Valves
Products Catalog

Make the most of your energy

Schneider Electric

General Information

TAC

TAC is a Schneider Electric Company with a long tradition of global leadership in building controls technology. We offer the most extensive line of controls and components available to today's market, including: valve bodies, valve assemblies, actuation devices and sensors, as well as interfaces, and automated systems that link these products and other building systems together.

With many patents awarded for our product designs, TAC offers the most innovative line of state-of-the-art HVAC control systems and devices in the industry. Superior engineering, combined with ISO 9001 certification and six-sigma lean manufacturing, ensures that our products conform to the highest standards of internationally recognized quality, providing solid performance, unsurpassed value, and exceptional reliability for our customers.

Through OEM's, Distributors, and a world-wide network of Field Offices, TAC is a single source for all building control needs.

TAC Valve Products

The TAC valve product offerings include two-way and three-way valves. The product line includes globe and ball valves from 1/2-inch to 6-inch; and butterfly valves up to 24 inches. A variety of connection types and the TAC actuators makes this a complete line for your building systems.

Organization and Index Systems

The TAC Valve Products Catalog is organized alphanumerically by product number. For a brief description of the model numbering system, consult the **Part Numbering System** chart on the following page. A **Model Number Index** follows**.** The **Model Number Index** mirrors the organization of the catalog and is used when you know the specific model number.

Other TAC Product Catalogs and Selection Guides

TAC also offers a complete range of pneumatic products and electric/electronic products in addition to its valve products. These are covered in separate catalogs:

F-27382	TAC Electric/Electronic Products Catalog
F-27383	TAC Pnematic Products Catalog

For complete specification and selection information on other TAC valve families not covered in this catalog, consult these Selection Guides:

F-27199	VB-8000 Series Balanced Plug Valves
F-27086	VB-2000 Series Ball Valves
F-27252	VB-7000 and VB-9000 Series Linked Globe Valve Assemblies with TAC DuraDrive™ Linear Series Actuators
F-26752	VB-7000 and VB-9000 Series Valve Assemblies with TAC DuraDrive Linear Series Actuators

All of the above catalogs and Selection Guides are included in the F-25684 CD.

Visit Us on the Web

Be sure and visit us at **www.tac.com**. You'll find electronic versions of all our catalogs, a complete list of field offices, training information, and links to more information about TAC and Schneider Electric.

All specifications are nominal and may change as design improvements are introduced. TAC shall not be liable for damages resulting from misapplication or misuse of its products.

Manufactured Parts Numbering System

Primary Designation (First Letter)

A	Accessories
H	Humidity
P	Pressure
S	Switch or Step Controller
V	Valve
C	Controller or Controlled Device
M	Motor (Actuator)
R	Receiver-Controller or P.E. Switch

Alpha Prefix Combinations

AD	accessory, electronic or electronic control package
AE	accessory, electric
AH	accessory, humidity
AK	pneumatic relay or positioner
AKR	accessory, pneumatic replacement
AKS	accessory, pneumatic
AL	accessory, pneumatic or E.P. relays
AM	accessory, motor
AP	accessory, pressure
ASP	accessory, electronic
AT	accessory, thermostat
AV	accessory, valve
C	cover, 2" x 2" pneumatic thermostats
CC	controller/controlled device, electronic
CN	multi-purpose bridge, electronic
CP	controller/controlled device, electronic
CT	cover, 2" x 2" pneumatic thermostats
H	humidistat or humidity transmitter, pneumatic
HC	humidity, two-position (three-wire), electric
HKS	humidity or enthalpy transmitter, pneumatic
HS	humidity sensor, electronic
HSP	humidity transmitter, electronic
HTSP	humidity/temperature transmitter, electronic
M	motor, pneumatic, with or without positioner
MA	motor, two-position, spring return, electric
MC	motor, two-position (three-wire), electric
MCS	accessories, modular control systems (TAC PNEUMODULAR®)
ME	motor
MF	motor, floating, proportional
MK	motor, pneumatic
MK4	motor, pneumatic with positive positioner
MM	motor, modular
MMC	control card, modular motor
MMR	replacement motor, modular
MP	motor, proportional, electric or electronic
MS	motor, proportional, electronic
MU	motor, proportional, temp., electric or electronic
N	thermostat, accessories
P	pressure or differential pressure transmitter, or receiver-controller, pneumatic
PC	pressure, two-position (three-wire), electric
PCP	TAC PNEUMODULAR control panels
PF	pressure, floating, electric
PKSR	differential water pressure or air velocity transmitters, pneumatic
PP	pressure, proportional, electric or pneumatic
R	electric power relays, pneumatic relays, P.E. switches, and VAV controllers
RKS	receiver-controller, pneumatic
RKSR	receiver-controller, pneumatic replacement
S	switch, pneumatic
SLC	controller, solid-state
SP	step controller, proportional, electric, pneumatic, or electronic
T	thermostat or transmitter, pneumatic
TA	thermostat, two-position, electric
TC	thermostat, two-position, electric
TF	thermostat, floating
THC	enthalpy controller, electric
THCR	enthalpy controller, electric replacement
TK	thermostat, pneumatic
TKR	thermostat, pneumatic replacement
TKS	temperature transmitters, pneumatic
TOOL	calibration fixtures, kits, and tools
TP	thermostat, proportional, electric or electronic
TR	thermostat, pneumatic replacement
TS	temperature sensor, electronic
TSP	temperature transmitter, electronic
VA	valve, two-position, spring return, electric
VB	valve body
VC	valve, two-position (three-wire), electric
VK	valve, pneumatic
VK4	valve, pneumatic with positive positioner
VM	valve, modular motor
VP	valve, proportional, electric or electronic
VS	valve, electronic

Model Number Index

Model Number Index

Model Number Index

Model Number Index

Model Number Index

Model Number Index

VALVE SELECTION GUIDE

KEY

1. This section allows selection of a **Valve Assembly** (consisting of factory assembled valve body, linkage, and actuator) or **Component Parts** (valve body, linkage, and actuator unassembled). Refer to page 3 for an explanation of the part numbering system for valves. For details on the general information required for valve sizing and selection, refer to pages 172 through 179.
2. Begin the selection process by referring to the Valve Selection Guide on pages 7 through 11 or page 12 for metric valves. The Valve Selection Guide will refer you to the appropriate pages for complete selection and ordering information based on the valve body, type of actuator, and type of input signal required. Instructions on these pages will assist in completing the selection process. Note that for some input signals, adapters are required and are shown in these pages.
3. The specific valve selection pages are color coded as shown below to assist valve selection:

   Valve Body data less P code (size, Cv rating, port code) or **Valve Assembly** less actuator code (XXX) and P code (size, Cv rating, port code).

   P Code (size, Cv rating, port code).

   Actuator or **Actuator Code (XXX)** for factory available valve assemblies.

   (NOTE: Selected combinations of actuators and valves are available.)

   Valve Linkage

   Typical example of the color coding used for Valve Assembly and Component Parts:

   Valve Assembly . . **VS-7223-211-4-8**

   Component Parts:

   Valve Body **VB-7223-0-4-8**

   Actuator **MP-5210**

   Valve Linkage . . . **AV-7600-1**

4. Term abbreviations used in the valve selection tables:

   N.P. — Normal Position

   N.O. — Normally Opened

   N.C. — Normally Closed

Before starting the selection of a valve/valve actuator assembly, the following application information should be available:

- Is the installation indoor or outdoor.
- What is the size of the pipe.
- What fittings will be used: flange, sweat, screwed, etc.
- What type of valve body: globe, ball, butterfly, or zone.
- What is being controlled: fluid-hot or cold; steam, etc.
- Is the fluid control: on/off, proportional, floating, two-way, three-way.

PART NUMBERING SYSTEM
GLOBE AND BUTTERFLY VALVE

Refer to the product listing for part numbering.

Always a Letter Always a Number(Digit)

VXX-XXXX-XXX-X-XX

VALVE

B — VALVE BODY

VALVE ASSEMBLIES*

A — 2-Position (SPST)
C — 2-Position (SPDT)
F — Floating SPDT
K — Pneumatic
M — Modular Actuator (order MMC control module separately)
P — Multiple Electric/Electronic Input:
1. 2-Position SPST
2. 2-Position SPDT
3. Slidewire (Series 90)
4. Current Input
5. Floating Control (Direct Digital)
6. Pneumatic to Electric

S — TAC System 8000, 2-15 Vdc, Proportional

* These items require that an actuator be specified.

S — Stainless Steel
4 — Positive Positioner on Pneumatic only
5 — 50 Hz
6 — Hazardous Location Housing 60 Hz
7 — Hazardous Location Housing 50 Hz

VALVE BODY DATA

121 — 2-Way, 1/2" O.D. Tubing (Flared)
324 — 3-Way, 1/2" O.D. Tubing (Flared)
606 — 2-Way Butterfly Valve, Metal-to-Metal Trim
616 — 2-Way Butterfly Valve, Rubber Lined
666 — 3-Way Butterfly Valve, Metal-to-Metal Trim
676 — 3-Way Butterfly Valve, Rubber Lined
721, 921 — 2-Way, N.O. (Stem Up Open), Brass Trim with Disc
722, 922 — 2-Way, N.C. (Stem Up Closed), Brass Trim with Disc
725 — 2-Way, N.O. (Stem Up Open), Stainless Steel Trim with Disc
726 — 2-Way, N.C. (Stem Up Closed), Stainless Steel Trim with Disc
727 — 2-Way, N.O. (Stem Up Open), Stainless Steel Trim
728 — 2-Way, N.C. (Stem Up Closed), Stainless Steel Trim
731, 931 — 3-Way Mixing
732, 932 — 3-Way Diverting
733, 933 — 3-Way Sequencing
821 — 2-Way (Stem Up Open), Brass Trim
822 — 2-Way (Stem Up Closed), Brass Trim
831 — 3-Way Mixing/Diverting, Brass Trim

TYPE OF END FITTING FOR VX-7XXX, 9XXX*

1 — Union End
2 — Flared End
3 — Screwed or Flanged
4 — Union Sweat End
5 — Metric (SI) Screwed, Rp or G

*For VX-6XX this digit is Actuator Series Type.

1, 2, 3, 4 — **1/2" (15 mm)**
5, 6 — **3/4" (20 mm)**
7, 8 — **1" (25 mm)**
9 — **1-1/4" (32 mm)**
10 — **1-1/2" (40 mm)**
11 — **2" (50 mm)**
12 — **2-1/2"**
13 — **3"**
14 — **4"**
15 — **5"**
16 — **6"**
17 — **8"**
18 — **10"**
19 — **12"**
20 — **14"**
21 — **16"**
22 — **18"**
23 — **20"**
24 — **24"**

PATTERN CODE OF VALVE BODY

2 — Globe Flanged
3 — Angle
4 — Straightway
5 — Globe Flanged

0 — Valve Body (Only)
XXX — Actuator Code (XXX) for Valve Assemblies

PART NUMBERING SYSTEM
BALL VALVES

V (Control Type) - 2 (Configuration) 53- (Actuator) - 8 - (Port Code)

V X - 2 X 5 3 - X X X - 8 - X X

Control Signal Type
A = Two Position
F = Floating
S = Proportional
B = Valve Body & Linkage (less actuator)

Configuration
2 = 2-Way 1
3 = 3-Way 2

Plug Type and Temp Ratings
5 = Stainless Steel Ball

Connection
3 = Threaded NPT

P Code

Size	2-Way Cv	2-Way P Code	3-Way Cv	3-Way P Code
1/2"	1.0	20	—	
	—		5.4	21
	2.0	22	—	
	4.0	24	—	
	15.0	26	—	
3/4"	—		12.0	41
	30.0	44	—	
	51.0	46	—	
1"	—	—	14.0	51
	43.0	54	—	
	68.0	56	—	
1-1/4"	—	—	21.0	61
	48.0	64	—	
1-1/2"	—		34.0	71
	84.0	74	—	
	177.0	76	—	
2"	—		47.0	81
	108.0	86	—	

Actuator

3 3 3

Two Position
MA40-7043=536
MA40-7043-501=537
MA40-7040=532
MA40-7040-501=533
MA40-7041=534
MA40-7041-501=535
MA40-7173=576
MA40-7170=572
MA40-7171=574
MA40-7153=556
MA40-7153-502=557
MA40-7150=552
MA40-7150-502=553
MA40-7151=554
MA40-7151-502=555
MA40-7073=546
MA40-7073-502=547
MA40-7070=542
MA40-7070-502=543
MA40-7071=544
MA40-7071-502=545

Dual Mount
MA40-7173=586
MA40-7170=582
MA40-7171=584
MA40-7153=566
MA40-7153-502=567
MA40-7150=562
MA40-7150-502=563
MA40-7151=564
MA40-7151-502=565

Proportional
MS40-6043=505
MS40-6083=506
MS40-6153=508
MS40-6343=516
MS40-6340=512
MS40-6341=514
MS40-7043=536
MS40-7043-501=537
MS40-7073=546
MS40-7073-502=547
MS40-7153=556
MS40-7153-502=557
MS40-7173=576
MS40-7170=572
MS40-7171=574

Dual Mount
MS40-7153=566
MS40-7153-502=567

Floating
MF40-6043=505
MF40-6083=506
MF40-6153=508
MF40-6343=516
MF40-7043=536
MF40-7043-501=537
MF40-7073=546
MF40-7073-502=547
MF40-7153=556
MF40-7153-502=557
MF40-7173=576

Dual Mount
MF40-7153=566
MF40-7153-502=567

Valve Body & Linkage (less actuator)
505=MX40-6043
506=MX40-6083, 6153, 704X
510=MX40-634X, 717X
530=MX40-704X
550=MX40-707X, 715X
single mount only

1 Two-way ball valve assemblies are shipped with spring-return models normally open, as standard. Normally closed operation available on special order.

2 Three-way ball valve assemblies are recommended for diverting applications, and are shipped with ports configured as shown in Sizing and Selection.

3 Dual-mount models are two actuators mounted in tandem to generate the necessary torque.

PART NUMBERING SYSTEM
ZONE VALVES WITH FLOATING AND PROPORTIONAL ACTUATORS

Zone Valves With Floating And Proportional Actuators

V M 2 X X X A X X X X XX X

Body Type
M = Modulating

Configuration
2 = 2-Way
3 = 3-Way

Valve Size
2 = 1/2"
3 = 3/4"
4 = 1"
5 = 1-1/4"

When ordering body and actuator together drop "A" (1)

Options
Non-Spring Return Actuators
0 = No Options
T = Three-Wire Signal Time-Out

Spring Return Actuators
T = Time-Out (2)

Electrical Leads
00 = No leads

Voltage
A = 24 Vac Only

Temperature Ratings
3 = General Temperature

Connection	Availability
1 = Sweat	1/2", 3/4", 1", 1-1/4"
2 = Threaded NPT	1/2", 3/4", 1"
3 = Threaded Rp	1/2", 3/4", 1"
4 = Inverted Flare (Retrofit) (1)	3/4"
5 = SAE Flare	1/2"

(1) TAC inverted flare fittings must be ordered separately. See actuator accessories for fitting part numbers.

