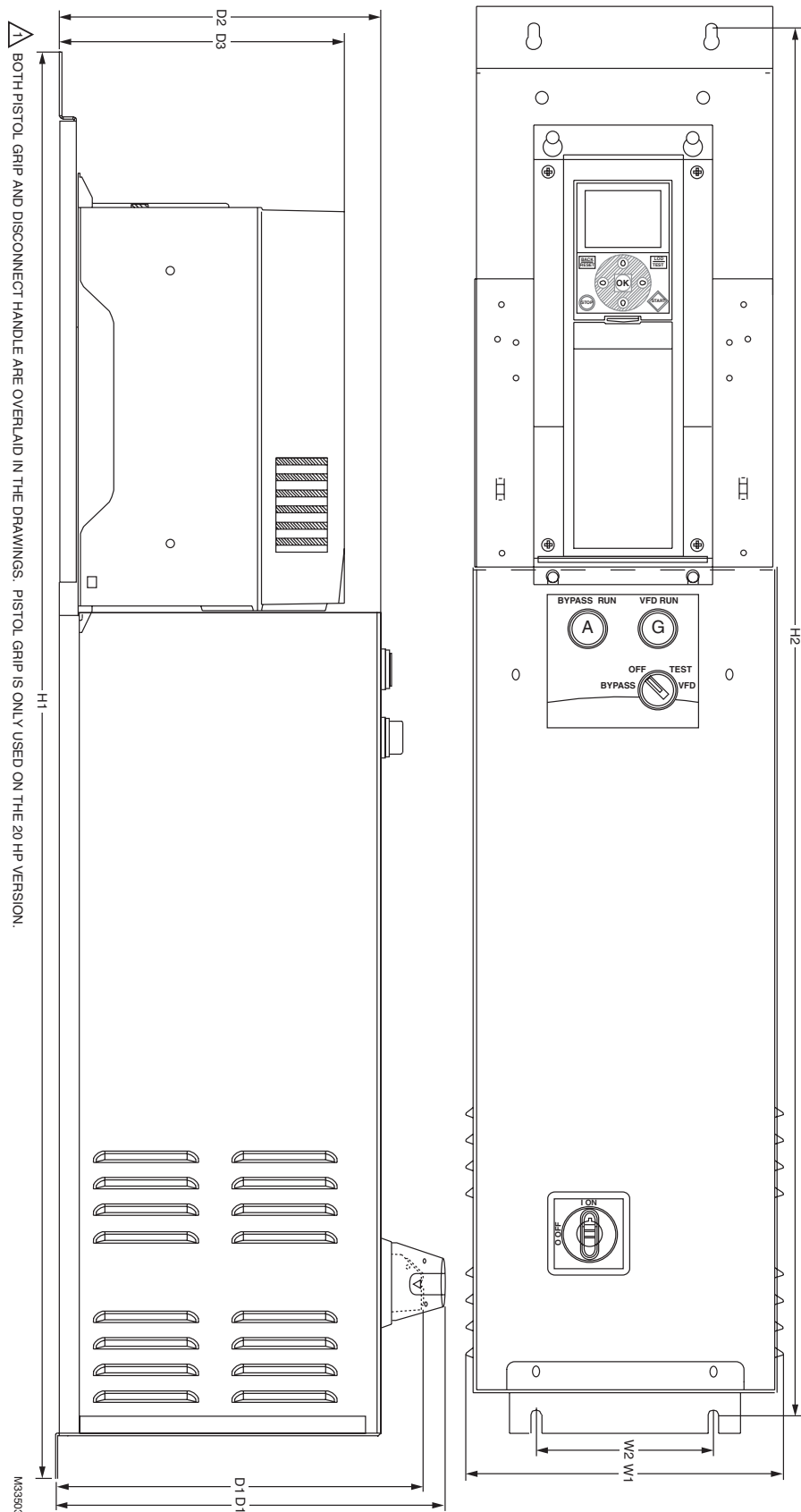
Frame Size 8

Frame Size	HP and Voltage		Configuration	Dimensions							Weight (approx.) Lb.
	208/230	460Vac		W1	W2	H1	H2	D1	D2		
8	50HP	100HP	Disconnect	25	23.41	60	55	16.27	14.55	200	
* depth of 2 CONT only			2-Contractor	25	23.41	60	55	*15.28	14.55	250	
8	60HP	125HP	Disconnect	25	23.41	60	55	16.27	14.55	200	
			2-Contractor	25	23.41	60	55	*15.28	14.55	265	
8	75HP	150HP	Disconnect	25	23.41	60	55	16.27	14.55	200	
			2-Contractor	25	23.41	60	55	*15.28	14.55	280	

Submittal Data - VFDs

SmartVFD HVAC Drives with Bypass and/or Disconnect

NEMA 1, SmartVFD HVAC Drive with 3-Contactor and 3-Contactor with Auto-Bypass, Fused Disconnect.



SmartVFD HVAC Drives with Bypass and/or Disconnect

NEMA 1, SmartVFD HVAC Drive with 3-Contactor and 3-Contactor with Auto-Bypass, Fused Disconnect.

Frame Size 4

Frame Size	HP and Voltage			Configuration	Dimensions						Weight Lb.	
	208/230 VAC	460 VAC	600 VAC		W1	W2	H1	H2	D1	D2		D3
4	0.75-4HP	1.5-7.5HP		3-Contactor	8.92	4.98	38.91	37.8	10.36	9.04	8.01	44
				3-Contactor with Auto Bypass	8.92	4.98	38.91	37.8	10.36	9.04	8.01	38

Frame Size 5

Frame Size	HP and Voltage			Configuration	Dimensions						Weight Lb.	
	208/230 Vac	460 Vac	600 Vac		W1	W2	H1	H2	D1	D2		D3
5	5HP	10HP		3-Contactor	8.92	4.98	41.72	40.61	10.36	9.04	8.96	55.5
				3-Contactor with Auto-Bypass	8.92	4.98	41.72	40.61	10.36	9.04	8.96	56
5	7.5HP	15HP		3-Contactor	8.92	4.98	41.72	40.61	10.36	9.04	8.96	57
				3-Contactor with Auto-Bypass	8.92	4.98	41.72	40.61	10.36	9.04	8.96	57.5
5	10HP	20HP		3-Contactor	8.92	4.98	41.72	40.61	10.36	9.04	8.96	59.5
				3-Contactor with Auto-Bypass	8.92	4.98	41.72	40.61	10.36	9.04	8.96	60

Frame Size 6

Frame Size	HP and Voltage			Configuration	Dimensions						Weight Lb.	
	208/230 Vac	460 Vac	600 Vac		W1	W2	H1	H2	D1	D2		D3
6		25HP		3-Contactor	12.42	4.98	55.21	53.99	11.31	9.55		94.5
				3-Contactor with Auto-Bypass	12.42	4.98	55.21	53.99	11.31	9.55		96.5
6	15HP	30HP		3-Contactor	12.42	4.98	55.21	53.99	11.31	9.55		98.5
				3-Contactor with Auto-Bypass	12.42	4.98	55.21	53.99	11.31	9.55		100.5
6	20HP	40HP		3-Contactor	12.42	4.98	55.21	53.99	11.31	9.55		105.5
				3-Contactor with Auto-Bypass	12.42	4.98	55.21	53.99	11.31	9.55		107.5

Frame Size 7

Frame Size	HP and Voltage		Configuration	Dimensions						Weight Lb.	
	208/230	460Vac		W1	W2	H1	H2	D1	D2		D3
7	25HP	50HP	3-Contactor	20.84	20.09	59	55	13.28	11.44	11.08	135
			3-Contactor with Auto-Bypass	20.84	20.09	59	55	13.28	11.44	11.08	135
7	30HP	60HP	3-Contactor	20.84	20.09	59	55	13.28	11.44	11.08	150
			3-Contactor with Auto-Bypass	20.84	20.09	59	55	13.28	11.44	11.08	150
7	40HP	75HP	3-Contactor	20.84	20.09	59	55	13.28	11.44	11.08	170
			3-Contactor with Auto-Bypass	20.84	20.09	59	55	13.28	11.44	11.08	170

Frame Size 8

Frame Size	HP and Voltage		Configuration	Dimensions						Weight (approx.) Lb.
	208/230 Vac	460Vac		W1	W2	H1	H2	D1	D2	
8	50HP	100HP	3-Contactor	25	24	70.06	55	16.2	14.6	285.8
			3-Contactor with Auto-Bypass	25	24	70.06	55	16.2	14.6	287
8	60HP	125HP	3-Contactor	25	24	70.06	55	16.2	14.6	295.3
			3-Contactor with Auto-Bypass	25	24	70.06	55	16.2	14.6	297
8	75HP	150HP	3-Contactor	25	24	70.06	55	16.2	14.6	331.3
			3-Contactor with Auto-Bypass	25	24	70.06	55	16.2	14.6	333

Submittal Data - VFDs

SmartVFD HVAC Drives with Bypass and/or Disconnect

NEMA 12, SmartVFD HVAC – All Configurations

Frame Size	HP and Voltage			Configuration	208/230 Vac Dimensions (in) & Weight (lb)				460 Vac Dimensions (in) & Weight (lb)				600 Vac Dimensions (in) & Weight (lb)			
	208/230 Vac	460 Vac	600 Vac		W	H	D	lb	W	H	D	lb	W	H	D	lb
4	0.75-3 HP	1.5-7.5 HP	N/A	Drive alone	5	12.9	7.5	13.2	5	12.9	7.5	13.2	5	12.9	7.5	13.2
				Disconnect	12	37.5	11	40	12	37.5	11	40	N/A			
				2-Contactor	16	37.5	11	55	16	37.5	11	53				
				3-Contactor	16	37.5	11	55	16	37.5	11	53				
				3-Contactor with Auto-Bypass	16	37.5	11	55	16	37.5	11	53				
5	5-10 HP	10 HP 15 HP 20 HP	Only drive alone is available as of this printing	Drive alone	5.7	16.5	8.4	22	5.7	16.5	8.4	22	5.7	16.5	8.4	22
				Disconnect	12	41	11	72	12	41	11	72	N/A			
				2-Contactor	16	41/41/45	11	70/70/84	16	41/41/45	11	64/64/76				
				3-Contactor	16	41/41/45	11	70/70/84	16	41/41/45	11	64/64/76				
				3-Contactor with Auto-Bypass	16	41/41/45	11	70/70/84	16	41/41/45	11	64/64/76				
6	15-20 HP	25 HP 30 HP 40 HP	Only drive alone is available as of this printing	Drive alone	7.7	21.9	9	44.1	7.7	21.9	9	44.1	7.7	21.9	9	44.1
				Disconnect	12	46.5	13	120	12/12/16	46.5	13	120/120/136	N/A			
				2-Contactor	16/20	50.5/54.5	13	125/140	16/16/20	50.5/50.5/54.5	13	120/120/136				
				3-Contactor	16/20	50.5/54.5	13	125/140	16/16/20	50.5/50.5/54.5	13	120/120/136				
				3-Contactor with Auto-Bypass	16/20	50.5/54.5	13	125/140	16/16/20	50.5/50.5/54.5	13	120/120/136				
7	25-40 HP	50 HP 60 HP 75 HP	Only drive alone is available as of this printing	Drive alone	9.3	25.4	10.2	82.7	9.3	25.4	10.2	82.7	9.3	25.4	10.2	82.7
				Disconnect	16	50.5	13.5	145/160/175	16	50.5	13.5	145/160/175	N/A			
				2-Contactor	20/24/30	58.5/65.5/70.5	13.5	160/175/200	20/24/30	58.5/65.5/70.5	13.5	150/165/193				
				3-Contactor	20/24/30	58.5/65.5/70.5	13.5	160/175/200	20/24/30	58.5/65.5/70.5	13.5	150/165/193				
				3-Contactor with Auto-Bypass	20/24/30	58.5/65.5/70.5	13.5	160/175/200	20/24/30	58.5/65.5/70.5	13.5	150/165/193				
8	50-75 HP	100 HP 125 HP 150 HP	Only drive alone is available as of this printing	Drive alone	11.4	38	13.5	154.3	11.42	38.03	13.5	154.3	11.42	38.03	13.5	154.3
				Disconnect	Contact Customer Care				Contact Customer Care				N/A			
				2-Contactor												
				3-Contactor												
				3-Contactor with Auto-Bypass												
9	100-125 HP	180-220 HP	150-200 HP	Drive alone	18.9	45.3	14.4	238.1	18.9	45.27	14.4	238.1	18.9	45.27	14.4	238.1

SmartVFD HVAC Drives with Bypass and/or Disconnect

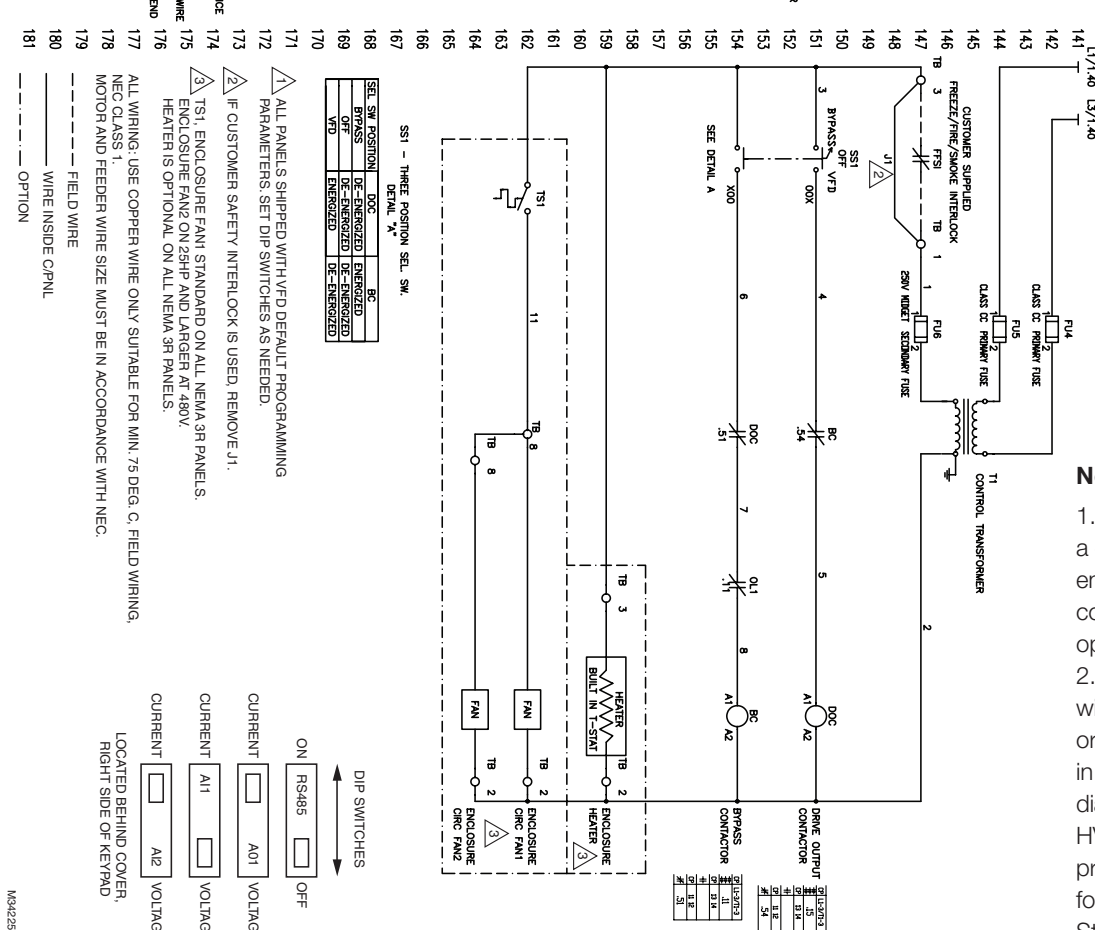
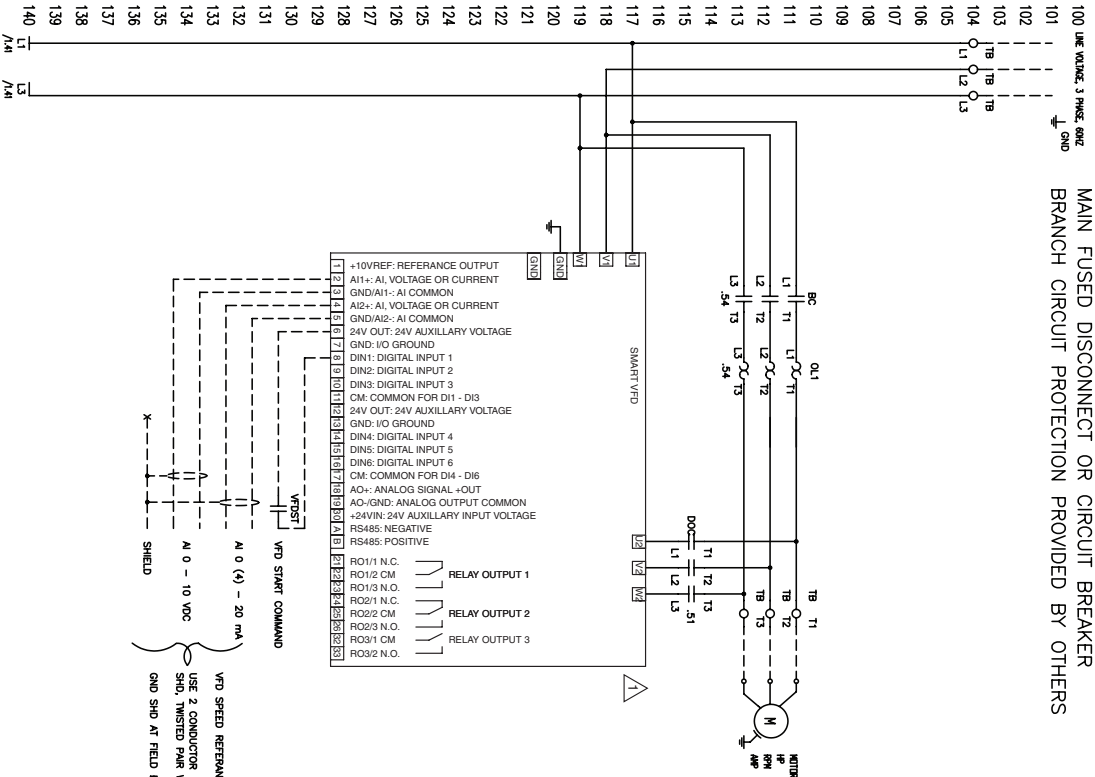
NEMA 3R, SmartVFD HVAC – All Configurations

Frame Size	HP and Voltage		Configuration	Dimensions (in)			Weight lb
	208/230 Vac	460 Vac		W	H	D	
4	0.75-3 HP	1.5-7.5 HP	Drive alone	20.5	20	10.5	39
			Disconnect	20.5	20	12	43
			2-Contactor	24.5	24	10.5	49
			3-Contactor	24.5	24	12	54
			3-Contactor with Auto-Bypass	24.5	24	12	54
5	5-10 HP	10 HP-20 HP	Drive alone	20.5	24	10.5	58
			Disconnect	24.5	24	12	61
			2-Contactor	28.5	24	10.5	72
			3-Contactor	28.5	30	12	78
			3-Contactor with Auto-Bypass	28.5	30	12	78
6	15-20 HP	25 HP-40 HP	Drive alone	28.5	36	10.5	80
			Disconnect	28.5	36	12	88
			2-Contactor	28.5	36	10.5	118
			3-Contactor	34.5	36	12	124
			3-Contactor with Auto-Bypass	34.5	36	12	124
7	25-40 HP	50 HP-75 HP	Drive alone	28.5	48	12.5	130
			Disconnect	28.5	48	14	149
			2-Contactor	28.5	48	12.5	185
			3-Contactor	40.5	48	14	193
			3-Contactor with Auto-Bypass	40.5	48	14	193
8	50-75 HP	100 HP-150 HP	Drive alone	40.5	60	12.5	299
			Disconnect	40.5	60	14	340
			2-Contactor	40.5	60	12.5	430
			3-Contactor	40.5	60	14	440
			3-Contactor with Auto-Bypass	40.5	60	14	440

Wiring Diagrams - VFDs

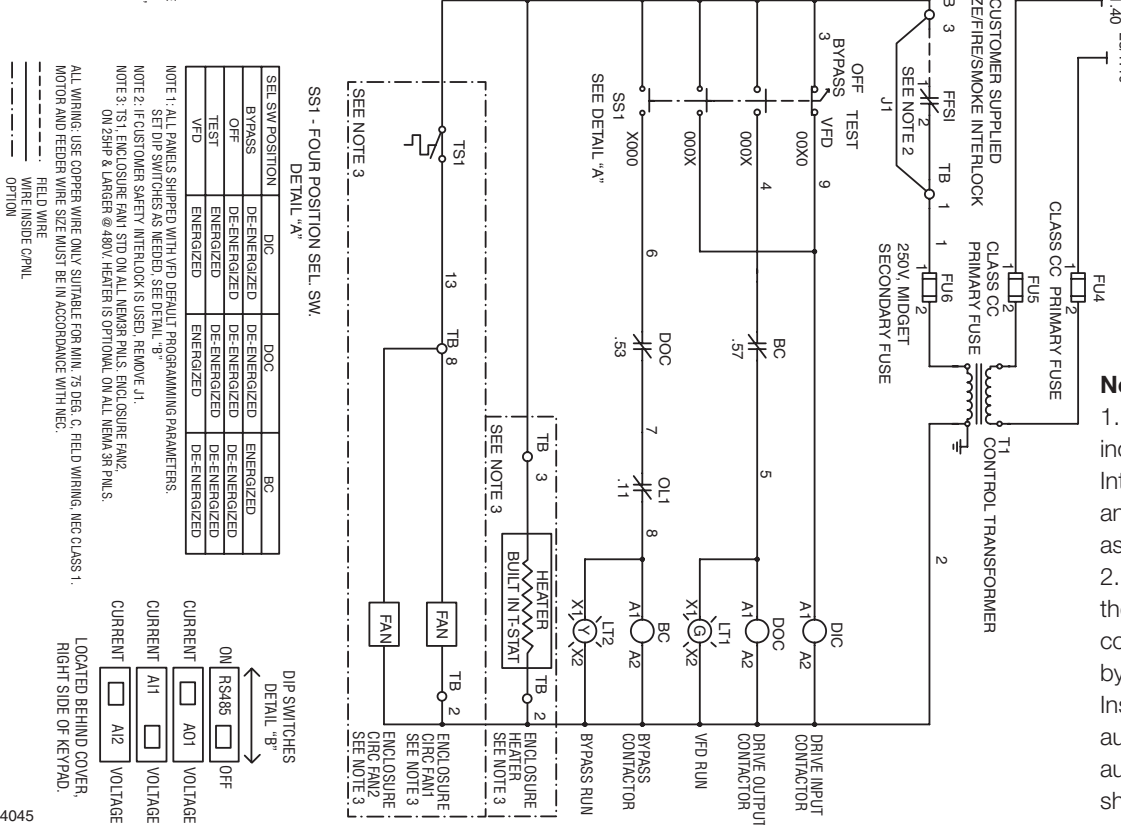
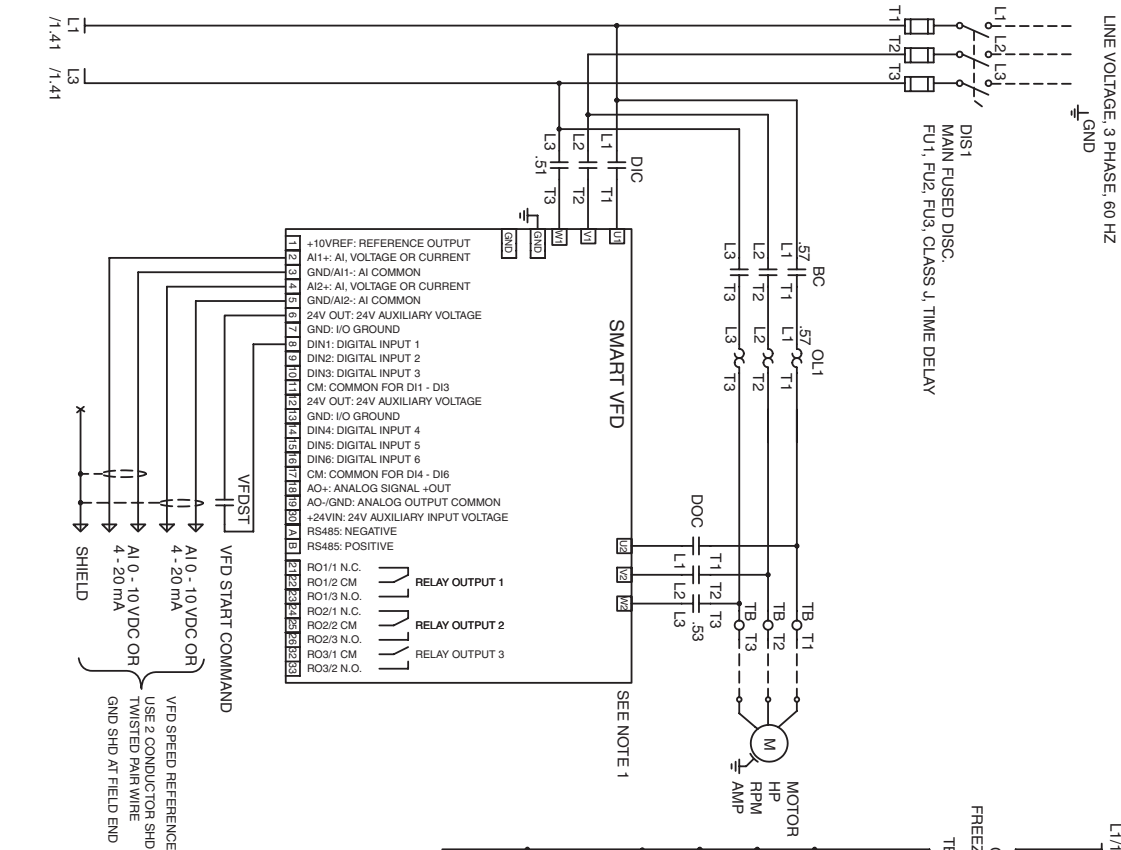
SmartVFD HVAC Drives with Bypass and/or Disconnect

SmartVFD HVAC Drive with 2-Contactor Bypass (No Disconnect)



SmartVFD HVAC Drives with Bypass and/or Disconnect

SmartVFD HVAC Drive with 3-Contactor Bypass and Fused Disconnect



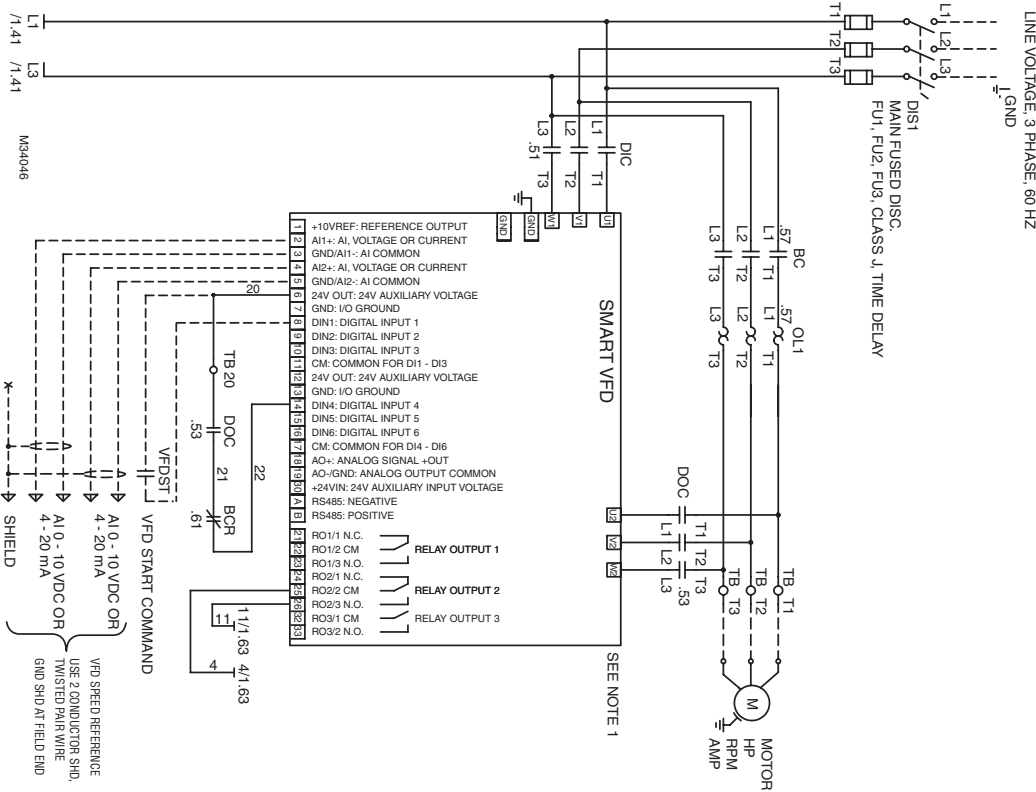
Notes:

1. NEMA 3R enclosures include a circulation fan(s). Integral enclosure heaters and/or cooling are available as special options.
2. For auto-bypass units the drive parameters come configured for auto-bypass. Refer to Installation Instructions to disable the auto-bypass or to reset the auto-bypass parameters should factory defaults be reset on the drive.

Wiring Diagrams - VFDs

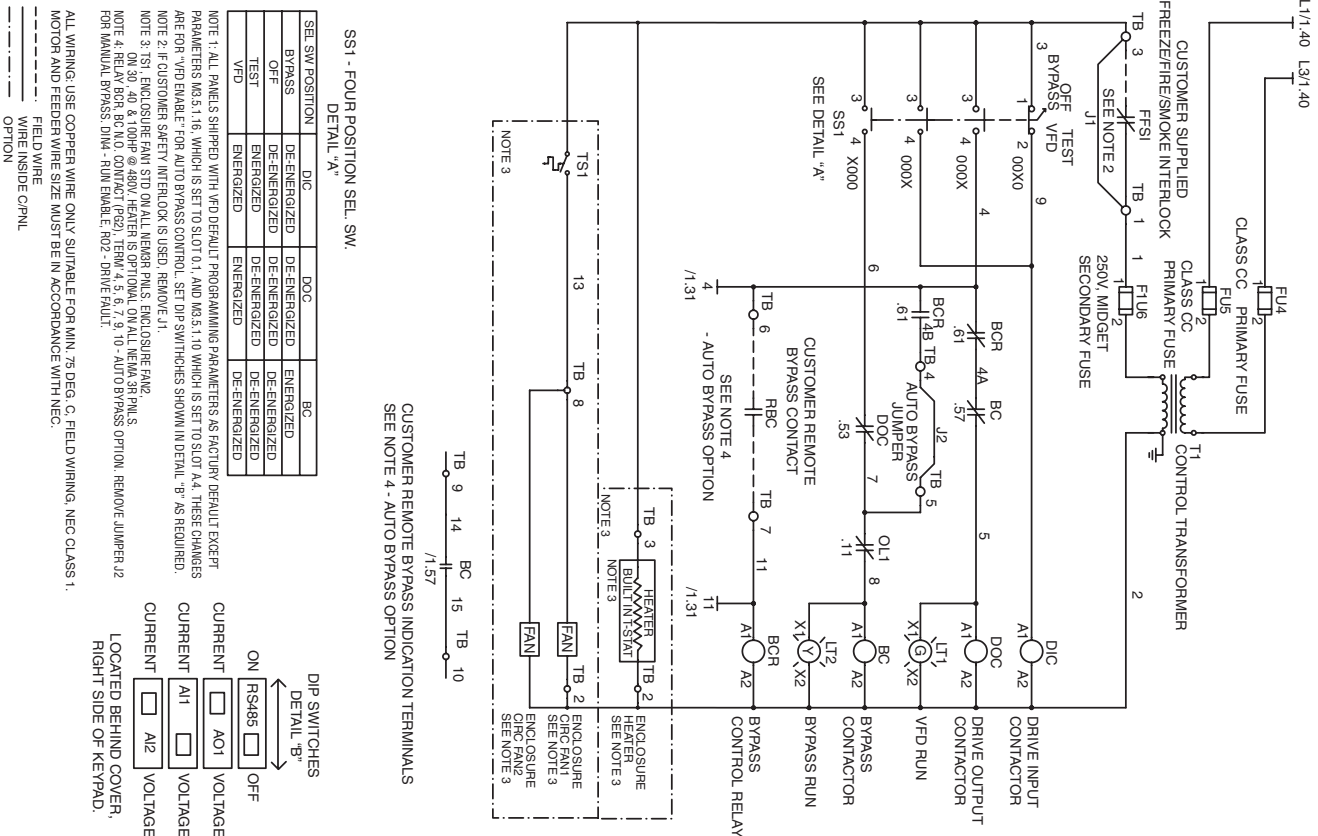
SmartVFD HVAC Drives with Bypass and/or Disconnect

SmartVFD HVAC Drive with 3-Contactor Auto-Bypass and Fused Disconnect



Notes:

1. NEMA 3R enclosures include a circulation fan(s). Integral enclosure heaters and/or cooling are available as special options.
2. For auto-bypass units the drive parameters come configured for auto-bypass. Refer to Installation Instructions 62-2032 to disable the auto-bypass or to reset the auto-bypass parameters should factory defaults be reset on the drive.



SS1 - FOUR POSITION SEL. SW. DETAIL "A"

SEL. SW POSITION	DISC	DOC	BC
BYPASS	DE-ENERGIZED	DE-ENERGIZED	ENERGIZED
OFF	DE-ENERGIZED	DE-ENERGIZED	DE-ENERGIZED
TEST	ENERGIZED	DE-ENERGIZED	DE-ENERGIZED
VFD	ENERGIZED	ENERGIZED	DE-ENERGIZED

NOTE 1: ALL PANELS SHIPPED WITH VFD DEFAULT PROGRAMMING PARAMETERS AS FACTORY DEFAULT EXCEPT PARAMETERS M3.5.1, T6, WHICH IS SET TO SLOT 0.1, AND M3.5.1.10 WHICH IS SET TO SLOT 4. THESE CHANGES ARE FOR VFD ENABLE FOR AUTO BYPASS CONTROL. SET DIP SWITCHES SHOWN IN DETAIL "B" AS REQUIRED.

NOTE 2: IF CUSTOMER SAFETY INTERLOCK IS USED, REMOVE J1.

NOTE 3: TST1 ENCLOSEURE FAN STD ON ALL NEMA PANELS. ENCLOSEURE FAN2 ON 30, 40, & 10HP @ 480V. HEATERS IS OPTIONAL ON ALL NEMA PANELS.

NOTE 4: 10, 15, & 20HP @ 480V. HEATERS IS OPTIONAL ON ALL NEMA PANELS.

ALL WIRING - USE COPPER WIRE ONLY SUITABLE FOR MAIN 75 DEG. C. FIELD WIRING. NEC CLASS 1. MOTOR AND FEEDER WIRE SIZE MUST BE IN ACCORDANCE WITH NEC.

FIELD WIRE WHEN INSIDE CPANEL
 --- FIELD WIRE
 --- OPTION

Sensor Selection

Honeywell's complete line of sensors covers all necessary control applications and mounting options, making Honeywell your best sensor source. From temperature and current sensors to CO₂ and enthalpy sensors an more, Honeywell sensors are the smart, cost-effective choice.

Section 6: Sensors

Spyder Sylk Sensors, TR70 Series		Outdoor Air Temperature Sensors	
Product Selection	278	Submittal Data	302
Submittal Data	286	Duct Air Temperature Sensors	
Dimensional Diagrams	286	Submittal Data	304
Spyder Sylk Sensors TR40 Series		Strap-On Water Temperature Sensors	
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TR20 Wireless Sensors and Receivers		Electronic Air Temperature Sensor	
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TR20 Series Wall Modules		Submittal Data	314
Product Selection	279	Dimensional Diagrams	315
Submittal Data	289	Mini Current Sensors	
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C7772A Series Wallplate Sensors		Submittal Data	320
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T7300 Temperature Sensors		Humidity Sensors	
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T775 Temperature Sensors		Dew Point Sensors	
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Analog Economizer Sensors		CO ₂ Sensors	
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		MLH Gauge Pressure Sensors	
		Product Selection	284
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Product Selection - Sensors

TR70 and TR40 Series, Wireless Sensors and Receivers

Spyder Sylk Sensors



	Display	Temperature	Humidity	CO2	Customizable Parameters	Schedule Access
TR70-US	•	•			•	
TR70-H-US	•	•	•		•	
TR71	•	•			•	
TR71-H	•	•	•		•	
TR75	•	•			•	•
TR75-H	•	•	•		•	•
TR42	•	•				
TR42-H	•	•	•			
TR42-CO2	•	•		•		
TR42-H-CO2	•	•	•	•		
TR40		•				
TR40-H		•	•			
TR40-CO2		•		•		
TR40-H-CO2		•	•	•		

Wireless Sensors and Receivers



Model Number	Temp	Humidity	Selectable Setpoint	Occupied Override	Comments	Compatible Controllers	Compatible Thermostats
TR21-WK	•				Includes one prebound sensor and receiver	Honeywell controllers including Spyder, Excel 10, W7750, W7751, W7752, W7753 and non-Honeywell controllers with remote setpoint	T7350, T7351 and TB8575 Honeywell Thermostats and Non Honeywell thermostats with remote setpoint
TR21-WKU	•				Includes one prebound sensor and receiver, No Honeywell logo		
TR23-WK	•		•	•	Includes one prebound sensor and receiver		
TR23-WKU	•		•	•	Includes one prebound sensor and receiver, No Honeywell logo		
TR21-WS	•				Sensor only. For replacement. Requires a wireless receiver		
TR23-WS	•		•	•	Sensor only. For replacement. Requires a wireless receiver		
WRECVR					Wireless receiver only. For replacement. Requires a wireless sensor.		

Product Selection - Sensors

TR20, C7772A and T7560 Series Sensors

For use in XL10, Excel 10, 15, 50, 100, 500, Spyder, and T7350 applications



	Model Number	Model Number	Sensor Element Type	Sensor Type	Sensor Type	Selectable Setpoint	Occupied Override	LON Jack	Fan	Comments
Application	Honeywell Wall Module Model	Replaces Honeywell Model		Temp	Humidity					
Excel 10, 15, 50, 100, 500, Spyder, T7350	TR21	T7770A1006	20K ohms non-linear	•						
Excel 10, 15, 50, 100, 500, Spyder, T7350	TR21-A	T7770A3002	10K ohms non-linear for averaging only	•						
Excel 10, 15, 50, 100, 500, Spyder, T7350	TR21-H	N/A	20K ohms non-linear	•	•			•		
Excel 10, 15, 50, 100, 500, Spyder, T7350	TR21-J	T7770A2004	20K ohms non-linear	•				•		
Excel 10, 15, 50, 100, 500, Spyder, T7350	TR22	T7770B1004 T7770B1020 T7770B1046	20K ohms non-linear	•		•		•		
Excel 10, 15, 50, 100, 500, Spyder, T7350	TR23	TR7770C1002 TR7770C1028 TR7770C1044	20K ohms non-linear	•		•	•	•		
Excel 10, 15, 50, 100, 500, Spyder, T7350	TR23-H	N/A	20K ohms non-linear	•	•	•	•	•		
Excel 10, 15, 50, 100, 500, Spyder, T7350	TR23-KL	N/A	20K ohms non-linear	•		•	•	•		Knobs not included
Excel 10, 15, 50, 100, 500, Spyder, T7350	TR23-H-KL	N/A	20K ohms non-linear	•	•	•	•	•		Knobs not included
Excel 10, 15, 50, 100, 500, Spyder, T7350	TR23-N	T7770C1051	20K ohms non-linear	•		•	•	•		No Honeywell logo
Excel 10, 15, 50, 100, 500, Spyder, T7350	TR24	T7770D1000	20K ohms non-linear	•			•	•		
Excel 10, 15, 50, 100, 500, Spyder, T7350	TR22-F5	N/A	20K ohms non-linear	•		•		•	5 position	Not for use with T7350
Excel 10, 15, 50, 100, 500, Spyder, T7350	TR23-F3	T7770E1023	20K ohms non-linear	•		•	•	•	3 position	Not for use with T7350
Excel 10, 15, 50, 100, 500, Spyder, T7350	TR23-F5	T7770F1005	20K ohms non-linear	•		•	•	•	5 position	Not for use with T7350
Excel 10, 15, 50, 100, 500, Spyder, T7350	C7772A1004	N/A	20K ohms non-linear	•						No Honeywell logo
Excel 10, 15, 50, 100, 500, Spyder, T7350	C7772A1012	N/A	20K ohms non-linear	•						With Honeywell logo
Excel 10, 20, 50, 80, 10, 500, 600	T7560A1018	N/A	20K ohms non-linear	•		•	•	Optional	Yes	LCD Display/white and blue
Excel 10, 20, 50, 80, 10, 500, 600	T7560A1042	N/A	20K ohms non-linear	•		•	•	Optional	Yes	LCD Display/all white
Excel 10, 20, 50, 80, 10, 500, 600	T7560B1016	N/A	20K ohms non-linear	•	•	•	•	Optional	Yes	LCD Display/white and blue
Excel 10, 20, 50, 80, 10, 500, 600	T7560B1032	N/A	20K ohms non-linear	•	•	•	•	Optional	Yes	LCD Display/all white
TR20 Series Sensors	KNOB-C	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Replacement Knob (C [°])
TR20 Series Sensors	KNOB-F	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Replacement Knob (F [°])
TR20 Series Sensors	KNOB-O	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Replacement Knob +/-

Note: For use in XL10, Excel 10, 15, 50, 100, 500, Spyder and T7350 applications.

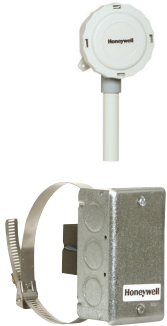
Product Selection - Sensors

T7047, T7147 Temperature Sensors and Economizer Sensors

Sensors for use in T7300 applications

Part Number	Sensing Element/Sensor Type	Color/Mounting	Features
T7047C2007	1420 ohms	Taupe, new styling	
T7047C2015	1420 ohms	Premier white, new styling	
T7047G2008	710 ohms	Taupe, new styling	Averaging only
T7047G2016	710 ohms	Premier white, new styling	Averaging only
T7147A2000	1420 ohms	Taupe, new styling	Override
T7147A2018	1420 ohms	Taupe, new styling	Override, warmer, cooler
T7147G2023	710 ohms	Taupe, new styling	Override, warmer, cooler, averaging only
T7022A1010	1420 ohms	Duct mount	
C7031G2014	PT3000	Outdoor mount	For use with T7350
C7031G2006	1715 ohms	Outdoor mount	For use with W7100

T775 Sensors



Part Number	Sensing Element	Description	Temperature Range
50021579-001	1097 ohms at 77° F	Standard temperature probe	-40° to 350° F (-40° to 177° C)
T775-SENS-WR	1097 ohms at 77° F	Water-resistant probe with 5-ft. leads	-40° to 270° F (-40° to 132° C)
T775-SENS-WT	1097 ohms at 77° F	Water-tight probe with 6-ft. leads	-40° to 270° F (-40° to 132° C)
T775-SENS-OAT	1097 ohms at 77° F	Outdoor air temperature sensor	-40° to 158° F (-40° to 70° C)
T775-SENS-STRAP	1097 ohms at 77° F	Strap-on	-40° to 250° F (-40° to 121° C)
C7031D2003	1097 ohms at 77° F	5-in. immersion sensor with wiring box (well included, 50001774-001)	-40° to 350° F (4° to 177° C)
C7031B2005	1097 ohms at 77° F	6-in duct with wiring box	-40° to 250° F (-40° to 121° C)
C7031J2009	1097 ohms at 77° F	12-in. duct averaging sensor with four elements with wiring box	40° to 180° F (4° to 82° C)
C7046D1008	1097 ohms at 77° F	8-in. duct probe with mounting flange	40° to 150° F (4° to 66° C)
C7100D1001	1097 ohms at 77° F	12-in. flat response, duct averaging sensor with flange	40° to 220° F (4° to 104° C)
C7130B1009	1097 ohms at 77° F	Room mount sensor	-40° to 100° F (-40° to 38° C)

Analog and Communicating Economizer Sensors

	Part Number	Sensing Element	Temperature Range	Insertion Length	Type	Mounting & Application
Analog Economizer and Spyder	C7150B1004	3K ohms NTC at 77° F	-40° to 110° F (-40° to 43° C)	N/A	Duct - Temp Sensor	Mixed or discharge air sensor
	C7660A1000	4 - 20 mA	-40° to 149° F (-40° to 65° C)	N/A	Duct - Temp Sensor	Dry-bulb temperature sensor
	C7046A1004	3K ohms NTC at 77° F	40° to 150° F (4° to 66° C)	8 in.	Duct - Temp Sensor	Mixed or discharge air sensor
	C7046A1038	3K ohms NTC at 77° F	40° to 150° F (4° to 66° C)	12 in.	Duct - Temp Sensor	Mixed or discharge air sensor
	C7400A2001	4 - 20 mA	-40° to 150° F (-40° to 66° C)	NA	Duct - Enthalpy Sensor	Outdoor or return air sensor, may be used with duct mounting kit 50053060-001
JADE Economizer	C7400S1000	S-bus Temperature & Humidity	-40° to 150° F (-40° to 66° C)	N/A	Duct - Temp Sensor	Outdoor, return, discharge air sensor, may be used with duct mounting kit 50053060-001
Spyder	C7400S1010	S-bus Temperature & Humidity	-40° to 150° F (-40° to 66° C)	N/A	Duct - Temp Sensor	Outdoor, return, discharge air sensor, may be used with duct mounting kit 50053060-001
JADE Economizer and Spyder	C7250A1001	20K NTC	-40° to 150° F (-40° to 66° C)	N/A	Duct - Temp Sensor	Outdoor, mixed dry bulb sensor, may be used with duct mounting kit 50053060-001

Product Selection - Sensors

General Temperature Sensors



General Temperature Sensors



	Part Number	Sensing Element	Resistance	Operating Range	Mounting and Application
Wall Mount	C7130B1009	PT1000	1,097 Ohms PTC at 77°F	-40° to 100° F	Wall mount
Water	C7021D2001	10K ohms NTC Type II	10K ohms NTC at 77°F	-40° to 250° F	5" w/ wiring enclosure, use well 50001774-001
Water	C7023D2001	10K ohms NTC Type III	10K ohms NTC at 77°F	-40° to 250° F	5" w/ wiring enclosure, use well 50001774-001
Water	C7031D2003	PT1000	1097 ohms PTC at 77F	-40° to 350° F	5" w/ wiring enclosure, includes well 50001774-001
Water	C7041D2001	20K ohms NTC	20K ohms NTC at 77°F	-40° to 250° F	5" w/ wiring enclosure, use well 50001774-001
Outdoor	C7021F2009	10K ohms NTC Type II	10K ohms NTC at 77°F	-40° to 158° F	Outdoor weatherproof, connects to 1/2" conduit
Outdoor	C7023F2009	10K ohms NTC Type III	10K ohms NTC at 77°F	-40° to 158° F	Outdoor weatherproof, connects to 1/2" conduit
Outdoor	C7031G2014	PT3000	3484 ohms at 77F	-40° to 120° F	Outdoor weatherproof, connects to 1/2" conduit
Outdoor	C7041F2006	20K ohms NTC	20K ohms NTC at 77°F	-40° to 158° F	Outdoor weatherproof, connects to 1/2" conduit
Duct Mount	C7021J2007	10K ohms NTC Type II	10K ohms NTC at 77°F	-40° to 250° F	12" duct averaging w/ wiring enclosure
Duct Mount	C7021R2000	10K ohms NTC Type II	10K ohms NTC at 77°F	-40° to 250° F	12" duct averaging flexible copper
Duct Mount	C7021R2018	10K ohms NTC Type II	10K ohms NTC at 77°F	-40° to 250° F	24" duct averaging flexible copper
Duct Mount	C7031J2009	PT1000	1097 ohms PTC at 77F	40° to 180° F	12" duct averaging flexible copper
Duct Mount	C7041J2007	20K ohms NTC	20K ohms NTC at 77°F	-40° to 250° F	12 ft. Duct (Averaging) w/ wiring enclosure
Duct Mount	C7041R2000	20K ohms NTC	20K ohms NTC at 77°F	-40° to 250° F	12 ft. Duct flexible copper (Averaging)
Duct Mount	C7041R2018	20K ohms NTC	20K ohms NTC at 77°F	-40° to 250° F	24 ft. Duct flexible copper (Averaging)
Duct Mount	C7021K2005	10K ohms NTC Type II	10K ohms NTC at 77°F	-40° to 250° F	6" duct w/ wiring enclosure
Duct Mount	C7021B2013	10K ohms NTC Type II	10K ohms NTC at 77°F	-40° to 250° F	12" duct w/ wiring enclosure
Duct Mount	C7021C2003	10K ohms NTC Type II	10K ohms NTC at 77°F	-40° to 250° F	18" duct w/wiring enclosure
Duct Mount	C7023B2005	10K ohms NTC Type III	10K ohms NTC at 77°F	-40° to 250° F	6" duct w/ wiring enclosure
Duct Mount	C7023B2013	10K ohms NTC Type III	10K ohms NTC at 77°F	-40° to 250° F	12" duct w/ wiring enclosure
Duct Mount	C7023C2003	10K ohms NTC Type III	10K ohms NTC at 77°F	-40° to 250° F	18" duct w/ wiring enclosure
Duct Mount	C7031B2005	PT1000	1097K ohms NTC at 77F	-40° to 250° F	6" duct w/wiring enclosure
Duct Mount	C7041B2005	20K ohms NTC	20K ohms NTC at 77°F	-40° to 250° F	6" duct w/ wiring enclosure
Duct Mount	C7041B2013	20K ohms NTC	20K ohms NTC at 77°F	-40° to 250° F	12" duct w/ wiring enclosure
Duct Mount	C7041C2003	20K ohms NTC	20K ohms NTC at 77°F	-40° to 250° F	18" duct w/ wiring enclosure
Water	C7021K2005	10K ohms NTC Type II	10K ohms NTC at 77°F	-40° to 250° F	Strap-on pipe sensor with wiring enclosure
Water	C7023K2005	10K ohms NTC Type III	10K ohms NTC at 77°F	-40° to 250° F	Strap-on pipe sensor with wiring enclosure
Water	C7041K2005	20K ohms NTC	20K ohms NTC at 77°F	-40° to 250° F	Strap-on with wiring enclosure
Water/Air	C7021N2001	10K ohms NTC Type II	10K ohms NTC at 77°F	-40° to 250° F	Probe Sensor with 6' Lead
Water/Air	C7023N2001	10K ohms NTC Type III	10K ohms NTC at 77°F	-40° to 250° F	Probe Sensor with 6' Lead
Water/Air	C7041N2020	20K ohms NTC	20K ohms NTC at 77°F	-40° to 250° F	Probe Sensor with 6' Lead
Wall Mount	C7021P2004	10K ohms NTC Type II	10K ohms NTC at 77°F	-40° to 250° F	Small metal button sensor
Wall Mount	C7023P2004	10K ohms NTC Type III	10K ohms NTC at 77°F	-40° to 250° F	Small metal button sensor
Wall Mount	C7041P2004	20K ohms NTC	20K ohms NTC at 77°F	-40° to 250° F	Small metal button sensor

Product Selection - Sensors

Current Sensors, Transmitters, Switches and Relays

Current Switches



Model #	Trip Point Type	Normally (Open/Closed)	Core (Solid/Split)	Amp Range	Trip Point	Contact Rating
CS-O-A	Adjustable	Open	Solid	0 to 250 A	0.5 to 220 A	0.2 A @ 200 VAC/VDC
CP-O-A		Open	Split		1.5 to 220 A	
CP-O-AL		Open	Split		0.6 to 180 A	
CP-C-A		Closed	Split		1.5 to 220 A	
CS-O-F	Fixed	Open	Solid	0 to 200 A	0.25 A or less	
CS-C-F		Closed	Solid		0.25 A or less	
CP-O-F		Open	Split		1.5 A or less	
CP-O-FL		Open	Split		0.5 A or less	
CP-C-F		Closed	Split		1.5 A or less	

Current Transmitters



Model #	Selectable Ranges	Measurement	AC Waveform	Core (Solid/Split)	Output Signal
CTS-A-250	0 to 100/200/250A	Average	Pure Sinusoidal	Solid	4 to 20 mA
CTP-A-200	0 to 100/150/200A	Average	Pure Sinusoidal	Split	4 to 20 mA
CTP-A-50-RMS	0 to 10/20/50A	True RMS	Distorted & Pure Sinusoidal	Split	4 to 20 mA
CTS-V-50	0 to 10/20/50A	Average	Pure Sinusoidal	Solid	0 to 5 VDC
CTP-V-50	0 to 10/20/50A	Average	Pure Sinusoidal	Split	0 to 10 VDC
CTS-V-150	0 to 50/100/150A	Average	Pure Sinusoidal	Solid	0 to 10 VDC
CTP-V-150	0 to 50/100/150A	Average	Pure Sinusoidal	Split	0 to 10 VDC



Mini Current Switches

Part Number	Description	Core Type	Normally Open or Normally Closed	Trip Point	Amperage Rating	Output Rating	LEDs
MCSS-F	"Go/No Go" Fixed Mini Current Switch	Solid	N/O	0.20 A	0.20 to 150 Amps	"0.5A Continuous, 36 Vac/Vdc"	Red LED - Above Trip Point, Blue LED - Under Trip Point
MCSP-F	"Go/No Go" Fixed Mini Current Switch	Split	N/O	0.55 A	0.55 to 150 Amps	"0.5A Continuous, 36 Vac/Vdc"	Red LED - Above Trip Point, Blue LED - Under Trip Point
MCSS-A	Adjustable Mini Current Switch	Solid	N/O	0.32-150 Amps	0.32 to 150 Amps continuous	"1A Continuous 36 Vac/Vdc"	N/A
MCSP-A	Adjustable Mini Current Switch	Split	N/O	0.70-150 Amps	0.70 to 150 Amps continuous	"1A Continuous 36 Vac/Vdc"	N/A

Command Relays



Part Number	Description	Coil Voltage	Contact Ratings (All SPDT)	Status LED
CR-DC-5A	5 Amp SPDT Relay	23-31.2Vdc, 15mA@24Vdc	5A (NO)/2A(NC) @ 250Vac, 5A(NO)/3A(NC) @ 125Vac	Yes
CR-DC-12A	12 Amp SPDT Relay	20-31.2Vdc, 16mA@24Vdc	12A @ 250Vac, 12A @ 30Vdc	Yes
CR-12DC-12A	12 Amp SPDT Relay	10-15.6Vdc, 30mA@12Vdc	12A @ 250Vac, 12A @ 30Vdc	Yes
CR-24AC-10A	10 Amp SPDT Relay	16-26.4Vac, 28mA@24Vac	10A @ 250Vac, 10A @ 24Vdc	Yes
CR-115AC-8A	8 Amp SPDT Relay	80-132Vac, 10mA@115Vac	8A @ 250Vac, 8A @ 30Vdc	Yes
CR-230AC-8A	8 Amp SPDT Relay	165-264Vac, 5mA@230Vac	8A @ 250Vac, 8A @ 30Vdc	Yes

Product Selection - Sensors

Humidity and Dew Point Sensors



Electronic Humidity Sensors

Part Number	Output Signal	RH Accuracy	Mounting & Application	Voltage Supply	Temp Sensor	Use With	Insertion Length
H7625A2010	Selectable 4-20mA, 0-10Vdc, or 0-5Vdc	± 2% from 20-95% RH	Wall	18-40 VDC / 18-28 VAC	20K ohm at 77° F	T7350, H775, XL50, XFC, W750B/C, W7753, W7760A/C, W7761	N/A
H7625B2006	Selectable 4-20mA, 0-10Vdc, or 0-5Vdc	± 2% from 20-95% RH	Duct	18-40 VDC / 18-28 VAC	20K ohm at 77° F	T7350, H775, XL50, XFC, W750B/C, W7753, W7760A/C, W7761	7.5" - "B" model only
H7626A2020	Selectable 4-20mA, 0-10Vdc, or 0-5Vdc	± 2% from 20-95% RH	Wall	18-40 VDC / 18-28 VAC	1097 ohm at 77°F	Excel 15, Excel 10, T7350, T775 Series 2000	N/A
H7626B2024	Selectable 4-20mA, 0-10Vdc, or 0-5Vdc	± 2% from 20-95% RH	Duct	18-40 VDC / 18-28 VAC	1097 ohm at 77°F	Excel 15, Excel 10, T7350, T775 Series 2000	7.5" - "B" model only
H7635A2012	Selectable 4-20mA, 0-10Vdc, or 0-5Vdc	± 3% from 20-95% RH	Wall	18-40 VDC / 18-28 VAC	20K ohm at 77° F	T7350, H775, XL50, XFC, W750B/C, W7753, W7760A/C, W7761	N/A
H7635B2018	Selectable 4-20mA, 0-10Vdc, or 0-5Vdc	± 3% from 20-95% RH	Duct	18-40 VDC / 18-28 VAC	20K ohm at 77° F	T7350, H775, XL50, XFC, W750B/C, W7753, W7760A/C, W7761	7.5" - "B" model only
H7635C2015	Selectable 4-20mA, 0-10Vdc, or 0-5Vdc	± 3% from 20-95% RH	Outdoor	18-40 VDC / 18-28 VAC	20K ohm at 77° F	T7350, H775, XL50, XFC, W750B/C, W7753, W7760A/C, W7761	
H7636A2022	Selectable 4-20mA, 0-10Vdc, or 0-5Vdc	± 3% from 20-95% RH	Wall	18-40 VDC / 18-28 VAC	1097 ohm at 77°F	Excel 15, Excel 10, T7350, T775 Series 2000	N/A
H7636B2026	Selectable 4-20mA, 0-10Vdc, or 0-5Vdc	± 3% from 20-95% RH	Duct	18-40 VDC / 18-28 VAC	1097 ohm at 77°F	Excel 15, Excel 10, T7350, T775 Series 2000	7.5" - "B" model only
H7656B2029	Selectable 4-20mA, 0-10Vdc, or 0-5Vdc	± 5% from 25-95% RH	Duct	18-40 VDC / 18-28 VAC	1097 ohm at 77°F	Excel 15, Excel 10, T7350, T775 Series 2000	N/A
H7655A1001	0-10 Vdc	5%	Wall	16-40 VDC / 16-30 VAC	None	Any controller that accepts 0-10 Vdc input	N/A
H7655B2014	Selectable 4-20mA, 0-10Vdc, or 0-5 Vdc	5%	Duct	18-40 VDC/18-28 VAC	20K ohm at 77° F	T7350, H775, XL50, XFC, W750B/C, W7753, W7760A/C, W7761	N/A
C7600A2008	4-20 mA	5% between 30-70% RH	Anywhere where it is exposed to freely circulating air	N/A	None	W7600 or controller requiring 4-20 mA reverse acting input	N/A
C7600B2008	2-10 Vdc	± 5 between 30-70% RH ± 7 between 10-90% RH	Wall	16-40 VDC / 16-30 VAC	None	H775 that accepts 2-10 Vdc output	N/A
C7600C2001	4-20 mA	5% between 30-70% RH	Anywhere where it is exposed to freely circulating air	N/A	None	W7600 or controller requiring 4-20 mA reverse acting input	N/A




Dew Point Sensors

Part Number	Output	Switch	Hysteresis
HSS-DPS	Potential-free relay with changeover contact	RH>90% ± 3% contact open; RH < 90% ± 3% closed	5% RH

Product Selection - Sensors

CO2 Sensors, Pressure Sensors and Transducers

Carbon Dioxide Sensors



Part Number	Output Signal	20K ohms Temp sensor	Display Screen	Honeywell Logo	Mounting	CO2 Range (accuracy)
C7232A1008	0/2 to 10 Vdc or 0/4 to 20 mA w/ one adjustable SPST relay output	No	Yes	Yes	Wall	0 to 2,000 ppm adjustable, +/- 30 ppm +/- 2% of reading at normal temperature and pressure
C7232A1016	0/2 to 10 Vdc or 0/4 to 20 mA w/ one adjustable SPST relay output	No	No	Yes	Wall	0 to 2,000 ppm adjustable, +/- 30 ppm +/- 2% of reading at normal temperature and pressure
C7232A1024	0/2 to 10 Vdc or 0/4 to 20 mA w/ one adjustable SPST relay output	No	Yes	No	Wall	0 to 2,000 ppm adjustable, +/- 30 ppm +/- 2% of reading at normal temperature and pressure
C7232A1032	0/2 to 10 Vdc or 0/4 to 20 mA w/ one adjustable SPST relay output	No	No	No	Wall	0 to 2,000 ppm adjustable, +/- 30 ppm +/- 2% of reading at normal temperature and pressure
C7232B1006	0/2 to 10 Vdc or 0/4 to 20 mA w/ one adjustable SPST relay output	No	Yes	Yes	Duct (8" insertion length)	0 to 2,000 ppm adjustable, +/- 30 ppm +/- 2% of reading at normal temperature and pressure
C7232B1014	0/2 to 10 Vdc or 0/4 to 20 mA w/ one adjustable SPST relay output	No	No	Yes	Duct (8" insertion length)	0 to 2,000 ppm adjustable, +/- 30 ppm +/- 2% of reading at normal temperature and pressure
C7232B1022	0/2 to 10 Vdc or 0/4 to 20 mA w/ one adjustable SPST relay output	No	Yes	No	Duct (8" insertion length)	0 to 2,000 ppm adjustable, +/- 30 ppm +/- 2% of reading at normal temperature and pressure
C7232B1030	0/2 to 10 Vdc or 0/4 to 20 mA w/ one adjustable SPST relay output	No	No	No	Duct (8" insertion length)	0 to 2,000 ppm adjustable, +/- 30 ppm +/- 2% of reading at normal temperature and pressure
C7262A1008	0/2 to 10 Vdc or 0/4 to 20 mA w/ one adjustable SPST relay output	Yes	Yes	Yes	TR20 Series Style Wall	0 to 2,000 ppm adjustable, +/- 30 ppm +/- 3% of reading from 59°F - 85°F (15°C - 30°C)
C7262A1016	0/2 to 10 Vdc or 0/4 to 20 mA w/ one adjustable SPST relay output	Yes	No	Yes	TR20 Series Style Wall	0 to 2,000 ppm adjustable, +/- 30 ppm +/- 3% of reading from 59°F - 85°F (15°C - 30°C)
C7632A1004	0-10 Vdc (fixed)	No	No	Yes	Wall	0 to 2,000 ppm fixed
C7632B1002	0-10 Vdc (fixed)	No	No	Yes	Duct	0 to 2,000 ppm fixed

P7650 Differential Pressure Transducers



Model	Mounting	Selectable w.c. Pressure Range, Uni or Bi-Directional	Velocity Mode	Display	Output	Supply Voltage
P7650A1000	Panel	+/-0-1", 0-.25", 0-.5", 0-1" w.c. or +/-25, 50, 100, 250 Pa Selectable	500/1,000/2,000/3,000 FPM 2.5/5/10/15MS	Yes	0-10Vdc, 0-5Vdc, and 4-20mA Selectable	12-30Vdc or 24Vac
P7650A1018				No		
P7650A1026				Yes		
P7650A1034				No		
P7650B1008	Duct	+/-0-1", 0-.25", 0-.5", 0-1" w.c. or +/-25, 50, 100, 250 Pa Selectable	500/1,000/2,000/3,000 FPM 2.5/5/10/15MS	Yes		
P7650B1016				No		
P7650B1024				Yes		
P7650B1032				No		
P7650U1040	Universal	+/-0-1", 0-.25", 0-.5", 0-1", 0-2", 0-5", 0-10" in. w.c. or +/-0.25, 0.5, 1.0, 2.5 kPa; or +/-25, 50, 100, 250 Pa Selectable	500/1,000/2,000/3,000/4,000/5,000/6,000/7,000 FPM 2.5/5/10/15/20/25/30/35 MS	No		
P7650U1052				Yes		

P7635 Differential Air Pressure Sensors



Model	Pressure Range	Range	Accuracy	Output	Supply Voltage	
P7635D01M	0 to 0.1 in wc	Uni	0.5	4-20mA	+16-36 VDC (250 Ohm Load) +21-36 VDC (500 Ohm Load)	
P7635D025M	0 to 0.25 in wc	Uni	0.5			
P7635D05M	0 to 0.5 in wc	Uni	0.5			
P7635D1M	0 to 1 in wc	Uni	0.5			
P7635D2M	0 to 2 in wc	Uni	0.5			
P7635D5M	0 to 5 in wc	Uni	0.5			
P7635D10M	0 to 10 in wc	Uni	0.5			
P7635B01M	-0.1 to 0.1 in wc	bi	0.5			
P7635B025M	-0.25 to 0.25 in wc	bi	0.5			
P7635B05M	-0.5 to 0.5 in wc	bi	0.5			
P7635B1M	-1 to 1 in wc	bi	0.5			
P7635D2V	0 to 2 in wc	Uni	0.5			0-10Vdc

PWT Series Wet Differential Pressure Transducers



Model	Selectable Pressure Range	Output	Supply Voltage
PWT50	0-5, 0-10, 0-25, 0-50 psid	0-10Vdc, 0-5Vdc, and 4-20mA selectable	12-30Vdc or 24Vac
PWT100	0-10, 0-20, 0-50, 0-100 psid	0-10Vdc, 0-5Vdc, and 4-20mA selectable	12-30Vdc or 24Vac
PWT250	0-25, 0-50, 0-125, 0-250 psid	0-10Vdc, 0-5Vdc, and 4-20mA selectable	12-30Vdc or 24Vac

MLH Gauge Pressure Sensors



Model	Pressure Range	Pressure Connection	Output	Excitation
MLH050PSCDJ1235	0-50 psig	1/4" -18 NPT	4-20mA	9.5 Vdc to 30 Vdc
MLH150PSCDJ1236	0-150 psig	1/4" -18 NPT	4-20mA	9.5 Vdc to 30 Vdc
MLH300PSCDJ1237	0-300 psig	1/4" -18 NPT	4-20mA	9.5 Vdc to 30 Vdc
MLH500PSCDJ1240	0-500 psig	1/4" SAE Female Schrader	4-20mA	9.5 Vdc to 30 Vdc
MLH01KPSCDJ1241	0-1000 psig	1/4" SAE Female Schrader	4-20mA	9.5 Vdc to 30 Vdc

Submittal Data - Sensors

Spyder Sylk Sensors, TR70 Series



The TR71 and TR75 are two-wire, polarity insensitive, Sylk bus communicating wall modules, which communicate with Spyder® and some ComfortPoint™ programmable controllers.

All models have a space-temperature sensor, network bus jack and an LCD panel with three softkeys and two Up/Down adjustment keys. The TR71-H and TR75-H models include an onboard humidity sensor.

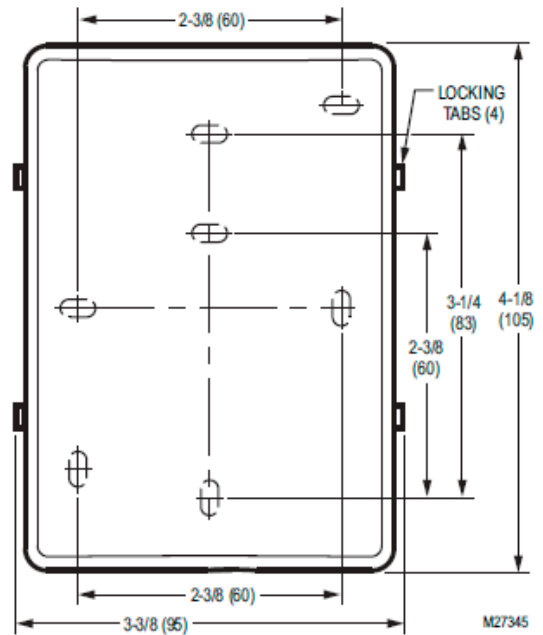
FEATURES

- Ability to control tenant access to controller parameters via password protection
- Ability to assign labels for enumerated values
- Customized parameter access, by using the Honeywell WEBS-AX Workbench tool
- Ability to link setpoint limits to a network variable
- Programmable for: Home screen options, tenant access, contractor access, optional password protection to contractor mode, access to controller parameters, setpoint, override, fan and other parameters
- Ability to access and adjust most parameters in the programmable controller.
- TR75 can access and adjust the controller schedule
- Ability to balance the VAV system from the wall module
- Home screen can display one to three of any of the following parameters: Temperature Setpoint, Room Temperature, Room Humidity, Outdoor Humidity, Outdoor Temperature and Time, or one of virtually any parameter in the controller
- The TR75 has more than twice the memory capacity for parameters as the TR71
- Network bus jack
- Simple two-wire terminal connection to the programmable controller (includes power) and an optional two-wire terminal connection for the network. All connections are polarity insensitive
- Permanent retention of user configuration, including setpoints after a power outage

SPECIFICATIONS

Compatibility.....	Full feature set, including scheduling and password protection requires the latest Spyder firmware (field upgradeable with Spyder Flash Tool), Spyder Tool version greater than 5.18, and WEBS-AX Workbench version 3.4.57 or greater.
Construction	Two-piece construction, cover and internally wired subbase. Field wiring, 18 to 24 AWG (0.82 to 0.20 sq. mm), connects to a terminal block in the subbase.
Mounting Options.....	The LCD wall modules can be mounted on a standard two by four inch junction box or on a 60 mm diameter junction box. The modules may be mounted up to 200 ft. (61 m) from the programmable controller. Twisted pair wiring is recommended for distances longer than 100 ft. (30.5 m).
Environmental Ratings.....	Operating Temperature: 30 °F to 110 °F (-1 °C to 43 °C) Shipping Temperature: -40 °F to 150 °F (-40 °C to 65.5 °C) Relative Humidity: 5% to 95% non-condensing
Temperature Setpoint Range.....	Default range is 55 °F to 85 °F (10 °C to 35 °C); configurable for other ranges.
Temperature Sensor Accuracy.....	±0.36 °F at 77 °F (±0.2 °C at 25 °C)
Humidity Sensor Accuracy.....	±5% RH from 20% to 80% RH (TR71-H/TR75-H only)
Power.....	18 Vdc power is supplied to the wall module from the two-wire S-BUS connection to the programmable controller.
Accessories.....	50007298-001 (pack of 12) medium, cover plate; 6-7/8 x 5 in. (175 x 127 mm).
Approvals	CE; UL94-HB plastic enclosure; FCC Part 15, Class B

DIMENSIONS DIAGRAM



Spyder Sylk Sensors, TR40 Series



The TR40 and TR42 are two-wire, non-polarity sensitive, Sylk communicating wall modules, which communicate with Spyder® programmable controllers.

The TR40 and TR42 are simple temperature wall modules with basic setpoint, override and fan options; designed for a broad range of applications.

SPECIFICATIONS

Environmental Ratings.....	Operating Temperature: 32 °F to 122 °F (0 °C to 50 °C) Shipping Temperature: -40 °F to 150 °F (-40 °C to 65.5 °C) Relative Humidity: 5% to 95% non-condensing
Accessories.....	50007298-001 (pack of 12) medium, cover plate; 6-7/8 x 5 in. (175 x 127 mm).
Approvals	CE; UL94-V0 plastic enclosure; FCC Part 15, Class B
Accuracy	Temperature: ± 0.2 °C at 25 °C (± 0.36°F at 77°F) Humidity: +/-3% RH from 20-80%RH CO2: +/- (30ppm +3% of measured value). Calibrated at the factory. Uses automatic background calibration. No calibration required for the life of the product. Meets CEC Title 24 requirement of +/-75ppm accuracy at 600ppm and 1000ppm ambient levels. For proper CO2 operation, install only in spaces that see at least 4 hours of continuous unoccupied time per week.

FEATURES

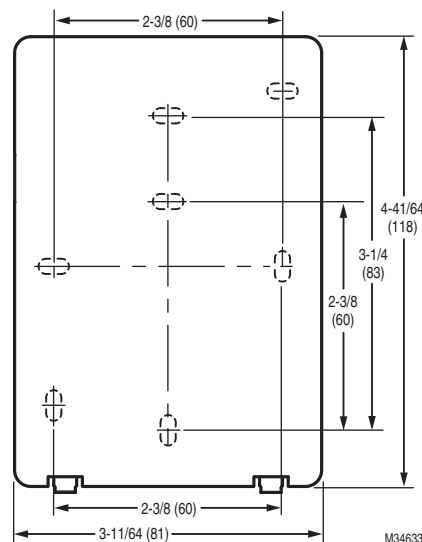
The TR40 and TR42 wall modules include:

- Two-wire, polarity insensitive Sylk provides both power and communication to the device.
- Models available with display (TR42) or without display (TR40).
- Models available with or without built-in humidity or CO2 sensors.

All TR42 display wall modules include:

- Fan speed options: Auto-On, Auto-Off-On, Auto-Off-Low-Med-High (configurable in the Niagara tool)
- Override option (configurable in the Niagara tool)
- Ability for tenant to change between °F and °C
- Ability to provide tenant either a relative "warmer cooler" setpoint adjustment or absolute temperature setpoint adjustment
- An installer mode with optional password protection that allows:
 - Switching between °F and °C
 - Temperature calibration
 - Humidity calibration
 - Numerical or Graphical setpoint adjustment
 - Adjustment of the Setpoint Range Limits
 - Adjustment of override time (Choose Network Time or 1-24 hours)
- Choosing the sensor or setpoint value to be shown in the Home Screen, or choose to scroll through sensor and setpoint values.
- Choosing between English and International icon display.

DIMENSIONS DIAGRAM



Submittal Data - Sensors

Wireless Sensors and Receivers



The WRECVR receiver and TR21-WS, TR23-WS, TR21-WK, and TR23-WK are a family of wireless wall modules and receiver for use with:

- Spyder Unitary Controllers: PUL, PVL, etc.
 - Excel 10 W7750, W7751, W7752 and W7753 controllers
 - T7350, T7351 and TB8575 low-voltage SuitePRO™ thermostats
 - Will not work with TB7220, TB8220 or TB line voltage thermostats, XL15s, W7762, W7763 or certain other XL controllers
- Will work with WEBs-AX™ I/O Module products if using a separate transformer
 - Compatibility with various other non-Honeywell controllers that accept 10K type2 NTC temperature inputs

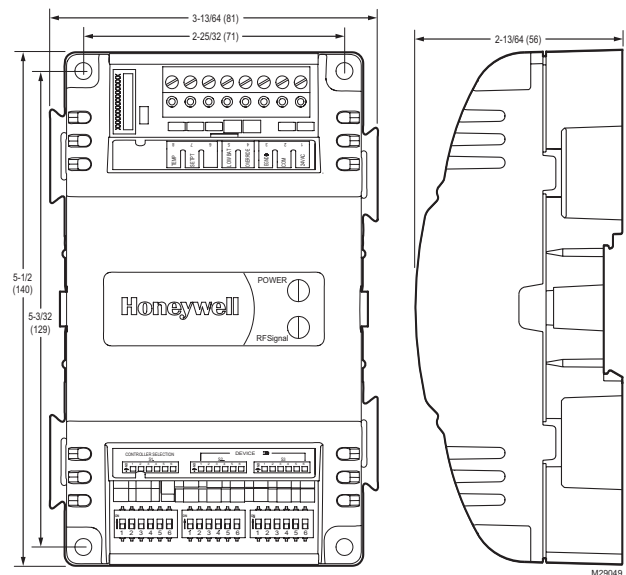
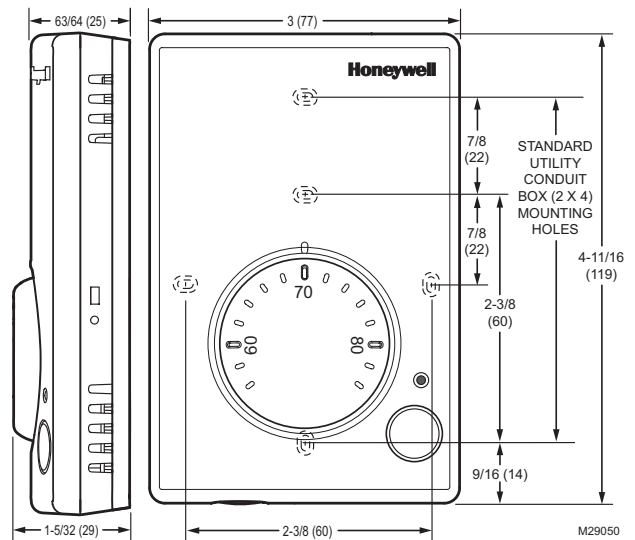
SPECIFICATIONS

Models.....	For specific model information, see Specification Data, form 63-1332.
Environmental Ratings.....	Wall Module Operating Temperature: 45° to 99 °F (7° to 37 °C). Receiver Operating Temperature: -40° to 150 °F (-40° to 65.5 °C). Storage Temperature: -40° to 150 °F (-40° to 65.5 °C). Operating Humidity: 5% to 95% RH (non-condensing)
Accuracy	+/- 1°F (+/- 0.5°C) across 12 °C to 30°C
Setpoint Range for TR23	56° to 84 °F (13° to 29 °C)
Accessories.....	50007298-001 (pack of 12) medium, cover plate; 6-7/8 x 5 in. (175 x 127 mm).
Power	Receiver Voltage: 20 – 30VAC/DC, 50/60Hz; 24VAC typical
Housing	Wall Module: UL94-HB Receiver: UL94-5VA
Radio Frequency	2.4 GHz (IEEE Std 802.15.4-2003 compliant) Open Range: 3000 feet Typical Range: 100 feet Output power: 16dBm Receiver power consumption: <1.5 VA@24VAC

FEATURES

- Wall module to Receiver (point to point) wireless kits can replace any standard wired sensor
- Wireless Kits (wall module and receiver) are pre-bound at the factory for quick installation
- Signal Strength LED built into the wall module
- Low battery indication
- Optional dip switches available to bind any wall module to any receiver
- Approximate 5-year battery life with AA Alkaline (included), 7.5 years with Lithium
- Locking screw discourages tampering and battery theft

DIMENSIONS DIAGRAM





The TR21, TR22, TR23 and TR24 are a family of direct-wired wall modules for use with:

- Spyder Unitary Controllers: PUL, PVL
- Excel 10 W7750, W7751a, W7752, and W7753 controllers
- Honeywell Excel 800, 600, 500, 100, and 80 (all fully programmable) controllers
- W7761 Controller
- ComfortPoint LON Controllers: CP-UL, CP-VL
- All models have a space temperature

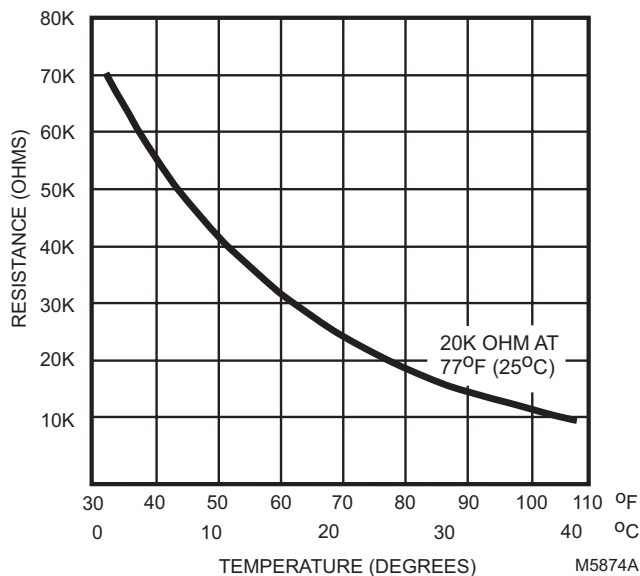
sensor. Some models have a temperature dial, setpoint adjustment, LONWORKS bus jack, override (bypass) with LED, and fan switch.