Action	Cv Availability
1 = Spring Return Normally closed	1, 2, 3
2 = Spring Return Normally opened	1, 2, 3
3 = Non-Spring Return	1, 2, 3, 4

CV Size

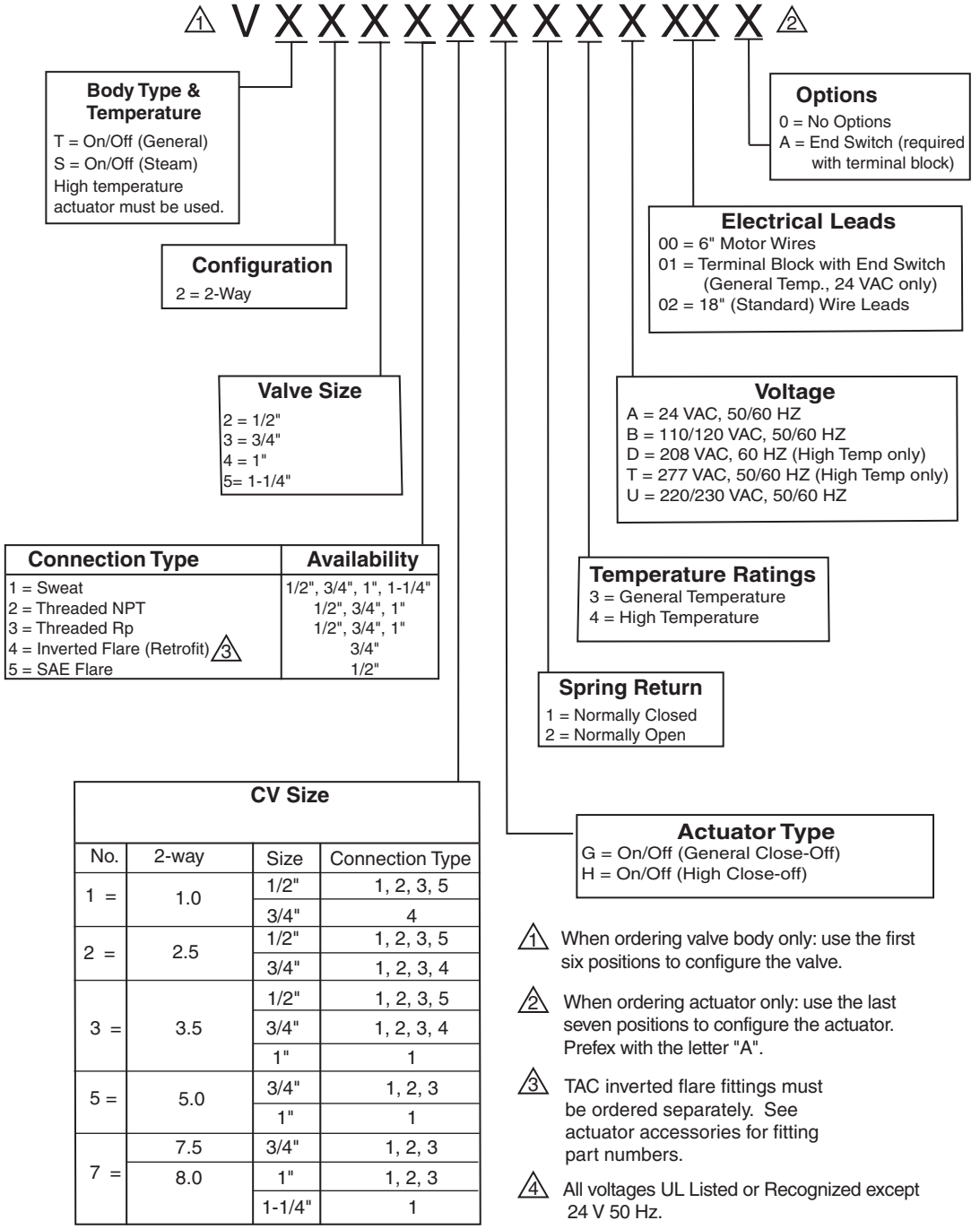
	2-way	3-way	Size	Connection Type
1 =	1.0	1.0	1/2"	1, 2, 3, 5
2 =	2.0	2.0	1/2"	1, 2, 3, 5
			3/4"	1, 2, 3
			1/2"	1, 2, 3, 5
3 =	4.0	4.0	3/4"	1, 2, 3
			1"	1
7 =	7.5	7.5	3/4"	1, 2, 3
	8.0	8.0	1	1, 2, 3
			1-1/4"	1

Actuator Type
T = Three-wire Floating
P = Proportional, 0-10 Vdc, 0-5 Vdc, 5-10 Vdc or 4-20 mA, Jumper Selectable

(1) When ordering valve body only: Drop "A" and all characters that follow.
When ordering actuator only: Begin with "A" and drop all previous characters.

(2) This feature is standard for spring return actuators. It must be included in the part number.

PART NUMBERING SYSTEM
ZONE VALVES WITH TWO POSITION, SPRING RETURN ACTUATORS



CV Size

No.	2-way	Size	Connection Type
1 =	1.0	1/2"	1, 2, 3, 5
		3/4"	4
2 =	2.5	1/2"	1, 2, 3, 5
		3/4"	1, 2, 3, 4
3 =	3.5	1/2"	1, 2, 3, 5
		3/4"	1, 2, 3, 4
		1"	1
5 =	5.0	3/4"	1, 2, 3
		1"	1
7 =	7.5	3/4"	1, 2, 3
	8.0	1"	1, 2, 3
		1-1/4"	1

① When ordering valve body only: use the first six positions to configure the valve.

② When ordering actuator only: use the last seven positions to configure the actuator. Prefex with the letter "A".

③ TAC inverted flare fittings must be ordered separately. See actuator accessories for fitting part numbers.

④ All voltages UL Listed or Recognized except 24 V 50 Hz.

Body & Actuator Combination Requirements

Temperature Configurations

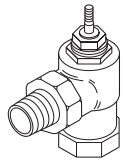
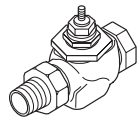
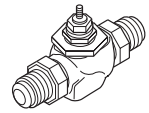
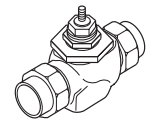
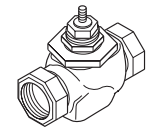
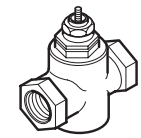
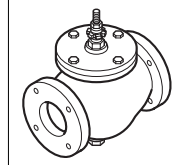
Body Configuration
V T X X X X

T = General
S = Steam
If body configuration is T, actuator temp rating can be 3 or 4.
If body configuration is S, actuator temp rating must be 4.

Actuator Spring Return Mode
A X X 3 A X X X

3 = General Temperature
4 = High Temperature
If actuator temp rating is 3, body style must be T.
If actuator temp rating is 4, body style can be S or T.

Valve Selection Guide for Two-Way Valves

Valve Application	Chilled or Hot Water 281°F Maximum; 35 psig Maximum Steam						
	Globe Valves						
Valve Body Type	**Union, Angle**	**Union, Straightway**	**Flared**	**Union, Sweat**	**Screwed**	**Screwed**	**Flanged**
							
Stem Up Open	**VB-7211-0-3-P**	**VB-7211-0-4-P**	**VB-7212-0-4-P**	**VB-7214-0-4-P**	**VB-7213-0-4-P**	**VB-9213-0-4-P**	**VB-9213-0-5-P**
Stem Up Closed	**Not Available**	**VB-7221-0-4-P**[a]	**VB-7222-0-4-P** [a]	**VB-7224-0-4-P** [a]	**VB-7223-0-4-P** [a]	**VB-9223-0-4-P**[a]	**VB-9223-0-5-P** [a]
Static Pressure Rating	250 psig	250 psig	250 psig	250 psig	250 psig	250 psig	125 psig
Sizes Available	1/2 to 1-1/4 in.	1/2 to 1-1/4 in.	5/8 in. O.D., SAE 45°	1/2 to 2 in.	1/2 to 2 in.	2-1/2 & 3 in.	2-1/2 to 6 in.
Range of Cv's Available	0.4 to 22	0.4 to 20	0.4 to 4.4	0.4 to 40	0.4 to 40	65 & 85	56 to 350
Flow Type	Equal %	Equal %	Equal %	Equal %	Equal %	Equal %	Equal %

PNEUMATIC ACTUATORS[b]

	Pages						
	13 to 20	13 to 20 42 to 49	13 to 20	21 to 26	21 to 26	21 to 26	21 to 26

ELECTRIC/ ELECTRONIC ACTUATORS

Input Signals	Pages						
Two-Position (SPST) (Spring Return)	13 to 20	13 to 20 42 to 49	13 to 20	27 to 31	27 to 31 42 to 49	27 to 31	32 to 41
Two-Position (SPDT Snap Acting) (Non-Spring Return)	—	—	—	—	32 to 41	32 to 41	32 to 41
TAC System 8000, Voltage Input 2 to 15 Vdc	13 to 20	13 to 20	13 to 20	27 to 31	27 to 31	27 to 31	27 to 31
Slidewire (Series 90)	—	—	—	—	27 to 31	27 to 31	27 to 31
Current Input 4 to 20 mA etc.	—	—	—	—			
Floating Control, SPDT or Two SPST, Direct Digital Control	—	42 to 49	—	32 to 41	32 to 49	32 to 41	32 to 41
Pneumatic to Electric	—	—	—	27 to 41	27 to 41	27 to 41	27 to 41
Voltage Input 2 to 10 Vdc	—	42 to 49	—	—	42 to 49	—	—

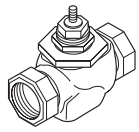
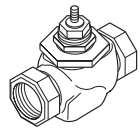
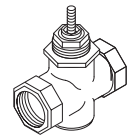
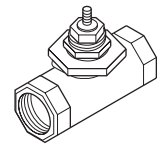
[a] Not applicable with gear train actuators. Use stem up open valve body with N.C. actuator.

[b] Optional inputs available to pneumatic are: SPST, SPDT, slidewire (Series 90), TAC System 8000 (voltage input 2 to 15 Vdc), current input 4 to 20 mA. These options are shown with the specific valve selected.

HOW TO USE TABLE:

1. Select the vertical column that has a valve body series that meets your requirements.
2. Select the horizontal column with correct type of actuator (Pneumatic or Electric/Electronic) and correct input signal for Electric/Electronic actuator.
3. The intersection of the two columns shows the pages for complete selection and ordering information.

Valve Selection Guide for Two-Way Valves

Valve Application	Hot Water 340°F Max.; 100 psig Max. Steam	Hot Water 366°F Max.; 150 psig Max. Steam	Hot Water 300°F Max.; 50 psig Max. Steam	Hot Water 250°F Max.; 15 psig Max. Steam
Valve Body Type	Globe Valves			Ball Valve
	Screwed	Screwed	316 Stainless Steel Screwed	NPT Screwed
				
				VB-2253-0-8-P[a]
Stem Up Open	VB-7253-0-4-P	VB-7273-0-4-P	—	—
Stem Up Closed	VB-7263-0-4-P [a]	VB-7283-0-4-P[b]	VBS-9263-0-6-P	
Static Pressure Rating	250 psig	250 psig	250 psig	125/150 psig
Sizes Available	1/2 to 2 in.	1/2 to 2 in.	1/2 to 3/4 in.	1/2 to 2 in.
Range of Cv's Available	0.4 to 40	0.4 to 40	0.10 to 6.2	1.0 to 389.0
Flow Type	Modified Linear	Modified Linear	Modified Linear	Equal %

PNEUMATIC ACTUATORS[c]

	Pages			
	21 to 26	21 to 26	50 to 53	—

ELECTRIC/ELECTRONIC ACTUATORS

Input Signals	Pages			
Two-Position (SPST) (Spring Return)	27 to 31	27 to 31	—	54 to 58
Two-Position (SPDT Snap Acting) (Non-Spring Return)	32 to 41	32 to 41	50 to 53	54 to 58
TAC System 8000, Voltage Input 2 to 15 Vdc	27 to 31	27 to 31	—	—
Slidewire (Series 90)	32 to 41	32 to 41	—	—
Current Input 4 to 20 mA etc.			50 to 53	—
Floating Control, SPDT or Two SPST, Direct Digital Control			—	54 to 58
Pneumatic to Electric			—	—

[a] Linkage Required

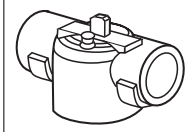
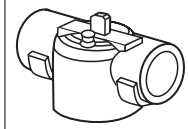
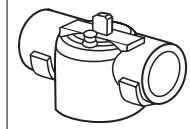
[b] Not applicable with gear train actuators. Use stem up open valve body with N.C. actuator.

[c] Optional inputs available to pneumatic are: SPST, SPDT, slidewire (Series 90), TAC System 8000 (voltage input 2 to 15 Vdc), current input 4 to 20 mA. These options are shown with the specific valve selected.

HOW TO USE TABLE:

1. Select the vertical column that has a valve body series that meets your requirements.
2. Select the horizontal column with correct type of actuator (Pneumatic or Electric/Electronic) and correct input signal for Electric/Electronic actuator.
3. The intersection of the two columns shows the pages for complete selection and ordering information.