SPECIFICATIONS

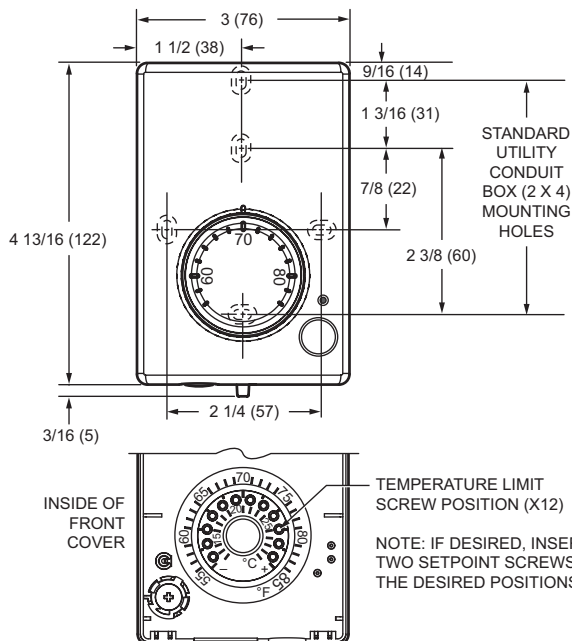
Models.....	For specific model information, see TR21, TR22, TR23, and TR24 Wall Modules – Specification Data, form 63-1321.
Environmental Ratings.....	Operating Temperature: 45° to 99° F (7° to 37° C). Shipping Temperature: -40° to 150° F (-40° to 65.5° C).
Accessories.....	50007298-001 (pack of 12) medium, cover plate; 6-7/8 x 5 in. (175 x 127 mm).
Approvals.....	CE; UL94 plastic enclosure; FCC Part 15, Class B
Sensor.....	All models are furnished with a 20K Ohm nonlinear NTC temperature sensor that follows a specific temperature resistance curve. NOTE: The TR21-A wall module model has two (2) 20K Ohm nonlinear NTC temperature sensors in parallel, which provide 10K NTC temperature sensing necessary for averaging.

FEATURES

- Models with setpoint adjustment.
- Models with humidity output.
- Models with occupied/unoccupied override (bypass) with LED.
- Models with three-position (auto/0/1) or 5-position (auto/0/1/2/3 speed) fan switch.
- LONWORKS® bus jack on all models except the TR21 and TR21-A models.
- Locking cover on all models.
- Operating range 45° to 99° F (7° to 37° C).
- Models (TR22 and TR23) with user-selectable temperature setpoint dials in Fahrenheit, Celsius and Relative (- to +).



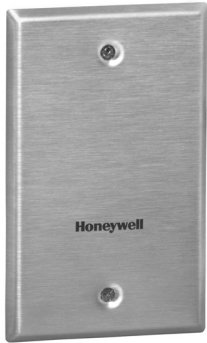
DIMENSIONS DIAGRAM



M25482

Submittal Data - Sensors

C7772A Series Wallplate Sensors



The C7772A series of Wallplate Temperature Sensors are designed to be used with the Excel 5000 family and other Honeywell controllers. The C7772F Series is designed to be used with the TB7600, TB7300 and TB7200 Series communicating thermostats and other controllers that require a 10K ohm NTC Type II sensor. The C7772G is designed to be used with WEBs-AX I/O modules and other controllers that require a 10K ohm NTC Type III sensor. The C7772 sensors provide a resistive output signal proportional to sensed room or space temperature. The C7772 is well

suited for low-profile wall-mounted applications where durability and tamper-proof construction is desired, such as schools, prisons and institutions.

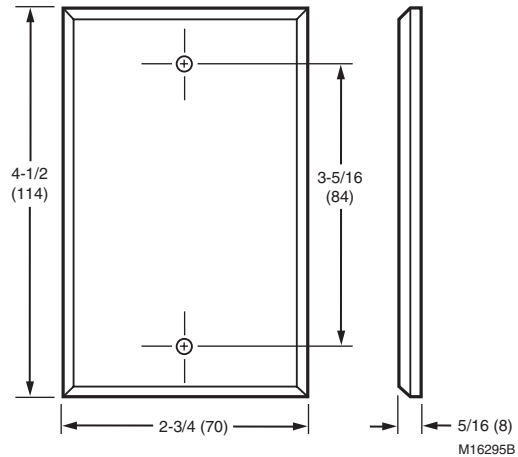
SPECIFICATIONS

Temperature Ratings	Operating: 45 °F to 99 °F (7 °C to 37 °C). Shipping: -40 °F to 150 °F (-40 °C to 65 °C).
Long-term temperature sensor drift (for 20K ohm sensors only)	Maximum sensor drift is nominally +/-0.13 °F after 5 years of operation, no appreciable drift thereafter. No calibration of the device is possible. Long term drift calibration/maintenance through controller software is typically not necessary.
Humidity Ratings	5 to 95% rh, non-condensing.
Sensor	C7772A furnished with a 20K non-linear NTC thermister, C7772F with a 10K non-linear NTC type II thermister, and C7772G with a 10K non-linear NTC type III thermister.
Approvals	National Electrical Code (NEC) Class II

FEATURES

- Low profile when mounted on industry standard utility conduit box.
- Rugged, brushed stainless steel wallplate.
- Integral foam pad isolates wallplate sensor from conduit box.
- Insulated screw terminals ensure reliable field wiring connection.
- Models available with a variety of resistive temperature sensor elements.

DIMENSIONS DIAGRAM



C7772 SENSOR RESISTANCE

	Typical Resistance (in ohms)	Typical Resistance (in ohms)	Typical Resistance (in ohms)
	C7772A	C7772F	C7772G
At 41°F (5°C)	54,200	25,392	23,467
At 50°F (10°C)	41,758	19,901	18,789
At 59°F (15°C)	32,427	15,712	15,137
At 68°F (20°C)	25,370	12,493	12,268
At 77°F (25°C)	20,000	10,000	10,000
At 86°F (30°C)	15,856	8,057	8,196
At 95°F (35°C)	12,654	6,531	6,754



The T7047C and T7047G Electronic Thermostats and Remote Space Sensors are used in Series 70 Control Systems to provide modulating space temperature control.

SPECIFICATIONS

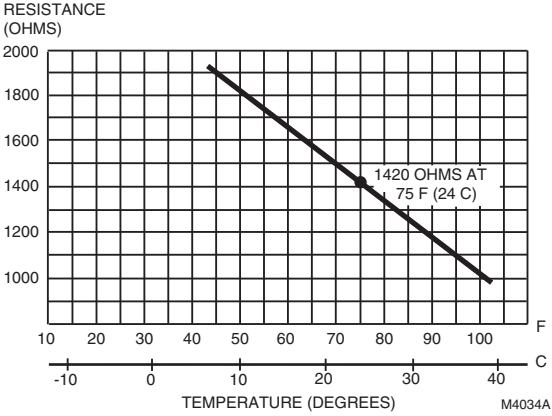
Models.....T7047C: 2-wire remote sensor for use with control systems such as the T7100, T7300, W927, W960 and W973.
 T7047G: 2-wire remote sensor without internal adjustment means, requires remote setpoint device such as T7100, T7300, S963B, 7067B or T7080B.

Temperature Sensor.....Thermistor-resistor element.

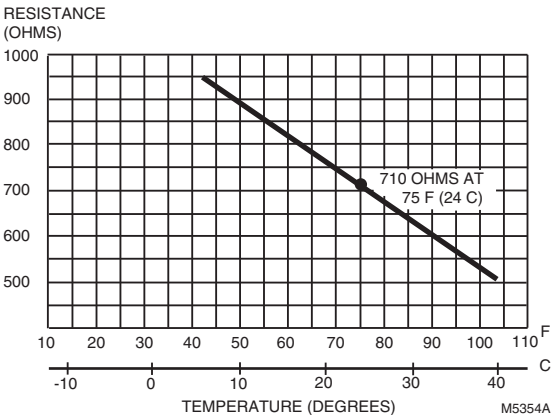
Sensor Resistance.....For the following negative temperature coefficient (NTC) devices, resistance decreases as temperature increases
 T7047C: 1420 ohms nominal at 75°F (24°C); resistance changes 15 ohms for each 1°F (0.6°C) temperature change.
 T7047G: 710 ohms nominal at 75°F (24°C); resistance changes 7.5 ohms for each 1°F (0.6°C) temperature change.

Mounting.....Mounts on wall or 2 x 4 in. vertical outlet box with screws provided.

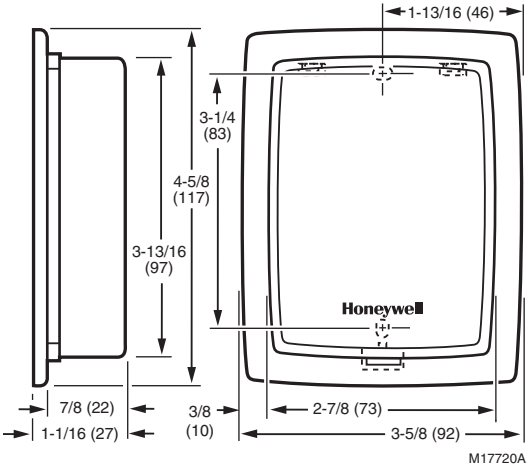
T7047C



T7047G



DIMENSIONS DIAGRAM



SENSORS

Submittal Data - Sensors

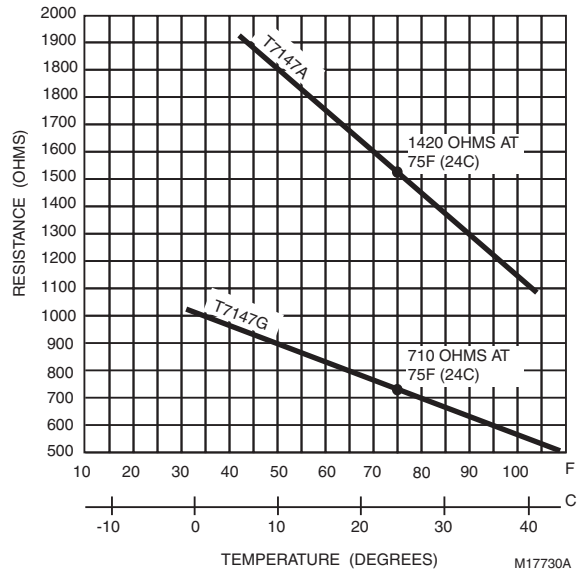
T7300 Sensors



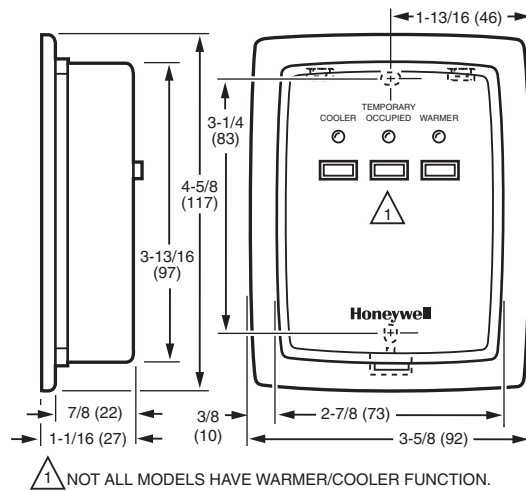
The T7147A and T7147G Remote Space Sensors and Override Modules are used with T7300/Q7300 Thermostat/ Subbase to provide space temperature control, switch initiation and override indication from a remote location.

SPECIFICATIONS

Temperature Sensor	Thermistor-resistor (NTC) element.
Sensor Resistance.....	Resistance decreases as temperature increases
	T7147A: 1420 ohms nominal at 75 °F (24 °C); resistance changes 15 ohms for each 1 °F (0.6 °C) temperature change.
	T7147G: 710 ohms nominal at 75 °F (24 °C); resistance changes 7.5 ohms for each 1 °F (0.6 °C) temperature change.
Mounting.....	Mounts on wall or 2 x 4 in. vertical outlet box with screws provided.



DIMENSIONS DIAGRAM





- Used with T775 Series 2000 Electronic Controllers
- Some typical applications for the 50021579-001 and T775-SENS-WT/WR sensors include:
 - Monitoring return air temperatures
 - Monitoring discharge air temperatures
 - Monitoring mixed air temperatures

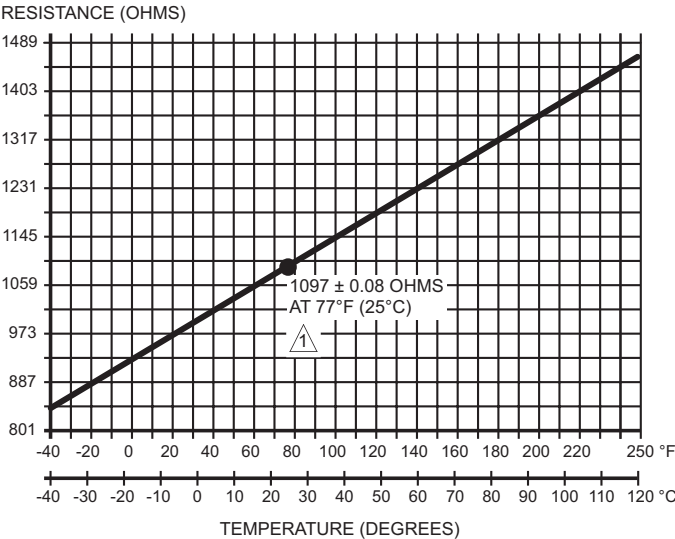
Use the T775-SENS-OAT to measure outside air temperature.

FEATURES

- Fast response time and highly accurate
- 1/2 in. (6.35 mm) stainless steel probe with a thermally conductive epoxy
- All sensors are 1,097 Ohms PTC at 77°F (25°C)
- The 50021579-001 is a standard temperature sensor for indoor applications
- The T775-SENS-WR is a water resistant sensor with 5 ft leads
- The T775-SENS-WT is a water tight sensor with 6 ft leads
- The T775-SENS-OAT is for sensing outdoor air temperature and is housed in a weatherproof case for outdoor use (knockouts allow for 1/2 in. conduit connection)
- Two-year warranty

SPECIFICATIONS

Operating temperature range	50021571-001: -40 F to 350 F (-40C to 177C) Short term spikes to 392F (200C) okay. T775-SENS-WR and T775-SENS-WT: -40F to 270F (-40C to 132C) T775-SENS-OAT: -40F to 158F (-40C to 70C)
Accuracy	Meets DIN-IEC-751 Class A standards for overall accuracy of +/- 0.06% at 32°F (0°C)
Self Heating Coefficient.....	4 mW/C (Measured in air with velocity of 1m/sec.)
Response Time.....	Air (Velocity = 1 m/s) = 15 sec. max.
Temperature Coefficient	3,850 ppm/C
Environmental Compliance	RoHS-Directive 2002/95/EC
Applied Current	1.0 mA Max.
Sensor Output	1 K Ohms at 32 F (0 C)
Approvals	RoHS: Compliant



△ POSITIVE TEMPERATURE COEFFICIENT (PTC) OF 2.1 OHMS PER °F
M24304

Wiring Diagrams - Sensors

T775 Sensors

DIMENSIONS DIAGRAM

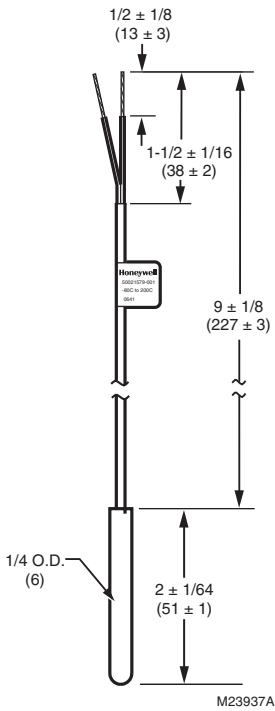


Fig. 1. 50021579-001 Dimensions in Inches (mm).

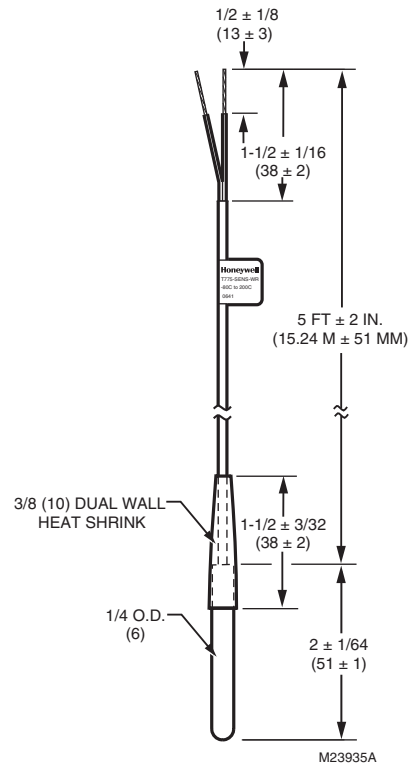


Fig. 2. T775-SENS-WR Dimensions in Inches (mm).

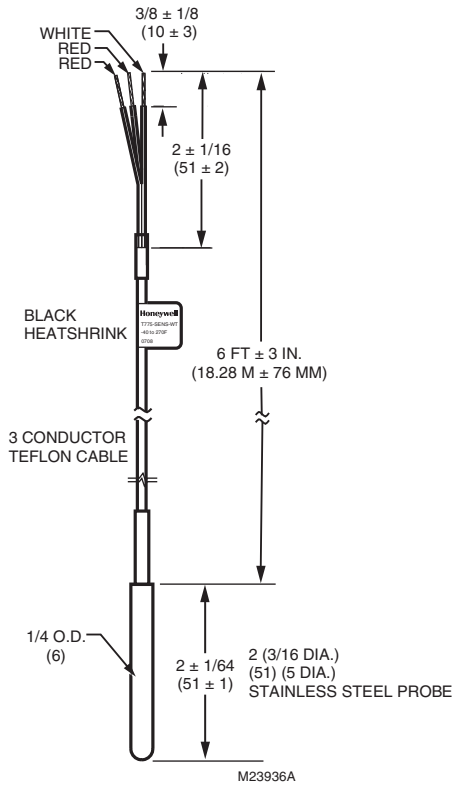


Fig. 3. T775-SENS-WT Dimensions in Inches (mm).

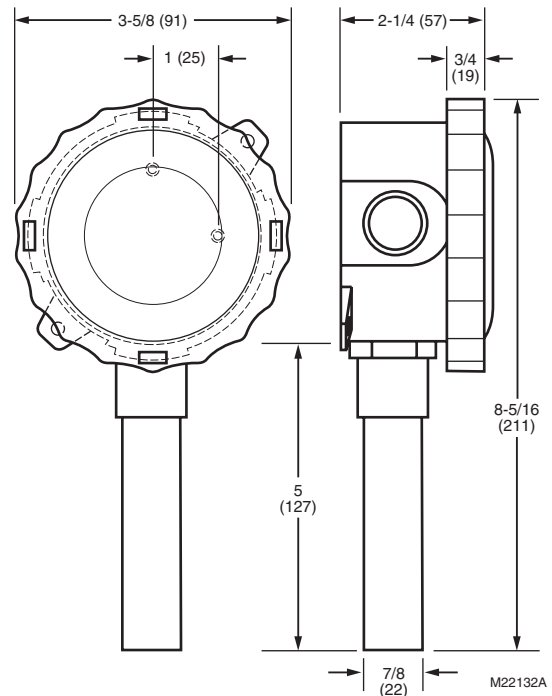


Fig. 4. T775-SENS-OAT Dimensions in Inches (mm).



The C7660 Selectable Outdoor Air Temperature Sensor is used with the W7459, W7215, W7212, W7213 and W7214 Economizer Controls. The economizer controls are mounted on an M7415/M7215 Actuator. They permit the use of outdoor air as the first stage of cooling in heating, ventilating and air conditioning (HVAC) systems.

The C7660 Selectable Temperature Sensor is only to be used with single temperature change over with the sensor located in the outdoor air.

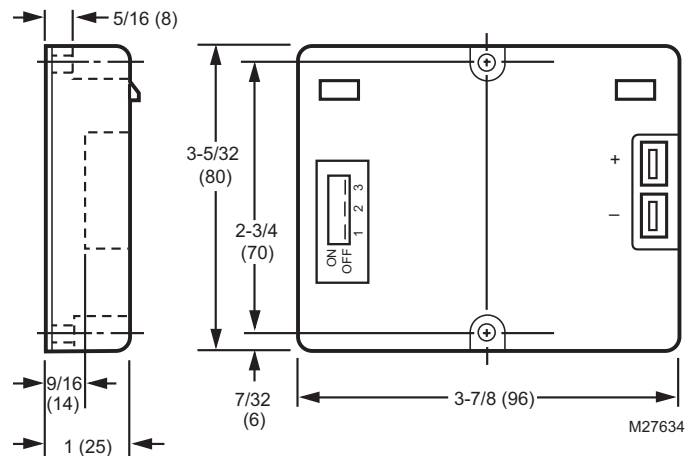
SPECIFICATIONS

Model.....	C7660 Selectable Temperature Sensor Case: Duct mount Temperature Sensing Element: Thermistor
Output Signal.....	4mA not OK to economize, 20 mA OK to economize
Operating Ambient Temperature Range ..	-40° to 149 °F (-40° to 65 °C).
Shipping Temperature Range	-40° to 149 °F (-40° to 65 °C).
Supply Voltage	Power to sensor is supplied through economizer or if not used with an economizer, logic power input is 21.6 vdc ± 1.5 vdc.
Electrical Connections.....	Two 1/4 in. (6.4 mm) quick connect terminals.
Hysteresis.....	Hysteresis +/- 1F; Economizer Cut-in 1F below setpoint, Cut-out 1F above setpoint
Accuracy	+/- 1° F
Approvals	Underwriters Laboratories Inc. Flammability Rating UL94-5V

FEATURES

- Senses temperature of outdoor air and provides a signal to economizer control with OK or not OK to economize.
- Selectable dip switch provides 8 change over temperature options.
- When temperature of outdoor air is below change over temperature, the outdoor air damper is opened to reduce the cooling load in the building.
- Provides 4 OR 20 mA output signal to economizer control; At 4 mA not OK to economize, 20 mA OK to economize.
- Highly accurate microprocessor control.
- Sensor is enclosed in a rugged, corrosion-resistant plastic case.
- Replaces C7650 temperature sensors and the control function of temperature change over in the economizer control.
- Easy to set change real time temperature settings. The installer can change the temperature set point without cutting power to the system.

DIMENSIONS DIAGRAM



Submittal Data - Sensors

Analog Economizer Sensors



The C7046 series of Duct Air Temperature Sensors for analog economizer applications and primary and/or secondary sensors in electronic control systems.

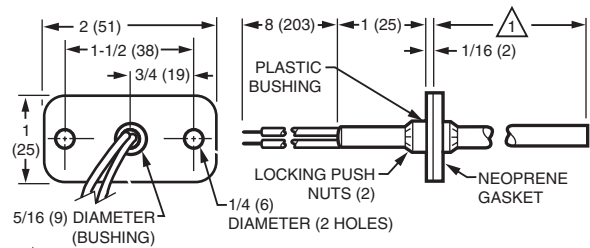
FEATURES

- C7046 Sensors have probe lengths of 6 in. (152 mm), 8 in. (203 mm) and 12 in. (305 mm).
- Carbon type, negative temperature coefficient (NTC) thermistor sensing element in the C7046A,B,C and platinum thin film, positive temperature coefficient (PTC) element in C7046D precisely measures temperature changes.
- No settings or calibration required.
- Solid state components not affected by dust or dirt.
- Fast reacting.
- Rugged stainless steel insertion probe.
- Mounts on duct or plenum surface with mounting flange or in a 2 in. by 4 in. (51 by 102 mm) junction box

SPECIFICATIONS

C7046 Air Temperature Sensor	C7046A used with W973, W7210, W7460 and other controllers; C7046B used with W7080; C7046C used with W973; and C7046D used with Excel controllers and T775 series 2000.
Mounting.....	Integral mounting flange requiring two No. 8 screws.
Sensing Element.....	C7046A,B,C: Carbon type, thermistor-resistor element, C7046D platinum thin film element, 1/4" (6 mm) diameter
Maximum Ambient Temperature	250 °F (121 °C).
Operating Temperature Range.....	40 to 150 °F (4 to 66 °C).
Wiring Connections	6 in. (152 mm) leadwires.
Performance Characteristics.....	Reaction Time Constant with Air Approach Velocity of 500 ft/min (2 m/sec): C7046A: 100 seconds. C7046A,C: Nominal Resistance: 3000 ohms at 77 °F (25 °C) Nominal Sensitivity: 70 ohms per degree F (124 ohms per degree C) at midrange. C7046B: 22.8K ohms NTC at 77F C7046D: 1097 ohms PTC at 77F
Resistance/Temperature (NTC)	

DIMENSIONS DIAGRAM



△ INSERTION LENGTH DEPENDS UPON THE MODEL.

M22402B

Analog Economizer Sensors



The C7400A Enthalpy Sensor is used with the economizer logic modules with the A,B,C and D performance curves. The sensors combined with the economizer logic modules permit the use of outdoor air as the first stage of cooling in heating, ventilating and air conditioning (HVAC) systems.

SPECIFICATIONS

C7400A enthalpy sensor for use with economizer logic modules with A,B,C, and D performance curves.

Output Signal..... 4 to 20 mA current signal increases from 4 mA to 20 mA as enthalpy decreases.

Ambient Temperature Ranges..... Shipping: -40 °F to 150 °F (-40 °C to 66 °C)
Operating: 32 °F to 125 °F (0 °C to 52 °C)

Maximum Power Consumption..... 0.8VA maximum at 40Vdc 20mA

Supply Voltage 12 to 40 Vdc

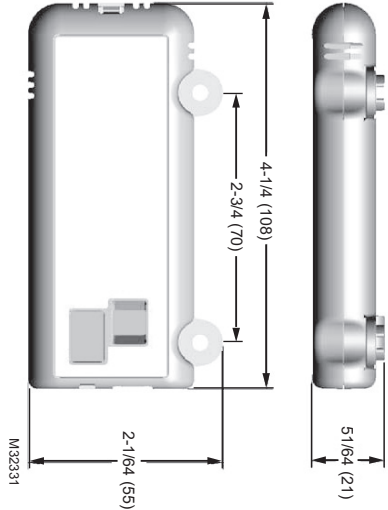
Electrical Connections..... Two 1/4 in. (6 mm) quick connect terminals.

Approvals Underwriters Laboratories Inc.
Flammability Rating UL94-5V

FEATURES

- Senses and combines temperature and humidity of outdoor air.
- Long lasting thermistor sensing element is accurate and stable over time.
- As enthalpy of outdoor air increases, the outdoor air damper closes to a preset minimum position.
- As enthalpy of outdoor air becomes low, the outdoor air damper opens to reduce the mechanical cooling load in the building.
- Maximum economizer savings is achieved when two C7400 Enthalpy Sensors are used for differential enthalpy changeover control.
- Compact size and lightweight construction allow easy mounting in HVAC rooftop unit.
- Sensor is enclosed in a rugged, corrosion-resistant glass fiber reinforced plastic duct-mount case.
- Provides a 4 to 20 mA output signal to Economizer Logic Module; setpoint is located on the logic module.

DIMENSIONS DIAGRAM



SENSORS

Submittal Data - Sensors

Communicating Economizer Sensors



The sensors are part of the JADE™ Economizer System (Model W7220) that permit the use of outdoor air as the first stage of cooling in heating, ventilating and air conditioning (HVAC) systems. With Spyder system, the C7400S1010 communicates temperature and humidity via Sylk to the controller.

The C7400S Sylk Bus sensor is a combination temperature and humidity sensor, which is intended to be used in commercial rooftop units for sensing air. The sensor is powered by and communicates on the Sylk Bus. The C7400S communicates temperature and humidity separately digitally on the Sylk Bus Communication Protocol. The JADE Economizer controller provides power and communications on the Sylk Bus for the C7400S Sylk Bus sensor.

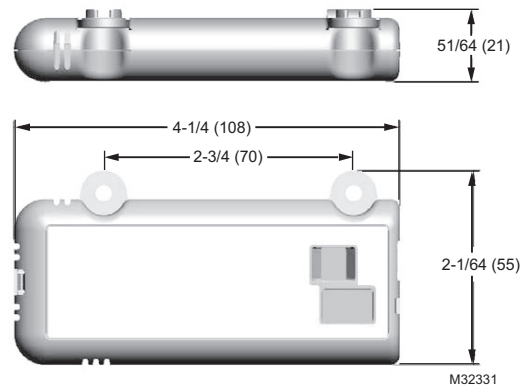
SPECIFICATIONS

Supply Voltage	7 to 21 Vdc
Power Consumption	5 mA
Output Rating	75 ohm load switched at 9600 Baud
Wiring: Sylk Bus.....	2-wire (18 to 22 AWG)
Operating Temperature range.....	-40 to 150 °F (-40 to 65 °C)
Storage Temperature range	-40 to 150 °F (-40 to 65 °C)
Shipping Temperature range.....	-40 to 150 °F (-40 to 65 °C)
Operating Relative Humidity range	5% to 95% RH noncondensing
Temperature and Humidity, C7400S:.....	Temperature sensing range: -40 to 150 °F (-40 to 65 °C) Humidity sensing range: 0 to 100% RH with 5% accuracy.
Height	0.8 inches (20.5 mm)
Width	2.17 inches (55 mm)
Length	4.25 inches (108 mm)
Weight	0.58 lb. (0.265 kg)
Approvals	EN61000-6-3, EN61000-3-2; EN61000-3-3; EN61000-6-1; EN60730-1; Annex H.23 (emissions); Annex H.26 (immunity); CE Mark

FEATURES

- This unit mounted C7400S enthalpy sensor includes solid state temperature and humidity sensors.
- Outputs a digital communicating signal on a two-wire Sylkbus communications link, reporting the temperature and humidity separately to the controller.
- The controller then determines the enthalpy (total heat), enabling economizer modes of operation when outside air enthalpy is suitable for free cooling.
- Enthalpy sensors are compatible with Honeywell economizer systems.
- The enthalpy boundary curve is programmed via the controller. When the temperature and humidity are determined to be suitable based on the relationship to the boundary, the controller allows outside air for economizing
- Ambient temperature operating range from -40° to 150° F.
- Dual enthalpy sensors in outside air and return switches the controllers to economizer mode of operation anytime the outside enthalpy is less than the return air enthalpy. UL recognized component (Guide info XAPX).
- Select the C7400S1010 for use with the Spyder Controller to communicate temperature and humidity to your building automation system via Sylk.

DIMENSIONS DIAGRAM



Communicating Economizer Sensors

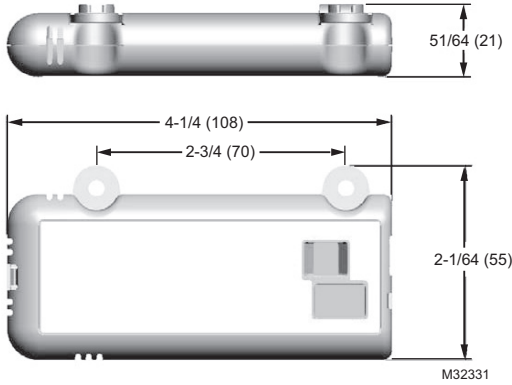


The C7250 Temperature sensor is designed for use as a 20k input to a controller for mixed air or discharge air temperature in rooftop packaged air conditioning equipment. Compatible with the JADE™ Economizer System (Model W7220) which provides power and communications for the C7250 temperature sensor.

FEATURES

- This unit mounted C7250A temperature sensor utilizes a 20K NTC sensor.
- Compatible with Honeywell W7220 JADE economizer controller

DIMENSIONS DIAGRAM

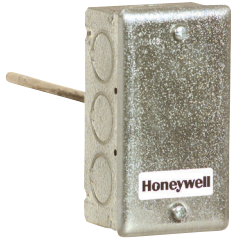


SPECIFICATIONS

Output Rating	20K ohms at 77 °F (25 °C), NTC
Wiring	2-wire (18 to 22 AWG)
Operating Temperature range	-40 to 150 °F (-40 to 65 °C)
Storage Temperature range	-40 to 150 °F (-40 to 65 °C)
Shipping Temperature range	-40 to 150 °F (-40 to 65 °C)
Temperature, C7250	Temperature sensing range: 0 to 150 °F (18 to 65 °C)
Height	0.8 inches (20.5 mm)
Width	2.17 inches (55 mm)
Length	4.25 inches (108 mm)
Weight	0.58 lb. (0.265 kg)
Approvals	EN61000-6-3, EN61000-3-2; EN61000-3-3; EN61000-6-1; EN60730-1 Annex H.23 (emissions); Annex H.26 (immunity); CE Mark FOR EU

Submittal Data - Sensors

Immersion Temperature Sensors



FEATURES

- C7021D, C7023D, C7031D, C7041D for immersion mounted water temperature sensing
- Solid state components not affected by dust or dirt

SPECIFICATIONS

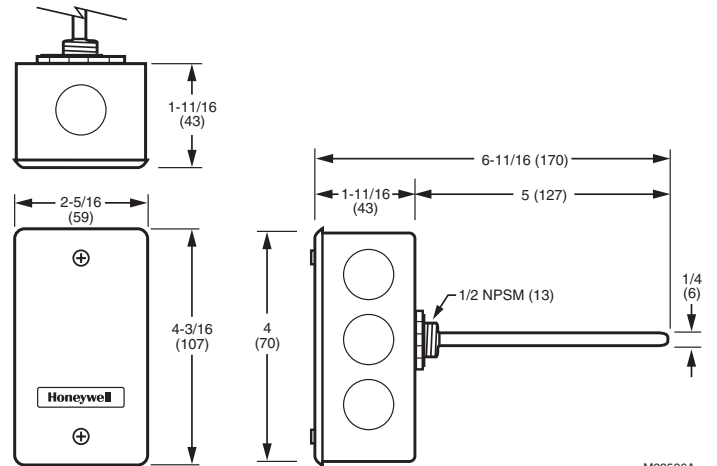
See Table 1 and 2 for additional specifications.

Compatibility.....	Use Series 2000 C7031, C7041 Temperature Sensors with Excel 10, 15, 80, 100, and 500 controllers. Series 2000 C7031D sensors are compatible with various Honeywell controllers. Series 2000 C7021 temperature sensors are compatible with TB7600, TB7300 and TB7200 communicating thermostats. Series 2000 C7023 temperature sensors are compatible with WEBs-AX I/O modules
Sensor Accuracy	± 0.36 °F at 77 °F (± 0.2 °C at 25 °C) for 20K ohm NTC sensors and 10K ohm NTC Type II and Type III sensors.

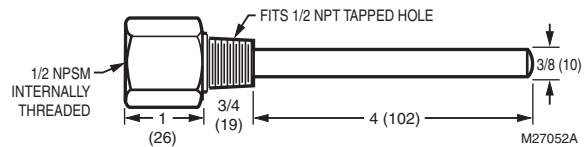
APPLICATION

The Series 2000 Electronic Temperature Sensors are designed for use with electronic controllers in domestic or commercial heating and cooling systems.

DIMENSIONS DIAGRAM



M22596A



M27052A

Fig. 1. 5-inch Stainless-Steel Immersion Well.

Submittal Data - Sensors

Immersion Temperature Sensors

Table 1: Specifications

Part Number	Sensing Element	Resistance	Operating Range	Mounting and Application
C7021D2001	10K ohms NTC Type II	10K ohms NTC at 77°F	-40° to 250° F	5" w/wiring enclosure, use well 50001774-001
C7023D2001	10K ohms NTC Type III	10K ohms NTC at 77°F	-40° to 250° F	5" w/wiring enclosure, use well 50001774-001
C7031D2003	PT1000	1097K	40° to 350° F	5" w/wiring enclosure, use well 50001775-001
C7041D2001	20K ohms NTC	20K ohms NTC at 77°F	-40° to 250° F	5" w/wiring enclosure, use well 50001774-001

Table 2: Sensor Resistance

	Typical Resistance (in ohms)			
	C7021 Sensors (10K Ohm NTC Type II)	C7023 Sensors (10K Ohm NTC Type III)	C7031 Sensors (1097 Ohms PTC)	C7041 Sensors (20K ohm NTC)
At 41°F (5°C)	25,392	23,467	1,020	54,200
At 50°F (10°C)	19,901	18,789	1,039	41,758
At 59°F (15°C)	15,712	15,137	1,059	32,427
At 68°F (20°C)	12,493	12,268	1,078	25,370
At 77°F (25°C)	10,000	10,000	1,097	20,000
At 86°F (30°C)	8,057	8,196	1,117	15,856
At 95°F (35°C)	6,531	6,754	1,136	12,654

Submittal Data - Sensors

Outdoor Air Temperature Sensors



FEATURES

- C7021F, C7023F, C7031G, C7041F sense outdoor air temperature and are weatherproof for outdoor use (knockouts allow for 1/2 in. conduit connection).
- Solid state components not affected by dust or dirt

SPECIFICATIONS

See Table 1 and 2 for additional specifications.