Valve Selection Guide for Two-Way Valves

Valve Application	Water 281°F Max.; 35 psig Max. Steam	Water 275°F Max.; 30 psig Max. Steam	Hot & Chilled Water 32 to 200°F (0 to 94°C)	32 to 250°F (0 to 121°C) 15 psia (103 kPa) Steam Water and Steam	Hot & Chilled Water 32 to 200°F (0 to 94°C)
Valve Body Type	**Butterfly**		**ZoneOn/Off**		**Zone Modulating**
	Metal-to-Metal	**Rubber Lined**	**Screwed and Sweat**		
					
	VXX-606X-XXX-2-P	**VXX-616X-XXX-2-P**	**VT2XXX**	**VS2XXX**	**VM2XXX**
Static Pressure Rating	125/150 psig	125/150 psig	300 psig (2068 kPa)	300 psig (2068 kPa)	300 psig (2068 kPa)
Sizes Available	2 to 24 in.	2 to 12 in.	1/2 to 1-1/4 in.	1/2 to 1-1/4 in.	1/2 to 1-1/4 in.
Range of Cv's Available	75 to 10,000	45 to 2,600	1.0 to 7.0	1.0 to 7.0	1.0 to 8.0
Flow Type	Equal %	Equal %	Linear	Linear	1 to 4 Cv: Equal % 8 Cv: Linear[a]
PNEUMATIC ACTUATORS[b]					
	Pages				
	59 to 63	59 to 63	—	—	—
ELECTRIC/ELECTRONIC ACTUATORS					
Input Signals	Pages				
Two-Position (SPST) (Spring Return)	59 to 63	59 to 63	64 to 69	64 to 69	—
Two-Position (SPDT Snap Acting) (Non-Spring Return)	59 to 63	59 to 63	—	—	—
TAC System 8000, Voltage Input 2 to 15 Vdc	59 to 63	59 to 63	—	—	—
Slidewire (Series 90)	59 to 63	59 to 63	—	—	—
Current Input 4 to 20 mA etc.			—	—	64 to 69
Floating Control, SPDT or Two SPST, Direct Digital Control			—	—	64 to 69
Pneumatic to Electric			—	—	—
Voltage input 0-10 /0-5/5-10 Vdc	—	—	—	—	64 to 69

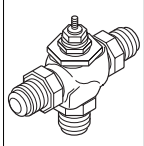
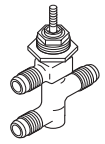
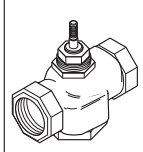
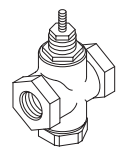
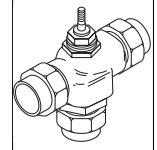
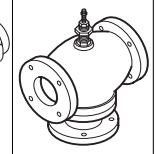
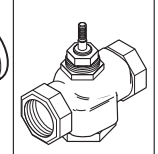
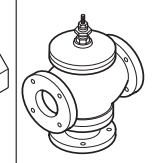
[a] For use with non-spring return modulating actuators only (AT33XXXX, AP33XXXX)

[b] Optional inputs available to pneumatic are: SPST, SPDT, slidewire (Series 90), TAC System 8000 (voltage input 2 to 15 Vdc), current input 4 to 20 mA. These options are shown with the specific valve selected.

HOW TO USE TABLE:

1. Select the vertical column that has a valve body series that meets your requirements.
2. Select the horizontal column with correct type of actuator (Pneumatic or Electric/Electronic) and correct input signal for Electric/Electronic actuator.
3. The intersection of the two columns shows the pages for complete selection and ordering information.

Valve Selection Guide for Three-Way Valves

Valve Application	Chilled or Hot Water 300°F Maximum					Chilled or Hot Water 300°F Maximum	Chilled or Hot Water 300°F Maximum	Chilled or Hot Water 300°F Maximum
Valve Body Type	Globe							
	Flared	Flared	Screwed	Screwed	Union Sweat	Flanged	Screwed	Flanged
								
	VB-7312-0-4-P	VB-324-0-5-P	VB-7313-0-4-P	VB-9313-0-4-P	VB-7314-0-4-P	VB-9313-0-5-P	VB-7323-0-4-P	VB-9323-0-5-P
Static Pressure Rating	250 psig	250 psig	250 psig	250 psig	250 psig	125 psig	250 psig	125 psig
Sizes Available	5/8 in. O.D., SAE 45°	1/2 in. O.D. Tube	1/2 to 2 in.	2-1/2 & 3 in.	1/2 to 2 in.	2-1/2 to 6 in.	1/2 to 2 in.	2-1/2 to 6 in.
Range of Cv's Available	2.2 to 4.4	1.5	2.2 to 41	67 to 91	2.2 to 41	74 to 390	4.4 to 40	75 to 275
Flow Type	Mixing	3-Way Mixing, Top Port Normally Closed, Bottom Port Normally Open	Mixing	Mixing	Mixing	Mixing	Diverting	Diverting

PNEUMATIC ACTUATORS[a]

	Pages							
	70 to 76	70 to 76	77 to 82	77 to 82	77 to 82	77 to 82	77 to 82	77 to 82

ELECTRIC/ ELECTRONIC ACTUATOR

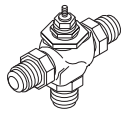
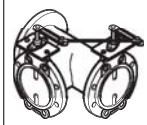
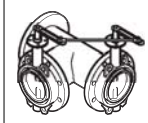
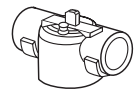
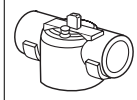
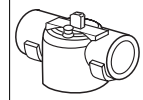
Input Signals	Pages							
Two-Position (SPST) (Spring Return)	70 to 76	70 to 76	83 to 103	87 to 96	83 to 103	87 to 96	83 to 103	87 to 96
Two-Position (SPDT Snap Acting) (Non-Spring Return)	—	—	87 to 103	87 to 96	87 to 103	87 to 96	87 to 103	87 to 96
TAC System 8000, Voltage Input 2 to 15 Vdc	70 to 76	70 to 76	83 to 103	87 to 96	83 to 96	87 to 96	83 to 96	87 to 96
Slidewire (Series 90)	—	—	87 to 103	87 to 96	87 to 103	87 to 96	87 to 103	87 to 96
Current Input 4 to 20 mA etc.	—	—						
Floating Control, SPDT or Two SPST, Direct Digital Control	—	—						
Pneumatic to Electric	—	—						

[a] Optional inputs available to pneumatic are: SPST, SPDT, slidewire (Series 90), TAC System 8000 (voltage input 2 to 15 Vdc), current input 4 to 20 mA. These options are shown with the specific valve selected.

HOW TO USE TABLE:

1. Select the vertical column that has a valve body series that meets your requirements.
2. Select the horizontal column with correct type of actuator (Pneumatic or Electric/Electronic) and correct input signal for Electric/Electronic actuator.
3. The intersection of the two columns shows the pages for complete selection and ordering information.

Valve Selection Guide for Three-Way Valves

Valve Application	Chilled or Hot Water 300°F Maximum	Chilled or Hot Water	Chilled or Hot Water 281°F Maximum	Chilled or Hot Water 275°F Maximum	32 to 200°F (0 to 94°C) Hot & Chilled Water	32 to 250F (0 to 121C) Water and Steam 15 psia (103 kPa) Steam.	32 to 200°F (0 to 94°C) Hot & Chilled Water
Valve Body Type	**Globe**	**Ball**	**Butterfly**		**Zone On/Off**		**Zone Modulating**
	Flared	**NPT Screwed**	**Metal-to-Metal**	**Rubber Lined**	**Screwed and Sweat**		
							
	VB-7332-0-4-P	**VB-2353-0-8-P[a]**	**VXX-666X-XXX-2-P**	**VXX-676X-XXX-2-P**	**VT3XXX**	**VS3XXX**	**VM3XXX**
Static Pressure Rating	250 psig	—	125 psig	125 psig	300 psi (2068 kPa)	300 psi (2068 kPa)	300 psi (2068 kPa)
Sizes Available	5/8 in. O.D., SAE 45°	1/2 to 2 in.	2 to 24 in.	2 to 12 in.	1/2 to 1-1/4 in.	1/2 to 1-1/4 in.	1/2 to 1-1/4 in.
Range of Cv's Available	2.2 or 4.4	5.4 to 47.0	75 to 10,000	45 to 2,600	1.0 to 7.0	1.0 to 7.0	1.0 to 8.0
Flow Type	Sequencing	Equal %	Mixing or Diverting	Mixing or Diverting	Mixing or Diverting	Mixing or Diverting	1.0-4.0 Cv: Equal % Mixing 8.0 Cv: Mixing or Diverting[b]

PNEUMATIC ACTUATORS[c]

	Pages						
	70 to 76		108 to 112	108 to 112	—	—	—

ELECTRIC/ ELECTRONIC ACTUATORS

Input Signals	Pages						
Two-Position (SPST) (Spring Return)	—	104 to 107	—	—	113 to 118	113 to 118	—
Two-Position (SPDT Snap Acting) (Non-Spring Return)	—	104 to 107	108 to 112	108 to 112	—	—	—
TAC System 8000, Voltage Input 2 to 15 Vdc	70 to 76	—	108 to 112	108 to 112	—	—	—
Slidewire (Series 90)	—	—	108 to 112	108 to 112	—	—	—
Current Input 4 to 20 mA etc.	—	—			—	—	113 to 118
Floating Control, SPDT or Two SPST, Direct Digital Control	—	104 to 107			—	—	113 to 118
Pneumatic	—	—			—	—	—
Voltage input 0-10 /0-5/5-10 Vdc	—	104 to 107	—	—	—	—	113 to 118

[a] Linkage required.

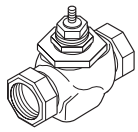
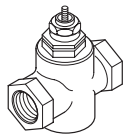
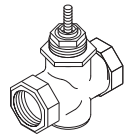
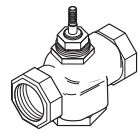
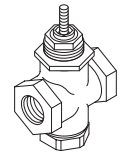
[b] For use with non-spring return modulating actuators only (AT33XXXX, AP33XXXX)

[c] Optional inputs available to pneumatic are: SPST, SPDT, slidewire (Series 90), TAC System 8000 (voltage input 2 to 15 Vdc), current input 4 to 20 mA. These options are shown with the specific valve selected.

HOW TO USE TABLE:

1. Select the vertical column that has a valve body series that meets your requirements.
2. Select the horizontal column with correct type of actuator (Pneumatic or Electric/Electronic) and correct input signal for Electric/Electronic actuator.
3. The intersection of the two columns shows the pages for complete selection and ordering information.

Valve Selection Guide for SI-Threaded Valves, Two-Way and Three-Way

		Globe				
Valve Application		Two-Way Valves	Two-Way Valves	Two-Way Valves	Three-Way Valves	Three-Way Valves
		Chilled or Hot Water 138°C Maximum; 240 kPa (2.4 Bar) Max. Steam	Chilled or Hot Water 138°C Maximum; 240 kPa (2.4 Bar) Max. Steam	Hot Water 149°C 690 kPa Steam	Chilled or Hot Water 149°C Maximum	Chilled or Hot Water 149°C Maximum
						
Action	Two-Way Stem Up Open	VB-7215-0-4-P	VB-9215-0-4-P	—	—	—
	Two-Way Stem Up Closed	VB-7225-0-4-P	VB-9225-0-4-P	VBS-9265-0-6-P	—	—
	Three-Way Mixing	—	—	—	VB-7315-0-4-P	VB-9315-0-4-P
Static Pressure Rating		PN 16 (16 Bar)	PN 16 (16 Bar)	PN 16 (16 Bar)	PN 16 (16 Bar)	PN 16 (16 Bar)
Sizes Available		15 to 50 mm (R_p 1/2 to R_p 2)	65 & 80 mm (R_p 2-1/2 & R_p 3)	15 to 20 mm (R_p 1/2 & R_p 3/4)	15 to 50 mm (R_p 1/2 to R_p 2)	65 & 80 mm (R_p 2-1/2 & R_p 3)
Range of K_{vs}'s Available		0.3 to 35	56 & 73	0.09 to 5.4	1.9 to 36	58 & 78
Flow Type		Equal %	Equal %	Modified Linear	Linear	Linear

PNEUMATIC ACTUATORS

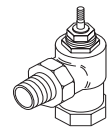
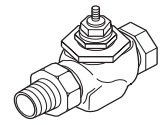
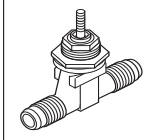
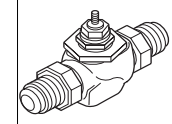
	Pages				
	121 to 124	121 to 124	142 to 145	146 to 149	146 to 149

ELECTRIC/ELECTRONIC ACTUATORS

Input signals	Pages				
Two-Position (SPST) Spring Return	129 to 141	129 to 135	—	150 to 166	153 to 160
Two-Position (SPDT Snap Acting) (Non-Spring Return)	125 to 141	129 to 135	142 to 145	150 to 166	153 to 160
TAC System 8000, Voltage Input 2 to 15 Vdc, Voltage Input 0 to 15 Vdc	125 to 135	129 to 135	—	153 to 160	153 to 160
Slidewire (Series 90)	129 to 135	129 to 135	—	153 to 160	153 to 160
Current Input 4 to 20 mAdc	125 to 135	129 to 135	142 to 145	153 to 160	153 to 160
Floating Control SPDT or Two SPST Direct Digital Control	125 to 141	129 to 135	—	150 to 166	153 to 160
Pneumatic to Electric	121 to 141	121 to 135	—	146 to 166	146 to 160
Voltage input 0-10 /0-5/5-10 Vdc	42 to 49 141 to 141	—	—	97 to 103 161 to 166	—

2-Way Globe Valves, Union End (1/2 to 1-1/4 in.) and Flared (1/2 & 5/8 in. O.D.) with Electric, Hydraulic, and Pneumatic Actuators

TABLE 1. Select Valve Body including P Code (Valve Size, Cv Rating, Port Code) or select Valve Assembly with correct Input Signal (refer to Table 4 also) less Actuator Code (XXX) including the P Code (Size, Cv Rating, Port Code). (Refer to Pages 172 to 179 for Valve Sizing.)

		Application			
		Chilled or Hot Water 281°F Max; 35 psig Steam			
		Union, Angle	Union, Straightway	SAE Flared (Mating Nuts Not Included)	Flared
					
Size		**1/2 to 1-1/4 in.**	**1/2 to 1-1/4 in.**	**1/2 in. O.D., SAE Flare**	**5/8 in. O.D., SAE Flare**
Normally Open Valves	**Valve Body**	VB-7211-0-3-P	VB-7211-0-4-P	VB-121-0-4-P	VB-7212-0-4-P
	Valve Assembly 2-Position SPST	VA-7211-XXX-3-P	VA-7211-XXX-4-P	VA-1219-0-4-P	VA-7212-XXX-4-P
	Valve Assembly 2 to 15 Vdc Input, 4 to 20 mA	VS-7211-XXX-3-P	VS-7211-XXX-4-P	VS-1219-0-4-P	VS-7212-XXX-4-P
	Valve Assembly Pneumatic	VK-7211-XXX-3-P	VK-7211-XXX-4-P	VK-1219-0-4-P	VK-7212-XXX-4-P
Non-Spring Return (no normal position)	**Valve Assembly Floating**	VF-7211-XXX-3-P	VF-7211-XXX-4-P	VF-1219-0-4-P	VF-7212-XXX-4-P
	Valve Assembly Proportional 2 to 10 Vdc or 4 to 20 mA	VS-7211-XXX-3-P	VS-7211-XXX-4-P	VS-1219-0-4-P	VS-7212-XXX-4-P
Normally Closed Valves	**Valve Body**	—	VB-7221-0-4-P	—	VB-7222-0-4-P
	Valve Assembly 2-Position SPST	—	VA-7221-XXX-4-P	—	VA-7222-XXX-4-P
	Valve Assembly 2 to 15 Vdc Input, 4 to 20 mA	—	VS-7221-XXX-4-P	—	VS-7222-XXX-4-P
	Valve Assembly Pneumatic	—	VK-7221-XXX-4-P	—	VK-7222-XXX-4-P

NOTE: These charts are color coded as shown below to assist valve selection. Note it is possible to select either a valve assembly or component parts (actuator, valve linkage, valve body).