Compatibility.....	Use Series 2000 C7031, C7041 Temperature Sensors with Excel 10, 15, 80, 100 and 500 controllers. Series 2000 C7031G sensors are compatible with various Honeywell controllers. The C7031F2014 is compatible with the T7350 Commercial Thermostat Series 2000 C7021 temperature sensors are compatible with TB7600, TB7300 and TB7200 communicating thermostats. Series 2000 C7023 temperature sensors are compatible with WEBS-AX I/O module
Sensor Accuracy.....	±0.36 °F at 77 °F (±0.2 °C at 25 °C) for 20K ohm NTC sensors and 10K ohm NTC Type II and Type III sensors.

APPLICATION

The Series 2000 Electronic Temperature Sensors are designed for use with electronic controllers in domestic or commercial heating and cooling systems.

DIMENSIONS DIAGRAM

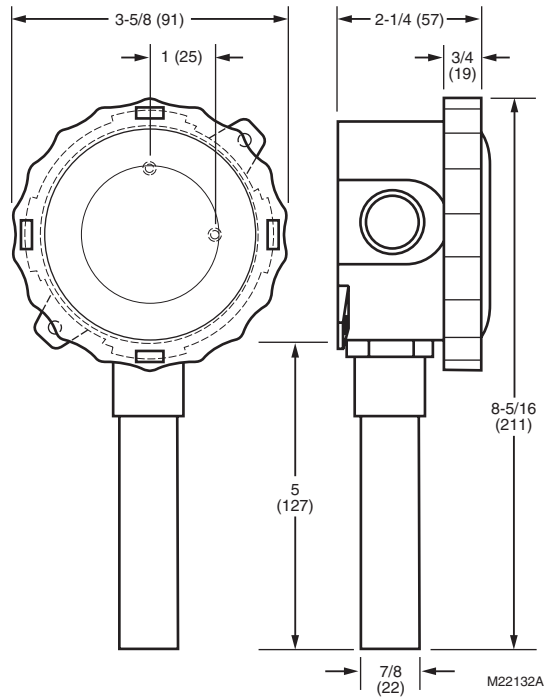


Fig. 1. C7031G, C7021F, C7023F, C7041F Dimensions in Inches (mm).

Submittal Data - Sensors

Outdoor Air Temperature Sensors

Table 1: Specifications

Part Number	Sensing Element	Resistance	Operating Range	Mounting and Application
C7021F2009	10K ohms NTC Type II	10K ohms NTC at 77°F	-40° to 158° F	Outdoor weatherproof, connects to 1/2" conduit
C7023F2009	10K ohms NTC Type III	10K ohms NTC at 77°F	-40° to 158° F	Outdoor weatherproof, connects to 1/2" conduit
C7031G2014	PT3000	3484 ohms at 77F	-40° to 120° F	Outdoor weatherproof, connects to 1/2" conduit
C7041F2006	20K ohms NTC	20K ohms NTC at 77°F	-40° to 158° F	Outdoor weatherproof, connects to 1/2" conduit

Table 2: Sensor Resistance

	Typical Resistance (in ohms)			
	C7021 Sensors (10K Ohm NTC Type II)	C7023 Sensors (10K Ohm NTC Type III)	C7031 Sensors (1097 Ohms PTC)	C7041 Sensors (20K ohm NTC)
At 41°F (5°C)	25,392	23,467	1,020	54,200
At 50°F (10°C)	19,901	18,789	1,039	41,758
At 59°F (15°C)	15,712	15,137	1,059	32,427
At 68°F (20°C)	12,493	12,268	1,078	25,370
At 77°F (25°C)	10,000	10,000	1,097	20,000
At 86°F (30°C)	8,057	8,196	1,117	15,856
At 95°F (35°C)	6,531	6,754	1,136	12,654

Submittal Data - Sensors

Duct Air Temperature Sensors



FEATURES

- C7021J/R, C7023J/R, C7031J, C7041J/R sense average duct air temperature.
- Solid state components not affected by dust or dirt

SPECIFICATIONS

See Table 1 and 2 for additional specifications.

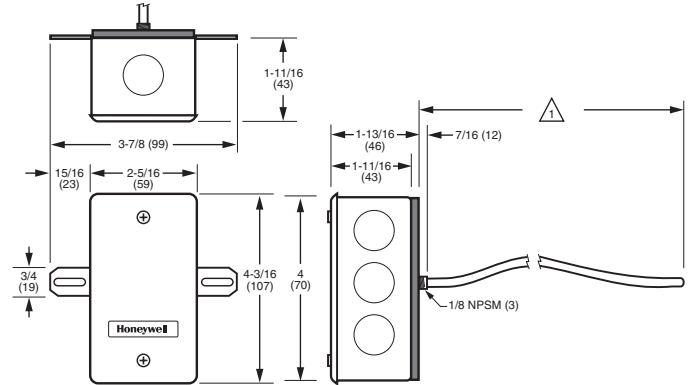
Compatibility.....Use Series 2000 C7031, C7041 Temperature Sensors with Excel 10, 15, 80, 100 and 500 controllers. Series 2000 C7031B,D,G,J sensors are compatible with various Honeywell controllers. The C7031G2014 is compatible with the T7350 Commercial Thermostat. Series 2000 C7021 temperature sensors are compatible with TB7600, TB7300 and TB7200 communicating thermostats. Series 2000 C7023 temperature sensors are compatible with WEBs-AX I/O modules

Sensor Accuracy..... $\pm 0.36^{\circ}\text{F}$ at 77°F ($\pm 0.2^{\circ}\text{C}$ at 25°C) for 20K ohm NTC sensors and 10K ohm NTC Type II and Type III sensors.

APPLICATION

The Series 2000 Electronic Temperature Sensors are designed for use with electronic controllers in domestic or commercial heating and cooling systems.

DIMENSIONS DIAGRAM



△ DEPENDING ON THE MODEL, THE ELEMENT LENGTH IS EITHER 12 FT (366 CM) OR 24 FT (732 CM). M22818A

Fig. 1. C7021R, C7023R, C7041R Dimensions in Inches (mm).

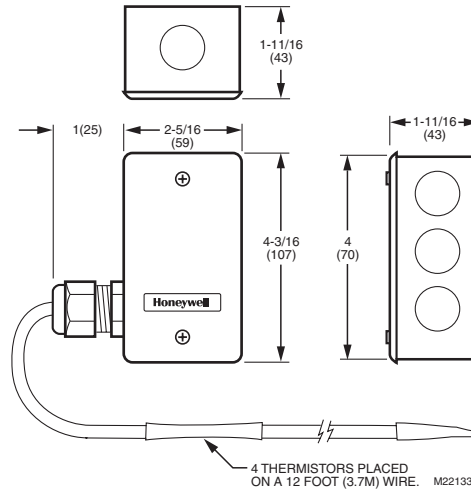


Fig. 2. C7021J, C7023J, C7031J, C7041J Dimensions in Inches (mm).

Submittal Data - Sensors

Duct Air Temperature Sensors

Table 1: Specifications

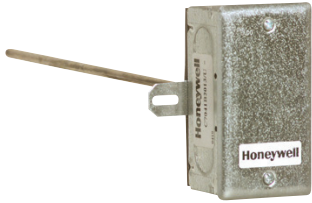
Part Number	Sensing Element	Resistance	Operating Range	Mounting and Application
C7021J2007	10K ohms NTC Type II	10K ohms NTC at 77°F	-40° to 250° F	12' duct averaging w/wiring enclosure
C7021R2000	10K ohms NTC Type II	10K ohms NTC at 77°F	-40° to 250° F	12' duct averaging flexible copper
C7021R2018	10K ohms NTC Type II	10K ohms NTC at 77°F	-40° to 250° F	24' duct averaging flexible copper
C7023J2007	10K ohms NTC Type III	10K ohms NTC at 77°F	-40° to 250° F	12' duct averaging w/wiring enclosure
C7023R2000	10K ohms NTC Type III	10K ohms NTC at 77°F	-40° to 250° F	12' duct averaging flexible copper
C7023R2018	10K ohms NTC Type III	10K ohms NTC at 77°F	-40° to 250° F	24' duct averaging flexible copper
C7031J2009	PT1000	1097 ohms PTC at 77F	40° to 180° F	12' duct averaging flexible copper
C7041J2007	20K ohms NTC	20K ohms NTC at 77°F	-40° to 250° F	12 ft. Duct (Averaging) w/wiring enclosure
C7041R2000	20K ohms NTC	20K ohms NTC at 77°F	-40° to 250° F	12 ft. Duct flexible copper (Averaging)
C7041R2018	20K ohms NTC	20K ohms NTC at 77°F	-40° to 250° F	24 ft. Duct flexible copper (Averaging)

Table 2: Sensor Resistance

	Typical Resistance (in ohms)			
	C7021 Sensors (10K Ohm NTC Type II)	C7023 Sensors (10K Ohm NTC Type III)	C7031 Sensors (1097 Ohms PTC)	C7041 Sensors (20K ohm NTC)
At 41°F (5°C)	25,392	23,467	1,020	54,200
At 50°F (10°C)	19,901	18,789	1,039	41,758
At 59°F (15°C)	15,712	15,137	1,059	32,427
At 68°F (20°C)	12,493	12,268	1,078	25,370
At 77°F (25°C)	10,000	10,000	1,097	20,000
At 86°F (30°C)	8,057	8,196	1,117	15,856
At 95°F (35°C)	6,531	6,754	1,136	12,654

Submittal Data - Sensors

Duct Air Temperature Sensors



FEATURES

- C7021B/C, C7023B/C, C7031B, C7041B/C sense duct air temperature.
- Solid state components not affected by dust or dirt

SPECIFICATIONS

See Table 1 and 2 for additional specifications.

Compatibility.....Use Series 2000 C7031, C7041 Temperature Sensors with Excel 10, 15, 80, 100 and 500 controllers. Series 2000 C7031B sensors are compatible with various Honeywell controllers. Series 2000 C7021 temperature sensors are compatible with TB7600, TB7300 and TB7200 communicating thermostats. Series 2000 C7023 temperature sensors are compatible with WEBS-AX I/O modules

Sensor Accuracy..... $\pm 0.36^{\circ}\text{F}$ at 77°F ($\pm 0.2^{\circ}\text{C}$ at 25°C) for 20K ohm NTC sensors and 10K ohm NTC Type II and Type III sensors.

APPLICATION

The Series 2000 Electronic Temperature Sensors are designed for use with electronic controllers in domestic or commercial heating and cooling systems.

DIMENSIONS DIAGRAM

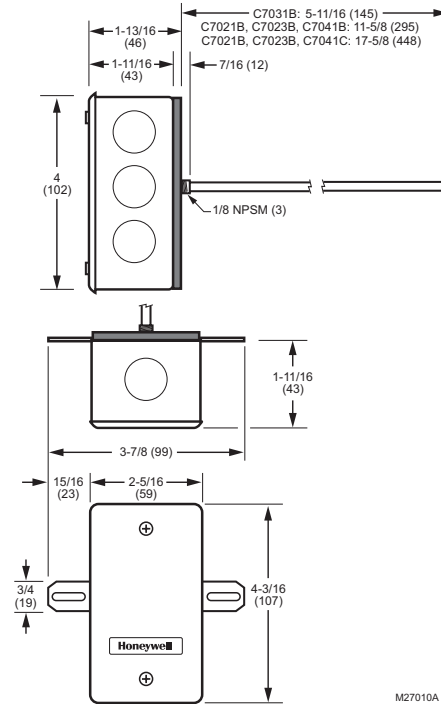


Fig. 1. C7021B/C, C7023B/C Dimensions in Inches (mm).

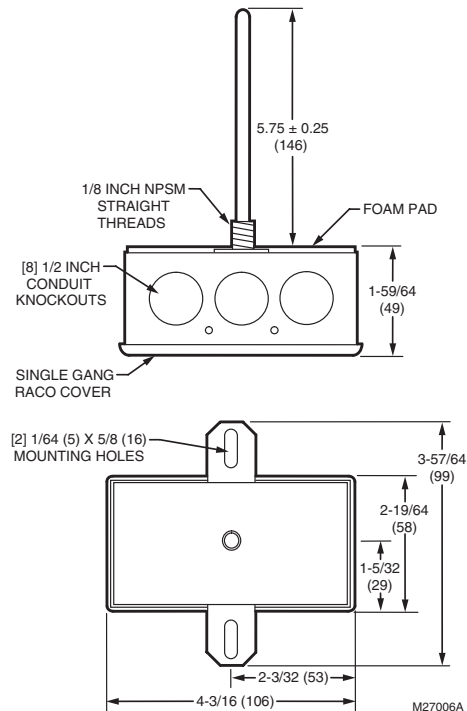


Fig. 2. C7031B Dimensions in Inches (mm).

Submittal Data - Sensors

Duct Air Temperature Sensors

Table 1: Specifications

Part Number	Sensing Element	Resistance	Operating Range	Mounting and Application
C7021B2005	10K ohms NTC Type II	10K ohms NTC at 77°F	-40° to 250° F	6" duct w/wiring enclosure
C7021B2013	10K ohms NTC Type II	10K ohms NTC at 77°F	-40° to 250° F	12" duct w/wiring enclosure
C7021C2003	10K ohms NTC Type II	10K ohms NTC at 77°F	-40° to 250° F	18" duct w/wiring enclosure
C7023B2005	10K ohms NTC Type III	10K ohms NTC at 77°F	-40° to 250° F	6" duct w/wiring enclosure
C7023B2013	10K ohms NTC Type III	10K ohms NTC at 77°F	-40° to 250° F	12" duct w/wiring enclosure
C7023C2003	10K ohms NTC Type III	10K ohms NTC at 77°F	-40° to 250° F	18" duct w/wiring enclosure
C7031B2005	PT1000	1097K ohms NTC at 77F	-40° to 250° F	6" duct w/wiring enclosure
C7041B2005	20K ohms NTC	20K ohms NTC at 77°F	-40° to 250° F	6" duct w/wiring enclosure
C7041B2013	20K ohms NTC	20K ohms NTC at 77°F	-40° to 250° F	12" duct w/wiring enclosure
C7041C2003	20K ohms NTC	20K ohms NTC at 77°F	-40° to 250° F	18" duct w/wiring enclosure

Table 2: Sensor Resistance

	Typical Resistance (in ohms)			
	C7021 Sensors (10K Ohm NTC Type II)	C7023 Sensors (10K Ohm NTC Type III)	C7031 Sensors (1097 Ohms PTC)	C7041 Sensors (20K ohm NTC)
At 41°F (5°C)	25,392	23,467	1,020	54,200
At 50°F (10°C)	19,901	18,789	1,039	41,758
At 59°F (15°C)	15,712	15,137	1,059	32,427
At 68°F (20°C)	12,493	12,268	1,078	25,370
At 77°F (25°C)	10,000	10,000	1,097	20,000
At 86°F (30°C)	8,057	8,196	1,117	15,856
At 95°F (35°C)	6,531	6,754	1,136	12,654

Submittal Data - Sensors

Strap-On Water Temperature Sensors



FEATURES

- C7021K, C7023K, C7041K with strap-on mounting senses water temperature.
- Solid state components not affected by dust or dirt

SPECIFICATIONS

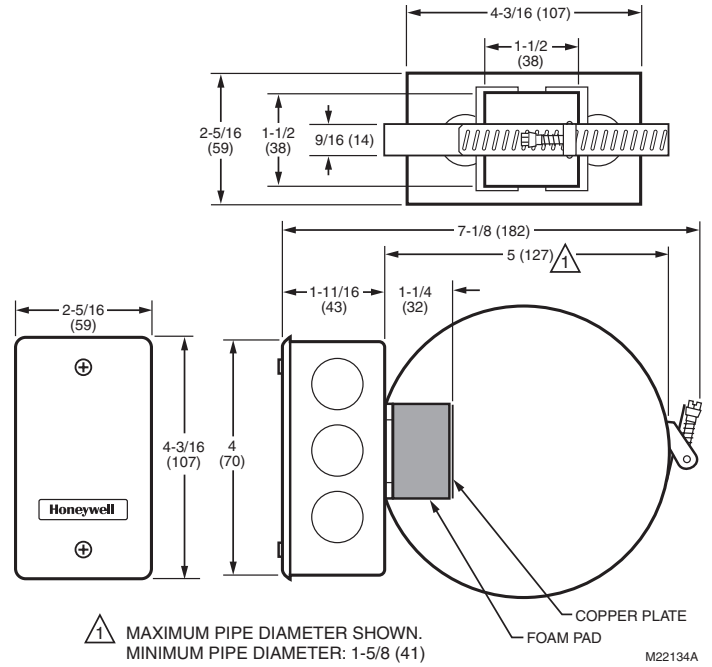
See Table 1 and 2 for additional specifications.

Compatibility.....	Use Series 2000 C7041 Temperature Sensors with Excel 10, 15, 80, 100, and 500 controllers. Series 2000 C7021 temperature sensors are compatible with TB7600, TB7300 and TB7200 communicating thermostats. Series 2000 C7023 temperature sensors are compatible with WEBs-AX I/O modules
Sensor Accuracy.....	$\pm 0.36^{\circ}\text{F}$ at 77°F ($\pm 0.2^{\circ}\text{C}$ at 25°C) for 20K ohm NTC sensors and 10K ohm NTC Type II and Type III sensors.

APPLICATION

The Series 2000 Electronic Temperature Sensors are designed for use with electronic controllers in domestic or commercial heating and cooling systems.

DIMENSIONS DIAGRAM



Submittal Data - Sensors

Strap-On Water Temperature Sensors

Table 1: Specifications

Part Number	Sensing Element	Resistance	Operating Range	Mounting and Application
C7021K2005	10K ohms NTC Type II	10K ohms NTC at 77°F	-40° to 250° F	Strap-on pipe sensor with wiring enclosure
C7023K2005	10K ohms NTC Type III	10K ohms NTC at 77°F	-40° to 250° F	Strap-on pipe sensor with wiring enclosure
C7041K2005	20K ohms NTC	20K ohms NTC at 77°F	-40° to 250° F	Strap-on with wiring enclosure

Table 2: Sensor Resistance

	Typical Resistance (in ohms)		
	C7021 Sensors (10K Ohm NTC Type II)	C7023 Sensors (10K Ohm NTC Type III)	C7041 Sensors (20K ohm NTC)
At 41°F (5°C)	25,392	23,467	54,200
At 50°F (10°C)	19,901	18,789	41,758
At 59°F (15°C)	15,712	15,137	32,427
At 68°F (20°C)	12,493	12,268	25,370
At 77°F (25°C)	10,000	10,000	20,000
At 86°F (30°C)	8,057	8,196	15,856
At 95°F (35°C)	6,531	6,754	12,654

Submittal Data - Sensors

Air or Water Temperature Sensor Probe



APPLICATION

The Series 2000 Electronic Temperature Sensors are designed for use with electronic controllers in residential or commercial heating and cooling systems.

FEATURES

- C7021N, C7023N, C7041N probe senses water or air temperature.
- Solid state components not affected by dust or dirt

SPECIFICATIONS

See Table 1 and 2 for additional specifications.

Compatibility.....	Use Series 2000 C7041 Temperature Sensors with Excel 10, 15, 80, 100 and 500 controllers. Series 2000 C7021 temperature sensors are compatible with TB7600, TB7300 and TB7200 communicating thermostats. Series 2000 C7023 temperature sensors are compatible with WEBs-AX I/O modules
Sensor Accuracy.....	$\pm 0.36^{\circ}\text{F}$ at 77°F ($\pm 0.2^{\circ}\text{C}$ at 25°C) for 20K ohm NTC sensors and 10K ohm NTC Type II and Type III sensors.

Table 1: Specifications

Part Number	Sensing Element	Resistance	Operating Range	Mounting and Application
C7021N2001	10K ohms NTC Type II	10K ohms NTC at 77°F	-40° to 250° F	Probe Sensor with 6' Lead
C7023N2001	10K ohms NTC Type III	10K ohms NTC at 77°F	-40° to 250° F	Probe Sensor with 6' Lead
C7041N2020	20K ohms NTC	20K ohms NTC at 77°F	-40° to 250° F	Probe Sensor with 6' Lead

Table 2: Sensor Resistance

	Typical Resistance (in ohms)		
	C7021 Sensors (10K Ohm NTC Type II)	C7023 Sensors (10K Ohm NTC Type III)	C7041 Sensors (20K ohm NTC)
At 41°F (5°C)	25,392	23,467	54,200
At 50°F (10°C)	19,901	18,789	41,758
At 59°F (15°C)	15,712	15,137	32,427
At 68°F (20°C)	12,493	12,268	25,370
At 77°F (25°C)	10,000	10,000	20,000
At 86°F (30°C)	8,057	8,196	15,856
At 95°F (35°C)	6,531	6,754	12,654

DIMENSIONS DIAGRAM

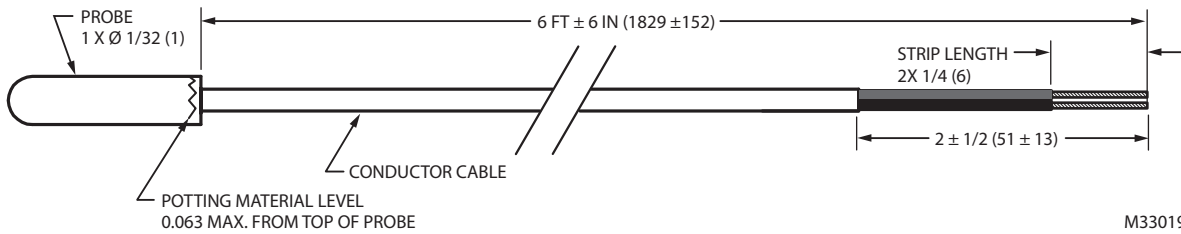
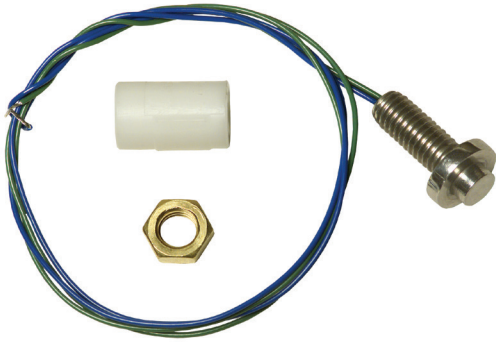


Fig. 1. C7021N, C7023N, C7041N Dimensions in Inches (mm).

Submittal Data - Sensors

Air Temperature Sensor



APPLICATION

The Series 2000 Electronic Temperature Sensors are designed for use with electronic controllers in domestic or commercial heating and cooling systems.

FEATURES

- C7021P, C7023P, C7041P senses air temperature.
- Solid state components not affected by dust or dirt

SPECIFICATIONS

See Table 1 and 2 for additional specifications.

Compatibility.....	Use Series 2000 C7041 Temperature Sensors with Excel 10, 15, 80, 100 and 500 controllers. Series 2000 C7021 temperature sensors are compatible with TB7600, TB7300 and TB7200 communicating thermostats. Series 2000 C7023 temperature sensors are compatible with WEBs-AX I/O modules
Sensor Accuracy.....	$\pm 0.36^{\circ}\text{F}$ at 77°F ($\pm 0.2^{\circ}\text{C}$ at 25°C) for 20K ohm NTC sensors and 10K ohm NTC Type II and Type III sensors.

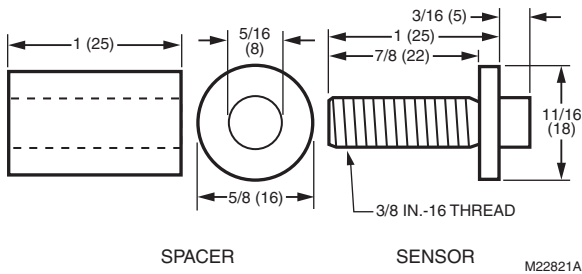
Table 1: Specifications

Part Number	Sensing Element	Resistance	Operating Range	Mounting and Application
C7021P2004	10K ohms NTC Type II	10K ohms NTC at 77°F	-40° to 250° F	Small metal button sensor
C7023P2004	10K ohms NTC Type III	10K ohms NTC at 77°F	-40° to 250° F	Small metal button sensor
C7041P2004	20K ohms NTC	20K ohms NTC at 77°F	-40° to 250° F	Small metal button sensor

Table 2: Sensor Resistance

	Typical Resistance (in ohms)		
	C7021 Sensors (10K Ohm NTC Type II)	C7023 Sensors (10K Ohm NTC Type III)	C7041 Sensors (20K ohm NTC)
At 41°F (5°C)	25,392	23,467	54,200
At 50°F (10°C)	19,901	18,789	41,758
At 59°F (15°C)	15,712	15,137	32,427
At 68°F (20°C)	12,493	12,268	25,370
At 77°F (25°C)	10,000	10,000	20,000
At 86°F (30°C)	8,057	8,196	15,856
At 95°F (35°C)	6,531	6,754	12,654

DIMENSIONS DIAGRAM



Submittal Data - Sensors

Current Switches, CS & CP



APPLICATIONS

- Overload Conditions
- Underload Conditions
- Normal Operating Conditions
- Broken Belts
- Belt Slippage
- Locked Rotors
- Equipment Failure
- Fans
- Pumps
- Compressors
- Motors
- Ovens
- Industrial Equipment
- Lighting Status and Usage
- Electrical Load Status
- Local Alarms (Strobes and Audible Alarms)
- Preventative Maintenance Scheduling

SPECIFICATIONS

Sensor Power	Induced from monitored conductor
Amperage Rating	0 to 200 Amps and 0 to 250 Amps (See table)
Operating Frequency Range.....	40 Hz to 1 kHz
Isolation Voltage	2220 Vac
Max AC Voltage.....	600 Vac
Adjustable Trip Point (Setpoint)	See table
Hysteresis (Dead Band)	10% of trip point, typical (for adjustable switches).
Status Indication.....	Red LED - Above Trip Point (adjustable switches) Monitored current is above Trip Point (fixed switches) Blue LED - Below Trip Point (adjustable switches)
Aperture (Hole) Size	3/4 in. (19 mm)
DIN Rail Size.....	35 mm
Unit Weight	See table
Enclosure Rating	UL94-V0
Operating Temperature Range.....	5° to 104 °F (-15° to 40 °C)
Operating RH Range.....	0 to 95% RH, non-condensing
Approvals	UL/CUL US Listed (UL 508) Ind. Control Equipment (File # E309723), CE
Environmental Compliance	RoHS-Directive 2002/95/EC WEEE-Directive 2002/96/EC

APPLICATION

The Current Switches are designed for use in any AC current monitoring application in which you are looking to monitor a particular piece of equipment for equipment failure, preventative maintenance, status, and electrical load status.

The current switches should be installed on the line side of the power to the electrical equipment.

The current switches are available in both solid and splitcore versions which also includes a 35 mm Din Rail mounting foot for easy installation in panel mount applications.

The solid-core versions are a great choice for new installations or OEM applications in which cost sensitivity, lower trip points and environmental issues may be of concern.

The split-core version of the current switches work great in retrofit applications and for use in service vehicles since one part will work in most applications and can be installed without disconnecting any wires.

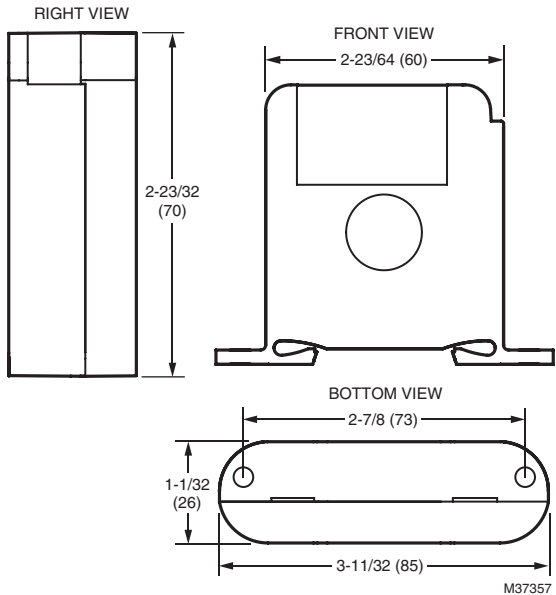
The switches can be used to determine the run time of your equipment as well as basic load trending applications where you want to know how long your piece of equipment runs when logging the contact closures on your building management system or PLC.

Model #	Trip Point Type	Amp Range	Trip Point	Contact Rating	Weight in lbs. (Kg)
CS-O-A	Adjustable	0 to 250 A	0.5 to 220 A	0.2 A @ 200 VAC/VDC	0.216 (0.097)
CP-O-A			1.5 to 220 A		0.270 (0.123)
CP-O-AL			0.6 to 180 A		0.280 (0.127)
CP-C-A			1.5 to 220 A		0.266 (0.121)
CS-O-F	Fixed	0 to 200 A	0.25 A or less		0.216 (0.097)
CS-C-F			0.25 A or less		0.216 (0.097)
CP-O-F			1.5 A or less		0.270 (0.123)
CP-O-FL			0.5 A or less		0.280 (0.127)
CP-C-F			1.5 A or less	0.270 (0.123)	

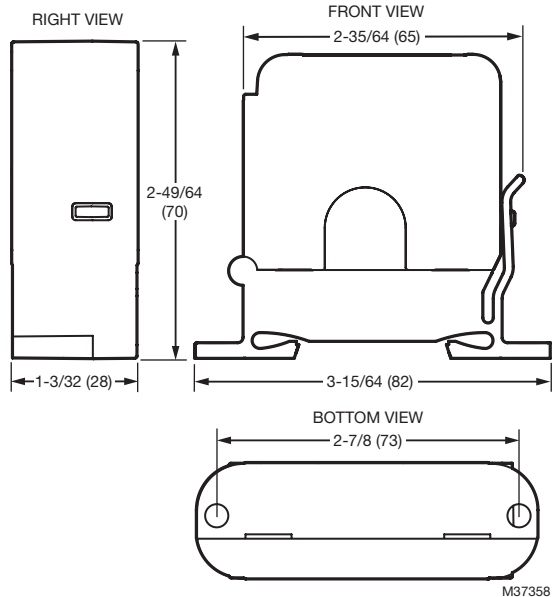
Table 1. Operating Specifications

Model #	Trip Point Type	Normally (Open/Closed)	Core (Solid/Split)	Amp Range	Trip Point	Contact Rating
CS-O-A	Adjustable	Open	Solid	0 to 250 A	0.5 to 220 A	0.2 A @ 200 VAC/VDC
CP-O-A		Open	Split		1.5 to 220 A	
CP-O-AL		Open	Split		0.6 to 180 A	
CP-C-A		Closed	Split		1.5 to 220 A	
CS-O-F	Fixed	Open	Solid	0 to 200 A	0.25 A or less	
CS-C-F		Closed	Solid		0.25 A or less	
CP-O-F		Open	Split		1.5 A or less	
CP-O-FL		Open	Split		0.5 A or less	
CP-C-F		Closed	Split		1.5 A or less	

DIMENSIONS DIAGRAM



Solid-core sensor dimensions in in. (mm).



Split-core sensor dimensions in in. (mm).

Submittal Data - Sensors

Current Transmitters, CTS & CTP 0–5/10Vdc Output Models



APPLICATIONS

- Load Trending
- Basic Power Monitoring
- Electronic Ballasts
- Computers/Data Centers
- Industrial
- Variable Speed Loads
- Pumps
- Compressors
- Fans
- Preventative Maintenance
- LEED
- Project Justification (ROI) Process Control
- Solid State Environments (SCR's)
- Single Speed Loads

SPECIFICATIONS

Monitored Current Type.....	AC Current
Maximum AC Voltage.....	600 VAC
Isolation Voltage.....	2200 VAC
Operating Frequency Range.....	50 to 600 Hz
Core Style.....	Solid-Core and Split-Core Versions
Supply Voltage.....	Induced from the Monitored Conductor (Insulated Conductors only)
Output Voltage.....	CTS-V-50: 0 to 5 Vdc CTP-V-50; CTS-V-150; CTP-V-150: 0 to 10 Vdc
Accuracy.....	CTS-V-50 (0-10 A Range Only): +/- 1% from 5-100 % of Selected Range CTS-V-150 & CTP-V-150 Series: +/- 1% from 5-100 % of Selected Range
Aperture Size.....	0.75 in. (19.05 mm)
DIN Rail Size.....	35 mm
Unit Weight.....	CTS-V-50-xxx and CTS-V-150-xxx Series: 0.194 lbs. (0.088 kg) CTP-V-150-xxx Series: 0.274 lbs. (0.125 kg)
Operating Temperature Range.....	5 to 104°F (-15 to 40°C)
Minimum Mounting Distance.....	1" (2.6 cm) between current sensor & other magnetic devices (Relays, Contactors, Transformers)
Operating Humidity Range.....	0 to 95%, non-condensing
Terminal Block Torque Rating.....	4.43 to 5.31 in-lbs. (0.5 to 0.6 Nm)
Storage Temperature.....	41 to 95°F (5 to 35°C)
Approvals.....	UL/CUL US Listed (UL 508) Ind. Control Equipment (File # E309723), CE, RoHS2, WEEE

APPLICATION

The 0–5/10 Vdc Output Analog Current Sensors are designed for use in any AC current monitoring application in which you are looking to monitor a particular piece of equipment for proper operation. All voltage output current sensors use an “Average” current measuring method and should be used in applications with a pure Sinusoidal AC waveform that has very little or no distortion/noise on the conductor being monitored.

The current sensors are available in both solid and split-core versions which also includes a 35 mm Din Rail mounting foot for easy installation in panel mount applications.

The solid-core versions are a great choice for new installations or OEM applications in which cost sensitivity, lower trip points and environmental issues like dust and moisture may be of concern. The split-core version of the current sensors work great in retrofit applications and for use on service technicians vehicles since one or two parts will work in most applications and can be easily installed without disconnecting any wires. Voltage Output current sensors are available in both solid and split-core versions which also includes a 35 mm Din Rail mounting foot for easy installation in panel mount applications.

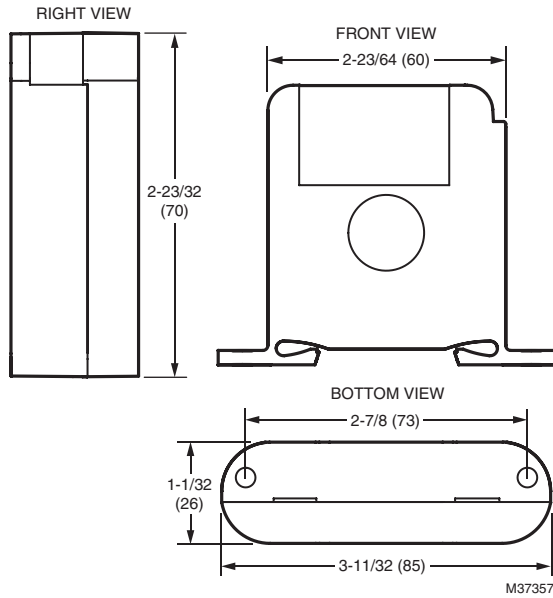
For best results, the voltage output current sensors should not be used in applications with switching power supplies or variable speed drives due to the limited operating frequency range. Applications may include monitoring a resistive type load such as an incandescent light bulb, heating element as well as any single speed linear load.

Model #	Selectable Ranges	Measurement	AC Waveform	Core (Solid/Split)	Output Signal
CTS-V-50	0 to 10/20/50A	Average	Pure Sinusoidal	Solid	0 to 5 VDC
CTP-V-50	0 to 10/20/50A	Average	Pure Sinusoidal	Split	0 to 10 VDC
CTS-V-150	0 to 50/100/150A	Average	Pure Sinusoidal	Solid	0 to 10 VDC
CTP-V-150	0 to 50/100/150A	Average	Pure Sinusoidal	Split	0 to 10 VDC

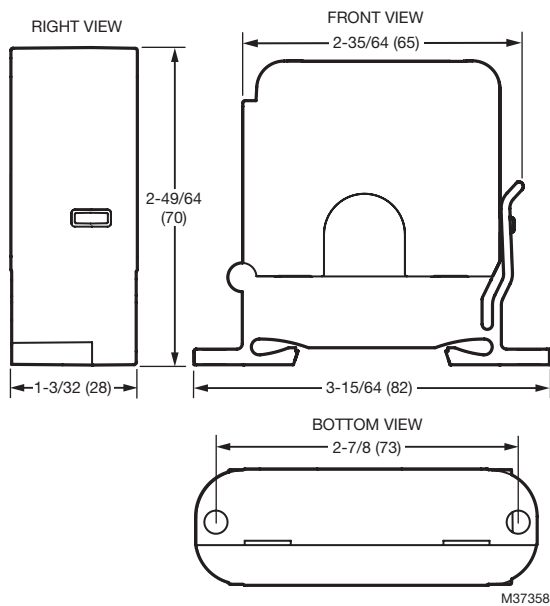
Table 1. Operating Specifications

Product Number	Selectable Ranges	Measurement	AC Waveform	Core (Solid/Split)	Output Signal
CTS-V-50	0 to 10/20/50A	Average	Pure Sinusoidal	Solid	0 to 5 VDC
CTP-V-50	0 to 10/20/50A	Average	Pure Sinusoidal	Split	0 to 10 VDC
CTS-V-150	0 to 50/100/150A	Average	Pure Sinusoidal	Solid	0 to 10 VDC
CTP-V-150	0 to 50/100/150A	Average	Pure Sinusoidal	Split	0 to 10 VDC

DIMENSIONS DIAGRAM



Solid-core sensor dimensions in in. (mm).



Split-core sensor dimensions in in. (mm).

Submittal Data - Sensors

Current Transmitters, CTS & CTP 4–20mA Output Models



APPLICATIONS

- Load Trending
- Basic Power Monitoring
- Electronic Ballasts
- Computers/Data Centers
- Industrial
- Variable Speed Loads
- Pumps
- Compressors
- Fans
- Preventative Maintenance
- LEED
- Project Justification (ROI) Process Control
- Solid State Environments (SCR's)
- Single Speed Loads

SPECIFICATIONS

Monitored Current Type.....	AC Current
Maximum AC Voltage.....	600 VAC
Isolation Voltage.....	2200 VAC
Operating Frequency Range.....	CTP-A-200 & CTS-A-250: 40 to 1 KHz CTP-A-50-RMS: 15 to 100 Hz
Supply Voltage.....	+8.5 to 30 VDC (Reverse Polarity Protected) 250 Ohm Load (1-5 VDC): +13.5 to 30 VDC 500 Ohm Load (2-10 VDC): +18.5 to 30 VDC
Supply Current.....	25 mA minimum
Output Signal.....	4 to 20 mA (2-Wire, Loop Powered)
Maximum Output Signal.....	Limited to 25 mA
Accuracy.....	CTP-V-50 (0-10 A Range Only): +/- 1% from 5-100 % of Selected Range CTS-V-150 & CTP-V-150 Series: +/- 1% from 5-100 % of Selected Range
Response Time.....	CTS-A-xxx and CTP-A-XXX: < 600 mS (Rise and Fall Time) CTP-A-50-RMS: 600 mS (Rise Time) and 2800 mS (Fall Time)
Aperture Size.....	0.75 in. (19.05 mm)
DIN Rail Size.....	35 mm
Unit Weight.....	CTS-A-xxx: 0.260 lbs. (0.118 kg) CTP-A-xxx: 0.274 lbs. (0.124 kg) CTS-A-xxx-RMS: 0.190 lbs. (0.087 kg) CTP-A-xxx-RMS: 0.190 lbs. (0.087 kg)
Storage Temperature.....	41 to 95°F (5 to 35°C)
Operating Temperature Range.....	5 to 104 °F (-15 to 40 °C)
Operating Humidity Range.....	0 to 95 %, non-condensing
Approvals.....	CE (-RMS Versions): CE to IEC 61326-1: 2012 Class A, UL/CUL US Listed (UL 508) Ind. Control Equipment (File # E309723), RoHS2, WEEE
Minimum Mounting Distance.....	1 in. (2.6 cm) between current sensor and other magnetic devices (Relays, Contactors, Transformers)
Terminal Block Torque Rating.....	4.43 to 5.31 in-lbs. (0.5 to 0.6 Nm)
Wire Size.....	18 to 24 AWG (0.823 to 0.205 mm2) Copper wire only

APPLICATION

The 4-20 mA Output Analog Current Sensors are designed for use in any AC current monitoring application in which you are looking to monitor a particular piece of equipment for proper operation. All voltage output current sensors use an “Average” current measuring method and should be used in applications with a pure Sinusoidal AC waveform that has very little or no distortion/noise on the conductor being monitored.

The current sensors are available in both solid and split-core versions which also includes a 35 mm Din Rail mounting foot for easy installation in panel mount applications.

The solid-core versions are a great choice for new installations or OEM applications in which cost sensitivity, lower trip points and environmental issues like dust and moisture may be of concern. The split-core version of the current sensors work great in retrofit applications and for use on service technicians vehicles since one or two parts will work in most applications and can be easily installed without disconnecting any wires. Voltage Output current sensors are available in both solid and split-core versions which also includes a 35 mm Din Rail mounting foot for easy installation in panel mount applications.

For best results, the voltage output current sensors should not be used in applications with switching power supplies or variable speed drives due to the limited operating frequency range. Applications may include monitoring a resistive type load such as an incandescent light bulb, heating element as well as any single speed linear load.

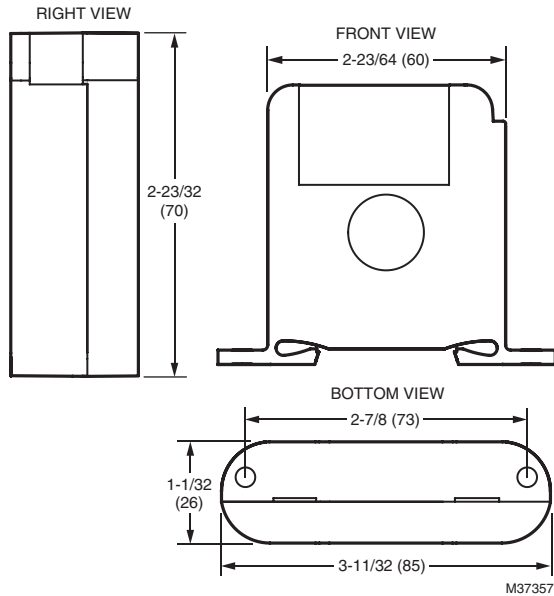
In applications where variable speed drives or waveforms include distortion/noise, Honeywell recommends the use of the CTP-A-50-RMS Series sensors where you need to supply 24 VDC power to the current sensors with a 4-20 mA signal. A 249 Ohm or 499 Ohm 1 Watt resistor can be used to convert the 4-20 mA signal into a usable 1-5 or 2-10 VDC output signal at your building management system or PLC. Note that the “True RMS” sensors are able to be used in all applications since the “True RMS” current sensors provide the best overall accuracy and should be used in applications which include Variable Frequency Drives, Switching Power Supplies, Computers and Data Centers, Electronic Ballasts, SCR's, and Variable Speed Loads.

Product Number	Selectable Ranges	Measurement	AC Waveform	Core (Solid/ Split)	Output Signal
CTS-A-250	0 to 100/200/250A	Average	Pure Sinusoidal	Solid	4 to 20 mA
CTP-A-200	0 to 100/150/200A	Average	Pure Sinusoidal	Split	4 to 20 mA
CTP-A-50-RMS	0 to 10/20/50A	True RMS	Distorted & Pure Sinusoidal	Split	4 to 20 mA

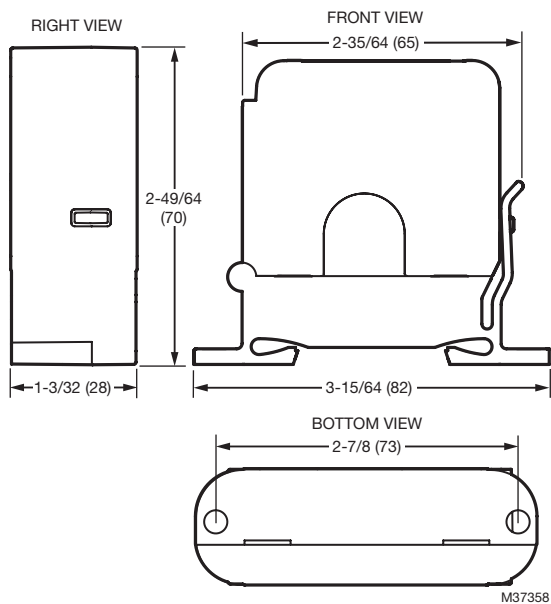
Table 1. Operating Specifications

Product Number	Selectable Ranges	Measurement	AC Waveform	Core (Solid/Split)	Output Signal
CTS-A-250	0 to 100/200/250A	Average	Pure Sinusoidal	Solid	4 to 20 mA
CTP-A-200	0 to 100/150/200A	Average	Pure Sinusoidal	Split	4 to 20 mA
CTP-A-50-RMS	0 to 10/20/50A	True RMS	Distorted & Pure Sinusoidal	Split	4 to 20 mA

DIMENSIONS DIAGRAM



Solid-core sensor dimensions in in. (mm).



Split-core sensor dimensions in in. (mm).

Submittal Data - Sensors

Mini Current Switches, MCSS & MCSP



SPECIFICATIONS

Sensor Power	Induced from monitored conductor
Amperage Rating	MCSS-F: 0.20 to 150 Amps MCSP-F: 0.55 to 150 Amps MCSS-A: 0.32 to 150 Amps continuous MCSP-A: 0.70 to 150 Amps continuous
Max. Sensing Current Voltage.....	600 VAC Isolation Voltage: 2,200 VAC
Output Rating	MCSS-F: 0.5 A Continuous, 36 VAC/VDC MCSP-F: 0.5 A Continuous, 36 VAC/VDC MCSS-A: 1.0 A Continuous, 36 VAC/VDC MCSP-A: 1.0 A Continuous, 36 VAC/VDC
Status LED Indication (MCSS-A/MCSP-A models only).....	Red LED: Above Trip Point Blue LED: Under Trip Point NOTE: Do NOT use the LEDs to indicate whether the sensors have power applied to them.
Operating Frequency	50 Hz, 60 Hz
Isolation Voltage	2,200 VAC
Aperture (Hole) Size	MCSS: 0.55" dia., up to 1 AWG cables MCSP: 0.53" dia., up to 1 AWG cables
Trip Point	MCSS-F: Fixed @ below 0.20 A MCSP-F: Fixed @ below 0.55 A
Dimensions (L x W x H).....	MCSS: 2.50" x 1.96" x 0.95" MCSP: 2.65" x 2.35" x 0.95"
Operating Temperature Range.....	-30 to 60 °C (-22 to 140 °F)
Operating Humidity Range.....	0 to 95% RH, non-condensing

APPLICATION

The Honeywell MCSS and MCSP series current switches are miniature "Go/No Go" current status switches designed to provide status information on AC current supplied equipment. The output of these switches uses a N/O solid-state switch (more reliable than a relay) and is non-polarity sensitive.

The MCSS series is an excellent option for new installations where the conductors can be run through the solid-core housing before connecting the wires. The MCSP series are ideal for retrofit applications, since their split-core design allows them to be opened and clamped around the existing wires without disconnecting the current being monitored. Both of these units do not need power supplied to them as they induce the current from the conductors being monitored. The MCSS series has a fixed trip point of below 0.20 A while the MCSP series has a fixed trip point of below 0.55 A. When the current in the conductor exceeds this threshold, the sensor will be "Closed." The sensor will indicate "Open" when the current is interrupted or falls to 0 A. The adjustable switches, MCSS-A and MCSP-A, include two Status LED indicators that will indicate three states: tripped on, current present but below trip point, and current off or below the low end of the adjustable trip point range. Also these adjustable current switches can be used to monitor any change in AC current. A change in current may indicate motor failure, belt loss/slippage, or mechanical failure. Any time one of these events occurs, the current can significantly decrease, thus tripping the current switch and immediately notifying the Building Management System of the failure or problem.

Table 1. Operating Specifications

Model	Core Type	Switch Type	Trip Point	Output Switch Rating	Max. Sensing Current Voltage	Max. Continuous Current	Max. Current for 6 seconds	Max. Current for 1 second
MCSS-F	Solid	Fixed	< 0.20 Amps	0.50 Amp @ 36 VAC/ VDC	600 VAC	158 Amps	240 Amps	600 Amps
MCSP-F	Split	Fixed	< 0.55 Amps					
MCSS-A	Solid	Adjustable	0.32 - 150 Amps	1.00 Amp @ 36 VAC/ VDC				
MCSP-A	Split	Adjustable	0.70 - 150 Amps					

DIMENSIONS DIAGRAM

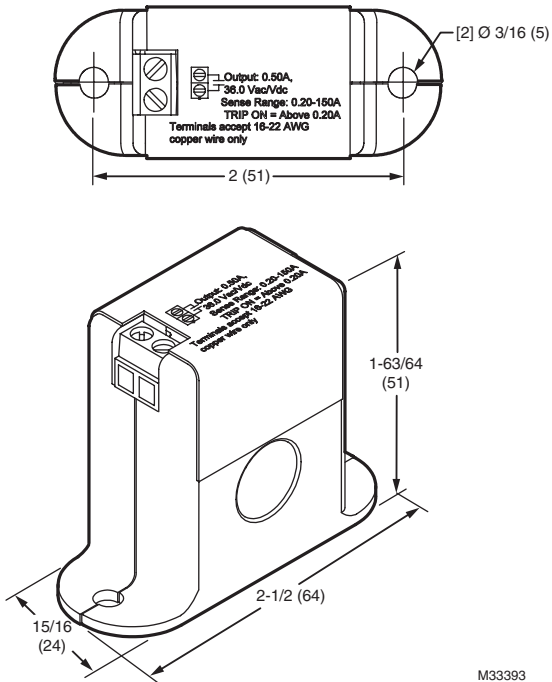


Fig. 1. Dimensions in Inches (mm) of the Solid Core Models MCSS-F and MCSS-A.

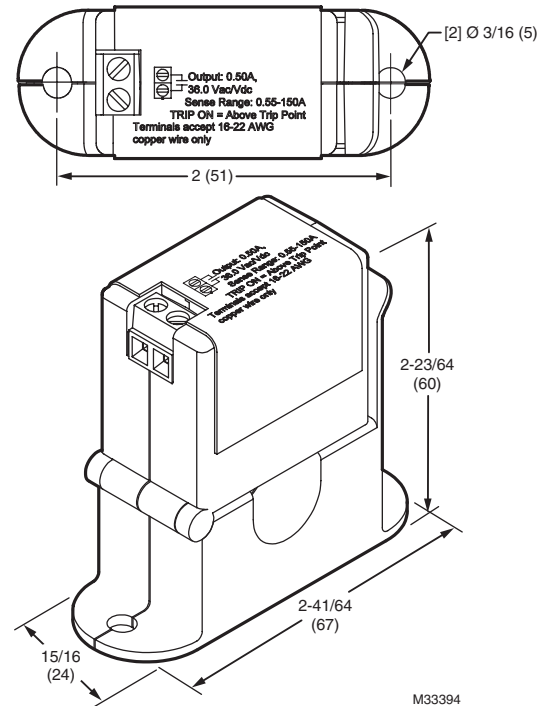


Fig. 2. Dimensions in Inches (mm) of the Split Core Models MCSS-F and MCSS-A.

Submittal Data - Sensors

Command Relays



FEATURES

- 35mm DIN-rail mounting flange
- SPDT Form 1C Relay contacts
- Pilot duty rated
- LED status indication
- Stackable for streamlined installation
- Can be used with any Honeywell analog current sensor or switch

APPLICATION

The CR (Command Relay) Series brings control (start/stop) functionality to your load trending and fan/pump/motor status monitoring applications. Each unit has a Form 1C-SPDT relay which means you have both a N/O and a N/C contact in the same unit. (See Table 1 for output ratings). The 35mm DIN-rail Mounting Flange will allow you to use the CR Series with any Honeywell analog current sensor or switch. The stacking feature will also allow you to reduce the required panel space, since up to two CR Series Command Relays may be stacked together during installation.

The command relays are for use with:

- Motor control
- Lighting applications
- Interposing relay
- Control pumps/compressors
- Appliances/industrial equipment

Table 1. Operating Specifications

Part #	Description	Contact Ratings (All SPDT)	Coils
CR-DC-5A	5 Amp SPDT Relay, 23-31.2 VDC Coil Voltage	5A (NO)/2A(NC) @ 250VAC, 5A(NO)/3A(NC) @ 125VAC	23-31.2VDC, 15mA@24VDC
CR-DC-12A	12 Amp SPDT Relay, 20-31.2 VDC Coil Voltage	12A @ 250VAC, 12A @ 30VDC	20-31.2VDC, 16mA@24VDC
CR-12DC-12A	12 Amp SPDT Relay, 10-15.6 VDC Coil Voltage	12A @ 250VAC, 12A @ 30VDC	10-15.6VDC, 30mA@12VDC
CR-24AC-10A	10 Amp SPDT Relay, 16-26.4 VAC Coil Voltage	10A @ 250VAC, 10A @ 24VDC	16-26.4VAC, 28mA@24VAC
CR-115AC-8A	8 Amp SPDT Relay, 80-132 VAC Coil Voltage	8A @ 250VAC, 8A @ 30VDC	80-132VAC, 10mA@115VAC
CR-230AC-8A	8 Amp SPDT Relay, 165-264 VAC Coil Voltage	8A @ 250VAC, 8A @ 30VDC	165-264VAC, 5mA@230VAC

DIMENSIONS DIAGRAM

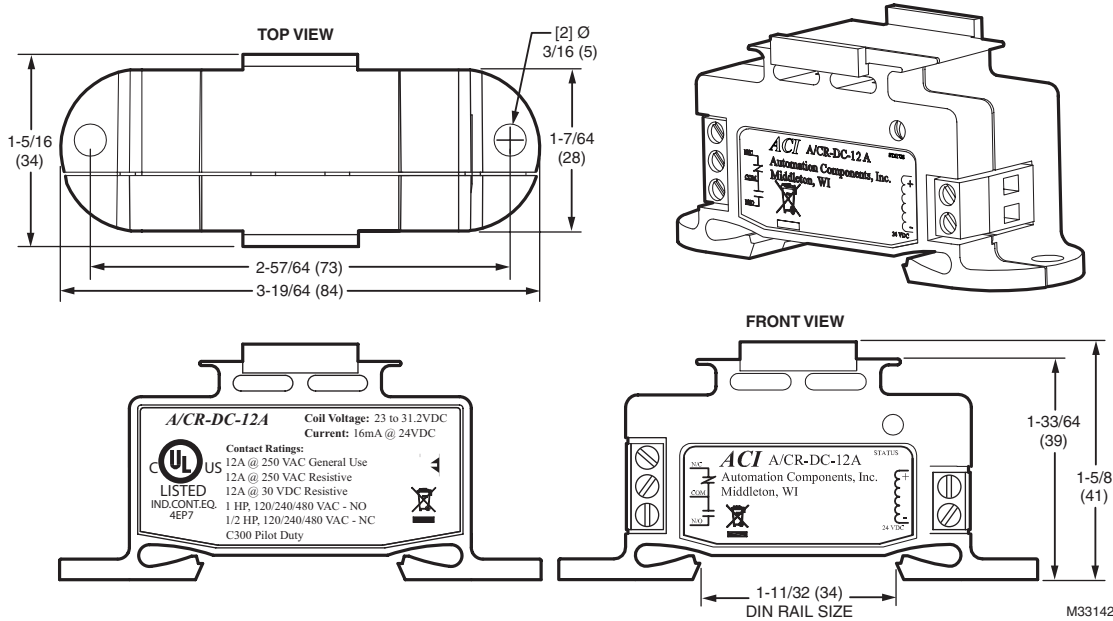


Fig. 1. Dimensions in Inches (mm).

Submittal Data - Sensors

Humidity/Temperature Sensors



FEATURES

- Thermoset polymer capacitive sensing element for high accuracy and fast response
- Multi-layer construction sensing element provides excellent resistance to wetting, dust and common environment
- Highly accurate, repeatable, stable output with negligible hysteresis
- Temperature compensated output
- Zero and span trimmers and increment/decrement recalibration feature.
- All units have selectable 4-20mA, 0-10Vdc, or 0-5Vdc output.

APPLICATION

The H7625, H7635 and H7655 are highly accurate, stable humidity transducers designed for use with HVAC controllers such as the T7350 Thermostat, H775 Remote Humidity Controller, and W7760 Direct Digital Controllers. The multi-layer thermoset polymer capacitive sensing element has stable low-drift performance and fast response time.

SPECIFICATIONS

Operating RH Range.....	0 to 100% RH.
Humidity Accuracy.....	±2%, ±3% or ±5% from 20 to 95% RH.
1K Ohm Temperature Accuracy.....	± (0.15 + 0.002t) C t = actual temperature in C
20K Ohm Temperature Accuracy.....	±0.4 °F at 77 °F (±0.2 °C at 25 °C)
1K Ohm Temperature	Room: 32 to 122 °F (0 to 50 °C).
Output Range.....	Duct: -58 to 572 °F (-50 to 300 °C).
20K Ohm Temperature	Room: 40° to 110 °F (4° to 43 °C).
Output Range.....	Duct/Outdoor: -40° to 240 °F (-40° to 116 °C).
Hysteresis.....	Less than ±0.5% RH.
Supply Voltage.....	4-20mA Output: 250 Ohm Load 15 – 40 VDC / 18 - 28 VAC 4-20mA Output: 500 Ohm Load 18 – 40 VDC / 18 - 28 VAC (500 Ohm Load Max) 0-5 VDC Output: 12 - 40 VDC / 18 - 28 VAC (10K Load Minimum) 0-10 VDC Output: 18 - 40 VDC / 18 – 28 VAC (10K Load Minimum)
Maximum Supply Current.....	Current Mode: 24 mA. Voltage Mode: 8 mA.
Finish.....	Room Enclosure: ABS Plastic (UL94-VO rated). Duct Enclosure: ABS Plastic (UL94-5VA rated). Outdoor Enclosure: ASA Plastic (UL-94V0 rated).
Compensated Temperature Range..	Room: 32 to 122 °F (-0 to 50 °C).
(Full RH Range)	Duct/Outdoor: -10 to 140 °F (-23 to 60 °C)
Humidity Response Time.....	200 seconds.
Saturation Response Time.....	10 minutes.
Sensitivity.....	0.1%RH.
Interchangeability.....	Less than ±3% RH nominal.
Repeatability.....	0.5% RH.
Long term drift.....	Less than 2% RH drift/5 years.

Table 1. Operating Specifications

Model Number	Replaces	RH Accuracy	Mounting	Temperature Sensor	Output Signal	Used With
H7625A2010	H7625A1008	2%	Room	20K ohm at 77F, reference 206598	Selectable 4-20mA, 0-10Vdc, or 0-5Vdc	T7350, H775, XL50, XL500, XFC, W7750B/C, W7753, W7760A/C, W7761
H7635A2012	H7635A1006	3%				
H7625B2006	H7625B1006	2%	Duct			
H7635B2018	H7635B1004	3%				
H7655B2014	H7655B1009	5%	Outdoor			
H7635C2015	H7635C1002	3%				
H7626A2020		2%	Room	1097 ohm at 77F		T775
H7636A2022		3%				
H7626B2024		2%	Duct			
H7636B2026		3%				
H7656B2029		5%				

DIMENSIONS DIAGRAM

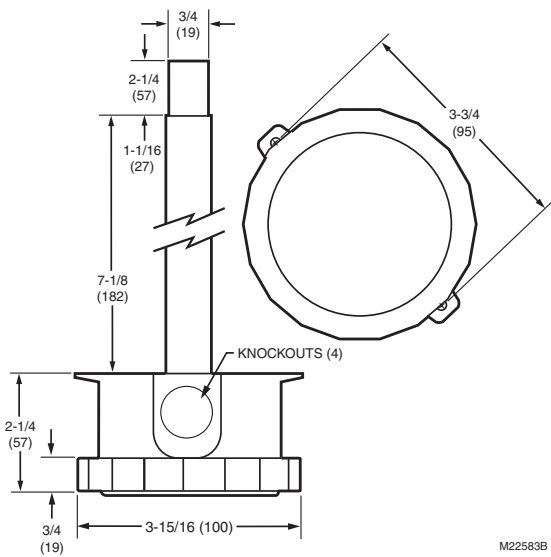


Fig. 1. Duct-mount Sensor Dimensions in In (mm).

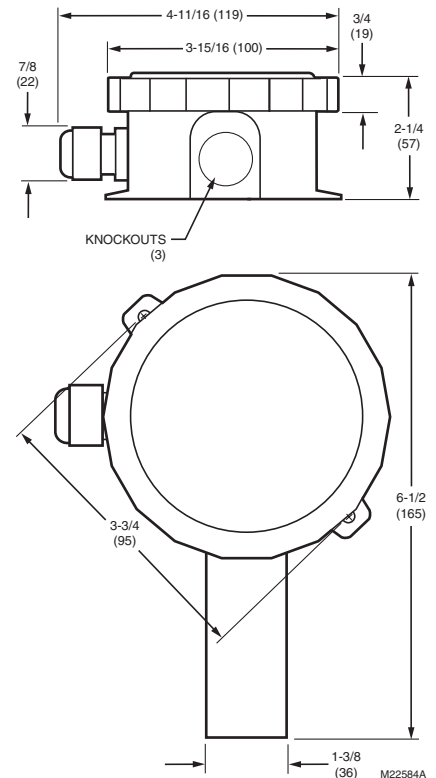


Fig. 2. Outdoor-mount Sensor Dimensions in Inches (mm).

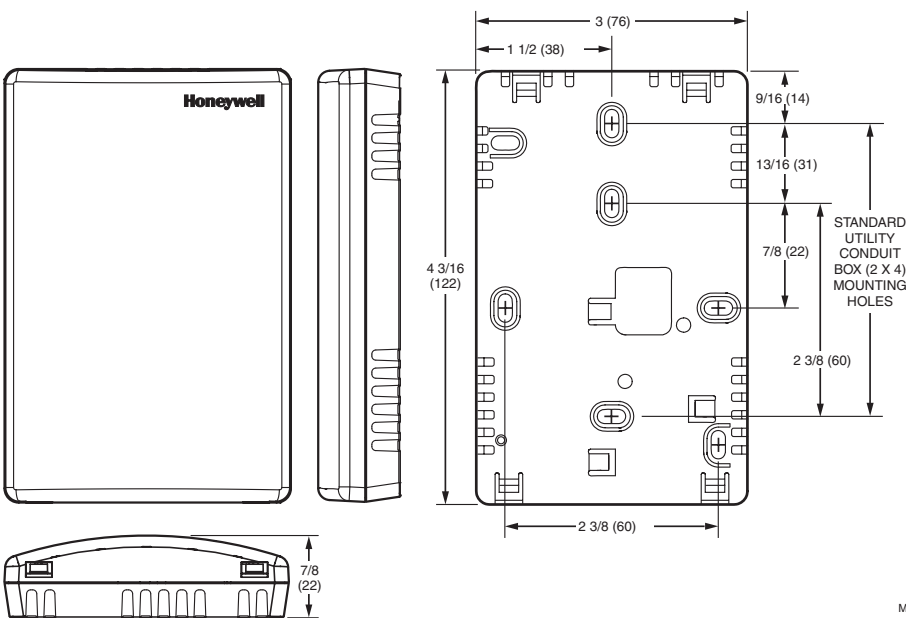


Fig. 3. Wall-mount Sensor Dimensions in In (mm).

Submittal Data - Sensors

Electronic Humidity Sensors



APPLICATION

H7655 and C7600 Solid State Humidity Sensors sense the relative humidity level of an area and is used with any controller capable of processing a 0-10 Vdc or 2-10 Vdc signal.

FEATURES

- Long-lasting solid state sensing element is accurate and stable over time.
- Enclosed in rugged, wall-mounted plastic case.
- Vents on top and sides of cover allow air flow to humidity sensing element.
- Compact size and lightweight construction provide easy mounting.
- C7600B provides 2-10 Vdc output directly proportional to relative humidity and can be used with the H775 Humidity Controller.
- H7655A provides 0-10 Vdc output directly proportional to relative humidity and can be used with the T7350 Temperature/Humidity Controller.

SPECIFICATIONS

Dimensions	See Fig. 1.
Case	Rugged, lightweight, compact plastic, easy to install.
Electrical Ratings	Input: 16-40 Vdc or 16-30 Vac.
Output	C7600B: 2-10 Vdc voltage signal; increases from 2 to 10Vdc as humidity increases. Output voltage is directly proportional to relative humidity increase. See Fig. 2. H7665A: 0-10 Vdc voltage signal; increases from 0 to 10Vdc as humidity increases. Output voltage is directly proportional to relative humidity increase. See Fig. 3.
Maximum Power Consumption.....	0.3 VA.
Mounting	Wall mount (directly to wall or standard outlet box).
Ambient Temperature Ranges.....	Operating: 32 °F to 125 °F (0 °C to 52 °C). Shipping: -40 °F to +150 °F (-40 °C to +66 °C).
Humidity Range	10 to 90 percent RH, noncondensing.
Humidity Accuracy	From 30 to 70% RH: ±5 percent RH. From 10 to 90% RH: ±7 percent RH.

DIMENSIONS DIAGRAM

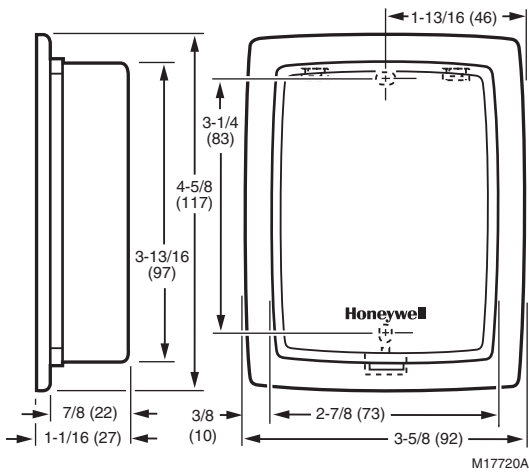


Fig. 1. C7600B, H7665A Dimensions in In (mm).

OUTPUT VOLTAGE CHARTS

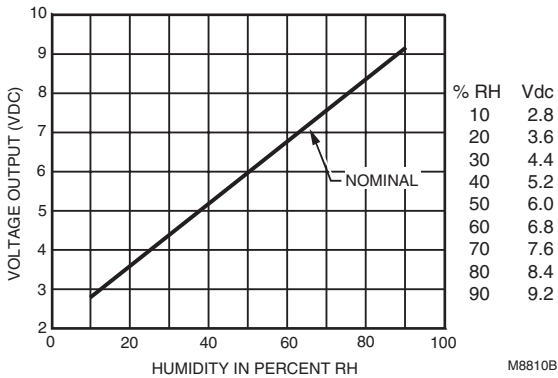


Fig. 2. C7600B Nominal Output Voltage Vs. Relative Humidity.

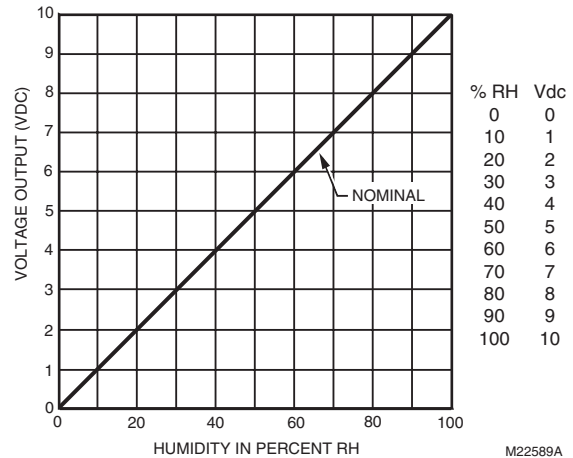


Fig. 3. H7665A Nominal Output Voltage Vs. Relative Humidity.

Submittal Data - Sensors

Dew Point Sensors



FEATURES

- Does not wait to detect when the dew point has already been reached, but rather provides an early warning of the approaching dew point
- Compact design
- Fast response
- Module is coated, thus protected against contamination
- Simple and easy mounting
- Status indication

SPECIFICATIONS

Supply Voltage	24 Vac/Vdc \pm 20%
Power Consumption	< 10 mA (ac) / < 3 mA (dc)
Switch-points	RH > 90% \pm 3% contact "open" RH < 90% \pm 3% contact "closed"
Switching hysteresis	5% RH
Output	Potential-free relay with changeover contact
Switching voltage max	24 Vac/dc
Switching current max	1 A
Response time at change of pipe/wall temperature	< 3 min
Response time at change of relative humidity	< 25 s
Weight approx.	60 g
Operation temperature	0...50 °C (32...122 °F)
Storage temperature	20...70 °C (-4...158 °F)
Humidity	10...100% RH
Status indication	LED, red
Dust protection	Special coating (permeable for water vapor)
Housing protection	class IP40
Housing material	PC, fire resistant according toUL94-V0

APPLICATION

The HSS-DPS early-warning dew point switch is used to monitor the formation of condensation on chilled ceilings or to prevent condensation at critical spots of HVAC systems. It is also used as a dew point monitor for systems operating near the dewpoint. The dew point switch measures the relative humidity near the dew point using its high-quality capacitive sensor. At reaching the switching point the output will provide an early warning signal for the initiation of control steps (increasing the initial water temperature, reducing the cooling capacity, switching on the heating, etc...). An additional status light indicates the condensation danger. Thanks to the special protection coating, sensor and electronics are highly insensitive to dust and dirt. HSS-DPS dew point switch can be mounted on walls, ducts and pipes up to 50mm (2").

DIMENSIONS DIAGRAM

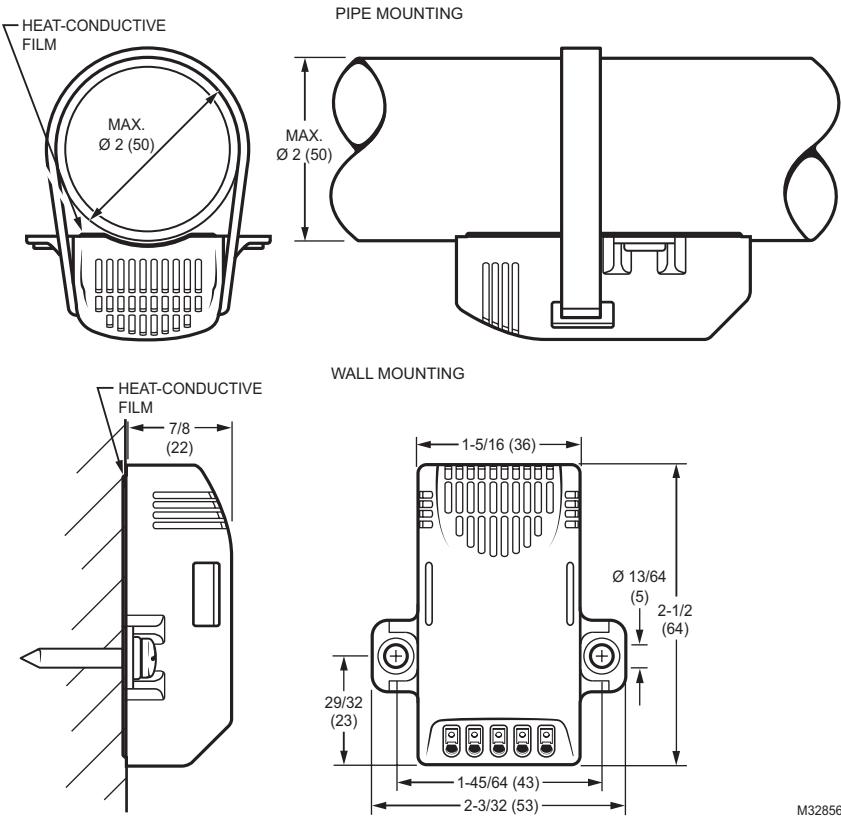


Fig. 1. Mounting (Dimensions in mm).

SENSORS

Submittal Data - Sensors

Carbon Dioxide Sensors

SPECIFICATIONS

Models.....	C7232 Sensor and Controller. A standalone carbon dioxide (CO ₂) sensor with two jumper-adjustable outputs (one analog and one SPST relay). C7232A: Wall mount model. C7232B: Duct mount model. NOTE: Models are available with or without a 4-digit LCD that indicates the current CO ₂ concentration.
Dimensions.....	C7232A: See Fig. 1. C7232B: See Fig. 2.
Sensor Response Time	1 min.
CO ₂ Sensor Operation	Non-dispersive infrared (NDIR).
CO ₂ Sensor Sampling	Diffusion
CO ₂ Sensor Range	0 to 2000 ppm
CO ₂ Sensor Accuracy.....	± (30 ppm +2% of reading)*
* This product complies with Title 24 Part 6, CEC Standard for Residential and Non-Residential Buildings—2005, when installed according to instructions.	
Power Supply	24 Vac/dc ±20%, 50/60 Hz (Class 2).
Maximum Power Consumption.....	3W.
Peak Current (at 20 ms)	600 mA.
Relay Configuration	Shipped N.O.
Contact Rating.....	1A at 50 Vac/24 Vdc.
Minimum Permissible Load	1 mA at 5 Vdc.
Linear Analog Output	Voltage: 0/2-10 Vdc (resistive load greater than 5000 ohms). Current: 0/4-20 mA (resistive load less than 500 ohms).
Outputs.....	Analog: 0-10 Vdc (Default: 2-10 Vdc, 500 to 1500 ppm). Relay: Normally Open SPST (Default: Close at 800 ppm).
Ambient Ratings	Temperature: Operating: +32°F to +122°F (0°C to +50°C). Storage: -4°F to +158°F (-20°C to +70°C). Relative Humidity (non-condensing): 0 to 95 percent.
CO ₂ Pressure Dependence	1.4% change in reading per 1 kPa deviation from 100 kPa.
Wiring Connections	C7232A: 20-gauge cable with six 8 in. leadwires. C7232B: 20-gauge cable with six 6 in. leadwires.
Mounting.....	C7232A: Vertical surface with standard single-gang junction box. C7232B: Sheet metal duct with a sampling tube. Automatic Background Calibration (ABC) default: On.
Calibration	This product is factory calibrated. No field calibration is necessary for the life of this product.
Approvals	CE Underwriters Laboratories Inc. Listed, File No. E4436 cUL C7232B: Flammability Rating, UL94-5V. C7232A: NEMA 1. C7232B: NEMA 3.



FEATURES

- Used for CO₂ based ventilation control.
- Models available with LCD that provides sensor readings and status information.
- Non-Dispersion-Infrared (NDIR) technology used to measure carbon dioxide gas.
- Device provides voltage or current output based on CO₂ levels.
- Models available with SPST relay output.
- Automatic Background Calibration (ABC) algorithm based on long-term evaluation reduces required typical zero-drift check maintenance.

APPLICATION

The C7232 Sensor and Controller is a standalone carbon dioxide (CO₂) sensor for use in determining ventilation necessity with HVAC controllers. The C7232 measures the CO₂ concentration in the ventilated space or duct. The C7232 is used in ventilation and air conditioning systems to control the amount of fresh outdoor air supplied to maintain acceptable levels of CO₂ in the space.

DIMENSIONS DIAGRAM

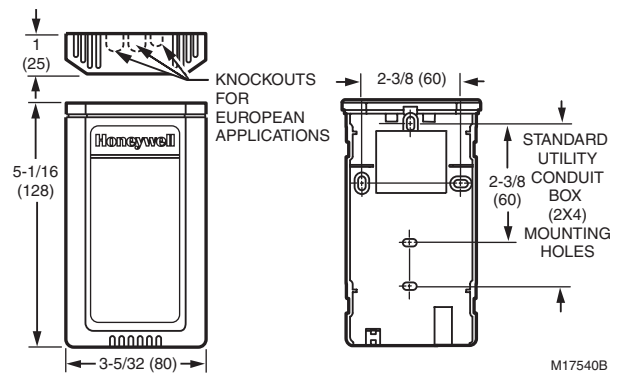


Fig. 1. C7232A Dimensions in In (mm).

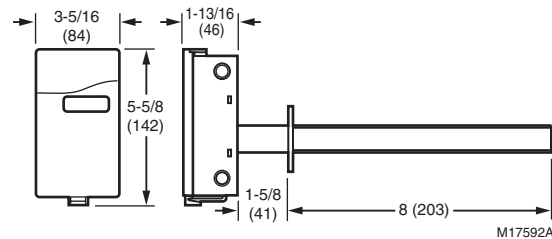


Fig. 2. C7232B Dimensions in In (mm).