ORDERING EXAMPLES:

1. **Valve Assembly . .**
   VA-7221-211-4-8
2. **Valve Body . . . . . .**
   VB-7221-0-4-8
   Actuator . . . . . MA -5210
   Linkage AV-7600-1

- ❒ Valve Body Data less P Code (Size, Cv Rating, Port Code) or Valve Assembly less Actuator Code (XXX) and less P Code (Size, Cv Rating, Port Code)
- ❒ P Code (Size, Cv Rating, Port Code)
- ❒ Actuator or Actuator Code (XXX) for Valve Assemblies
- ❒ Valve Linkage

Flow Type		Equal % (Refer to page 170)			
Material	**Body**	Bronze	Bronze	Brass	Bronze
	Seat				
	Stem	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
	Plug	Brass	Brass	Brass	Brass
	Packing	Spring Loaded TFE	Spring Loaded TFE	PTFE	Spring Loaded TFE
	Disc	Composition	Composition		Composition
ANSI Pressure Class[a] (psig) Refer to page 169		250 (up to 400 psig below 150°F)		250	
Maximum Inlet Pressure Steam psig (kPa)		35 (241)			
Allowable Control Media Temp [b]		20 to 281°F (-7 to 138°C)			
Allowable Differential Pressure for Water psig (kPa)		35 psi (241) Max. for normal life (Refer to page 172 for cavitation limits)			
Allowable Differential Pressure for Steam		20 psi (138 kPa)			

TO SELECT A PORT CODE (P).

P Code	Valve Size [a] in.	Cv[c]			
-1[d]	1/2 or 5/8	0.4	0.4	0.9	0.4
-2[c]		1.3	1.3	1.4	1.3
-3[c]		2.2	2.2	1.9	2.2
-4		5.0	4.4	—	4.4
-5[c]	3/4	5.5	5.5	—	—
-6		8.5	7.5		
-7[c]	1	14	10		
-8[c]		16	14		
-9	1-1/4	22	20		

[a] CAUTION: Fittings and/or piping schedules must meet or exceed working static pressure requirements.

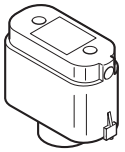
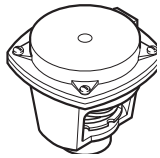
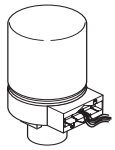
[b] CAUTION: Freeze protection required for fluid temperatures below 32°F (0°C). Avoid ice formation on stems. Do not use Hydraulic Actuators with fluid temperatures below 40°F (4°C). Do not use MF-22203 actuator models in chilled water applications.

[c] Kvs = Cv X 0.865

[d] Factory assemblies are not available for two-position applications using reduced port valve bodies.

2-Way Globe Valves, Union End (1/2 to 1-1/4 in.) and Flared (1/2 & 5/8 in. O.D.) with Electric, Hydraulic, and Pneumatic Actuators

TABLE 2. Select Actuator Type with correct Input Signal having sufficient close-off for the application. If selecting Component parts, Select ValveLinkage

				Input Signal	Pneumatic					Pneumatic				Two-Position Electric	Electronic Vdc 4 to 20 mA		
				Valve Linkage	AV-7400					AV-401				AV-7600[a]			
				Positive Positioner	AK-42309-500					AK-42039-500				—	—		
				Actuator Type	MK-2690					MK-4601	MK-4611	MK-4621		MA-521X-XXX MF-5X1X	MP-521X-XXX MP-541X MP-551X MPR-561X		
				Actuator Code	201		202		203	301	302	303		2XX			
				Spring Range (psig)	3 to 7		5 to 10		8 to 13	3 to 6	5 to 10	10 to 13		—			
					ACTUATOR CLOSE-OFF PRESSURE RATING (psi) [b] [c]												
N.P.	Factory Available Valve Assemblies[d]	Valve Body	P Code	Size in.	Supply Air Pressure (psig)												—
					15	20	15	20	15	20	15	20	15	20	15	20	—
N.O.	VA-7211-XXX-3-P	VB-7211-0-3-P	-1-2-3-4	1/2	130	220	60	170	—	90	250	250	—	—	10	200	130
	VF-7211-2XX-3-P		-5-6	3/4	80	130	40	120	—	60	180	250	—	—	—	120	80
	VK-7211-XXX-3-P		-7-8	1	35	70	—	50	—	25	90	150	—	—	—	65	40
	VS-7211-XXX-3-P		-9	1-1/4	20	40	—	30	—	15	50	90	—	—	—	40	25
	VA-7211-XXX-4-P VA-7212-XXX-4-P	VB-7211-0-4-P VB-7212-0-4-P	-1-2-3-4	1/2 [5/8][e]	130	220	60	170	—	90	250	250	120	250	10	200	130
	VF-7211-2XX-4-P VF-7212-2XX-4-P		-5-6	3/4	80	130	40	120	—	60	180	250	80	180	—	120	80
	VK-7211-XXX-4-P VK-7212-XXX-4-P		-7-8	1	35	70	15	50	—	25	90	150	35	100	—	65	40
	VS-7211-XXX-4-P VS-7212-XXX-4-P		-9	1-1/4	20	40	8	30	—	15	50	90	20	60	—	40	25
N.C.	VA-7221-XXX-4-P VF-7221-2XX-4-P	VB-7221-0-4-P VB-7222-0-4-P	-1-2-3-4	1/2 [5/8][e]	—	—	50		130		30		100		250		200 130
	VF-7222-2XX-4-P VK-7221-XXX-4-P		-5-6	3/4	—	—	30		60		20		70		160		130 80
	VK-7222-XXX-4-P		-7-8	1	—	—	9		30		5		30		60		50 40
	VS-7221-XXX-4-P VS-7222-XXX-4-P		-9	1-1/4	—	—	—		15		—		15		40		35 25
N.O.	VA-1219-XXX-4-P VF-1219-XXX-4-P VK-1219-XXX-4-P VS-1219-XXX-4-P	VB-121-0-4-P	-1, -2, -3	1/2	190	250	90	220	—	160	250	250	180	250	40	250	125

[a] MF-5X1X, MP-541X, MP-551X MPR-561X, use AV-7600-1 and AV-601.

[b] Close-off rated for ANSI IV (.01%) with pressure at inlet (port A). Ratings for normally open valves are with indicated supply air pressure applied to actuator. Ratings for normally closed valves are with 1 psi or less applied to actuator (for kPa multiply by 6.89). See "Valve General Information" section for seat leakage ratings.

[c] Close-off pressure ratings describe only the differential pressure which the actuator can close-off with adequate seating force. Consult valve body specifications for other limitations.

[d] Consult price guide for factory available valve assemblies.

[e] 5/8 O.D. SAE 45° fittings on VB-7212 and VB-7222 valves.

2-Way Globe Valves, Union End (1/2 to 1-1/4 in.) and Flared (1/2 & 5/8 in. O.D.) with Electric, Hydraulic, and Pneumatic Actuators

TABLE 2A. Nominal Two-Way Valve, Hydraulic Actuator Close Off Ratings.

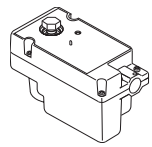
VA, VF, VS		Spring Closes (Normally Closed		Spring Opens (Normally Open)
		MP-5x1x Analog Actuators: 6 to 9, 0 to 10 Volt, and 4 to 20 mA	MA-521X & MF-521X Digital Actuators: 2 Position and Floating	All Actuators: Analog, 2 Position, and Floating
		Close Off Rating with Springs Show Psi (kpa)		
Size in. (cm)	Port Code	Unpainted with Booster	Unpainted with Booster	Black
1/2 (15)	1, 2, 3, 4	250 (1700)	250 (1700)	250 (1700)
3/4 (20)	5, 6	180 (1200)	200 (1300)	200 (1300)
1 (25)	7, 8	60 (410)	90 (620)	150 (1000)
1-1/4 (32)	9	40 (270)	60 (410)	90 (620)

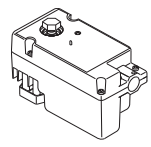
TABLE 2B. Controller Calibration with Spring Usage For VB-7XXX Valves.

Valve	Size in. (mm)	Spring	MP-521X Series[a]	
			Controller Calibration[b]	Nominal Control Range[b]
VB-721X Normally Open	1/2 to 1-1/4 (15 to 32)	large unpainted	7.5 volts	6 to 9 volts
			15 mA	12 to 18 mA
	1/2 to 2 (15 to 50)	Black[c] (highest close off)	5.0 volts	3.5 to 6.5 volts
			10 mA	7 to 13 mA
VB-722X Normally Closed	1/2 to 1-1/4 (15 to 32)	large unpainted[d]	7.5 volts	6 to 9 volts
			15 mA	12 to 18 mA
	1/2 to 2 (15 to 50)	large and small unpainted booster (highest close off)	7.5 volts	6 to 9 volts
			15 mA	12-18 mA

[a] MA, MF, MP-541X and MP-55XX actuator positioning is independent of spring selected.
[b] When using a TAC System 8000 controller or a 4 to 20 mA signal across a 500 ohm resistor to get the proper voltage.
[c] The black spring used on a normally open valves may eliminate the need for positive positioning actuators.
[d] The small unpainted spring may be added to provide additional close off.

TABLE 3. Select Actuator Type with correct Input Signal having sufficient close-off for the application.
If selecting Component parts, Select Valve Linkage .





Input Signal	Floating SPDT		2 to 10 Vdc or 4 to 20 mAdc
Valve Linkage		included with actuator	included with actuator
Actuator Type	MF-23203, MF-233X3	MF-22203[a]	MS-22353
Actuator Code	262, 265, 266	252, 25X	256

Factory Available Valve Assemblies[b]	Valve Body	P Code	Size in.	ACTUATOR CLOSE-OFF PRESSURE RATING (psi)[c]	
VF-7211-2XX-3-P VS-7211-2XX-3-P	VB-7211-0-3-P	-1-2-3-4-25	1/2	250	130
		-5-6	3/4	170	80
		-7-8	1	80	40
		-9	1-1/4	50	25
VF-7211-2XX-4-P VS-7211-2XX-4-P	VB-7211-0-4-P	-1-2-3-4-25	1/2 [5/8][d]	250	130
		-5-6	3/4	170	80
		-7-8	1	80	40
		-9	1-1/4	50	25
VF-7212-2XX-4-P VS-7212-2XX-4-P	VB-7212-0-4-P	-1-2-3-4-25	1/2 [5/8] [e]	250	130
VA-1219-XXX-4-P VF-1219-XXX-4-P VK-1219-XXX-4-P VS-1219-XXX-4-P	VB-121-0-4-P	-1-2-3	1/2 [5/8] [e]	125	100

[a] Do not use MF-22203 models in chilled water applications.
[b] There is no normal position for MF-2XXXX and MS-2XXXX valve assemblies. Consult price guide for factory available valve assemblies.
[c] Close-off rated for ANSI IV (.01%) with pressure at inlet (port A).
[d] 5/8 O.D. SAE 45° fittings on VB-7212 valves.

2-Way Globe Valves, Union End (1/2 to 1-1/4 in.) and Flared (1/2 & 5/8 in. O.D.) with Electric, Hydraulic, and Pneumatic Actuators

TABLE 4. Factory Assemblies, select exact Actuator Code (XXX) (2-Position SPST, TAC System 8000 2 to 15 Vdc, or 4 to 20 mAdc). Any MA-52XX, MP-5XXX, MPR-5X1X, MF-22XX3, MS-22353 can be assembled to 1/2 to 1-1/4 in. valve bodies with the close-off pressure ratings listed in Table 2. Select below listed Actuators or Actuator Codes (XXX) for factory available assemblies. For applications that factory assemblies are not available, select actuator, linkage, body and field assemble.

Input Signal	Voltage Vac 50/60 Hz	VA	Aux. Switch	Actuator Part No.	Actuator Code (XXX) for Factory Available Assembly		
					VA-72XX	VF-72XX	VS-72XX
2-Position SPST	24	18	No	MA-5213	201	—	—
	120			MA-5210	211		
	240			MA-5211	221		
2 to 15 Vdc. TAC System 8000, stroke occurs 6 to 9 Vdc approximately	24			MP-5213	—		201
	120			MP-5210			211
	240			MP-5211			221
2 to 15 Vdc, TAC System 8000, 3 Volt span, start 6 Vdc factory set, Adj. 2 to 12 Vdc, positive positioning	24			MP-5413			247[a]
	120			MP-5410			244[a]
	240			MP-5411			245[a]
4 to 20 mA	24			MPR-5613			267[a]
	120			MPR-5610			264[a]
	240			MPR-5611			265[a]
Floating SPDT	24	21		MF-5413		221[b]	—
				MF-5513		223[b]	
Floating SPDT	24	1.5		MF-22203		252	
				MF-22303		255	
				MF-22323		256	
2 to 10 Vdc	24	4		MS-22353		—	256
4 to 20 mAdc							
2-Position SPST		1.5		MF-23303		265	—
				MF-23323		266	

[a] Includes AV-601.

[b] MF-5X1X, MP-541X, MP-551X use AV-7600-1 and AV-601.

TABLE 4A. Factory Assemblies, Pneumatic Actuators, select exact Actuator or Actuator Code (XXX).

Input Signal[a]	Effective Area Sq. In.	Spring Range (lbs.)	Actuator Part No.	Actuator Code (XXX) for Factory Available Assembly
				VK-72XX-XXX
Pneumatic	6	3 to 7	MK-2690	201
		5 to 10		202
		8 to 13		203
	11	3 to 6	MK-4601	301
		5 to 10	MK-4611	302
		10 to 13	MK-4621	303

a Interface to Pneumatic Signal

Input Signal Type	Interface Module Required
2-Position, SPST (Electric)	AL-1XX
2-Position, SPDT Snap Acting (Electric)	
Voltage 2 to 15 Vdc TAC System 8000	CP-8511-XXX
Current Input 4 to 20 mA etc.	CP-8511-XXX, CP-8551

2-Way Globe Valves, Union End (1/2 to 1-1/4 in.) and Flared (1/2 & 5/8 in. O.D.) with Electric, Hydraulic, and Pneumatic Actuators

TABLE 5. Dimensions in Inches (Millimeters). Refer to page 19 for illustrations.