SPECIFICATIONS

Models.....	C7632 Sensor and Controller. A stand-alone carbon dioxide (CO ₂) sensor with one 0-10 Vdc analog output.
	C7632A: Wall mount model.
	C7632B: Duct mount model.
Dimensions.....	C7632A: See Fig. 1.
	C7632B: See Fig. 2.
Operating Temperature	+32°F to +122°F (0°C to +50°C).
Storage Temperature.....	-4°F to +158°F (-20°C to +70°C).
Relative Humidity (non-condensing)	0 to 95 percent.
Automatic Background Calibration (ABC) default.....	On.
Electrical Ratings.....	Power Supply: 24 Vac ±20%, 50/60 Hz (Class 2).
Maximum Power Consumption.....	Average: 1W.
	Peak: 2W.
Peak Current (at 20 ms)	300 mA.
Linear Analog Output	0-10 Vdc.
Mounting.....	C7632A: Vertical surface with standard single-gang junction box.
	C7632B: Sheet metal duct with a sampling tube.
CO ₂ Pressure Dependence	1.6% change in reading per 1 kPa deviation from 100 kPa.
Output.....	Analog: 0-10 Vdc, 0-2000 ppm (fixed).
Sensor Performance Ratings	Response Time: 1 min.
Carbon Dioxide Sensor	Operation: Non-dispersive infrared (NDIR).
Sampling	Diffusion.
Range.....	0 to 2000 ppm (fixed).
Annual Drift.....	±10 ppm (nominal).
Accuracy	±(30 ppm+2%) at normal temperature/pressure.
Wiring Connections	C7632A: Terminal block.
	C7632B: 20-gauge cable with three 6 in. leadwires.
Approvals	CE.
	C7632B: Flammability Rating, UL94-5V.
	C7632A: NEMA 1.
	C7632B: NEMA 3.

FEATURES

- Non-Dispersion-Infrared (NDIR) technology used to measure carbon dioxide gas.
- Gold-plated sensor provides long-term calibration stability.
- Device provides voltage output based on CO₂ levels.
- Used for CO₂ based ventilation control.
- Automatic Background Calibration (ABC) algorithm based on long-term evaluation reduces required typical zero-drift check maintenance.
- Fixed 0 to 10 Vdc from 0 to 2000 ppm. No adjustments are necessary.
- Compatible with Honeywell Excel 10, 15, 5000 and any controller requiring 0-10 Vdc input.

APPLICATION

The C7632 Sensor and Controller is a standalone carbon dioxide (CO₂) sensor for use in determining ventilation necessity with heating ventilation and air conditioning (HVAC) controllers. The C7632 measures the CO₂ concentration in the ventilated space or duct. The C7632 is used in HVAC systems to control the amount of fresh outdoor air supplied to maintain acceptable levels of CO₂ in the space.

DIMENSIONS DIAGRAM

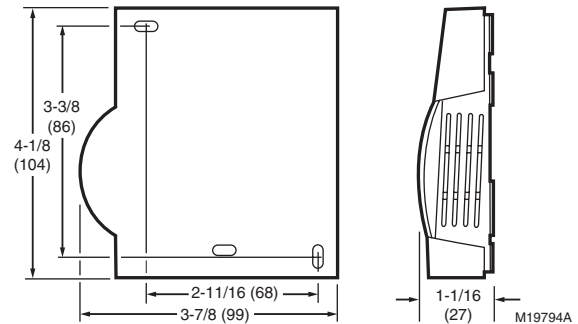


Fig. 1. C7632A Dimensions in Inches (mm).

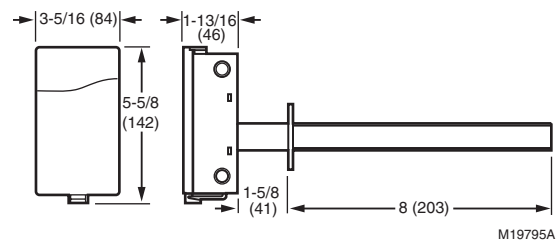


Fig. 2. C7632B Dimensions in Inches (mm).

Submittal Data - Sensors

Carbon Dioxide/Temperature Sensor



SPECIFICATIONS

Models.....	C7262 Sensor. A stand-alone carbon dioxide (CO ₂) and temperature sensor with two jumper-adjustable CO ₂ outputs (one analog and one SPST relay). C7262A1008: Wall module with display. C7262A1016: Wall module without display.
Dimensions.....	See Fig. 1.
Operating Temperature	+32°F to +122°F (0°C to +50°C).
Storage Temperature.....	-4°F to +158°F (-20°C to +70°C).
Relative Humidity (non-condensing)	0 to 95 percent.
Automatic Background Calibration (ABC) default.....	On.
Electrical Ratings.....	Power Supply: 24 Vac ±20%, 50/60 Hz (Class 2).
Maximum Power Consumption.....	1W
Peak Current (20 ms duration)	At rated voltages it is 120mA or less.
Linear Analog Output.....	Voltage: 0/2-10 Vdc (resistive load greater than 5000 ohms). Current: 0/4-20 mA (resistive load less than 500 ohms).
Mounting.....	Vertical surface with standard single-gang junction box.
CO ₂ Pressure Dependence	1.6% change in reading per 1 kPa deviation from 100 kPa.
Sensor Performance Ratings	Response Time: Less than 3 min.
Carbon Dioxide Sensor	Operation: Non-dispersive infrared (NDIR). Accuracy: ± (30 ppm + 3% of reading) from 59°F to 85°F (15°C to 30°C).
Sampling	Diffusion.
Range.....	0 to 2000 ppm (adjustable).
Accuracy	± (30 ppm + 3% of reading) from 59°F to 85°F (15°C to 30°C).
Wiring Connections	Terminals (16 gauge maximum)
Approvals	CE.

FEATURES

- Used for CO₂ based ventilation control.
- Integral 20K ohm NTC temperature output.
- Models available with LCD that provides CO₂ ppm level.
- Non-Dispersion-Infrared (NDIR) technology used to measure carbon dioxide gas.
- Device provides voltage or current output based on CO₂ levels.
- Models available with SPST relay output.
- Automatic Background Calibration (ABC) algorithm based on long-term evaluation reduces required typical zero-drift check maintenance.

APPLICATION

The C7262 Sensor is a stand-alone carbon dioxide (CO₂) and temperature sensor for use in determining ventilation necessity with HVAC controllers. The C7262 measures the CO₂ concentration and temperature in the ventilated space. The C7262 is used in ventilation and air conditioning systems to control the amount of fresh outdoor air supplied to maintain acceptable levels of CO₂ in the space and to sense the temperature of the space.

DIMENSIONS DIAGRAM

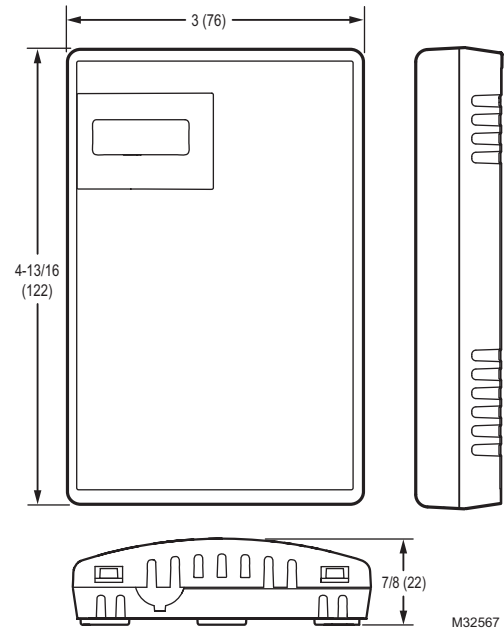


Fig. 1. C7262A dimensions in inches (mm).

P7650 Pressure Transducers



APPLICATION

The P7650 sensor can measure either air pressure or velocity. It is available in three installation configurations: duct, panel or universal. Duct and panel models have two pressure and velocity options: 0-1" WC / 0-3,000 FPM or 1-10" WC / 3,000-6,000 FPM with four field-selectable sub-ranges.

The universal model comes in one pressure/velocity range: 0-10" WC / 0-6,000 FPM with seven fieldselectable sub-ranges. All variants are available with and without display. The P7650 has an IP65/NEMA 4 environmental rating and a 5-year limited warranty.

- Duct static pressure (Pressure mode)
- Building or room pressure (Pressure mode)
- Filter status (Pressure mode)
- Air flow measurement (Velocity mode)

FEATURES

Reduce field failures

- Excellent tolerance to overpressure & vibration reduces field failures

Reduce setup

- Selectable ranges and scales reduce setup time and number of models to stock

High accuracy

- High accuracy digital sensor with seven selectable sub-ranges maintains calibration and reduces callbacks

Water-resistant housing

- IP65/NEMA 4 housing allows for mounting in wash-down locations

Maintenance free

- High reliability sensor technology for long-term, maintenance-free operation

Circuit protection

- Circuit protection avoids damage due to incorrect input wiring

SPECIFICATIONS

Media Compatibility.....	Dry air or inert gas
Input Power	Three-wire Volt mode: 24 Vac or 12-30 Vdc*
Output Power Field-selectable	Two-wire mA mode: 12-30 Vdc* 2-wire, loop-powered 4-20 mA** (DC only, clipped and capped), 24 Vac/dc or 3-wire 0-5V/0-10V***
Response Time.....	Standard: T95 in 20 sec, Fast: T95 in 2 sec, DIP switch selectable
Pressure Mode	Selectable unidirectional or bidirectional (example: unidirectional 0 to 1 inch w.c., or bi-directional -1 to 1 inch w.c.), DIP switch selectable
Velocity Mode.....	Velocity is set up in Feet/Minute or Meters/second
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 (20.6 kPa)
Burst Pressure	5 psid (34.5 kPa)
Pressure Mode Accuracy.....	±1% F.S. (combined linearity and hysteresis)
Velocity Mode Accuracy.....	±90 FPM (±0.45 MS) plus 5% of measured value****
Temperature Effect	1" (250 Pa) models: 0.05%/°C; 10" (2.5 kPa) models: 0.01%/°C (Relative to 25 °C) 0 to 50 °C (32 to 122 °F)
Zero Drift (1-year).....	1" (250 Pa) models: 2.0% max.; 10" (2.5 kPa) models: 0.5% max.

Zero Adjust	Pushbutton auto-zero and digital input (2-pos terminal block)
Operating Environment	0 to 60 °C (32 to 140 °F)
Altitude of Operation	0 to 3000 m
Pollution Degree	2
Humidity Range.....	100% RH, non-condensing
Mounting Location.....	For indoor use only.
Fittings.....	Brass barb; 0.24" (6.1 mm) o.d.
Limited Warranty	5 years
Environmental Rating	IP65, NEMA 4
Flammability Rating.....	Plastic enclosure is UL 94 5VA fire retardant ABS
Accessories.....	32003169-001 4 in. Duct Pressure Pick-up Probe. P7650L6, P7650L8, P7650L10, P7650L12, or P7650L14, Velocity Pick-up Probes. (Last number is probe length, i.e., P7650L6 has 6 inch probe, etc) P7650Lx can also be used for pressure, use only one of the two pick-ups

EMC Conformance: EN 61000-6-3:2007 and A1:2011 Class B, EN 61000-6-1:2007

* Class 2 power source.

** Minimum input voltage for 4 to 20 mA operation: 250 W loop = 12 Vdc; 500 W loop = 19 Vdc.

*** Minimum load resistance for Volt operation: 5 kW.

**** For measured values between 200 and 7000 FPM (1 and 35 MS).

Submittal Data - Sensors

Pressure Transducers

Table 1. Operating Specifications

Model	Mounting	Selectable W.C. Range	Display	Output	Supply Voltage
P7650A1000	Panel	0-.1", 0-.25", 0-.5", 0-1"	Yes	0-10 Vdc, 0-5 Vdc, and 4-20 mA selectable	12-30 Vdc or 24 Vac
P7650A1018	Panel	0-.1", 0-.25", 0-.5", 0-1"	No	0-10 Vdc, 0-5 Vdc, and 4-20 mA selectable	12-30 Vdc or 24 Vac
P7650A1026	Panel	0-1", 0-2.5", 0-5", 0-10"	Yes	0-10 Vdc, 0-5 Vdc, and 4-20 mA selectable	12-30 Vdc or 24 Vac
P7650A1034	Panel	0-1", 0-2.5", 0-5", 0-10"	No	0-10 Vdc, 0-5 Vdc, and 4-20 mA selectable	12-30 Vdc or 24 Vac
P7650B1008	Duct	0-.1", 0-.25", 0-.5", 0-1"	Yes	0-10 Vdc, 0-5 Vdc, and 4-20 mA selectable	12-30 Vdc or 24 Vac
P7650B1016	Duct	0-.1", 0-.25", 0-.5", 0-1"	No	0-10 Vdc, 0-5 Vdc, and 4-20 mA selectable	12-30 Vdc or 24 Vac
P7650B1024	Duct	0-1", 0-2.5", 0-5", 0-10"	Yes	0-10 Vdc, 0-5 Vdc, and 4-20 mA selectable	12-30 Vdc or 24 Vac
P7650B1032	Duct	0-1", 0-2.5", 0-5", 0-10"	No	0-10 Vdc, 0-5 Vdc, and 4-20 mA selectable	12-30 Vdc or 24 Vac
P7650U1040	Universal	0-.1", 0-.25", 0-.5", 0-1" 0-2.5", 0-5", 0-10"	No	0-10 Vdc, 0-5 Vdc, and 4-20 mA selectable	12-30 Vdc or 24 Vac
P7650U1052	Universal	0-.1", 0-.25", 0-.5", 0-1" 0-2.5", 0-5", 0-10"	Yes	0-10 Vdc, 0-5 Vdc, and 4-20 mA selectable	12-30 Vdc or 24 Vac

DIMENSIONS DIAGRAM

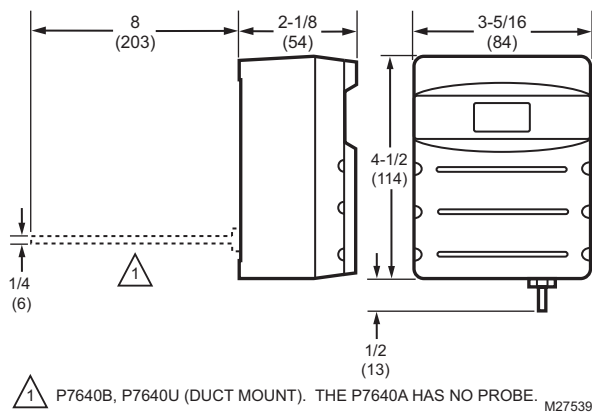


Fig. 1. Dimensions in Inches (mm).

Differential Air Pressure Sensors



The P7635 Series Low Differential Pressure transmitters are designed for use in OEM or high density panel mounting applications. Key installation features include an integral 35 mm Din rail mounting foot, vertically orientated wiring and pressure connections, and a pushbutton zero function conveniently located on the front cover. The P7635 incorporates a high accuracy, piezoresistive, silicon sensing element which senses differential pressure and provides a linear 4 to 20 mA or DC voltage output equal to the specified pressure range. This technology reduces warmup shift while also reducing the effect of package stress for increased long term stability.

In addition, the unit contains a de-pluggable terminal block that can be removed for ease of installation. This unit must be ordered with a single uni or bi-directional pressure range and output signal from +/- 0.1" of water column to a maximum pressure of +/- 10" of water column depending on your application. See the DLP Series pressure transmitter for a unit with 8 field selectable pressure ranges and three field selectable output signals.

All P7635 Series pressure transmitters are calibrated using NIST Certified equipment.

APPLICATIONS

- Building and Duct Static Pressure
- Filter Monitoring
- Air Flow Measurement
- Process Control
- Roof Top Units
- Air Handlers
- Clean Rooms
- Isolation Rooms
- Data Centers

SPECIFICATIONS

Media Compatibility.....	Dry air or inert non-conductive gases
Supply Voltage (VDC).....	0-5 VDC Output: +12-36 VDC 1-6 VDC & 0-10 VDC Output: +16-36 VDC 4-20 mA Output: +16-36 VDC (250 Ohm Load) +21-36 VDC (500 Ohm Load)
Supply Voltage (VAC).....	24 VAC +/- 10%, 50/60 Hz

Output Signals.....	4-20 mA: 2-wire Loop Powered (output limited to 20.5 mA maximum) 4-20 mA: 3-Wire, VAC Powered (output limited to 20.5 mA maximum) 0-5 VDC, 1-6 VDC, 0-10 VDC: 3-Wire, VAC or VDC Powered (output limited to 5.25, 6.25, & 10.25 VDC)
Response Time (T95).....	8 sec
Proof Pressure	Ranges < 1" wc (248.84 pa): 270" wc (67.2 kPa) Ranges > 1" wc (0.2488 kPa) to < 10" wc (2.488 kPa): 350" wc (87.12 kPa) Ranges > 10" wc (2.488 kPa) to < 40" wc (9953.6 kPa): 562" wc (140 kPa)
Burst Pressure	Ranges < 1" wc (248.84 pa): 415" wc (103.3 kPa) Ranges > 1" wc (0.2488 kPa) to < 10" wc (2.488 kPa): 550" wc (136.9 kPa) Ranges > 10" wc (2.488 kPa) to < 40" wc (9953.6 kPa): 1004.7" wc (250 kPa)
Accuracy	+/- 0.5% FSO (Standard)
Temperature Effects	+/- 0.056% FSO/°F (+/- 0.10% FSO/°C)
Zero Adjust.....	Pushbutton Zero Function (Recommended after 15 minutes warm up)
Operating Temperature	32 to 185°F (0 to 85°C)
Operating Humidity	10 to 95% RH, non-condensing
Storage Temperature.....	-40 to 176°F (-40 to 80°C)
Storage Humidity.....	10 to 95% RH, non-condensing
Flammability Rating.....	UL 94 V-0

Model	Pressure Range	Units	Range	Accuracy	Output	Supply Voltage
P7635D01M	0 to 0.1 in wc	in. wc	Uni	0.5	4-20mA	+16-36 VDC (250 Ohm Load) +21-36 VDC (500 Ohm Load)
P7635D025M	0 to 0.25 in wc		Uni			
P7635D05M	0 to 0.5 in wc		Uni			
P7635D1M	0 to 1 in wc		Uni			
P7635D2M	0 to 2 in wc		Uni			
P7635D5M	0 to 5 in wc		Uni			
P7635D10M	0 to 10 in wc		Uni			
P7635B01M	-0.1 to 0.1 in wc		bi			
P7635B025M	-0.25 to 0.25 in wc		bi			
P7635B05M	-0.5 to 0.5 in wc		bi			
P7635B1M	-1 to 1 in wc	bi				
P7635D2V	0 to 2 in wc	Uni			0-10Vdc	

DIMENSIONS DIAGRAM

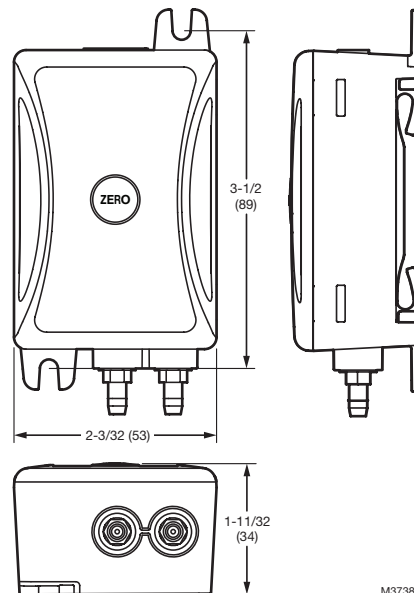


Fig. 1. Dimensions in Inches (mm).

Submittal Data - Sensors

Differential Pressure Transducers



APPLICATION

The PWT Series wet/wet differential pressure sensors provide reliable, accurate measurement and control of proper applications, including the monitor and control of pump differential pressure, chiller/boiler differential pressure drop and CW/HW system differential pressure. The PWT Series is ideal for measuring pressure across pumps, filters, heat exchangers, compressors and other non-corrosive wet media applications.

FEATURES

- The PWT Pressure Sensors incorporate microprocessor profiled sensors for exceptional accuracy and reliability.
- Field-selectable 4-20 mA, 0-5 Vdc, or 0-10 Vdc output.
- Jumper-selectable slow or fast response time.
- Switch-selectable pressure ranges (See Table 2).
- The jumper-selectable output switch for normal (4-20 mA) or reverse (20-4mA) operation provides application flexibility.
- Rugged, die-cast enclosure provides NEMA 4 sealing.
- Jumper-selectable port swap feature.
- All models offer both push button and digital input to zero the output. A microprocessor algorithm prevents accidental zero adjustment during normal operation.
- Used with the PWT-BV bypass valve manifold.

SPECIFICATIONS

Models.....	See Table 1.
Dimensions.....	See Fig. 1.
Media Compatibility.....	17-4 PH stainless steel
Supply Voltage	12 to 30 VDC, 24 VAC nom.
Maximum Current Draw DC	125 mA; AC: 280 mA
Proof Pressure	2x max. F.S. range
Burst Pressure	5x max. F.S. range
Accuracy at 25°C*	Ranges A, B, C: ±1% F.S.** Range D: ±2% F.S.**
Temperature Compensated Range ..	0° to 50 °C (32° to 122 °F); TC Zero <1.5% of product F.S. per sensor; TC Span <1.5% of product F.S. per sensor
Sensor Operating Range.....	-20° to 85 °C (-4° to 185 °F)
Long Term Stability	±0.25%
Zero Adjust	Push button auto-zero and digital input (2-position terminal block)
Operating Environment	-10° to 55 °C (14° to 131 °F); 10- 90% RH noncondensing
Fittings	1/8 in. NPT female, stainless steel 17-4 PH

* Accuracy combines linearity, hysteresis, and repeatability.

** F.S. is defined as full span of selected range in bidirectional mode.

Table 1. PWT Series Wet Differential Pressure Transducers

Model	Selectable Pressure Range	Output	Supply Voltage
PWT50	0-5, 0-10, 0-25, 0-50 psid	0-10Vdc, 0-5Vdc, and 4-20mA selectable	12-30Vdc or 24Vac
PWT100	0-10, 0-20, 0-50, 0-100 psid	0-10Vdc, 0-5Vdc, and 4-20mA selectable	12-30Vdc or 24Vac
PWT250	0-25, 0-50, 0-125, 0-250 psid	0-10Vdc, 0-5Vdc, and 4-20mA selectable	12-30Vdc or 24Vac

DIMENSIONS DIAGRAM

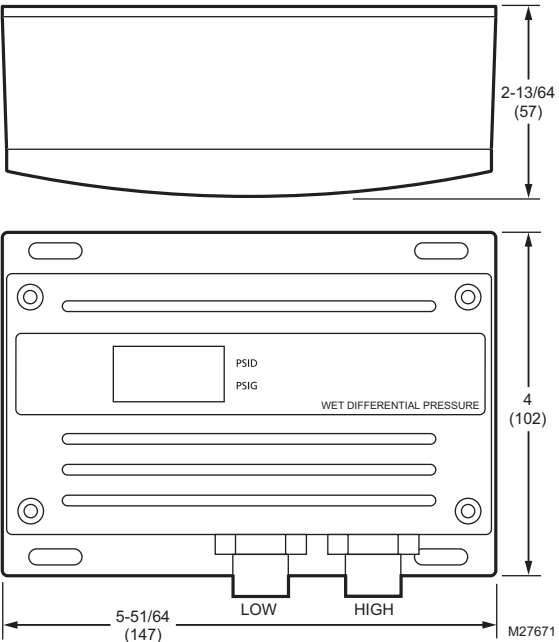


Fig. 1. Dimensional in in. (mm).

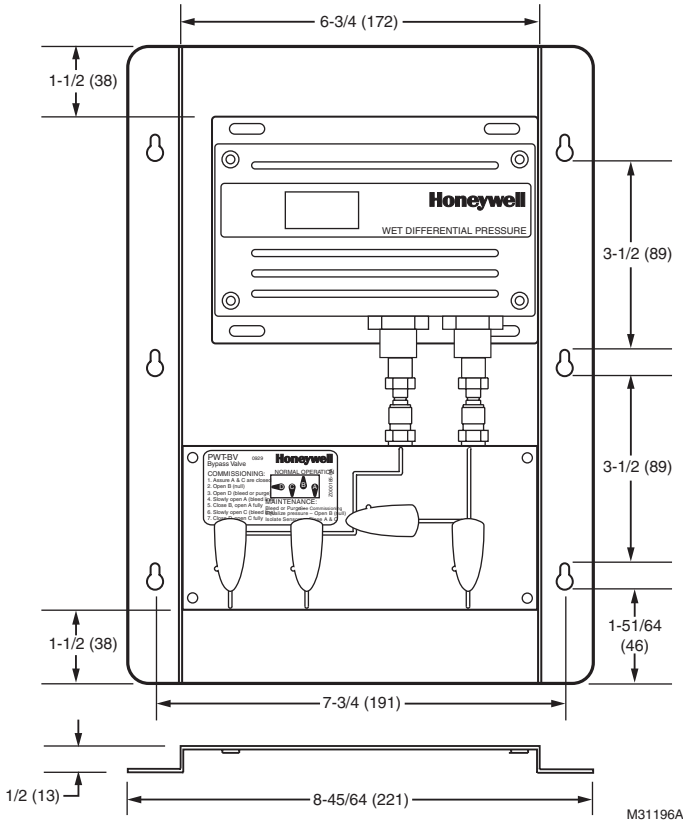


Fig. 2. Dimensional Drawing of PWT-BV Bypass Valve Manifold showing PWT (not included) for Reference Only.

SENSORS

Submittal Data - Sensors

Gauge Pressure Sensors



APPLICATION

The MLH Series is a two-wire 4-20mA gauge pressure sensor. This digitally compensated sensor offers an unparalleled value and performance combination, making it the ideal pressure sensing solution for demanding applications. The MLH series is available in pressure ranges up to 1000 psi.

FEATURES

- Available in 50, 150, 300, 500 and 1000 psi.
- All metal wetted parts for use in a wide variety of fluid applications.
- Suitable for use with refrigerants.
- No internal elastomeric seals mean no o-ring compatibility issues.
- 3 meter cable standard.
- Reverse polarity and overvoltage protection—protects against reversed excitation.
- Less than 2 ms response time provides accurate, high speed measurement.
- Select models available with 1/4-in. SAE female Schrader connection with valve depressor.
- Exceeds CE heavy industrial EMC for use in areas of high RFI/EMI.

SPECIFICATIONS

(All specifications are measured at 25°C (77°F) and at rated excitation unless otherwise specified.)

Operating temperature range	-40° C to 125° C (-40° F to 257° F)
Storage temperature range	-40° C to 125° C (-40° F to 257° F)
Compensated temperature range.....	-40° C to 125° C (-40° F to 257° F)
Proof Pressure	3X Working Pressure Range (50-500 psi) 2X Working Pressure Range (1000 psi)
Burst Pressure	10X Working Pressure Range
Dimensions.....	See Fig. 1 and 2.
Housing Material	Black plastic — Amodel AS-4133 HS - PPA
Material in contact with media.....	Stainless steel 304L and Haynes 214 alloy
Excitation	9.5Vdc to 30Vdc
Signal Output.....	4mA to 20mA
Zero Output	4.0mA
Full Scale Span (FSS).....	16mA (4 to 20mA)
Supply rejection ratio.....	90db
Termination	Cable (3 meter) Red Lead (Excitation) White Lead (Output Signal)
Shock.....	50 g peak [5 ms], 100 g peak [11 ms]
Vibration	MI - STD- 810C. Figure 514.2-5, Curve AK, Table 514.2-V, Random Vibration Test [overall g rms = 20.7 min.]

TABLE 1. MLH Specifications

Parameter	Specification
Response Time	<2 ms
Accuracy ¹	
<100 psi	±0.50% FSS
≥100 psi	±0.25% FSS
Total error band ²	
<300 psig (-40°C to 125°C [-40°F to 257°F])	±3% FSS
≥300 psig (>65°C to 125°C [>149°F to 257°F])	±2% FSS

¹ Includes pressure non-linearity (BFSL), pressure hysteresis, and non-repeatability. Thermal errors are not included.

² Includes zero error, span error, thermal effect on zero, thermal effect on span, thermal hysteresis, pressure-non-linear-ity, pressure hysteresis, and non-repeatability.

TABLE 2. MLH Models

Old Part Number	New Part Number	Pressure Range	Pressure Connection
50035430-050/U	MLH050PSCDJ1235	0-50 psig	1/4"-18 NPT
50035430-150/U	MLH150PSCDJ1236	0-150 psig	1/4"-18 NPT
50035430-300/U	MLH300PSCDJ1237	0-300 psig	1/4"-18 NPT
50035430-500/U	MLH500PSCDJ1240	0-500 psig	1/4" SAE female Schrader
50035430-01K/U	MLH01KPSCDJ1241	0-1000 psig	1/4" SAE female Schrader

DIMENSIONS DIAGRAM

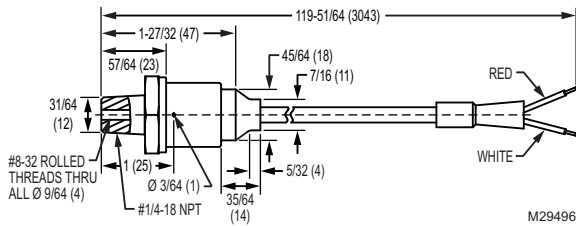


Fig. 1. MLH050PSCDJ1235/MLH150SCDJ1236/MLH300PSCDJ1237 Dimensions in Inches (mm).

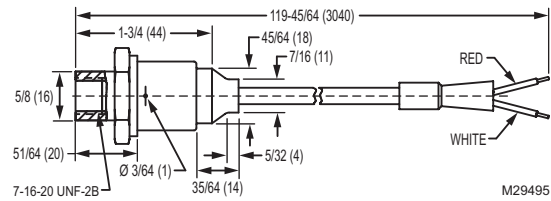


Fig. 2. MLH01KPSCDJ1241/MLH500PSCDJ1240 Dimensions in Inches (mm).

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Appendix A: Valve Selection and Sizing

Introduction

This section provides information on valve selection and sizing. Valves must be selected for ability to meet temperature, pressure, flow control characteristic, and piping connection requirements of the hydronic system. Valve sizing is critical to ensure support for heating and cooling loads with adequate valve capacity, yet able to control system flow to provide stable building conditions efficiently.

Definitions

Valve Components

Actuator: The part of an automatic control valve that moves the stem based on an electric, electronic, or pneumatic signal from a controller. The actuator and valve can be two separate devices or together they can be one device.

Body: The valve casting through which the controlled fluid flows (Fig. 1).

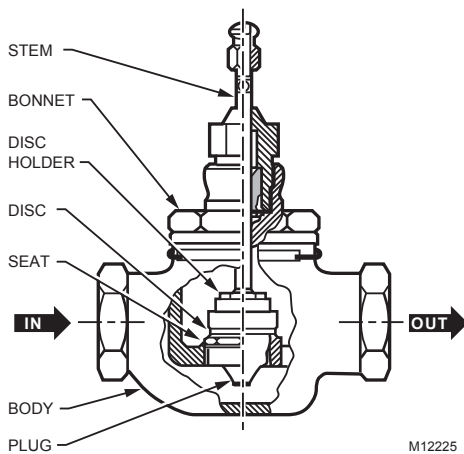


Fig. 1. Globe Valve Components.

Bonnet: The part that screws to the top of the valve body and contains the packing that seals and guides the valve stem.

Disc: The part of the valve assembly that contacts the valve seat to close off flow of the controlled fluid. Some valve assemblies are built so the disc is replaceable. Replaceable discs are usually made of a composition material softer than metal. "Metal trim" valves use precisely-machined metal plugs and seats operated by high force actuators instead of a disk.

Plug: The part that varies the opening for the fluid to flow through the valve body. The following describes the three most common types of plugs:

- A contoured plug has a shaped end that is usually end-guided at the top or bottom (or both) of the

valve body. The shaped end controls fluid flow through the valve with respect to stem travel.

- A V-port plug has a cylinder, called a skirt, that rides up and down in the valve seat ring. The skirt guides the plug and varies the flow area with respect to stem travel via its shaped openings.
- A quick-opening plug is flat and is either end-guided or guided by wings riding in the valve seat ring. The flat plug provides maximum flow soon after it lifts from the valve seat.

Port: The opening in the valve seat.

Seat: The stationary part of the valve body that has a raised lip to contact the valve disc when closing off flow of the controlled fluid.

Stem: The shaft that runs through the valve bonnet and connects an actuator to the valve plug.

Trim: All parts of the valve that contact the controlled fluid. Trim includes the stem, packing, plug, disc, and seat; it does not include the valve body.

Valve Flow Characteristics

Direction of Flow: The correct flow of the controlled fluid through the valve is usually indicated on the valve body. If the fluid flow through the valve is incorrect, the disc can slam into the seat as it approaches the closed position. The result is poor control, excessive valve wear, and noisy operation. In addition, the actuator must work harder to reopen the closed valve since it must overcome the pressure exerted by the fluid on top of the disc rather than have the fluid assist in opening the valve by exerting pressure under the disc. Gate and butterfly valves may offer bi-directional flow.

Equal percentage: A valve which changes flow by an equal percentage (regardless of flow rate) for similar movements in stem travel (at any point in the flow range).

Linear: A valve which provides a flow-to-lift relationship that is directly proportional. It provides equal flow changes for equal lift changes, regardless of percentage of valve opening.

Quick-opening: A valve which provides maximum possible flow as soon as the stem lifts the disc from the valve seat.

Valve flow characteristic: The relationship between the stem travel of a valve, expressed in percent of travel, and the fluid flow through the valve, expressed in percent of full flow.

Appendix A: Valve Selection and Sizing

Valve Flow Terms

Rangeability: The ratio of maximum flow to minimum controllable flow. Approximate rangeability ratios are 50 to 1 for V-port globe valves and 30 to 1 for contoured plug valves.

EXAMPLE:

A valve with a total flow capacity of 100 gpm full open and a rangeability of 30 to 1, can accurately controls flow accurately as low as 3 gpm.

Tight shut-off/close-off: A valve condition in which virtually no leakage of the controlled fluid occurs in the closed position. Generally, only single-seated valves provide tight shut-off. Double-seated valves typically have a one to three percent leakage in the closed position.

Turndown: The ratio of maximum flow to minimum controllable flow of a valve installed in a system. Turndown is equal to or less than rangeability.

EXAMPLE:

For the valve in the rangeability example, if the system requires a 66 gpm maximum flow through the valve and since the minimum accurately controllable flow is 3 gpm, the turndown is 22.

Valve Ratings

Flow coefficient (capacity index): Used to state the flow capacity of a control valve for specified conditions. In the control valve industry currently one of three flow coefficients is used depending upon the location and system of units; British A_v , European k_{vs} , or United States C_v . The flow coefficients have the following relationships:

$$\begin{aligned} A_v &= 0.0000278 k_{vs} \\ A_v &= 0.0000240 C_v \\ k_{vs} &= 0.865 C_v \end{aligned}$$

The flow coefficient A_v is in cubic meters per second and can be determined from the formula:

$$A_v = Q \sqrt{\frac{\rho}{\Delta p}}$$

Where:

- Q = volumetric flow in cubic meters per second.
- ρ = fluid density in kilograms per cubic meter.
- Δp = static pressure loss across the valve in pascals.

The flow coefficient k_{vs} is water flow in cubic meters per hour with a static pressure loss across the valve of

10^5 pascals (1 bar) within the temperature range of 5 to 40°C and can be determined from the formula:

$$k_{vs} = Q \sqrt{\frac{\Delta p k_{vs}}{\Delta p} \cdot \frac{\rho}{\rho_w}}$$

Where:

- Q = volumetric flow in cubic meters per hour.
- ρ = fluid density in kilograms per cubic meter.
- ρ_w = density of water in kilograms per cubic meter.
- $\Delta p k_{vs}$ = static pressure loss of 10^5 pascals.
- Δp = static pressure loss across the valve in pascals.

The flow coefficient C_v is water flow in gallons per minute with a pressure loss across the valve of one pound per square inch within the temperature range of 40 to 100F and can be determined for other conditions from the formula:

$$C_v = Q \sqrt{\frac{1}{\Delta p} \cdot \frac{\rho}{\rho_w}}$$

Where:

- Q = volumetric flow in US gallons per minute.
- ρ = fluid density in pounds per cubic foot.
- ρ_w = density of water in pounds per cubic foot within the temperature range of 40 to 100F
- Δp = static pressure loss across the valve in pounds per square inch.

Close-off rating: The maximum pressure drop that a valve can withstand without leakage while in the full closed position. The close-off rating is a function of actuator power to hold the valve closed against pressure drop, by structural parts such as the stem can be the limiting factor. The construction of gate-style valves, such as ball valves, often allows them to hold back high head pressures in the closed position, although the actuator may not be powerful enough to operate the valve against such forces.

EXAMPLE:

A valve with a close-off rating of 10 psi could have 40 psi upstream pressure and 30 psi downstream pressure. Note that in applications where failure of the valve to close is hazardous, the maximum upstream pressure must not exceed the valve close-off rating, regardless of the downstream pressure.

The valve close-off rating is independent of the actual valve body rating. See definition of BODY RATING (ACTUAL).

Appendix A: Valve Selection and Sizing

Close-off rating of three-way valves: The maximum pressure difference between either of the two inlet ports and the outlet port for mixing valves, or the pressure difference between the inlet port and either of the two outlet ports for diverting valves.

Pressure drop: The difference in upstream and downstream pressures of the fluid flowing through the valve.

Pressure drop (critical): The flow of a gaseous controlled fluid through the valve increases as the pressures drop increases until reaching a critical point. This is the critical pressure drop.

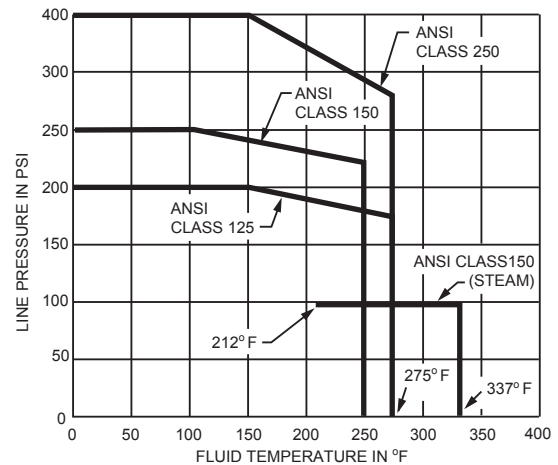
Any increase in pressure drop beyond the critical pressure drop is dissipated as noise and cavitation rather than increasing flow. The noise and cavitation can destroy the valve and adjacent piping components.

Body rating (nominal): The theoretical pressure rating, expressed in psi, of the valve body exclusive of packing, disc, etc. The nominal rating is often cast on the valve body and provides a way to classify the valve by pressure. A valve of specified body material and nominal body rating often has characteristics such as pressure-temperature ratings, wall thickness, and end connections which are determined by a society such as ANSI (American National Standards Institute). Figure 2 shows ANSI pressure-temperature ratings for valves. Note that the nominal body rating is not the same as the actual body rating.

Body rating (actual): The correlation between safe, permissible flowing fluid pressure and flowing fluid temperature of the valve body (exclusive of the packing, disc, etc.). The nominal valve body rating is the permissible pressure at a specific temperature.

EXAMPLE:

From Figure 2, a valve with an ANSI rating of 150 psi (ANSI Class 150) has an actual rating of 225 psi at 250F.



NOTES:

1. FOR HIGH FLUID TEMPERATURES, THE VALVE AND/OR PIPING SHOULD BE INSULATED TO PREVENT AMBIENT TEMPERATURES FROM EXCEEDING ACTUATOR RATINGS.

M12224

Fig. 2. Sample ANSI Pressure-Temperature Ratings for Valves.

Maximum pressure and temperature: The maximum pressure and temperature limitations of fluid flow that a valve can withstand. These ratings may be due to valve packing, body, or disc material or actuator limitations. The actual valve body ratings are exclusively for the valve body and the maximum pressure and temperature ratings are for the complete valve (body and trim). Note that the maximum pressure and temperature ratings may be less than the actual valve body ratings.

EXAMPLE:

The body of a valve, exclusive of packing, disc, etc., has a pressure and temperature rating of 125 psi at 335F. If the valve contains a composition disc that can withstand a temperature of only 240F, then the temperature limit of the disc becomes the maximum temperature rating for the valve.

Valve Types

Ball valve: A ball valve has a precision ball between two seats with a body (Fig. 3). Ball valves have several port sizes for a given body size and go from closed to open with a 90 degree turn of the stem. They are available in both two-way and three-way configurations. For HVAC applications, ball valve construction includes brass and cast iron bodies; stainless steel, chrome plated brass, and cast iron balls; resilient seats with various temperature ratings. Ball valves provide tight shut-off, while full port models have low flow resistance, and models with flow characterizing inserts can be selected for modulating applications.

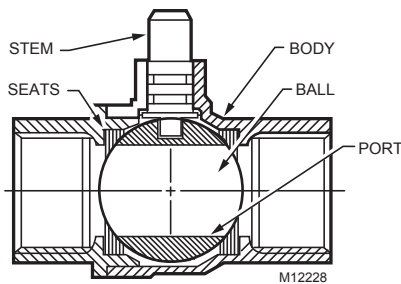


Fig. 3. Ball Valve.

Butterfly valve: A valve with cylindrical body, a shaft, and a rotating disc (Fig. 4). The disc rotates 90 degrees from open to closed. The disc seats against a resilient body liner or spring-loaded metal seat and may be manufactured for tight shut-off or made smaller for reduced operating torque at lower close-off. Butterfly valves have limited rangeability for modulating applications so are used mainly for two-way operation. For three-way applications, two butterfly valves are assembled to a pipe tee with linkage for simultaneous operation.

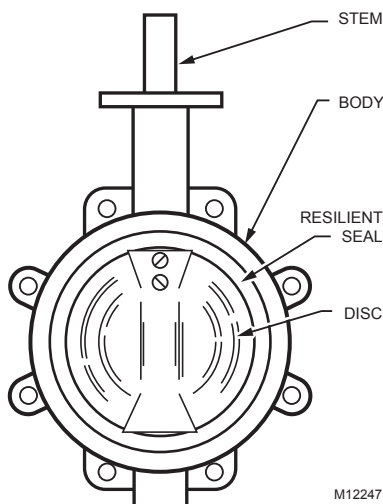


Fig. 4. Butterfly Valve.

Double-seated valve: A valve with two seats, plugs, and discs.

Double-seated valves are suitable for applications where fluid pressure is too high to permit a single seated valve to close. The discs in a double-seated valve are arranged so that in the closed position there is minimal fluid pressure forcing the stem toward the open or closed position; the pressure on the discs is essentially balanced. For a valve of given size and port area, the double-seated valve requires less force to operate than the single-seated valve so the double seated valve can use a smaller actuator than a single seated.

Also, double-seated valves often have a larger port area for a given pipe size. A limitation of double-seated valves is that they do not provide tight shut-off. Since both discs rigidly connect together and changes in fluid temperature can cause either the disc or the valve body to expand or contract, one disc may seat before the other and prevent the other disc from seating tightly.

Flanged-end connections: A valve that connects to a pipe by bolting a flange on the valve to a flange screwed onto the pipe. Flanged connections are typically used on large valves only.

Gate valve: A valve that controls flow using a gating mechanism, usually a plate, that moves across the valve seat instead of pushing against the flow. The actuator works against the friction of the seals rather than directly against the force of the water. Gate valves are inherently self-sealing and are often capable of high close-off pressures without an actuator. Ball valves are a type of gate valve.

Globe valve: A valve which controls flow by moving a circular disk against or away from a seat. When used in throttling control a contoured plug (throttling plug) extends from the center of circular disk through the center of the seat for precise control (Fig. 1).

Pressure-balanced valve: A globe valve with a sealed pressure chamber built into the plug, which equalizes head pressure across the seat and allows most of the actuator force to be used to close off the flow, resulting in very high close-off ratings with very low seat leakage.

Reduced-port valve: A valve with a capacity less than the maximum for the valve body. Ball, butterfly, and smaller globe valves are available with reduced ports to allow correct sizing for good control.

Appendix A: Valve Selection and Sizing

Single-seated valve: A valve with one seat, plug, and disc. Single-seated valves are suitable for applications requiring tight shut-off. Since a single-seated valve has nothing to balance the force of the fluid pressure exerted on the plug, it requires more closing force than a double-seated valve of the same size and therefore requires more actuator force than a double-seated valve.

Threaded-end connection: A valve with threaded pipe connections. Valve threads are usually tapered female, to National Pipe Thread standards, but male connections are available for special applications. Some valves have an integral union for easier installation.

Three-way valve: A valve with three ports. The internal design of a three-way valve classifies it as a mixing or diverting valve. Three-way valves control liquid in modulating or two-position applications and do not provide tight shut-off.

Two-way valve: A valve with one inlet port and one outlet port. Two-way valves control water or steam in two-position or modulating applications and provide tight shut-off in both straight through and angle patterns.

Valve Material and Media

Valves with bronze or cast iron bodies having brass or stainless steel trim perform satisfactorily in HVAC hydronic systems when the water is treated properly. Failure of valves in these systems may be an indication of inadequate water treatment. The untreated water may contain dissolved minerals (e.g., calcium, magnesium, or iron compounds) or gases (e.g., carbon dioxide, oxygen, or ammonia). Inadequate treatment results in corrosion of the system. Depending on the material of the valve, the color of the corrosion may indicate the substance causing the failure (Table 1).

Table 1. Corrosive Elements in Hydronic Systems.

Brass or Bronze Component	
Corrosive Substance	Corrosion Color
Chloride	Light Blue-Green
Ammonia	Blue or Dark Blue
Carbonates	Dark Blue-Green
Magnesium or Calcium	White
Oxides	Black (water)
Sulphide (Hydrogen)	Black (Gas)
Iron	Rust
Iron or Steel Component	
Corrosive Substance	Corrosion Color
Magnesium or Calcium	White
Iron	Rust

Petroleum products from sources such as cutting oils, solder flux, etc. can cause some rubber compounds to swell and interfere with moving parts.

Chloramines, chemical compounds of ammonia and chlorine used to treat municipal drinking water, are reported to attack some rubber compounds commonly used in closed loop hydronic systems.

Particulate present in the system can interfere with, and sometimes damage moving parts. Examples include: rust (Fe_2O_3), magnetite (Fe_3O_4), sand (quartz granules), silt from municipal water, iron filings from pipe threads, and scale precipitated from hard water. Rust, in particular, is highly abrasive and can rapidly wear out stem seals, causing leaks.

To prevent damage to valves and pumps, a complete flushing of the system during commissioning, including the existing structure when building an addition, may be required to remove physical particulate. Additional components may also be needed, such as in-line Y-strainers for large objects such as stones or solder blobs and mechanical filtration, such as a 50 micron 10% side-stream filter piped in parallel with the system pumps.

Glycol solutions may be used to prevent hydronic systems freezing. Glycol solutions should be formulated for HVAC systems. Some available glycol solutions formulated for other uses contain additives that are injurious to some system seals. In addition, hydronic seals react differently to water and glycol such that when a new system is started up with water or glycol the seals are effective. The hydronic seals are likely to leak if the system is later restarted with media changed from water to glycol or glycol to water. To prevent leakage part of the process of media changeover should include replacing seals such as, pump and valve packing. Glycol mixtures are usually limited to 50% concentration. At 60% concentration, glycol mixtures have their minimum freezing temperature, but can have unstable phase changes which may severely damage a system.

Appendix A: Valve Selection and Sizing

Valve Selection

Proper valve selection matches a valve to the control and hydronic system physical requirements. First consider the application requirements and then consider the valve characteristics necessary to meet those requirements. The following questions provide a guide to correct valve selection.

- What is the piping arrangement and size?

The piping arrangement indicates whether a two-way or three-way mixing or diverting valve is needed. The piping size gives some indication of whether the valve requires a screwed end or a flanged end connection.

- Does the application require two-position control or proportional control? Does the application require a normally open or normally closed valve? Should the actuator be direct acting or reverse acting?

In its state of rest, the valve is normally open or closed depending on the load being controlled, the fluid being controlled, and the system configuration.

For chilled water coils, it is usually preferable to close the valve on fan shutdown to prevent excessive condensation around the duct and coil, and to save pumping energy. This may be accomplished with either normally closed valves or a variety of other control schemes. Lower cost and more powerful normally open valve assemblies may be used with the close-on-shutdown feature and allow, in the case of pneumatic systems, the capability to provide heating or cooling in the event of air compressor failure.

Converter control valves should be normally closed and outdoor air preheat valves should be normally open.

- Is tight shut-off necessary? What differential pressure does the valve have to close against? How much actuator close-off force is required?

Valves should never be allowed to "dead head" a pump unless the pumps are controlled by variable speed drive systems capable of detecting such conditions and shutting down the pumps.

Single-seated valves provide tight shut-off, while double-seated valves do not. Double seated valves are acceptable for use in pressure bypass or in-line throttling applications.

The design and flow capacity of a valve determine how much actuator force is required for a given close-off. Therefore, the valve must first be sized, then, the valve and actuator selected to provide the required close-off.

- What type of medium is being controlled? What are the temperature and pressure ranges of the medium?

Valves must be compatible with system media composition, maximum and minimum temperature, and maximum pressure. The temperature and pressure of the medium being controlled should not exceed the maximum temperature and pressure ratings of the valve.

For applications such as chlorinated water or brine, select valve materials to avoid corrosion.

- What is the pressure drop across the valve? Is the pressure drop high enough?

The full open pressure drop across the valve must be high enough to allow the valve to exercise control over its portion of the hydronic system. However, the full open pressure drop must not exceed the valve's rating for quiet service and normal life. Closed pressure drop must not exceed valve and actuator close-off rating.

Globe Valve

Globe valves are popular for HVAC applications. They are available in pipe sizes from 1/2 in. to 12 in. and in a large variety of capacities, flow characteristics, and temperature and pressure capabilities. They provide wide rangeability and tight shutoff for excellent control over a broad range of conditions. Globe valves are made in two-way, straight or angle configurations and three-way mixing and diverting designs. Globe valves close against the flow and have arrows on the body indicating correct flow direction. Incorrect piping can result in stem oscillations, noise, and high wear.

A two-way globe valve has one inlet port and one outlet port (Fig. 5) in either a straight through or angle pattern. The valve can be either push-down-to-close or push-down-to-open.

Pneumatic and electric actuators with linear motion to operate globe valves are available for operation with many control signals.

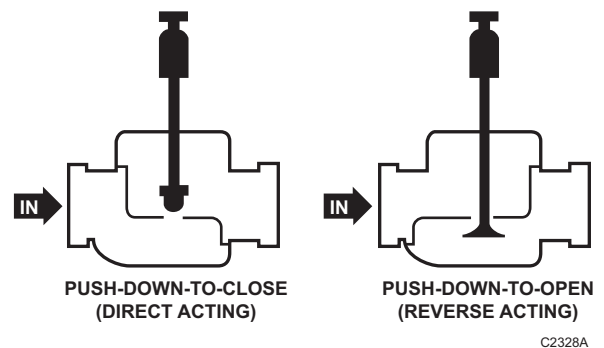


Fig. 5. Two-Way Globe Valves.

Appendix A: Valve Selection and Sizing

Ball Valve

Ball valves are available for two-position applications either manual (hand) or power operated or for modulating applications with direct coupled electric actuators. Ball valves are relatively low cost, provide tight close off, and are available in two-way and three-way configurations. As with all other valves, ball valves must be properly sized to provide good flow control.

When used in modulating service, ball valves must be specifically designed for modulating service as compared to two-position service. Packing must provide leak-free sealing through thousands of cycles to ensure trouble-free HVAC service. The ball, stem and seals should be made of materials that minimizes sticking and breakaway torque to achieve smooth operation.

Two-way ball valves have equal percentage flow control characteristics and flow in full-port models can be in either direction.

Three-way ball valves can be used in either mixing or diverting service. Full port models have linear flow control characteristics for constant total flow. A popular option with 3-way valves is a 20% flow capacity reduction in the B port to equalize pressure losses in a coil-bypass application.

Butterfly Valve

Butterfly valves (Fig. 6) control the flow of hot, chilled, or condenser water in two-position or proportional applications. Butterfly valves are available in two-way or three-way configurations. Tight shutoff may be achieved by proper selection of actuator force and body lining. The three-way valve can be used in mixing or diverting applications with the flow in any direction. The three-way valve consists of two butterfly valves that mount on a flanged cast iron tee and are linked to an actuator which opens one valve as it closes the other. Minimum combined capacity of both valves occurs at the half-open position.

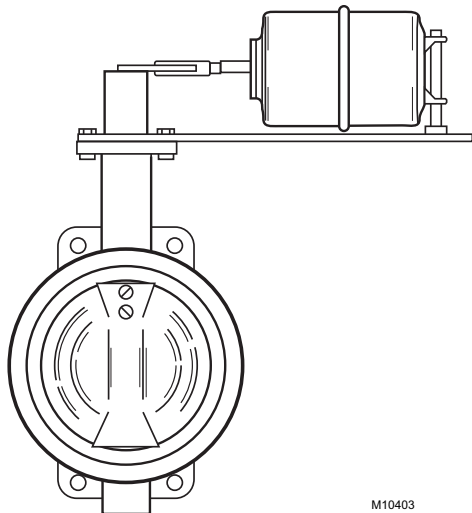


Fig. 6. Butterfly Valve.

When butterfly valves are used for proportional control, they must be applied using conservative pressure drop criteria. If the pressure drop approaches the critical pressure drop, unbalanced forces on the disc can cause oscillations, poor control, and/or damage to the linkage and actuator, even though the critical flow point is not reached. Modulating control is usually limited to a range of 15 to 65 degrees of disk rotation.

Butterfly valves are usually found in larger pipe sizes. For example, two butterfly valves could be piped in a mixing application to control the temperature of the water going back to the condenser. The valves proportion the amount of tower water and condenser water return that is flowing in the condenser water supply line.

Two-way Valve

Two-way valves are available as globe, ball, or butterfly valves. The combination of valve body and actuator (called valve assembly) determines the valve stem position. Two-way valves control steam or water in two-position or proportional applications (Fig. 7). They provide tight shutoff and are available with quick-opening, linear, or equal percentage flow characteristics. Control valves are typically installed on the supply side of convectors and radiators, and the return side of small-bore water coils used in fan-forced equipment.

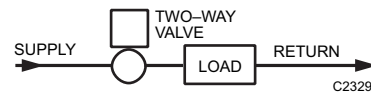


Fig. 7. Two-Way Valve Application.

Ideally, a control system has a linear response over its entire operating range. The sensitivity of the control to a change in temperature is then constant throughout the entire control range. For example, a small increase in temperature provides a small increase in cooling. A nonlinear system has varying sensitivity. For example, a small increase in temperature can provide a large increase in cooling in one part of the operating range and a small increase in another part of the operating range. To achieve linear control, the combined system performance of the actuator, control valve, and load must be linear. If the system is linear, a linear control valve is appropriate (Fig. 8). If the system is not linear, a nonlinear control valve, such as an equal percentage valve, is appropriate to balance the system so that resultant performance is linear.

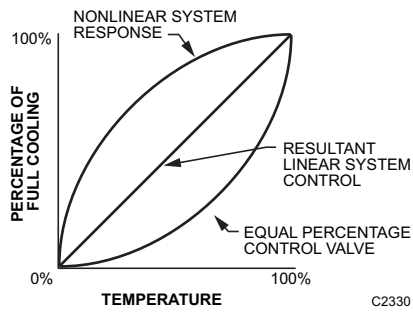


Fig. 8. Linear vs. Nonlinear System Control.

QUICK-OPENING VALVE

A quick-opening two-way valve includes only a disc guide and a flat or quick-opening plug. This type of valve is used for two position control of steam. The pressure drop for a quick opening two-way valve should be 10 to 20 percent of the piping system pressure differential, leaving the other 80 to 90 percent for the load and piping connections. Figure 9 shows the relationship of flow versus stem travel for a quick-opening valve. To achieve 90 percent flow, the stem must open only 20 percent. Linear or equal percentage valves can be used in lieu of quick-opening valves in two-position control applications as the only significant positions are full open and full closed.

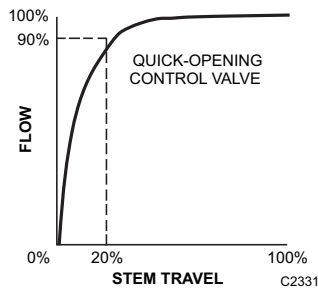


Fig. 9. Flow vs. Stem Travel Characteristic of a Quick-Opening Valve.

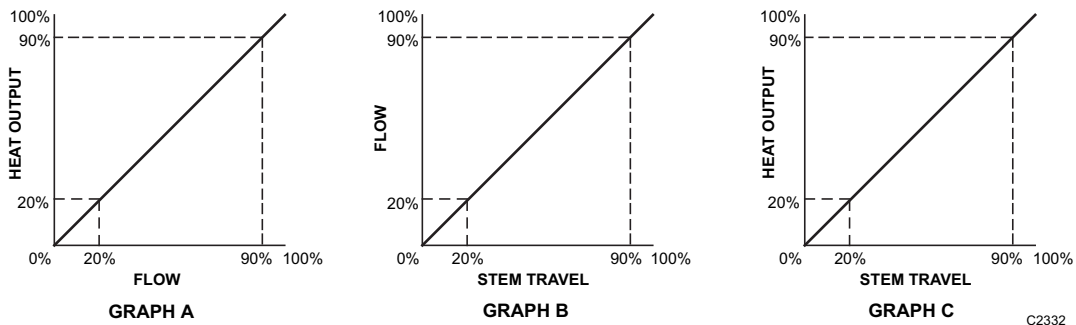


Fig. 10. Heat Output, Flow, and Stem Travel Characteristics of a Linear Valve.

EQUAL PERCENTAGE VALVE

An equal percentage valve includes a contoured plug or contoured V-port shaped so that similar movements in stem travel at any point in the flow range change the existing flow an

Linear Valve

A linear valve may include a V-port plug or a contoured plug. This type of valve is used for proportional control of steam or chilled water, or in applications that do not have wide load variations. Typically in steam or chilled water applications, changes in flow through the load (e.g., heat exchanger, coil) cause proportional changes in heat output. For example, Figure 10 shows the relationships between heat output, flow, and stem travel given a steam heat exchanger and a linear valve as follows:

- Graph A shows the linear relationship between heat output and flow for the steam heat exchanger. Changes in heat output vary directly with changes in the fluid flow.
- Graph B shows the linear relationship between flow and stem travel for the linear control valve. Changes in stem travel vary directly with changes in the fluid flow.

NOTE: As a linear valve just starts to open, a minimum flow occurs due to clearances required to prevent sticking of the valve. Some valves have a modified linear characteristic to reduce this minimum controllable flow. This modified characteristic is similar to an equal percentage valve characteristic for the first 5 to 10 percent of stem lift and then follows a linear valve characteristic for the remainder of the stem travel.

- Graph C shows the linear relationship between heat output and stem travel for the combined heat exchanger and linear valve. Changes in heat output are directly proportional to changes in the stem travel.

Thus a linear valve is used in linear applications to provide linear control.

Appendix A: Valve Selection and Sizing

EXAMPLE:

When a valve with the stem at 30 percent of its total lift and existing flow of 3.9 gpm (Table 2) opens an additional 10 percent of its full travel, the flow measures 6.2 gpm or increases 60 percent. If the valve opens an additional 10 percent so the stem is at 50 percent of its full travel, the flow increases another 60 percent and is 9.9 gpm.

Table 2. Stem Position vs. Flow for Equal Percentage Valve.

Stem		Flow	
Change	Position	Rate	Change
—	30% open	3.9 gpm	—
10% increase	40% open	6.2 gpm	60% increase
10% increase	50% open	9.9 gpm	60% increase

An equal percentage valve is used for proportional control in hot water applications and is useful in control applications where wide load variations can occur. Typically in hot water applications, large reductions in flow through the load (e.g., coil) cause small reductions in heat output. An equal percentage valve is used in these applications to achieve linear control. For example, Figure 11 shows the heat output, flow, and stem travel relationships for a hot water coil, with 200F, entering water and 50F entering air and an equal percentage valve, as follows:

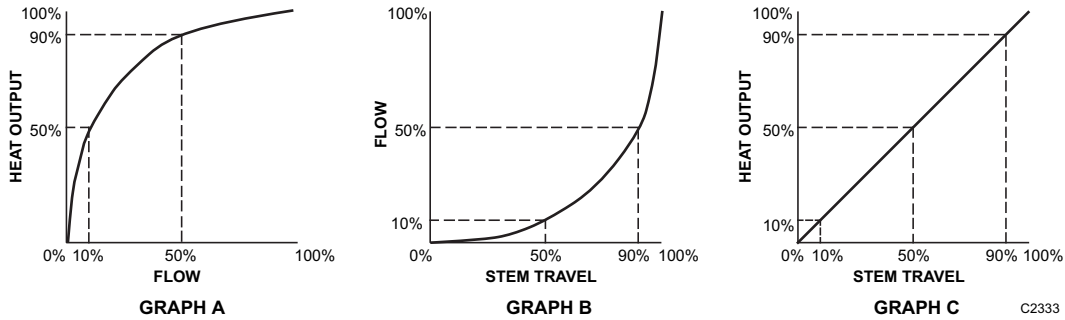


Fig. 11. Heat Output, Flow, and Stem Travel Characteristics of an Equal Percentage Valve.

Three-way Valves

Three-way valves (Fig. 12) control the flow of liquids in mixing or diverting valve applications (Fig. 13). The internal design of a three-way globe valve enables it to seat against the flow of liquid in the different applications. An arrow cast on the valve body indicates the proper direction of liquid flow. It is important to connect three-way valve piping correctly or oscillations, noise, and excessive valve wear can result. Three-way valves are typically have linear flow characteristics, although, some are equal percentage for flow through the coil with linear flow characteristics for flow through the coil bypass. Ball valves are also available in a three-way configuration, while two butterfly valves can be made to act as a three-way valve.

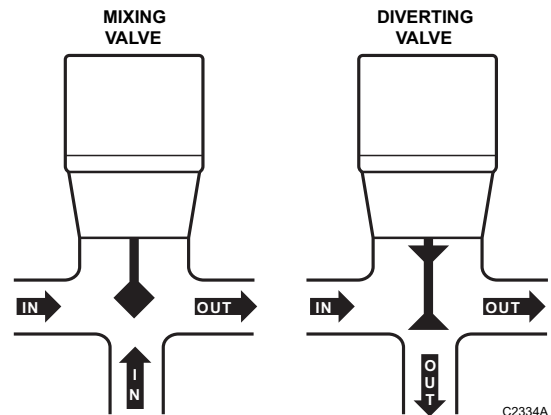
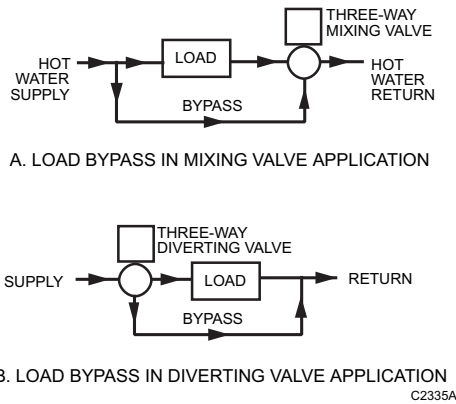


Fig. 12. Three-Way Valves.

- Graph A shows the nonlinear relationship between heat output and flow for the hot water coil. A 50 percent reduction in flow causes a 10 percent reduction in heat output. To reduce the heat output by 50 percent, the flow must decrease 90 percent.
- Graph B shows the nonlinear relationship between flow and stem travel for the equal percentage control valve. To reduce the flow 50 percent, the stem must close 10 percent. If the stem closes 50 percent, the flow reduces 90 percent.
- Graph C shows the relationship between heat output and stem travel for the combined coil and equal percentage valve. The combined relationship is close to linear. A 10 percent reduction in heat output requires the stem to close 10 percent, a 50 percent reduction in heat output requires the stem to close 50 percent, and a 90 percent reduction in heat output requires the stem to close 90 percent.

The equal percentage valve compensates for the characteristics of a hot water application to provide a control that is close to linear.



A. LOAD BYPASS IN MIXING VALVE APPLICATION

B. LOAD BYPASS IN DIVERTING VALVE APPLICATION
C2335A

Fig. 13. Three-Way Valve Applications.

MIXING VALVE

A mixing valve provides two inlet ports and one common outlet port. The valve receives liquids to be mixed from the inlet ports and discharges the liquid through the outlet port (Fig. 12). The position of the valve disc determines the mixing proportions of the liquids from the inlet ports.

The close-off pressure in a mixing valve equals the maximum value of the greater inlet pressure minus the minimum value of the downstream pressure.

EXAMPLE:

A mixing valve application has a maximum pressure of 25 psi on one inlet port, maximum pressure of 20 psi on the other inlet port, and minimum downstream pressure of 10 psi on the outlet port. The close-off pressure is $25 \text{ psi} - 10 \text{ psi} = 15 \text{ psi}$. The application requires a mixing valve with at least a 15 psi close-off rating. The actuator selected must have a high enough force to operate satisfactorily.

In globe mixing valve applications, the force exerted on the valve disc due to unbalanced pressure at the inlets usually remains in the same direction. In cases where there is a reversal of force, the force changes direction and holds the valve disc off the seat, cushioning it as it closes. If the pressure difference for the system is greater than the pressure ratings of available globe mixing valves, use a ball mixing valve or two butterfly valves in a tee configuration.

Globe mixing valves are not suitable for modulating diverting valve applications. If a mixing valve is piped for modulating diverting service, the inlet pressure slams the disc against the seat when it nears the closed position. This results in loss of control, oscillations, and excessive valve wear and noise. Mixing valves are acceptable using about 80 percent of the close-off rating, but not recommended, in two-position diverting valve applications.

DIVERTING VALVE

A globe diverting valve provides one common inlet port and two outlet ports. The diverting valve uses two V-port plugs which seat in opposite directions and against the common inlet flow. The valve receives a liquid from one inlet port and discharges the liquids through the outlet ports (Fig. 12) depending on the position of the valve disc. If the valve disc is against the bottom seat (stem up), all the liquid discharges through the side outlet port. If the valve disc is against the top seat (stem down), all the liquid discharges through the bottom outlet port.

The close-off pressure in a diverting valve equals the maximum value of the inlet pressure minus the minimum value of the downstream pressure.

Globe diverting valves must not be used for mixing service. As with mixing valves used for diverting service, media pressure drop across the valve can cause it to slam shut with resulting loss of control.

EXAMPLE:

A diverting valve application has 20 psi maximum on the inlet port, one outlet port discharging to the atmosphere, and the other outlet port connecting to a tank under 10 psi constant pressure. The pressure difference between the inlet and the first outlet port is 20 psi and between the inlet and second outlet port is 10 psi. The application requires a diverting valve with at least 20 psi close-off rating.

Valve Sizing

Every valve has a capacity index or flow coefficient (C_v). Typically determined for the globe and ball valves at full open and about 60 degrees open for butterfly valves. C_v is the quantity of water in gpm at 60F that flows through a valve with a pressure differential of 1 psi. Sizing a valve requires knowing the medium (liquid or gas) and the required pressure differential to calculate the required C_v . When the required C_v is not available in a standard valve, select the next closest and calculate the resulting valve pressure differential at the required flow to verify acceptable performance.

After determination of the valve C_v , calculation of the flow of any medium through that valve can be found if the characteristics of the medium and the pressure drop across the valve are known.

Appendix A: Valve Selection and Sizing

Water Valves

Determine the capacity index (C_v) for a valve used in a water application, using the formula:

$$C_v = \frac{Q\sqrt{G}}{\sqrt{h}}$$

Where:

- Q = Flow of fluid in gallons per minute required to pass through the valve.
- G = Specific gravity of the fluid (water = 1).
- h = Pressure drop in psi. See Figures 14 and 15 for glycol solution correction values.

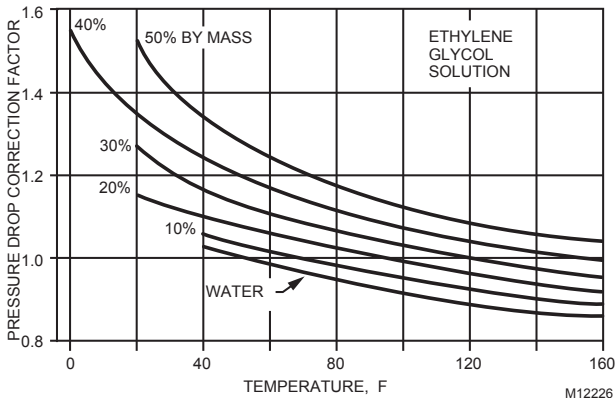
NOTE: The calculated C_v will rarely match the C_v of an available valve. For most accurate proportional control, select the valve with the next lower C_v value, and increase the pressure drop across the control valve to achieve the required flow through the coil by reducing the setting of the balancing valve. Otherwise, turn-down ratio will be reduced, proportionally.

For example, if the calculated C_v is 87, and the two closest C_v values are 63 and 100, the best choice for control precision would be the valve with a C_v of 63, and increase pressure drop across the valve by 90%.

If increased pressure drop is not possible, use the valve with C_v of 100, and accept a 13% reduction in valve rangeability.

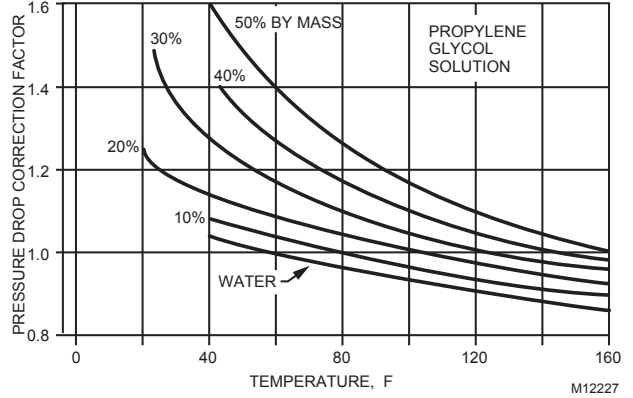
For two-position control, always choose the largest C_v greater than the coil with acceptable close-off pressure rating.

Determining the C_v of a water valve requires knowing the quantity of water (gpm) through the valve and the pressure drop (h) across the valve. If the fluid is a glycol solution, use the pressure drop multipliers from either Figure 14 or 15. See the sections on QUANTITY OF WATER and WATER VALVE PRESSURE DROP. Then select the appropriate valve based on C_v , temperature range, action, body ratings, etc., per VALVE SELECTION guidelines.



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Fig. 14. Pressure Drop Correction for Ethylene Glycol Solutions



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Fig. 15. Pressure Drop Correction for Propylene Glycol Solutions.

Quantity of Water

To find the quantity of water (Q) in gallons per minute use one of the following formulas:

1. When Btu/hr is known:

$$Q = \frac{Btu/hr}{K \times TD_w}$$

Where:

- Btu/hr = Heat output.
- K = Value from Table 3; based on temperature of water entering the coil. The value is in pounds per gallon x 60 minutes per hour.
- TD_w = Temperature difference of water entering and leaving the coil.

Table 3. Water Flow Formula Table

Water		Water	
Temp F	K	Temp F	K
40	502	200	484
60	500	225	483
80	498	250	479
100	496	275	478
120	495	300	473
150	490	350	470
180	487	400	465

2. For hot water coil valves:

$$Q = \frac{cfm \times 1.08 \times TD_a}{K \times TD_w}$$

Where:

- cfm = Airflow through the coil.
- 1.08 = A scaling constant. See Note.
- TD_a = Temperature difference of air entering and leaving the coil.
- K = Value from Table 3; based on temperature of water entering the coil (pounds per gallon x 60 minutes per hour).
- TD_w = Temperature difference of water entering and leaving the coil.

NOTE: The scaling constant 1.08 is derived as follows:

$$1.08 = \frac{0.24 BTU}{lbairF} \times \frac{60 min}{1 hr} \times \frac{1 lbair}{13.35 ft^3}$$

Where:

$$\frac{1 lbair}{13.35 ft^3} = \text{the specific volume of air at standard conditions of temperature and atmospheric pressure.}$$

Simplifying the equation:

$$1.08 = \frac{14.40 Btu min}{Fhr 13.35 ft^3}$$

To find the scaling constant for air conditions other than standard, divide 14.40 Btu by specific volume of air at those conditions.

3. For fan system chilled water coil valves:

$$Q = \frac{cfm \times Btu/lb}{113 \times TD_w}$$

Where:

- cfm = Airflow through the coil.
- Btu/lb = Heat per pound of dry air removed. Includes both sensible and latent heat.
- 113 = A scaling constant.
- TD_w = Temperature difference of water entering and leaving the coil.

WATER VALVE PRESSURE DROP

To determine valve pressure drop:

1. For two-way valves consider the following guidelines for valve pressure drop:
 - a. Include the pressure drop in the design of the water circulating system.
 - In systems with two-way valves only, it is often necessary to provide a pump relief bypass or some other means of differential pressure control to limit valve pressure drops to the valve capabilities. For control stability at light loads, pressure drop across the fully closed valve should not exceed triple the pressure drop used for sizing the valve.
 - To avoid high pressure drops near the pump, reverse returns are recommended in large systems.
 - b. The pressure drop across an open valve should be about half of the pressure difference between system supply and return, enough so that the valve, not the friction through the coil or radiator, controls the volume of water flow or the valve pressure drop should be equal to or greater than the pressure drop through the coil or radiator, plus the pipe and fittings connecting them to the supply and return mains.
 - c. Verify allowable full open and full closed pressure drops for all proportional and two-position water valves with appropriate manufacturer literature.
 - d. Make an analysis of the system at maximum and minimum rates of flow to determine whether or not the pressure difference between the supply and return mains stays within the limits that are acceptable from the stand point of control stability and close-off rating.
2. For two- and three-way valves consider the following guidelines for valve pressure drop:
 - a. In load bypass applications (Fig. 13) such as radiators, coils, and air conditioning units, the pressure drop should be 50 to 70 percent of the minimum difference between the supply and return main pressure at design operating conditions.
 - b. A manual balancing valve may be installed in the bypass to equalize the load drop and the bypass drop.
3. When selecting pressure drops for three-way mixing valves in boiler bypass applications (Fig. 13), consider the following:
 - a. Determine the design pressure drop through the boiler including all of the piping, valves, and fittings from the bypass connection through the boiler and up to the three-way valve input.
 - b. The valve pressure drop should be equal to or greater than the drop through the boiler and the fittings. If the valve drop is much smaller than the boiler pressure drop at design, effective control is obtained only when the disc is near one of the two seats. The mid-portion of the valve lift will be relatively ineffective.

Appendix A: Valve Selection and Sizing

- c. A manual balancing valve may be installed in the boiler bypass to equalize the boiler drop and the bypass drop.

WATER VALVE SIZING EXAMPLES

EXAMPLE 1:

A two-way linear valve is needed to control flow of 45F chilled water to a cooling coil. The coil manufacturer has specified an eight-row coil having a water flow pressure drop of 3.16 psi. Further, specifications say that the coil will produce 55F leaving air with a water flow of 14.6 gpm. Supply main is maintained at 40 psig, return is at 30 psig. Select required capacity index (C_V) of the valve.

Use the water valve C_V formula to determine capacity index for Valve V1 as follows:

$$C_V = \frac{Q\sqrt{G}}{\sqrt{h}}$$

Where:

- Q = Flow of fluid in gallons per minute required is 14.6 gpm.
- G = Specific gravity of water is 1.
- h = Pressure drop across the valve. The difference between the supply and return is 10 psi. 50% to 70% x 10 psi = 5 to 7 psi. Use 6 psi for the correct valve pressure drop. Note that 6 psi is also greater than the coil pressure drop of 3.16 psi.

Substituting:

$$C_V = \frac{14.6\sqrt{1}}{\sqrt{6}} = 6$$

Select a linear valve providing close control with a capacity index of 6 and meeting the required pressure and temperature ratings.

EXAMPLE 2:

A bypass valve is required to prevent flow through the chiller from dropping below 90 percent of design flow. When sizing valves for pump or chiller bypass applications (Fig. 16), system conditions that cause the valve to open or close completely must be considered before a pressure drop can be selected.

Assume the following:

- System flow at design, 1000 gpm
- Pump head at design, 48 ft
- Pump head at 90 percent flow, 50 ft
- Pressure across mains at AHU 1 at design flow, 28 ft
- Chiller pressure drop, 12 ft
- Chiller piping loop design pressure drop, 8 ft

With full system flow, Valve V5 is closed. Pressure drop across V5 equals the pump head minus the friction drops to V5. Pressure drop across Valve V5 is then 48 ft – 12 ft (chiller drop) – 4 ft (supply drop) – 4 ft (return drop) or 28 ft.

With system flow at 90 percent, the pump head rises to 50 ft, while the friction drops fall to the lower values shown in Figure 16. For additional information on chiller bypass operation see Chiller, Boiler, and Distribution System Applications section. Pressure drop across V5 equals the pump head minus the friction drops to V5. Pressure drop across Valve V5 is then 50 ft – 9.6 ft (chiller drop) – 3.2 ft (supply drop) – 3.2 ft (return drop) or 34 ft. Converting ft to psi, 34 ft x 0.4335 psi/ft = 14.7 psi.