Valve Body					Actuator Series				
					MPR-5X1X[a]	MF-5X1X	MF-22XXX MS-22353	MK-2690	MK-46X1
Part Number Series	**Size in.**	**A**	**B**	**C**	**E**	**E**	**E**	**E**	**E**
VB-7211 (Angle)	**1/2**	3-1/8 (79)	2-3/16 (56)	1-5/8 (41)	7-1/2 (191)	7-1/2 (191)	3-3/4 (95)	4-7/16 (113)	4/12 (114)
	3/4	3-5/8 (92)	2-13/16 (71)	1-11/16 (43)	7-11/16 (195)	7-11/16 (195)	3-15/16 (100)	4-5/8 (117)	4-5/8 (117)
	1	4-1/16 (103)	3 (76)	1-13/16 (30	8-3/16 (208)	8-3/16 (208)	4-9/16 (116)	5-1/4 (133)	5-1/4 (133)
	1-1/4	4-5/16 (110)	3-5/16 (84)	2-3/16 (56)	8-1/2 (216)	8-1/2 (216)	4-11/16 (119)	5-3/8 (136)	5-3/8 (136)
VB-7211 (Straight)	**1/2**	4-3/16 (106)	2-11/16 (68)	1-1/16 (27)	7-7/8 (200)	7-7/8 (200)	4-1/8 (105)	4-13/16 (122)	4-7/8 (124)
	3/4	4-15/16 (125)	3-3/16 (81)	1-1/16 (27)	7-7/8 (200)	7-7/8 (200)	4-1/8 (105)	4-13/16 (122)	4-7/8 (124)
	1	6 (152)	3-5/8 (92)	1-3/4 (44)	8-9/16 (217)	8-9/16 (217)	4-13/16 (122)	5-1/2 (140)	5-1/2 (140)
	1-1/4	6-1/4 (159)	3-15/16 (100)	1-3/8 (35)	8-9/16 (217)	8-9/16 (217)	4-13/16 (122)	5-1/2 (140)	5-1/2 (140)
VB-7212	**5/8**	4 (102)	2 (51)	1-1/16 (27)	7-7/8 (200)	7-7/8 (200	4-1/8 (105	4-13/16 (122)	4-7/8 (124)
VB-7221	**1/2**	3 (76)	2-11/16 (68)	1-1/16 (27)	7-7/8 (200)	7-7/8 (200)	4-1/8 (105)	4-13/16 (122)	4-7/8 (124)
	3/4	3-5/8 (92)	3-3/16 (81)	1-1/16 (27)	7-7/8 (200)	7-7/8 (200)	4-1/8 (105)	4-3/16 (106)	4-7/8 (124)
	1	4-5/8 (117)	3-5/8 (92)	1-3/4 (44)	8-9/16 (217)	8-9/16 (217)	4-13/16 (122)	5-1/2 (140)	5-1/2 (140)
	1-1/4	4-5/8 (117)	3-15/16 (100)	1-3/8 (35)	8-9/16 (217)	8-9/16 (217)	4-13/16 (122)	5-1/2 (140)	5-1/2 (140)
VB-7222	**5/8**	4 (102)	2 (51)	1-3/16 (30)	7-7/8 (200)	7-7/8 (200)	4-1/8 (105)	4-13/16 (122)	4-7/8 (124)

[a] Add 2-3/32 in. (53 mm) to the "E" dimension for a valve assembly using an AV-601 linkage extension.

TABLE 6. 2-Way Valve Dimensions in Inches (millimeters).

Valve Body					ACTUATOR												
Part Number	**Size In.**	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**J**	**K**	**L**	**M**	**N**	**O**	**P**	**Q**
VA-1219-2X1-4-P VS-1219-2X1-4-P	1/2	1-5/8 (41)	3/8 (10)	3-1/8 (79)	6-3/4 (171)	3-1/4 (83)	8-1/8 (206)	—									
VF-1219-22X-4--P VS-1219-24X-4-P VS-1219-26X-4-P					8-25/32 (223)		10-5/32 (258)										
VK-1219-20X-4-P					—			305/8 (25)	2-1/4 (57)	5 (127)	5 (127)	—					
VB-121-0-4-P Valve with MK-46X1 Actuator (Factory Assembly Not Available)					—							5-1/4 (133)	3-7/8 (98)	4-3/4 (121)	—		
VA-1219-25X-4-P VA-1219-25X-4-P VA-1219-25X-4-P VA-1219-25X-4-P					—										4-1/2 (114)	5-9/16 (141)	3 (76)

TABLE 7. Ambient Temperature Restrictions for Valve Actuators.

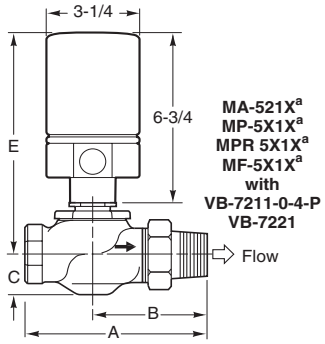
Temperatures °F (°C)						
		MF-22XXX	**MS-22353**	**MPR-581X,MP-541X, MF-5X1X**	**MK-2690 MK-46X1**	**MA-521X**
Linkage Extension		—	—	AV-601[a]	None [a]	AV-601 and AV-7600-1
Maximum Ambient		140 (60)	140 (60)	140 (60)	220 (104)	140 (60)
Max. Allowable Fluid		220 (104)	220 (104)		250 (121)	281 (138)
VB-7211 VB-7212 VB-7221 VB-7222	**Maximum Fluid**	281 (138)	281 (138)	281 (138)	281 (138)	281 (138)
	Max. Allowable Ambient	115 (46)	115 (46)	103 (39)	160 (71)	90 (32)

[a] Actuator condensation can be prevented by use of the “Linkage Extension”.

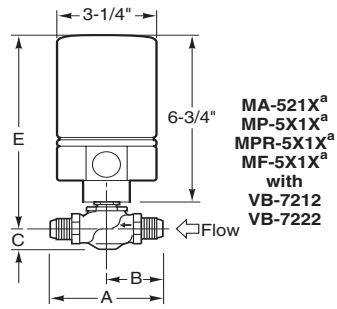
Condensation can facilitate corrosion. Piping insulation must not cover any part of the actuator or mounting nut. With 40°F (4°C) water, the maximum allowable dew point temperature without a linkage extension is 68°F (20°C).

2-Way Globe Valves, Union End (1/2 to 1-1/4 in.) and Flared (1/2 & 5/8 in. O.D.) with Electric, Hydraulic, and Pneumatic Actuators

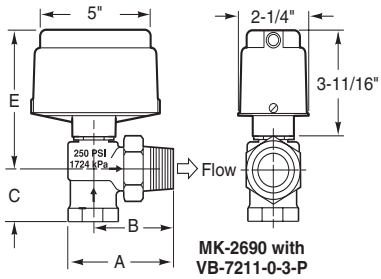
NOTE: Allow 3 inches clearance above actuator for removal. Mount MA/MP/MPR-5XXX actuators above the valve body at 45° from vertical on steam applications.



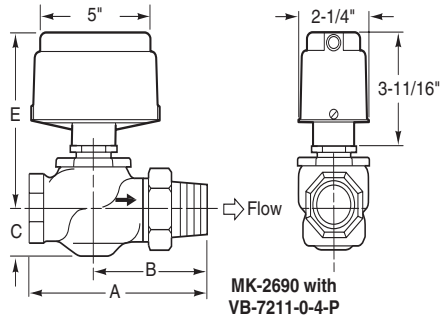
MA-521X[a]
MP-5X1X[a]
MPR 5X1X[a]
MF-5X1X[a]
with
VB-7211-0-4-P
VB-7221



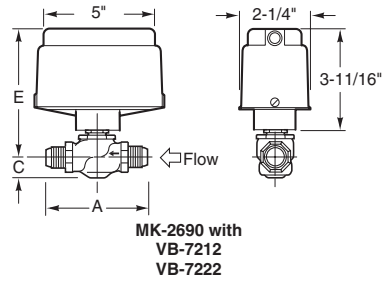
MA-521X[a]
MP-5X1X[a]
MPR-5X1X[a]
MF-5X1X[a]
with
VB-7212
VB-7222



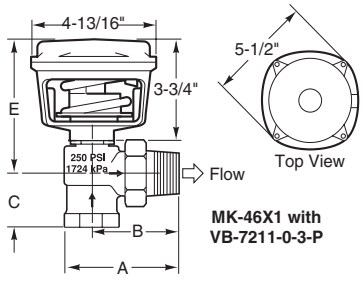
MK-2690 with
VB-7211-0-3-P



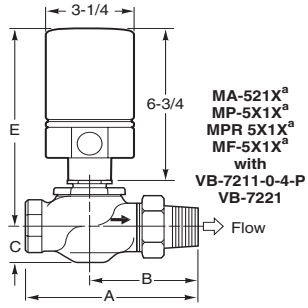
MK-2690 with
VB-7211-0-4-P
VB-7221



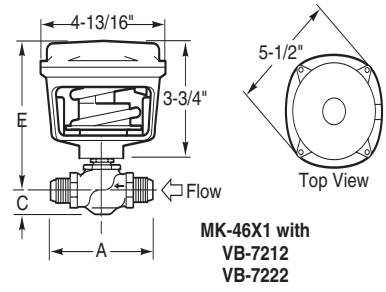
MK-2690 with
VB-7212
VB-7222



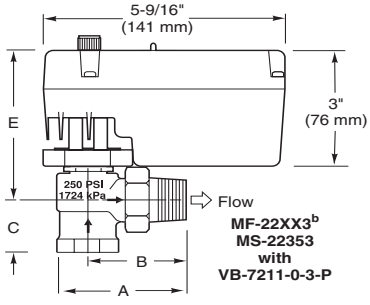
MK-46X1 with
VB-7211-0-3-P



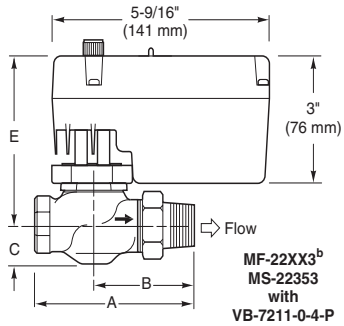
MA-521X[a]
MP-5X1X[a]
MPR 5X1X[a]
MF-5X1X[a]
with
VB-7211-0-4-P
VB-7221



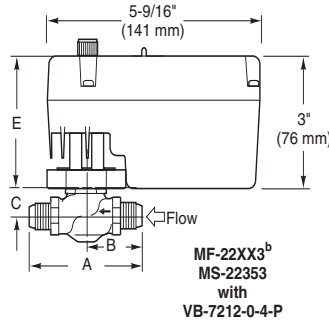
MK-46X1 with
VB-7212
VB-7222



MF-22XX3[b]
MS-22353
with
VB-7211-0-3-P



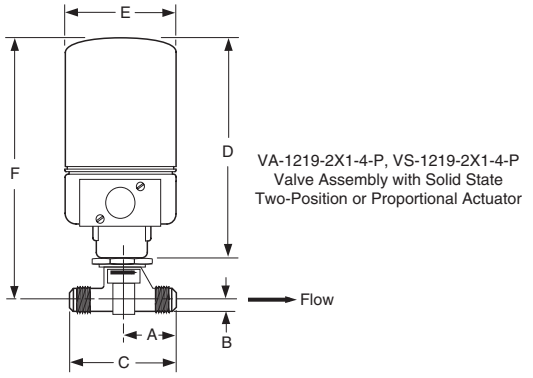
MF-22XX3[b]
MS-22353
with
VB-7211-0-4-P



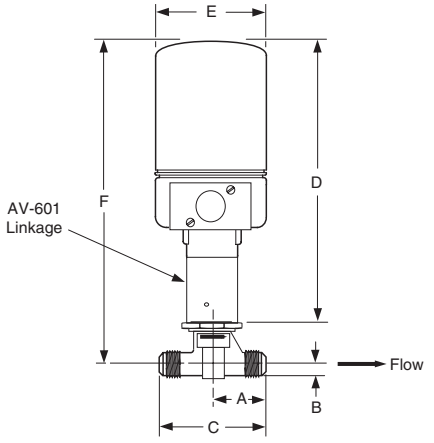
MF-22XX3[b]
MS-22353
with
VB-7212-0-4-P

[a] AV-601 linkage extension (not shown) required for hot water applications. Refer to Table 5.

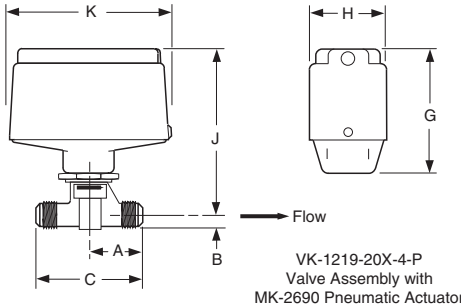
2-Way Globe Valves, Union End (1/2 to 1-1/4 in.) and Flared (1/2 & 5/8 in. O.D.) with Electric, Hydraulic, and Pneumatic Actuators



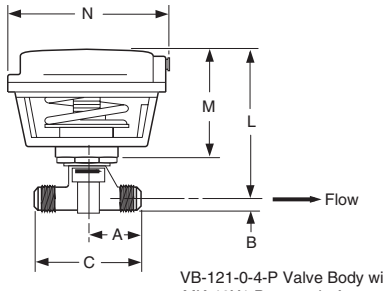
VA-1219-2X1-4-P, VS-1219-2X1-4-P
Valve Assembly with Solid State
Two-Position or Proportional Actuator



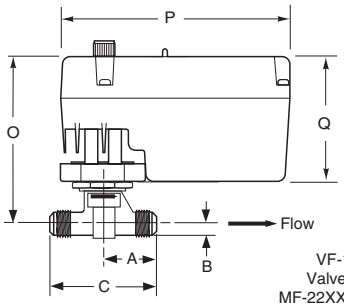
VF-1219-22X-4-P,
VS-1219-24X-4-P, VS-1219-26X-4-4-P
Valve Assembly with Solid State
Floating or Proportional Actuator



VK-1219-20X-4-P
Valve Assembly with
MK-2690 Pneumatic Actuator



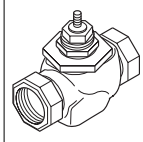
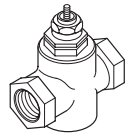
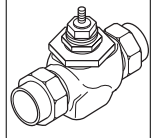
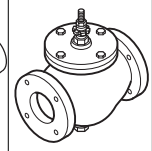
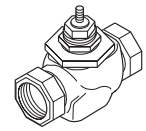
VB-121-0-4-P Valve Body with
MK-46X1 Pneumatic Actuator
(Factory Assembly Not Available)



VF-1219-2XX-4-P
Valve Assembly with
MF-22XX3 Floating Actuator

2-Way Globe Valves, Screwed (1/2 to 3 in.), Union Sweat (1/2 to 2 in.) and Flanged (2-1/2 to 6 in.) with Pneumatic Actuators

TABLE 1. Select Valve Body including P Code (Valve Size, Cv Rating, Port Code) or select Valve Assembly with correct Input Signal (refer to Table 3 also) less Actuator Code (XXX) including the P Code (Size, Cv Rating, Port Code). (Refer to Pages 172 to 179 for Valve Sizing.)