Substituting the flow of water, specific gravity of water, and pressure drop in the C_V formula shows that the Valve V5 should have a C_V of 235.

$$C_V = \frac{900\sqrt{1}}{\sqrt{14.7}} = 235$$

Appendix A: Valve Selection and Sizing

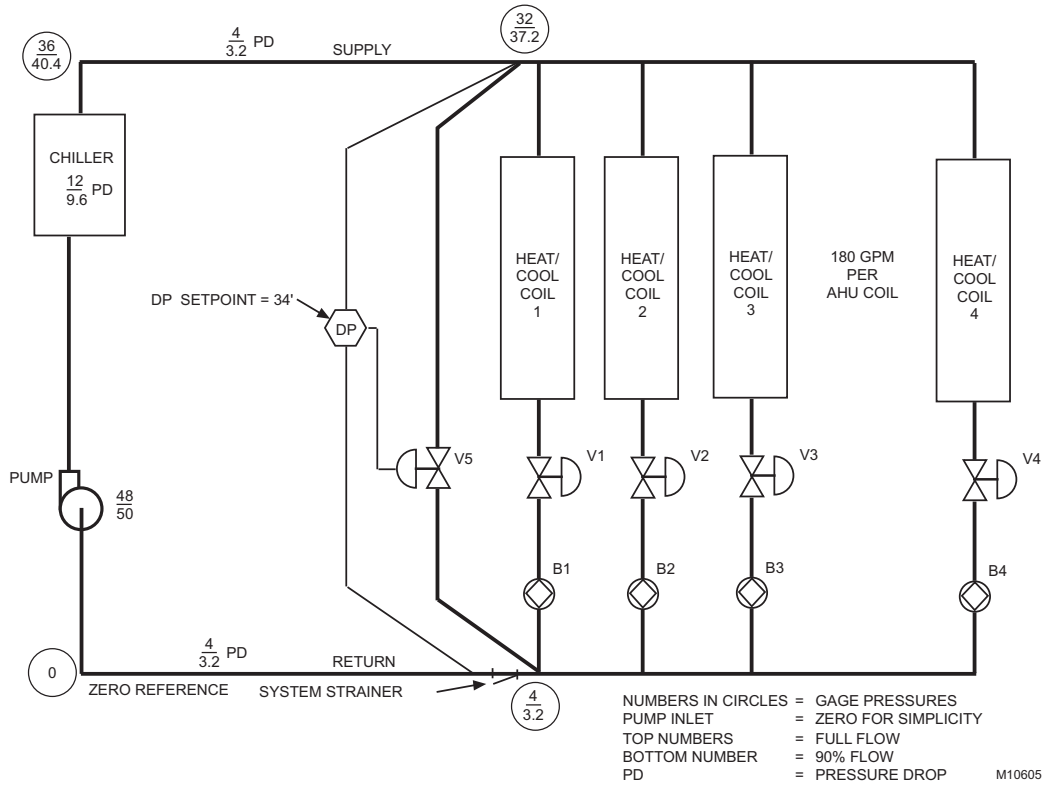


Fig. 16. Chiller Bypass Application.

EXAMPLE 3:

Sizing water valves for heating coils is especially critical. In Figure 17, a valve with a C_v of 12 will have 30 percent of the available pressure drop when full open, while a valve with a C_v of 5 will have 70 percent of the available pressure drop. As shown in Figure 18, the valve with 70 percent of the available pressure drop essentially provides the equal percentage water flow control, resulting in linear coil heat transfer and stable temperature control. The valve with only 30 percent of the available pressure drop has a more linear flow control which results in nonlinear coil heat transfer. See EQUAL PERCENTAGE VALVE section for further information.

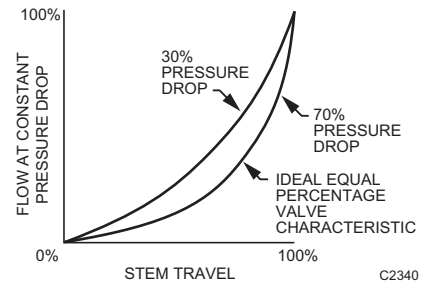


Fig 18. Effect of Pressure Drop in Hot Water Valve Sizing.

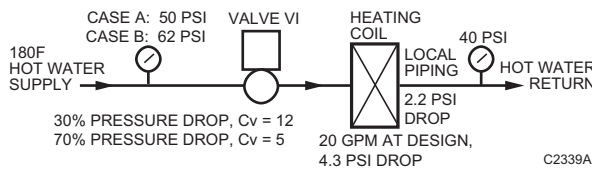


Fig. 17. Equal Percentage Valve Hot Water Application.

EXAMPLE 4:

A three-way mixing valve is needed for a heat exchanger application with a bypass line. Water flow is specified at the rate of 70 gpm. Manufacturer data for the exchanger indicates a pressure drop of 1.41 ft of water through the exchanger coils.

Appendix A: Valve Selection and Sizing

Use the water valve C_v formula to determine capacity index for Valve V1 as follows:

$$C_v = \frac{Q\sqrt{G}}{\sqrt{h}}$$

Where:

- Q = Flow of fluid in gallons per minute required to pass through the valve is 70 gpm.
- G = Specific gravity of water is 1.
- h = Pressure drop across the valve. Plans of the heating system indicate three-inch supply and return mains. From an elbow equivalent table and pipe friction chart found in the ASHRAE Handbook or other reference manuals, the calculated pressure drop through a three-inch tee and the piping from the valve and the tee to the exchanger is 0.09 psi. Heat exchanger pressure drop is 1.41 ft of water or 1.41 ft x 0.433 psi/ft = 0.61 psi. Total pressure drop from bypass connection through the heat exchanger and to the hot-water input of the three-way valve is 0.61 + 0.09 or 0.70 psi.

Since the valve pressure drop (h) should be equal to or greater than the drop through the heat exchanger and fittings, 0.70 psi is used as the valve pressure drop.

For optimum control, a manual balancing valve is installed in the bypass line to equalize the pressure drops in the exchanger and bypass circuits.

$$C_v = \frac{70\sqrt{1}}{\sqrt{0.70}} = 83.6 \text{ or } 84$$

Substituting the flow of water, specific gravity of water, and pressure drop in the C_v formula shows that the valve should have a C_v of 83.6 or 84.

Select a linear valve providing close control with a capacity index of 84 and meeting the required pressure and temperature ratings.

Steam Valves

Calculate the required capacity index (C_v) for a valve used in a steam application, using the formula:

$$C_v = \frac{(1 + 0.00075s)Q\sqrt{V}}{63.5\sqrt{h}}$$

Where:

- Q = Quantity of steam in pounds per hour required to pass through the valve.
- V = Specific volume of steam, in cubic feet per pound, at the average pressure in the valve. For convenience Table 5 at the end of the STEAM VALVES section lists the square root of the specific volume of steam for various steam pressures. Therefore, use the value in this column of the table as is; do not take its square root.
- 63.5 = A scaling constant.
- h = Pressure drop in psi.
- s = Superheat in degrees F.

Determining the C_v for a steam valve requires knowing, the quantity of steam (Q) through the valve, the pressure drop (h) across the valve, and the degrees of superheat. See QUANTITY OF STEAM and STEAM VALVE PRESSURE DROP. Then select the appropriate valve based on C_v , temperature range, action, body ratings, etc., per VALVE SELECTION guidelines.

NOTE: When the superheat is 0F, then (1 + 0.00075s) equals 1 and may be ignored.

QUANTITY OF STEAM

To find the quantity of steam (Q) in pounds per hour use one of the following formulas:

- When Btu/hr (heat output) is known:

$$Q = \frac{\text{Btu/hr}}{1000\text{Btu/lbsteam}}$$

Where:

- Btu/hr = Heat output.
- 1000 Btu/lb= A scaling constant representing the approximate heat of vaporization of steam.

- For sizing steam coil valves:

$$Q = \frac{\text{CFM} \times \text{TD}_a \times 1.08}{1000\text{Btu/lbsteam}}$$

Where:

- cfm = Cubic feet per minute (ft³/min) of air from the fan.
- TD_a = Temperature difference of air entering and leaving the coil.
- 1.08 = A scaling constant. See NOTE.
- 1000 Btu/lb= A scaling constant representing the approximate heat of vaporization of steam.

Appendix A: Valve Selection and Sizing

NOTE: The scaling constant 1.08 is derived as follows:

$$1.08 = \frac{0.24 BTU}{lbairF} \times \frac{60min}{1hr} \times \frac{1lbair}{13.35ft^3}$$

Where:

$$\frac{1lbair}{13.35ft^3} = \text{the specific volume of air at standard conditions of temperature and atmospheric pressure.}$$

Simplifying the equation:

$$1.08 = \frac{14.40 Btumin}{Fhr13.35ft^3}$$

To find the scaling constant for air conditions other than standard, divide 14.40 Btu by specific volume of air at those conditions.

3. For sizing steam to hot water converter valves:

$$Q = gpm \times TD_w \times 0.49$$

Where:

gpm = Gallons per minute of water flow through converter.

TD_w = Temperature difference of water entering and leaving the converter.

0.49 = A scaling constant. This value is derived as follows:

$$0.49 = \frac{8.33lbwater}{1gal} \times \frac{60min}{1hr} \times \frac{1lbsteam}{1000Btu} \times \frac{1Btu}{lbwaterF}$$

Simplifying the equation:

$$0.49 = \frac{0.49minlbsteam}{galhrF}$$

4. When sizing steam jet humidifier valves:

$$Q = \frac{(W_1 - W_2)lbmoisture}{lbair} \times \frac{1}{13.35ft^3} \times \frac{ft^3}{min} \times \frac{60min}{hr}$$

Where:

W₁ = Humidity ratio entering humidifier, pounds of moisture per pound of dry air.

W₂ = Humidity ratio leaving humidifier, pounds of moisture per pound of dry air.

$\frac{13.35ft^3}{lbair}$ = The specific volume of air at standard conditions of temperature and atmospheric pressure.

$\frac{ft^3}{min}$ = Cubic feet per minute (cfm) of air from the fan.

$\frac{60min}{hr}$ = A conversion factor.

Simplifying:

$$Q = 4.49 \frac{(W_1 - W_2)lbmoisture}{hr}$$

5. When Equivalent Direct Radiation (EDR) is known:

$$Q = EDR(Total) \times 0.24$$

Where:

EDR (Total)=Radiators are sized according to Equivalent Direct Radiation (EDR). If controlling several pieces of radiation equipment with one valve, add the EDR values for all pieces to obtain the total EDR for the formula.

0.24 = A scaling constant, lb steam/unit EDR. See Table 4.

Table 4. Output of Radiators and Convectors.

Average Radiator of Convector Temperature, Deg F	Cast Iron Radiator Btu/Hr/EDR ^a	Convector, Btu/Hr/EDR ^b
215	240	240
200	209	205
190	187	183
180	167	162
170	148	140
160	129	120
150	111	102
140	93	85
130	76	69
120	60	53
110	45	39
100	31	27
90	18	16

a At Room Temperature

b At 65 F Inlet Air Temperature

STEAM VALVE PRESSURE DROP

Proportional Applications

When specified, use that pressure drop (h) across the valve.

When not specified:

1. Calculate the pressure drop (h) across the valve for good modulating control:

$$h = 80\% \times (P_m - P_r)$$

NOTE: For a zone valve in a system using radiator orifices use:

$$h = (50 - 75)\% \times (P_m - P_r)$$

Where

P_m = Pressure in supply main in psig or psia (gage or absolute pressure).

P_r = Pressure in return in psig or psia. A negative value if a vacuum return.

Appendix A: Valve Selection and Sizing

2. Determine the critical pressure drop:

$$h_{\text{critical}} = 50\% \times P_{\text{ma}}$$

Where:

P_{ma} = Pressure in supply main in psia (absolute pressure)

psia = psig + 14.7

Use the smaller value h or h_{critical} when calculating C_v .

Two-Position Applications

Use line sized valves whenever possible. If the valve size must be reduced, use:

$$h = 20\% \times (P_{\text{m}} - P_{\text{r}})$$

Where

P_{m} = Pressure in supply main in psig or psia (gage or absolute pressure).

P_{r} = Pressure in return in psig or psia. A negative value if a vacuum return.

STEAM VALVE SIZING EXAMPLES

EXAMPLE 1:

A two-way linear valve (V1) is needed to control high-pressure steam flow to a steam-to-water heat exchanger. An industrial-type valve is specified. Steam pressure in the supply main is 80 psig with no superheat, pressure in return is equal to atmospheric pressure, water flow is 82.5 gpm, and the water temperature difference is 20F.

Use the steam valve C_v formula to determine capacity index for Valve V1 as follows:

$$C_v = \frac{(1 + 0.00075s)Q\sqrt{V}}{63.5\sqrt{h}}$$

Where:

Q = The quantity of steam required to pass through the valve is found using the converter valve formula:

$$Q = \text{gpm} \times TD_w \times 0.49$$

Where:

gpm = 82.5 gpm water flow through exchanger

TD_w = 20F temperature difference

0.49 = A scaling constant

Substituting this data in the formula:

Q = 808.5 pounds per hour

h = The pressure drop across a valve in a modulating application is:

$$h = 85\% \times (P_{\text{m}} - P_{\text{r}})$$

Where:

P_{m} = Upstream pressure in supply main is 80 psig.

P_{r} = Pressure in return is atmospheric pressure or 0 psig.

Substituting this data in the pressure drop formula:

$$h = 0.85 \times (80 - 0)$$

$$= 0.85 \times 80$$

$$= 68 \text{ psi}$$

The critical pressure drop is found using the following formula:

$$h_{\text{critical}} = 50\% \times (\text{psig} + 14.7 \text{ psi})$$

$$h_{\text{critical}} = 0.50 \times (80 \text{ psig upstream} + 14.7 \text{ psi})$$

$$= 0.50 \times 94.7 \text{ psi}$$

$$= 47.4 \text{ psi}$$

The critical pressure drop (h_{critical}) of 47.4 psi is used in calculating C_v , since it is less than the pressure drop (h) of 68 psi. Always, use the smaller of the two calculated values.

V = Specific volume (V) of steam, in cubic feet per pound at average pressure in valve (P_{avg}):

$$P_{\text{avg}} = P_{\text{m}} - \frac{h}{2}$$

$$= 80 - \frac{47.4}{2} = 80 - 23.6 = 56.4 \text{ psig}$$

The specific volume of steam at 56.4 psig is 6.14 and the square root is 2.48.

63.5 = A scaling constant.

Substituting the quantity of steam, specific volume of steam, and pressure drop in the C_v formula shows that the valve should have a C_v of 4.6.

$$C_v = \frac{(1 + 0.00075 \times 0) \times 808.5 \times 2.48}{63.5 \sqrt{47.4}}$$

$$= \frac{1745.6}{63.5 \times 6.88} = 4.6$$

NOTE: If P_{avg} is rounded off to the nearest value in Table 5 (60 psi), the calculated C_v is 4.5 a negligible difference.

Appendix A: Valve Selection and Sizing

Select a linear valve providing close control with a capacity index of 4 and meeting the required pressure and temperature ratings.

NOTE: For steam valves downstream from pressure reducing stations, the steam will be superheated in most cases and must be considered.

EXAMPLE 2:

In Figure 19, a linear valve (V1) is needed for accurate flow control of a steam coil that requires 750 pounds per hour of steam. Upstream pressure in the supply main is 5 psig and pressure in the return is 4 in. Hg vacuum minimum.

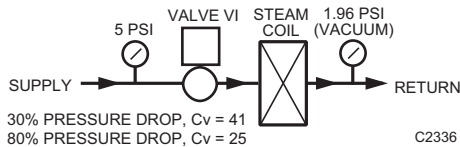


Fig. 19. Linear Valve Steam Application.

Use the steam valve C_V formula to determine capacity index for Valve V1 as follows:

$$C_V = \frac{(1 + 0.00075s)Q\sqrt{V}}{63.5\sqrt{h}}$$

Where:

- Q = Quantity of steam required to pass through the valve is 750 pounds per hour.
- h = The pressure drop across a valve in a modulating application is found using:
80% x (Pm – Pr)
- and:
- Pm = Upstream pressure in supply main is 5 psig.
- Pr = Pressure in return is 4 in. Hg vacuum.

NOTE: 1 in. Hg = 0.49 psi and 1 psi = 2.04 in. Hg.

Therefore,
4 in. Hg vacuum = -1.96 psig.

$$\begin{aligned} h &= 0.80 \times [5 - (-1.96)] \\ &= 0.80 \times 6.96 \\ &= 5.6 \text{ psi} \end{aligned}$$

The critical pressure drop is found using the following formula:

$$h_{\text{critical}} = 50\% \times (\text{psig} + 14.7 \text{ psi})$$

$$\begin{aligned} h_{\text{critical}} &= 0.50 \times (5 \text{ psig upstream} + 14.7 \text{ psi}) \\ &= 0.50 \times 19.7 \text{ psia} \\ &= 9.9 \text{ psi} \end{aligned}$$

The pressure drop (h) of 5.6 psi is used in calculating the C_V , since it is less than the critical pressure drop (h_{critical}) of 9.9 psi.

V = Specific volume (V) of steam, in cubic feet per pound at average pressure in valve (P_{avg}):

$$\begin{aligned} P_{\text{avg}} &= P_m - \frac{h}{2} \\ &= 5 - \frac{5.6}{2} = 5 - 2.8 = 2.2 \text{ psig} \end{aligned}$$

The specific volume of steam at 2.2 psig is 23.54 and the square root is 4.85.

63.5 = A scaling constant.
s = 0

Substituting the quantity of steam, specific volume of steam, and pressure drop in the C_V formula shows that Valve V1 should have a C_V of 24.17 or the next higher available value (e.g., 25).

$$\begin{aligned} C_V &= \frac{(1 + 0.00075 \times 0) \times 750 \times 4.85}{63.5\sqrt{5.6}} \\ &= \frac{3637.5}{63.5 \times 2.37} = 24.17 \end{aligned}$$

NOTE: If P_{avg} is rounded off to the nearest value in Table 5 (2 psi), the calculated C_V is 24.30.

Select a linear valve providing close control with a capacity index of 25 and meeting the required pressure and temperature ratings.

EXAMPLE 3:

Figure 20 shows the importance of selecting an 80 percent pressure drop for sizing the steam valve in Example 2. This pressure drop (5.6 psi) approximates the linear valve characteristic. If only 30 percent of the available pressure drop is used ($0.30 \times 6.96 \text{ psi} = 2.10 \text{ psi}$ or 2 psi), the valve C_V becomes:

$$\begin{aligned} C_V &= \frac{(1 + 0.00075s)Q\sqrt{V}}{63.5\sqrt{h}} \\ C_V &= \frac{750 \times 4.85}{63.5\sqrt{2}} = 40.5 \end{aligned}$$

Appendix A: Valve Selection and Sizing

This larger valve (2 psi drop) has a steeper curve that is further away from the desired linear valve characteristic. See LINEAR VALVE under VALVE SELECTION for more information.

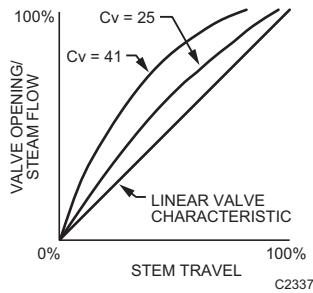


Fig. 20. Effect of Pressure Drop in Steam Valve Sizing.

Table 5. Properties of Saturated Steam.

Vacuum, Inches of Mercury	Boiling Point or Steam Temperature (Deg F)	Specific Volume (V), cu. ft/lb	\sqrt{V} (For valve sizing)	Maximum Allowable Pressure Drop, psi.
29	76.6	706.00	26.57	0.23
25	133.2	145.00	12.04	1.2
20	161.2	75.20	8.672	2.4
15	178.9	51.30	7.162	3.7
14	181.8	48.30	6.950	3.9
12	187.2	43.27	6.576	4.4
10	192.2	39.16	6.257	4.9
8	196.7	35.81	5.984	5.4
6	201.0	32.99	5.744	5.9
4	204.8	30.62	5.533	6.4
2	208.5	28.58	5.345	6.9

Gage Pressure, psig	Boiling Point or Steam Temperature (Deg F)	Specific Volume (V), cu. ft/lb	\sqrt{V} (For valve sizing)	Maximum Allowable Pressure Drop, psi.
0	212.0	26.79	5.175	7.4
1	215.3	25.20	5.020	7.8
2	218.5	23.78	4.876	8.4
3	221.5	22.57	4.751	8.8
4	224.4	21.40	4.626	9.4
5	227.1	20.41	4.518	9.8
6	229.8	19.45	4.410	10.4
7	232.3	18.64	4.317	10.8
8	234.8	17.85	4.225	11.4
9	237.1	17.16	4.142	11.8

Gage Pressure, psig	Boiling Point or Steam Temperature (Deg F)	Specific Volume (V), cu. ft/lb	\sqrt{V} (For valve sizing)	Maximum Allowable Pressure Drop, psi.
10	239.4	16.49	4.061	12.4
11	241.6	15.90	3.987	12.8
12	243.7	15.35	3.918	13.4
15	249.8	13.87	3.724	14.8
20	258.8	12.00	3.464	17.4
25	266.8	10.57	3.251	19.8
30	274.0	9.463	3.076	22.4
35	280.6	8.56	2.93	24.8
40	286.7	7.826	2.797	27.4
45	292.4	7.209	2.685	29.8
50	297.7	6.682	2.585	32.4
55	302.6	6.232	2.496	34.8
60	307.3	5.836	2.416	37.4
65	311.8	5.491	2.343	39.8
70	316.0	5.182	2.276	42.4
75	320.0	4.912	2.216	44.8
80	323.9	4.662	2.159	47.4
85	327.6	4.445	2.108	49.8
90	331.2	4.239	2.059	52.4
95	334.6	4.060	2.015	54.8
100	337.9	3.888	1.972	57.4
110	344.1	3.595	1.896	62.3
120	350.0	3.337	1.827	67.4
130	355.2	3.12	1.766	72.3
140	360.9	2.923	1.710	77.4
150	366.2	2.746	1.657	82.3
160	370.6	2.602	1.613	87.4
170	375.5	2.462	1.569	92.3
180	379.6	2.345	1.531	97.4
190	383.9	2.234	1.495	102.3
200	387.8	2.134	1.461	107.4
225	397.4	1.918	1.385	119.8
250	406.0	1.742	1.320	132.4
275	414.2	1.595	1.263	145.0
300	421.8	1.472	1.213	157.4
350	435.6	1.272	1.128	182.4
400	448.1	1.120	1.058	207.4
450	459.5	0.998	0.999	232.4
500	470.0	0.900	0.949	257.4
550	479.7	0.818	0.904	282.4
600	488.8	0.749	0.865	307.4
650	497.3	0.690	0.831	332.4
700	505.4	0.639	0.799	357.4
800	520.3	0.554	0.744	407.4
900	533.9	0.488	0.699	457.4
1000	546.3	0.435	0.659	507.4

Technology Comparison of Control Ball and Globe Valves

Attribute	Control Ball Valve	Globe Valve	Advantage	Reason
Flow Characteristics	Quadratic (with characterization)	Equal percent to design temp.	Globe	BAS controller expects flow from valve at low signal
	Linear (full port)	Linear		
	Delayed opening / early close-off	Continuous from start		
Rangeability (turn-down ratio)	Fixed minimum flow results in 1. Low TDR at low Cv 2. High TDR at high Cv	50:1 = 2% steps (HON)	Globe	Small sizes are the most common applications and need high TDR
		100:1 (Siemens claim)		
		Maximum 25:1 (JCI)		
Operating Differential Pressure	20 – 25 psid for characterized ports (plate distortion)	20 – 25 psid for quiet operation (cavitation at low flow)	— —	20+ psid is not typical of control valve applications
Close-Off Differential Pressure	High with low Torque actuators (water pressure aids sealing)	Inversely proportional to Cv, and proportional to actuator force	Control Ball	Globe is comparable in small sizes
	Capable of dead-heading pumps*	Pressure balanced is high		PB more expensive
Seat Leakage	ANSI Class IV (< 0.01% Cv) @ A port (Does not apply to B port without seals)	ANSI Class III w/ small metal seats ANSI Class IV with resilient seat and larger metal seated valves	Control Ball	Less leakage reduces energy use with chilled water
Trim (internal construction)	Plated brass ball and stem	Resilient material on metal seat	— —	Long term performance of ball valve in automatic control unknown
		Stainless steel ball and stem Brass plug on brass seat		
	Rubber and Teflon stem O-rings	Stainless steel plug on SS seat		
Steam Ratings	Low pressure (full port only)	Low pressure	Globe	Greater versatility. Equal % flow available with globe
	— —	High pressure		
Cv Ratings	Multiple Cv's per valve size	Multiple Cvs @ 1/2" size	Ball	Lower installed cost with no loss of control capability
Line Size Piping	Line size piping with lower Cv	Reducers often needed > 1/2"	Ball	Lower installed cost with no loss of control capability
Pipe Sizes	1/2" – 3" Threaded	1/2" – 3" Threaded ANSI 150	Globe	Wider applications
	4" – 6" ANSI 125 Flanged	2-1/2" – 6" ANSI 125 and 250 Flanged		
3-Way Body Styles	Combo mixing/diverting	Mixing models	Control Ball	Easier to select. Piping different mixing & diverting
	B port seal required for tight close-off	Diverting models		
Physical Size	Low profile at large sizes	Large profile at large sizes	Control Ball	Depends on application
	Relatively large in 1/2" pipe	Small size in 1/2" pipe	Globe	
Control Inputs	Floating/2-position, modulating	Floating/2-position, modulating	— —	Depends on application
	Some pneumatic actuators available	Large linear pneumatic installed base	Globe	
Fail Safe Operation	N/O or N/C by actuator position	N/O or N/C up to 3"	Control Ball	Globe needs higher power actuators
	Stay-in-place	Stay-in-place		
Valve Serviceability	Requires unions for valve access VBN stems replaceable	In-line serviceable	Globe	B.V. must be removed from piping
CE Preference	Growing with time	Well established	Globe	Familiar technology (habit)
Contractor Preference	Valve comes with actuator	Actuator selection separate	Control Ball	Easier to select
Actuator Selection	Match valve and damper DCAs	Requires linkage for DCAs	Control Ball	Added cost for globe valve

*Pumps require pressure cut-offs or supply-return differential pressure regulators to avoid pump seal damage and potential leakage that can result without flow-through. Unless used in end-of-line-service, control valves do not need to close off against full pump head.

Appendix B: NEMA Standard Classification Code for Enclosures

NEMA 1—General purpose. for indoor protection, where conditions are not unusually severe.

NEMA 2—Drip tight. Designed to exclude falling moisture or dirt. Particularly applicable to cooling rooms, laundries, etc., where condensation is prevalent. For indoor use.

NEMA 3—Weather Resistant (weatherproof). For outdoor use; designed to withstand all normal exposure to natural elements. Controls mounted on pullout racks for easy access. With rain hood and weather seals.

NEMA 4—Watertight. Withstands water pressure from 1 in. hose nozzle, 65 gallons per minute, from distance of not less than 10 ft for five minutes. Suitable for maritime applications, breweries, etc.

NEMA 5—Dust-tight. Equipped with dust-tight gaskets. Suitable for mills and other high-dust atmospheres.

NEMA 6—Submersible. For submerged operation under specified pressures and time.

NEMA 7—Hazardous Locations, National Electrical Code Class 1 (circuit breaks in air).

NEMA 8—Hazardous Locations, National Electrical Code Class 1 (circuit breaks immersed in oil).

NEMA 9—Hazardous Locations, National Electrical Code Class 2.

NEMA 10—Explosion-proof. Meets U.S. Bureau of Mines requirements for explosive atmospheres.

NEMA 11—Acid or Fume Resistant. Provides for immersion of enclosed equipment in oil.

NEMA 12—Industrial Use. Excludes oils, dust, moisture, to satisfy individual requirements.

Appendix C: Best Practices for Low Power Control Signal Wiring

Low power analog signals are commonly used for proportional control signal wiring in HVAC applications. Following are a series of best practices for the prevention of corruption of these signals due to electro-magnetic interference (“EMI”).

EMI is typically caused by coupling of the electro-magnetic field that surrounds all wires carrying current. It may also be caused by radio frequency sources such as “walkie talkies” using amplitude modulated signals. A strong EM field can induce electrical noise in wires up to 2 V in amplitude. The strongest coupling comes between closely spaced, parallel wires. Inductive and high power motor loads are some of the strongest sources of EMI, along with electronics lighting ballasts, dimmers, and variable frequency motor drives. More potential EMI sources in a building mean that greater attention needs to be paid to effective wiring practices.

All control wiring should consist of twisted pairs of wires, which resist interference better than straight, non-twisted conductors. Stranded conductors offer less resistance to current flow than solid wires, and are more flexible making them easier to install; however, care must be taken to ensure that all the conductors in the wire are properly installed and that “whiskers” do not short out any wiring connections.

Shielded Wiring

Control signals can be protected from EMI using shielded wire. The more continuous the shield, the more effective it is. Braided shield is commonly used for microphone cables because of its superior flexibility. HVAC wiring is fixed, does not require high flexibility during use, and is better served with lower cost cables using continuous foil shielding and a “drain wire”.

1. All signal wiring in hospitals should be shielded to prevent the potential for interference with medical equipment such as high power MRI and CT scanners.
2. All 0~10 Vdc control signals should be run in shielded cable. EMI noise can be interpreted as control signaling, depending on the noise suppression circuitry in the controlled equipment.
3. Long runs of wiring from 24 V power supply transformers should be shielded in heavy electrical noise environments to prevent EMI from coupling through the actuator’s power supply.
4. In typical commercial buildings, 2~10 Vdc signals do not require shielded wiring.
5. Current flow is much more difficult to induce in wiring than voltage, and current-based control signals usually do not require shielded cable except in heavy industrial applications.
 - a. If the terminal equipment only accepts voltage input, install a 500 ohm, ¼ Watt (or larger), 1% resistor across the control input terminals to convert a 4~20 mA(dc) signal to 2~10 Vdc.
 - b. If multiple actuators are connected in parallel, install this resistor at the first actuator in the group.

- c. Any standard resistor (“EIA”) value between 490 and 510 ohms is acceptable, and can be purchased at retail outlets that sell electronic components.
6. Floating, pulse-width modulated, and two-position actuators use switched 24 Vac control or power signals and so rarely require shielded wiring.

Wiring Techniques

1. No wiring should ever be assumed to be interference-proof. Never strap signal cables to other conductors or conduit, especially line voltage.
2. Never run signal wires in raceways or wiring troughs with other conductors. Keep signal wires at least a yard away from line voltage wiring. Higher voltage wiring requires greater separation.
3. When necessary, cross line voltage conductors with signal wiring at 90° (right angles), to minimize signal coupling.
4. Electromagnetic shielding is a static phenomenon; any current running through the shield will negate any protection the shield may have provided. Only ground (or “earth”) a shield drain wire at one point, preferably where the signal will be the weakest, for example: at the actuator.
 - a. Do not ground the secondary of the 24 V power supply in the control system. This will create a secondary current path and negate the protection of any shielding.
 - b. If there is a burner ignition system, power it with its own transformer and use an interface relay for isolation, if necessary.
 - c. Use relays with built-in coil arc suppression, such as a Honeywell R8229.
5. Insulate all exposed shielding and drain wire joins and splices so that they cannot contact electrical ground, especially junction boxes and conduit. Do not use the ground screw of a junction box as a tie point. Use a separate electrical ground wire if required for safety extra-low voltage wiring by local code.
6. Both rigid and flexible conduit are continuously grounded (“bonded”) for electrical safety, and cannot function as a signal shield. Where local codes require mechanical protection for all wiring, shielded signal cable may be run inside conduit, following the practices listed above.

Additional References

Most of these wiring techniques were developed to protect the very low-strength signals in audio recording. The 20 mA current loop signal was originally used with teletype (“TWX”) equipment communicating over telephone lines and adapted for proportional analog control signaling in industrial process control. Further information and background theory can be found in:

1. Audio Engineering Handbook, edited by Blair K. Benson, McGraw-Hill
2. Handbook for Sound Engineers, by Glen Ballou
3. Standard Handbook of Audio Engineering, by Jerry Whittaker and Blair K. Benson, McGraw-Hill.

Honeywell

BUILDING MANAGEMENT SYSTEMS WARRANTY POLICY

Honeywell warrants the products in this catalog (except those parts designated on Honeywell's price lists as not covered by this warranty) to be free from defects due to workmanship or materials, under normal use and service, for the following warranty periods.

Sixty (60) months from date of installation or purchase as noted

- MS, MN and fast acting 2-position Direct Coupled actuators; MVN rotary valve actuators, from date of installation
- Commercial Valves: VBN and VBF ball valves, and VRN pressure independent control valves, from date of installation
- JADE economizer when used with Honeywell sensors and actuators, from date of installation
- VR Series Butterfly Valves (up to 12 inch) from date of purchase
- VH Series Butterfly Valves (Up to 5 inch 2-way, up to 4 inch 3-way) from date of purchase
- MB Series Actuators (up to 1400 lb-in torque) from date of purchase

Thirty-six (36) months from date of shipment

- Variable frequency drive devices (VFD) and accessories

Thirty-six (36) months from date of installation

- LCBS Connect controllers, LCBS wall modules and gateways

Twenty-four (24) months from date of installation or purchase as noted

- TR4X Wall Modules from date of installation
- VR Series Butterfly Valves (14 inch and larger) from date of purchase
- VH Series Butterfly Valves (6 inch and larger 2-way, 5 inch and larger 3-way) from date of purchase
- MB Series Actuators (3540 lb-in torque and above) from date of purchase

Eighteen (18) months from date of shipment for non-licensed products and from date of license for licensed products

- All WEBs brand (including CIPer products) unless specified otherwise (warranty replacement parts will be warranted for 90 days or the balance of the original warranty period, whichever is longer)

Twelve (12) months from date of shipment or installation as noted

- Unitary controllers including Spyder, Stryker, and Sylk I/O modules from date of installation
- Building automation security accessories from date of shipment

The warranty period for all other products is twelve (12) months from date of installation.

If a product is defective due to workmanship or materials, is removed within the applicable warranty period, and is returned to Honeywell in accordance with the procedure described below, Honeywell will, at its option, either repair, replace or credit the customer for the purchase price of the product in accordance with the procedure described below. This warranty extends only to persons or organizations who purchase products in this catalog for resale.

The expressed warranty above constitutes the entire warranty of Honeywell with respect to the products in this catalog and IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT SHALL HONEYWELL BE RESPONSIBLE FOR ANY CONSEQUENTIAL DAMAGES OF ANY NATURE WHATSOEVER.

INSTRUCTIONS—INSTALLING OR SERVICING CONTRACTOR OR DEALER

When replacing a Honeywell product under warranty, including those products furnished on original heating and/or cooling equipment, you should rely on your local Honeywell Wholesaler or Distributor for prompt and efficient product replacement service.

No warranty claim for product replacement or credit will be honored by Honeywell without a completed Return Merchandise Authorization (RMA) form or a manual return authorization form issued by Honeywell Customer Care. (Reference Form # 31-00196)

INSTRUCTIONS—WHOLESALE OR DISTRIBUTOR

The following will apply to the return of any product to Honeywell under this warranty (Except Variable Frequency Drives (VFD) and WEBs products which are covered under separate policies as noted below:

- (i) the products are identified with a Honeywell Return Merchandise Authorization Form (obtained from the website at Customer.Honeywell.com).
- (ii) the Return Merchandise Authorization Form number and return address label is displayed on the outside of the return carton. Make sure a copy of the RMA form is enclosed in the return carton.
- (iii) the products are packed separately from other returns and protected from shipping damage.

(iv) A certification by the installer or servicing dealer that the product was removed, due to failure, within the applicable warranty period is included.

(v) the products are received transportation prepaid at the facility listed on the shipping and/or packing slip.

(vi) and the products are found by Honeywell's inspection to be defective in workmanship or materials under normal use and service.

Returns will be handled in accordance with one of the two following procedures, as specified by the customer making the return.

1. **CREDIT PROCEDURE.** Honeywell will issue credit, at Honeywell's lowest wholesaler net price in effect at the time of the return (as set forth on Honeywell's then current price sheet) or at the actual invoice amount if a copy of that invoice is attached to the packing list. Honeywell reserves the right to disallow this credit option in cases of warranty abuse.
2. **REPLACEMENT PROCEDURE.** Honeywell's Warranty replacement procedure must be used for in-warranty emergency replacement orders. Customer will not be credited for items not meeting warranty criteria as outlined in this policy. Please return the defective item to the address listed on the return authorization form. All new and unused VBN control ball valves MUST be approved by your Honeywell sales representative before they may be returned.

WEBs return products must be processed through WEBs Customer Care. Defective hardware products under warranty have to be returned to Tridium Production & Distribution Center, 9898 Mayland Drive, Henrico, VA 23233. Security Access products must have prior authorization from Honeywell Customer Care.

All VFD warranty return products must be coordinated through the Commercial Components Hotline (1-888-516-9347 option 4) staff and VFD Warranty and Repair Program Coordinator (VFD Coordinator). All VFD warranty returns must have prior authorization from Honeywell Customer Care and must be returned to the specified Honeywell VFD Service Center.

The warranty will not be honored if:

- (i) product is damaged or missing parts or accessory items including batteries.
- (ii) product exhibits evidence of field misapplications.

Final disposition of any warranty claim will be determined solely by Honeywell. If inspection by Honeywell does not disclose any defect covered by the warranty, the product will be returned or scrapped as instructed by the customer and Honeywell's regular service charges will apply. Products returned to the customer may be sent shipping charges collect.

If you have any questions relative to product returns to Honeywell, contact your Customer Care Representative:

Honeywell International Inc.
Customer Care Suite HBT
1985 Douglas Drive
Golden Valley, MN 55422
1-800-475-7515

SPECIAL MESSAGE TO INDUSTRIAL USERS AND BUILDING OWNERS

Thank you for using Honeywell products.

As a user, when you purchase a Honeywell product from this catalog you should expect performance from the product and, if it fails, replacement of the product by the installer.

Typically, you will have purchased a Honeywell product under the following circumstances:

1. To modernize or refurbish your existing commercial and/or process control system.
2. You have purchased new commercial and/or process heating, cooling, air cleaning or

humidification equipment that is furnished with Honeywell controls or components (refer to your owner's manual furnished with the equipment).

3. A control has failed on your existing commercial and/or process heating and/or cooling equipment and is replaced by a Honeywell TRADELINE product.

With few exceptions, you utilize the services of a competent plumbing, heating and/or cooling dealer/contractor for new or replacement work performed.

Although our warranty does not extend to you, Honeywell does extend a warranty to your supplier.

Your supplier can rely on its local Honeywell Wholesaler/Distributor or Honeywell for prompt replacement.

If you have any questions, need additional information or would like to comment on Honeywell's products or services, please write or phone:

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1-800-475-7515

or check online at www.customer.honeywell.com for a list of local Honeywell Distributors.

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