		Application					
		Chilled or Hot Water 281°F Max. 35 psig Steam				Hot Water 340°F Max. 100 psig Steam	Hot Water 400°F Max. 150 psig Steam
		Screwed NPT	Screwed NPT	Union Sweat	Flanged	Screwed NPT	
							
Size		1/2 to 2 in.	2-1/2 & 3 in.	1/2 to 2 in. I.D.	2-1/2 to 6 in.	1/2 to 2 in.	1/2 to 2 in.
Normally Open Valves	Valve Body	VB-7213-0-4-P	VB-9213-0-4-P	VB-7214-0-4-P	VB-9213-0-5-P	VB-7253-0-4-P	VB-7273-0-4-P
	Valve Assembly Pneumatic	VK-7213-XXX-4-P	VK-9213-XXX-4-P	—	VK-9213-XXX-5-P	—	—
	Valve Assembly Pneumatic w/Pos. Positioner	VK4-7213-XX1-4-P	VK4-9213-XX1-4-P	—	VK4-9213-XX1-5-P	—	—
Normally Closed Valves	Valve Body	VB-7223-0-4-P	VB-9223-0-4-P	VB-7224-0-4-P	VB-9223-0-5-P	VB-7263-0-4-P	VB-7283-0-4-P
	Valve Assembly Pneumatic	VK-7223-XXX-4-P	VK-9223-XXX-4-P	—	VK-9223-XXX-5-P	—	—
	Valve Assembly Pneumatic w/Pos. Positioner	VK4-7223-XX3-4-P	VK4-9223-XX3-4-P	—	VK4-9223-XX3-5-P	—	—
Flow Type		Equal % (Refer to page 170)				Modified Linear (Refer to page 170)	
Material	Body	Bronze	Bronze	Bronze	Cast Iron	Bronze	Bronze
	Seat	Bronze	Bronze	Bronze	Bronze	Stainless Steel	Stainless Steel
	Stem	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
	Plug	Brass	Brass	Brass	Brass	Stainless Steel	Stainless Steel
	Packing	Spring Loaded TFE	Spring Loaded TFE	Spring Loaded TFE	Spring Loaded TFE	Spring Loaded TFE	Spring Loaded TFE
	Disc	Composition	Composition	Composition	Composition	Teflon	None
ANSI Pressure Class (psig) Refer to page 169		250 (up to 400 psig below 150°F)			125 (200 psig below 150°F)	250 (400 psig below 150°F)	
Maximum Inlet Pressure Steam psig (kPa)		35 (241)				100 (690)	150 (1034)
Allowable Control Media Temp [a]		20 to 281°F (-7 to 138°C)	40 to 281°F (4 to 138°C)	20 to 281°F (-7 to 138°C)	40 to 281°F (4 to 138°C)	20 to 340°F (-7 to 171°C)	20 to 400°F (-7 to 205°C)
Allowable Differential Pressure for Water psig (kPa)		35 psi (241) Max. for normal life (Refer to page 172 for cavitation limits)[b]					
Allowable Differential Pressure for Steam		20 psi (138 kPa)	20 psi (138 kPa)	20 psi (138 kPa)	20 psi (138 kPa)	35 psi (241 kPa)	50 psi (345 kPa)

NOTE: These charts are color coded as shown below to assist valve selection. Note it is possible to select either a valve assembly or component parts (actuator, valve linkage, valve body).

1. **Valve Assembly: VK4-9213-611-4-11**
2. **Valve Body: VB-9213-0-4-11**
   Actuator: MK-6601
   Linkage: AV-430
   Positive Positioner: AK-42309-500

- ❒ Valve Body Data less P Code (Size, Cv Rating, Port Code) or Valve Assembly less Actuator Code (XXX) and less P Code (Size, Cv Rating, Port Code)
- ❒ P Code (Size, Cv Rating, Port Code)
- ❒ Actuator or Actuator Code (XXX) for Valve Assemblies
- ❒ Valve Linkage

TO SELECT A PORT CODE (P).

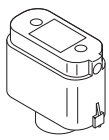
P Code	Valve Size in.	Cv					
-1	1/2	0.4		0.4		0.4	0.4
-2		1.3		1.3		1.3	1.3
-3		2.2		2.2		2.2	2.2
-4		4.4		4.4		4.4	4.4
-5	3/4	5.5		5.5		5.5	5.5
-6		7.5	—	7.5	—	7.5	7.5
-7	1	10		10		10	10
-8		14		14		12	12
-9	1-1/4	20		20		20	20
-10	1-1/2	28		28		28	28
-11	2	40		40		40	40
-12	2-1/2		65		56		
-13	3		85		85		
-14	4	—		—	145	—	—
-15	5		—		235		
-16	6				350		

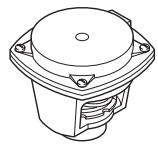
[a] CAUTION: Freeze protection required for fluid temperatures below 32°F (0°C). Avoid ice formation on stems.

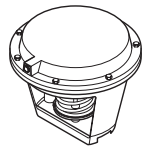
[b] Less than 20 psi recommended for quiet service.

2-Way Globe Valves, Screwed (1/2 to 3 in.), Union Sweat (1/2 to 2 in.) and Flanged (2-1/2 to 6 in.) with Pneumatic Actuators

TABLE 2. 1/2 to 2 in. Valves, select Actuator or Actuator Code (XXX) with correct Input Signal having sufficient close-off for the application. If selecting Component Parts, select Valve Linkage and Positive Positioner if required.







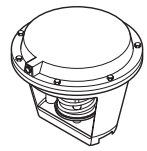
Effective Area		6 Sq. In.			11 Sq. In.			50 Sq. In.											
Valve Linkage		**AV-7400**			**AV-401**			**AV-430**											
Positive Positioner		AK-42309-500			AK-42309-500			AK-42309-500											
Factory Available Assembly with Positive Positioner	**N.O. Valves**	Yes	No	No	Yes	No	No	Yes	No	No									
	N.C. Valves	No	No	Yes	No	No	Yes	No	No	Yes									
Actuator Code (XXX)		201	202	203	301	302	303	611	612	613									
Actuator		**MK-2690**			**MK-4601**	**MK-4611**	**MK-4621**	**MK-6601**	**MK-6611**	**MK-6621**									
Spring Range (psig)		3 to 7	5 to 10	8 to 13	3 to 6	5 to 10	10 to 13	3 to 8	5 to 10	8 to 13									
ACTUATOR CLOSE-OFF PRESSURE RATING (psi) [a] [b]																			
N.P.	**Factory Available Valve Assemblies**	**Valve Body**	**P Code**	**Size in.**	**Supply Air Pressure (psig)**						**Supply Air Pressure (psig)**						**Supply Air Pressure (psig)**					
					15	**20**	**15**	**20**	**15**	**20**	**15**	**20**	**15**	**20**	**15**	**20**	**15**	**20**	**15**	**20**	**15**	**20**
N.O.	VK-7213-XXX-4-P VK4-7213-XX1-4-P VK-7214-XXX-4-P VK4-7214-XX1-4-P	VB-7213-0-4-P VP-7214-0-4-P VB-7253-0-4-P VB-7273-0-4-P	-1-2-3-4	**1/2**	130	220	60	170	—	90	250	250	120	250	10	200	—	—	—	—	—	—
			-5-6	**3/4**	80	130	40	120	—	60	180	250	80	180	—	120	—	—	—	—	—	—
			-7-8	**1**	35	70	15	50	—	25	90	150	35	100	—	65	—	—	—	—	—	—
			-9	**1-1/4**	20	40	8	30	—	15	50	90	20	60	—	40	—	—	—	—	—	—
			-10	**1-1/2**	14	29	5	20	—	9	30	60	10	40	—	25	170	250	110	230	40	160
			-11	**2**	6	14	—	10	—	—	15	30	—	20	—	10	90	160	60	120	20	90
N.C.	VK-7223-XXX-4-P VK4-7223-XX3-4-P VK-7224-XXX-4-P VK4-7224-XX1-4-P	VB-7223-0-4-P VB-7224-0-4-P VB-7263-0-4-P VB-7283-0-4-P	-1-2-3-4	**1/2**	—		50		130		30		100		250		—		—		—	
			-5-6	**3/4**	—		30		60		20		70		160		—		—		—	
			-7-8	**1**	—		9		30		5		30		60		—		—		—	
			-9	**1-1/4**	—		—		15		—		15		40		—		—		—	
			-10	**1-1/2**	—		—		10		—		10		35		40		80		170	
			-11	**2**	—		—		—		—		—		15		20		50		90	

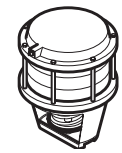
[a] Close-off rated ANSI IV (.01%) for soft seats and ANSI III for metal-to-metal seats with pressure at inlet (port A). Ratings for normally open valves are with indicated supply air pressure applied to actuator. Ratings for normally closed valves are with 1 psi or less applied to actuator (for kPa multiply C_v by 6.89). See "Valve General Information" section for seat leakage ratings.

[b] Close-off pressure ratings describe only the differential pressure which the actuator can close-off with adequate seating force. Consult valve body specifications for other limitations.

2-Way Globe Valves, Screwed (1/2 to 3 in.), Union Sweat (1/2 to 2 in.) and Flanged (2-1/2 to 6 in.) with Pneumatic Actuators

TABLE 3. 2-1/2 to 6 in. Valves, select Actuator or Actuator Code (XXX) with correct Input Signal having sufficient close-off for the application. If selecting Component Parts, select Valve Linkage and Positive Positioner if required.





Effective Area			50 Sq. In.			100 Sq. In.			**100 Sq. In.**										
Valve Linkage			**AV-495**			**AV-496**			**AV-496**										
Positive Positioner			**AK-42309-500**			**AK-42309-500**			**AK-42309-500**										
Factory Available Assembly with Positive Positioner	**N.O. Valves**		Yes		No	No			Yes		No	No			Yes		No	No	
	N.C. Valves		No		No	Yes			No		No	Yes			No		No	Yes	
Actuator Code (XXX)			601		602	603			801		802	803			811		812	813	
Actuator			**MK-6801**		**MK-6811**	**MK-6821**			**MK-8801**		**MK-8811**	**MK-8821**			**MK-8901**		**MK-8911**	**MK-8921**	
Spring Range (psig)			3 to 8		5 to 10	8 to 13			3 to 8		5 to 10	8 to 13			3 to 8		5 to 10	8 to 13	
ACTUATOR CLOSE-OFF PRESSURE RATING (psi) [a] [b] [c]																			
N.P.	**Factory Available Valve Assemblies**	**Valve Body**	**P Code**	**Size in.**	**Supply Air Pressure (psig)**						**Supply Air Pressure (psig)**						**Supply Air Pressure (psig)**					
					15	**20**	**15**	**20**	**15**	**20**	**15**	**20**	**15**	**20**	**15**	**20**	**15**	**20**	**15**	**20**	**15**	**20**
N.O.	VK-9213-60X-4-P VK4-9213-601-4-P VK4-9213-801-4-P [c]	VB-9213-0-4-P	-12	**2-1/2**	50	110	35	80	—	50	125	125	91	125	30	125	—	—	—	—	—	—
			-13	**3**	40	70	25	60	—	40	90	125	62	125	19	90	—	—	—	—	—	—
	VK-9213-60X-5-P VK4-9213-601-5-P VK4-9223-801-5-P [c] VK4-9213-811-5-P [c]	VB-9213-0-5-P	-12	**2-1/2**	50	110	35	80	—	50	125	125	91	125	30	125	—	—	—	—	—	—
			-13	**3**	40	70	25	60	—	40	90	125	62	125	19	90	—	—	—	—	—	—
			-14	**4**	20	40	14	30	—	20	48	89	33	73	10	48	—	—	—	—	—	—
			-15	**5**	—	—	—	—	—	—	—	—	—	—	—	—	27	50	17	40	—	30
			-16	**6**	—	—	—	—	—	—	—	—	—	—	—	—	18	35	11	30	—	20
N.C.	VK-9223-60X-4-P VK4-9223-603-4-P VK-9223-803-4-P [c]	VB-9223-0-4-P	-12	**2-1/2**	12		33		60		30		60		120		—	—	—	—	—	—
			-13	**3**	7		22		40		20		40		90		—	—	—	—	—	—
	VK-9223-60X-5-P VK4-9223-603-5-P VK4-9223-803-5-P [c] VK4-9223-813-5-P [c]	VB-9223-0-5-P	-12	**2-1/2**	12		33		60		30		60		120		—	—	—	—	—	—
			-13	**3**	7		22		40		20		40		90		—	—	—	—	—	—
			-14	**4**	—		11		20		10		25		49		—	—	—	—	—	—
			-15	**5**	—		—		—		—		—		—		4		17		30	
			-16	**6**	—		—		—		—		—		—		2		11		20	

[a] Close-off rated ANSI IV (.01%) for soft seats and ANSI III for metal-to-metal seats with pressure at inlet (port A). Ratings for normally open valves are with indicated supply air pressure applied to actuator. Ratings for normally closed valves are within 1 psi or less applied to actuator (for kPa multiply C_v by 6.89). See "Valve General Information" section for seat leakage ratings.

[b] Close-off pressure ratings describe only the differential pressure which the actuator can close-off with adequate seating force. Consult valve body specifications for other limitations.

[c] Factory valve assemblies only available with positive positioner.

TABLE 4. Optional Input Signal Interface to Pneumatic.

Input Signal Type	Interface Module Required
Two-Position, SPST (Electric)	AL-1XX
Two-Position, SPDT Snap acting (Electric)	AL-1XX
Voltage 2 to 15 Vdc TAC System 8000	CP-8511-XXX
Current Input 4 to 20 mA etc.	CP-8511-XXX, CP-8551

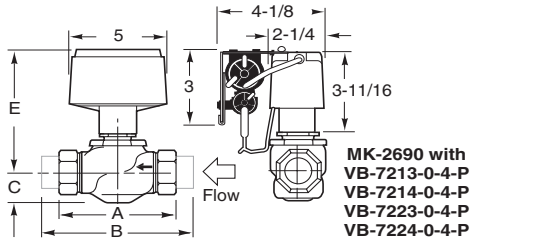
2-Way Globe Valves, Screwed (1/2 to 3 in.), Union Sweat (1/2 to 2 in.) and Flanged (2-1/2 to 6 in.) with Pneumatic Actuators

TABLE 5. Dimensions in Inches (Millimeters).

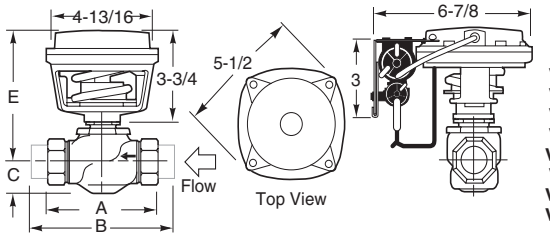
Valve Body					Actuator Series			
					200	300	600	8XX
					MK-2690	MK-46X1	MK-6XX1	MK-8XX1
Part Number	Size In.	A	B[a]	C	E	E	E	E
VB-7213-0-4-P VB-7214-0-4-P	1/2	3 (76)	4-3/16 (106)	1-1/16 (27)	4-13/16 (122)	4-7/8 (124)	13-5/8 (346)	—
	3/4	3-5/8 (92)	5-7/16 (138)	1-1/16 (27)	4-13/16 (122)	4-7/8 (124)	13-5/8 (346)	—
	1	4-5/8 (117)	6-5/8 (168)	1-1/8 (29)	5-1/2 (140)	5-1/2 (140)	14-5/16 (364)	—
	1-1/4		6-13/16 (173)	1-3/8 (35)	5-1/2 (140)	5-1/2 (140)	14-5/16 (364)	—
	1-1/2	5-3/8 (137)	8-5/16 (211)	1-1/2 (38)	5-9/16 (141)	5-5/8 (143)	14-3/8 (365)	—
	2	6-1/8 (156)	9-3/16 (233)	1-9/16 (40)	5-13/16 (148)	5-7/8 (149)	14-5/8 (371)	—
VB-7253-0-4-P VB-7273-0-4-P	1/2	3 (76)	4-3/16 (106)	1-3/16 (30)	4-13/16 (122)	4-7/8 (124)	13-5/8 (346)	—
	3/4	3-5/8 (92)	5-7/16 (138)	1-3/16 (30)	4-13/16 (122)	4-7/8 (124)	13-5/8 (346)	—
	1	4-5/8 (117)	6-5/8 (168)	1-1/8 (29)	5-1/2 (140)	5-1/2 (140)	14-5/16 (364)	—
	1-1/4		6-13/16 (173)	1-3/8 (35)	5-1/2 (140)	5-1/2 (140)	14-5/16 (364)	—
	1-1/2	5-3/8 (137)	8-5/16 (211)	1-1/2 (38)	5-9/16 (141)	5-5/8 (143)	14-3/8 (365)	—
	2	6-1/8 (156)	9-3/16 (233)	1-9/16 (40)	5-13/16 (148)	5-7/8 (149)	14-5/8 (371)	—
VB-9213-0-4-P	2-1/2	8-1/2 (216)	—	3-3/4 (95)	—	—	16-3/16 (411)	20-15/16 (532)
	3	9-1/2 (241)	—	4-1/4 (108)	—	—	17-3/16 (437)	21-5/16 (541)
VB-9213-0-5-P	2-1/2	8-1/2 (216)	—	3-1/2 (89)	—	—	16-1/4 (413)	20-3/4 (527)
	3	9-1/2 (241)	—	3-3/4 (95)	—	—	16-5/8 (422)	21-1/2 (546)
	4	11-1/2 (292)	—	4-1/2 (114)	—	—	17-7/8 (454)	22-3/8 (568)
	5	13 (330)	—	5 (127)	—	—	—	25-7/8 (657)
	6	14 (356)	—	5-1/2 (140)	—	—	—	26-1/2 (673)
VB-7223-0-4-P VB-7224-0-4-P VB-7263-0-4-P VB-7283-0-4-P	1/2	3 (76)	4-3/16 (106)	1-1/4 (32)	4-13/16 (122)	4-7/8 (124)	13-5/8 (346)	—
	3/4	3-5/8 (92)	5-7/16 (138)	1-1/4 (32)	4-13/16 (122)	4-7/8 (124)	13-5/8 (346)	—
	1	4-5/8 (117)	6-5/8 (168)	1-3/4 (44)	4-13/16 (122)	4-15/16 (125)	13-11/16 (347)	—
	1-1/4		6-13/16 (173)	1-3/4 (44)	5-1/16 (129)	5-1/8 (130)	13-15/16 (354)	—
	1-1/2	5-3/8 (137)	8-5/16 (211)	1-13/16 (46)	5-3/16 (132)	5-5/16 (135)	14-1/16 (357)	—
	2	6-1/8 (156)	9-3/16 (233)	2-1/16 (52)	5-5/16 (135)	5-7/16 (138)	14-1/8 (358)	—
VB-9223-0-4-P	2-1/2	8-1/2 (216)	—	3-3/4 (95)	—	—	16-13/16 (427)	20-15/16 (532)
	3	9-1/2 (241)	—	4 (102)	—	—	17-3/16 (436)	21-5/16 (541)
VB-9223-0-5-P	2-1/2	8-1/2 (216)	—	4-1/8 (105)	—	—	15-7/8 (403)	20-3/4 (527)
	3	9-1/2 (241)	—		—	—	16-1/4 (413)	21 (533)
	4	11-1/2 (292)	—	5-1/16 (129)	—	—	16-7/8 (429)	21-5/8 (549)
	5	13 (330)	—	6-3/4 (171)	—	—	—	24-1/2 (622)
	6	14 (356)	—	7-3/8 (187)	—	—	—	25-1/2 (648)

[a] Use B dimension for VB-7214 and VB-7224 valve bodies.

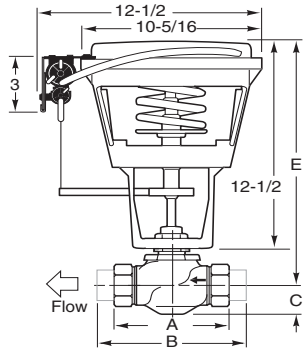
NOTE: Allow 3 inches clearance above actuator for removal.



MK-2690 with
VB-7213-0-4-P
VB-7214-0-4-P
VB-7223-0-4-P
VB-7224-0-4-P



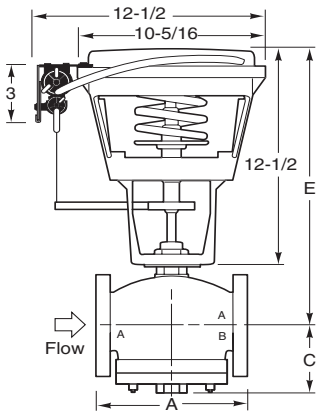
MK-46X1 with
VB-7213-0-4-P
VB-7214-0-4-P
VB-7223-0-4-P
VB-7224-0-4-P
VB-7253-0-4-P[a]
VB-7263-0-4-P
VB-7273-0-4-P[a]
VB-7283-0-4-P[a]



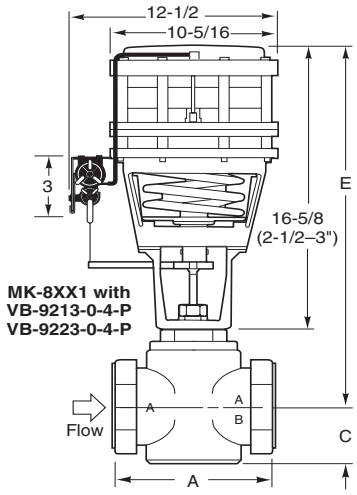
MK-66X1 with
VB-7213-0-4-P
VB-7214-0-4-P
VB-7223-0-4-P
VB-7224-0-4-P
VB-7253-0-4-P[a]
VB-7263-0-4-P[a]
VB-7273-0-4-P[a]
VB-7283-0-4-P[a]

[a] Not available factory assembled.

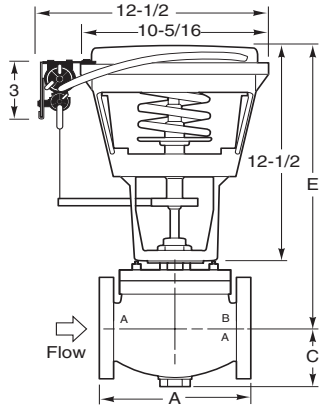
2-Way Globe Valves, Screwed (1/2 to 3 in.), Union Sweat (1/2 to 2 in.) and Flanged (2-1/2 to 6 in.) with Pneumatic Actuators



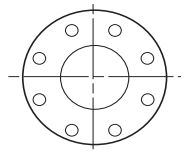
MK-68X1 with VB-9223-0-5-P



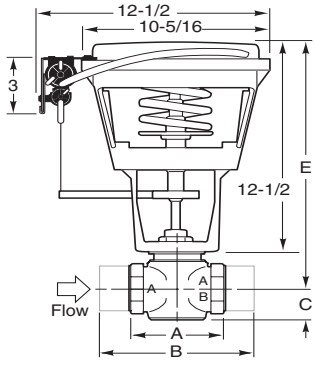
MK-8XX1 with VB-9213-0-4-P VB-9223-0-4-P



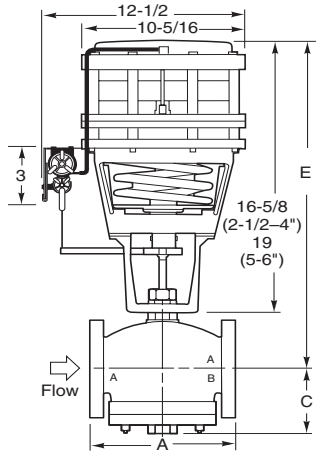
MK-68X1 with VB-9213-0-5-P



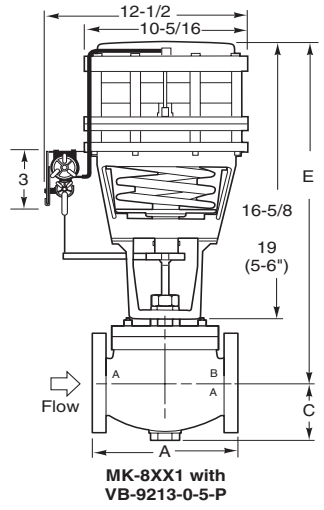
See Flange Detail Table



MK-68X1 with VB-9213-0-4-P VB-9223-0-4-P



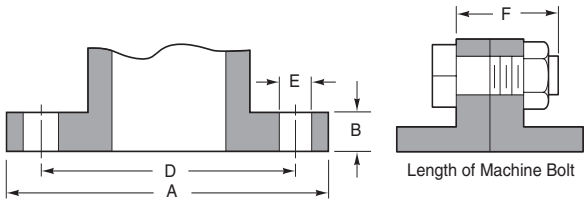
MK-8XX1 with VB-9223-0-5-P



MK-8XX1 with VB-9213-0-5-P

2-Way Globe Valves, Screwed (1/2 to 3 in.), Union Sweat (1/2 to 2 in.) and Flanged (2-1/2 to 6 in.) with Pneumatic Actuators

American Standard 125 lb. Cast Iron Pipe Flanges.



Flange Detail **Dimensions in Inches (Metric conversion 25.4 mm = 1 in.).**

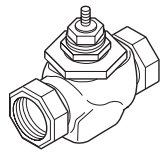
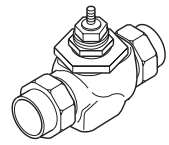
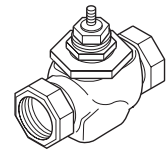
Nominal Pipe Size	Flanges		Drilling		Bolting		Length of Machine Bolts F
	Flange Diameter A	Flange Thickness B	Diameter of Bolt Circle D	Diameter of Bolt Holes E	Number of Bolts	Diameter of Bolts	
2-1/2	7	11/16	5-1/2	3/4	4	5/8	2-1/2
3	7-1/2	3/4	6	3/4	4	5/8	2-1/2
4	9	15/16	7-1/2	3/4	8	5/8	3
5	10	15/16	8-1/2	7/8	8	3/4	3
6	11	1	9-1/2	7/8	8	3/4	3-1/4

TABLE 6. Restrictions on Maximum Ambient Temperature for Valve Actuators.

Temperatures °F (°C)					
Actuator Code (XXX)		**2XX**	**3XXX**	**6XX**	**8XX**
Actuator		**MK-2690**	**MK-46X1**	**MK-6XX1**	**MK-8XX1**
Maximum Ambient		220 (104)	220 (104)	220 (104)	220 (104)
Max. Allowable Fluid		250 (121)	250 (121)	250 (121)	250 (121)
VB-7213-0-4-P VB-7214-0-4-P VB-7223-0-4-P VB-7224-0-4--P VB-9213-0-4-P VB-9213-0-5-P VB-9223-0-4-P VB-9223-0-5-P	**Maximum Fluid**	281 (138)	281 (138)	281 (138)	281 (138)
	Max. Allow. Ambient	160 (71)	160 (71)	160 (71)	160 (71)
VB-7253-0-4-P VB-7263-0-4-P	**Maximum Fluid**	—	340 (171)	340 (171)	—
	Max. Allow. Ambient		100 (37)	100 (37)	
VB-7273-0-4-P VB-7283-0-4-P	**Maximum Fluid**		366 (186)	366 (186)	
	Max. Allow. Ambient		100 (38)	100 (38)	

2-Way Globe Valves, Screwed (1/2 to 2 in.) and Union Sweat (1/2 to 2 in.) with Hydraulic Actuators

TABLE 1. Select Valve Body including P Code (Valve Size, Cv Rating, Port Code) or select Valve Assembly with correct Input Signal (refer to Table 3 also) less Actuator Code (XXX) including the P Code (Size, Cv Rating, Port Code). (Refer to Pages 172 to 179 for Valve Sizing.)

		Application			
		Chilled or Hot Water 281°F Max. 35 psig Steam		Hot Water 340°F Max. 100 psig Steam	Hot Water 400°F Max. 150 psig Steam
		Screwed NPT	Union Sweat	Screwed NPT	
					
Size		1/2 to 2 in.	1/2 to 2 in. I.D.	1/2 to 2 in.	1/2 to 2 in.
Normally Open Valves	**Valve Body**	VB-7213-0-4-P	VB-7214-0-4-P	VB-7253-0-4-P	VB-7273-0-4-P
	Valve Assembly 2 to 15 Vdc Input, 4 to 20 mA	VS-7213-XXX-4-P	—	—	—
	Two-Position SPST Valve Assembly	VA-7213-2XX-4-P	—	—	—
Normally Closed Valves	**Valve Body**	VB-7223-0-4-P	VB-7224-0-4-P	VB-7263-0-4-P	VB-7283-0-4-P
	Valve Assembly, 2 to 15 Vdc Input, 4 to 20 mA	VS-7223-XXX-4-P	—	—	—
	Two-Position SPST Valve Assembly	VA-7223-2XX-4-P	—	—	—
Flow Type		Equal % (Refer to page 170)		Modified Linear (Refer to page 170)	
Material	**Body**	Bronze	Bronze	Bronze	Bronze
	Seat	Bronze	Bronze	Stainless Steel	Stainless Steel
	Stem	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
	Plug	Brass	Brass	Stainless Steel	Stainless Steel
	Packing	Spring loaded TFE	Spring loaded TFE	Spring loaded TFE	Spring loaded TFE
	Disc	Composition	Composition	Teflon	None
ANSI Pressure Class (psig)		250 (up to 400 psig below 150°F, see page 169)			
Maximum Inlet Pressure Steam psig (kPa)		35 (241)		100 (690)	150 (1034)
Allowable Control Media Temp [a]		20 to 281°F (-7 to 138°C)	20 to 281°F (-7 to 138°C)	20 to 340°F (-7 to 171°C)	20 to 400°F (-7 to 205°C)
Allowable Differential Pressure for Water psig (kPa)[b] Full Open		35 psi (241) Max. for normal life (Refer to page 172 for cavitation limits)		35 (241)	35 (241)
Allowable Differential Pressure for Steam Full Open		20 psi (138 kPa)	20 psi (138 kPa)	35 psi (241 kPa)	50 psi (345 kPa)

NOTE: These charts are color coded as shown below to assist valve selection. Note it is possible to select either a valve assembly or component parts (actuator, valve linkage, valve body).

1. **Valve Assembly:** VS-7223-211-4-8
2. **Valve Body:** VB-7223-0-4-8

   Actuator: MP-5210

   Linkage: AV-7600-1

- ❒ Valve Body Data less P Code (Size, Cv Rating, Port Code) or Valve Assembly less Actuator Code (XXX) and less P Code (Size, Cv Rating, Port Code)
- ❒ P Code (Size, Cv Rating, Port Code)
- ❒ Actuator or Actuator Code (XXX) for Valve Assemblies
- ❒ Valve Linkage

TO SELECT A PORT CODE (P).

P Code	Valve Size in.	Cv			
-1[c]	1/2	0.4	0.4	0.4	0.4
-2[b]		1.3	1.3	1.3	1.3
-3[b]		2.2	2.2	2.2	2.2
-4		4.4	4.4	4.4	4.4
-5[b]	3/4	5.5	5.5	5.5	5.5
-6		7.5	7.5	7.5	7.5
-7[b]	1	10	10	10	10
-8		14	14	12	12
-9	1-1/4	20	20	20	20
-10	1-1/2	28	28	28	28
-11	2	40	40	40	40

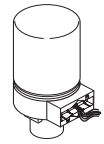
[a] CAUTION: Freeze protection required for fluid temperatures below 32°F (0°C). Avoid ice formation on stems. Do not use Hydraulic Actuators with fluid temperatures below 40°F (4°C).

[b] Less than 20 psi recommended for quiet service.

[c] Factory assemblies are not available for two-position applications using reduced port valve bodies.

2-Way Globe Valves, Screwed (1/2 to 2 in.) and Union Sweat (1/2 to 2 in.) with Hydraulic Actuators

TABLE 2. Select Actuator Type or Actuator Code (XXX) series with correct Input Signal having sufficient close-off for the application. If selecting Component Parts, select Valve Linkage.



Input Signal					Two-Position Electric	Vdc	mAdc
Valve Linkage					AV-7600-1[a]		
Actuator Code (XXX)					2XX	2XX	
Actuator					MA-521X MF-5XXX	MP-5XXX MPR-571X	MPR-561X MPR-571X[b]
	Factory Available Valve Assembly	Valve Body	P Code	Size in.	CLOSE-OFF PRESSURE RATING (psi)[c]		
N.O.	VA-7213-2XX-4-P VS-7213-XXX-4-P	VB-7213-0-4-P VB-7214-0-4-P VB-7253-0-4-P VB-7273-0-4-P	-1-2-3-4	1/2	130		
			-5-6	3/4	80		
			-7-8	1	40		
			-9	1-1/4	25		
			-10	1-1/2	60		
			-11	2	35		
N.C.	VA-7223-2XX-4-P VS-7223-XXX-4-P	VB-7223-0-4-P VB-7224-0-4-P VB-7263-0-4-P VB-7283-0-4-P	-1-2-3-4	1/2	200	130	
			-5-6	3/4	130	80	
			-7-8	1	50	40	
			-9	1-1/4	35	25	
			-10	1-1/2	35	25	
			-11	2	20	14	

[a] MP-541X, MPR-561X, MPR-571X, and MPR-581X use AV-7600-1 and AV-601.

[b] 135Ω slidewire input.

[c] Close-off rated with pressure at inlet (port A). For kPa multiply C_v by 6.89.

TABLE 3. Factory Assemblies, select exact Actuator Code (XXX). Any MA-52XX, MF-5X1X, MP-5XXX, MPR-5X1X can be assembled to 1/2 to 1-1/4 in. valve bodies with the close-off pressure ratings listed in Table 2. Select below listed Hydraulic Actuators or Actuator Codes (XXX) for factory available assemblies. For applications that factory assemblies are not available, select actuator, linkage, valve body and field assemble.

Input Signal	Voltage Vac 50/60 Hz	VA	Aux. Switch	Actuator Part No.	Actuator Code (XXX) for Factory Available Assembly		
					VA-72X3	VS-72X3	VF-72X3
Two-Position SPST	24	18	No	MA-5213	201	—	—
	120			MA-5210	211	—	—
	240			MA-5211	221	—	—
2 to 15 Vdc. System 8000, non-positive positioning, see Calibration Chart.	24			MP-5213	—	201	—
	120			MP-5210	—	211	—
	240			MP-5211	—	221	—
2 to 15 Vdc, System 8000, start 6 Vdc factory set, adjustable 2 to 12 Vdc, 3 Vdc span, positive positioning	24			MP-5413	—	247[a]	—
	120			MP-5410	—	244[a]	—
	240			MP-5411	—	245[a]	—
4 to 20 mA positive positioning	24	18		MPR-5613	—	267[a]	—
	120			MPR-5610	—	264[a]	—
	240			MPR-5611	—	265[a]	—
Floating SPDT	24	21		MF-5413	—	—	221[a]
				MF-5513	—	—	223[a]

[a] Includes AV-601.

TABLE 4. Controller Calibration with Spring Usage for VB-7XXX Valves.

			Actuator Series	
			MP-521X Series[a]	
Valve	**Size**	**Spring(s)**	**Controller Calibration[b]**	**Nominal Control Range[b]**
VB-721X Normally Open	1/2 to 1-1/4 in. (15 to 32 mm)	Large Unpainted	7.5 Volts 15 mA	6 to 9 Volts 12 to 18 mA
	1/2 to 2 in. (15 to 50 mm)	Black[c] (highest close-off)	5.0 Volts 10 mA	3.5 to 6.5 Volts 7 to 13 mA
VB-722X Normally Closed	1/2 to 1-1/4 in. (15 to 32 mm)	Large Unpainted[d]	7.5 Volts 15 mA	6 to 9 Volts 12 to 18 mA
	1/2 to 2 in. (15 to 50 mm)	Large and small unpainted booster (highest close-off)	7.5 Volts 15 mA	6 to 9 Volts 12 to 18 mA

[a] MA,MF, MP-541X, and MP-55XX actuator positioning is independent of spring selected.

[b] When using a TAC System 8000 controller or a 4 to 20 mA signal across a 500 ohm resistor to get the proper voltage.

[c] The black spring used on a normally open valve may eliminate the need for positive positioning actuators.

[d] The small unpainted spring may be added to provide additional close-off.

TABLE 5. Dimensions in Inches (Millimeters).

Valve Body					Actuator Series
					MA/MF/MP/ MPR-5XXX[a]
Part Number	**Size In.**	**A**	**B[b]**	**C**	**E**
VB-7213-0-4-P VB-7214-0-4-P	**1/2**	3 (76)	4-3/16 (106)	1-1/16 (27)	7-15/16 (202)
	3/4	3-5/8 (92)	5-7/16 (138)	1-1/16 (27)	7-15/16 (202)
	1	4-5/8 (117)	6-5/8 (168)	1-1/8 (29)	8-9/16 (217)
	1-1/4		6-13/16 (173)	1-3/8 (35)	8-9/16 (217)
	1-1/2	5-3/8 (137)	8-5/16 (211)	1-1/2 (38)	8-5/8 (219)
	2	6-1/8 (156)	9-3/16 (233)	1-9/16 (40)	8-7/8 (225)
VB-7253-0-4-P VB-7273-0-4-P	**1/2**	3 (76)	4-3/16 (106)	1-3/16 (30)	7-15/16 (202)
	3/4	3-5/8 (92)	5-7/16 (138)	1-3/16 (30)	7-15/16 (202)
	1	4-5/8 (117)	6-5/8 (168)	1-1/8 (29)	8-9/16 (217)
	1-1/4		6-13/16 (173)	1-3/8 (35)	8-9/16 (217)
	1-1/2	5-3/8 (137)	8-5/16 (211)	1-1/2 (38)	8-5/8 (219)
	2	6-1/8 (156)	9-3/16 (233)	1-9/16 (40)	8-7/8 (225)
VB-7223-0-4-P VB-7224-0-4-P VB-7263-0-4-P VB-7283-0-4-P	**1/2**	3 (76)	4-3/16 (106)	1-1/4 (32)	7-15/16 (202)
	3/4	3-5/8 (92)	5-7/16 (138)	1-1/4 (32)	7-15/16 (202)
	1	4-5/8 (117)	6-5/8 (168)	1-3/4 (44)	7-15/16 (202)
	1-1/4		6-13/16 (173)	1-3/4 (44)	8-3/16 (208)
	1-1/2	5-3/8 (137)	8-5/16 (211)	1-13/16 (46)	8-5/16 (211)
	2	6-1/8 (156)	9-3/16 (233)	2-1/16 (52)	8-3/8 (213)

[a] Add 2-3/32 in. (53 mm) to the “E” dimension for a valve assembly using an AV-601 linkage extension.

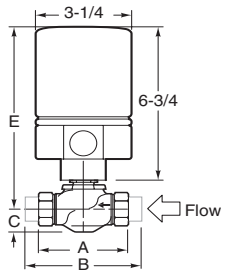
[b] Use B dimension for VB-7214 and VB-7224 valve bodies.

NOTE: Allow 3 inches clearance above actuator for removal. Mount MA/MF/MP/MPR-5XXX actuators above the valve body at 45° from vertical

2-Way Globe Valves, Screwed (1/2 to 2 in.) and Union Sweat (1/2 to 2 in.) with Hydraulic Actuators

on steam applications.

MA/MF/MP/MPR-5XXX[a] with
VB-7213-0-4-P
VB-7214-0-4-P
VB-7223-0-4-P
VB-7224-0-4-P



[a] AV-601 linkage extension (not shown) required for hot water applications for MF-5XXX, MP-54XX, MPR-5XXX, MP-55XX.

TABLE 6. Ambient Temperature Restrictions for Valve Actuators.

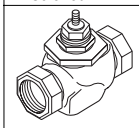
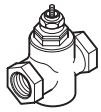
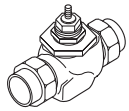
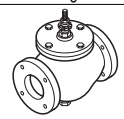
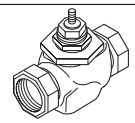
Temperatures °F (°C)					
Actuator Code (XXX)		**20X, 21X, 22X**			**24X, 26X**
Actuator Series		**MP-521X-XXX[a]**	**MP-521X-XXX w AV-601 Linkage Extension**	**MF-5XXX-XXX w/ AV-601 Linkage Extension**	**MPR-561X, MPR-571X, MP-541X, MP-551X w/ AV-601 Linkage Extension**
Maximum Ambient		140 (60)	140 (60)	140 (60)	140 (60)
Max. Allowable Fluid		181 (83)	281 (138)	140 (60)	140 (60)
VB-7213-0-4-P **VB-7214-0-4-P** **VB-7223-0-4-P** **VB-7224-0-4-P**	**Maximum Fluid**	281 (138)		281 (138)	281 (138)
	Max. Allow. Ambient	115 (46)	140 (46)	103 (39)	103 (39)
VB-7253-0-4-P	**Maximum Fluid**	340 (171)	340 (171)	340 (171)	340 (171)
VB-7263-0-4-P	**Max. Allow. Ambient**	100 (38)	100 (38)	100 (38)	93 (34)
VB-7273-0-4-P	**Maximum Fluid**	366 (180)	366 (180)	366 (180)	366 (186)
VB-7283-0-4-P	**Max. Allow. Ambient**	90 (32)	90 (32)	90 (32)	88 (31)

[a] Actuator condensation can be prevented by use of the Linkage Extension."

CAUTION: Condensation can facilitate corrosion. Piping insulation must not cover any part of the actuator or mounting nut. With 40°F (4°C) water, the maximum allowable dew point temperature without a linkage extension is 68°F (20°C).

2-Way Globe Valves, Screwed (1/2 to 3 in.), Union Sweat (1/2 to 2 in.) and Flanged (2-1/2 to 6 in.) with Electric Gear Train Actuators

TABLE 1. Select Valve Body including P Code (Valve Size, Cv Rating, Port Code) or select Valve Assembly with correct Input Signal (refer to Table 3 also) less Actuator Code (XXX) including the P Code (Size, Cv Rating, Port Code). (Refer to Pages 172 to 179 for Valve Sizing.)

			Application					
			Chilled or Hot Water 281°F Max. 35 psig Steam				Hot Water 340°F Max. 100 psig Steam	Hot Water 400°F Max. 150 psig Steam
			Screwed NPT	Screwed NPT	Union Sweat	Flanged	Screwed NPT	
								
Size			1/2 to 2 in.	2-1/2 & 3 in.	1/2 to 2 in. I.D.	2-1/2 to 6 in.	1/2 to 2 in.	1/2 to 2 in.
Valve Body (stem down to close) Actuator Provides Normal Position			VB-7213-0-4-P	VB-9213-0-4-P	VB-7214-0-4-P	VB-9213-0-5-P	VB-7253-0-4-P	VB-7273-0-4-P
Normal Position	Actuator Series	Input Signal	Factory Available Assemblies					
N.O. or N.C. (Refer to Table 3)	MA-318-XXX, MA-418-XXX, MA-419-XXX	SPST (Refer to Table 3)	VA-7213-3XX-4-P	VA-9213-3XX-4-P	—	—	—	—
	MP-36X, MP-37X, MP-46X, MP-47X, MP-46XX, MP-47XX	(Refer to Table 3C)	VP-7213-3XX-4-P	VP-9213-3XX-4-P	—	VP-9213-3XX-5-P	—	—
	MP-461-600, MP-471-600	2 to 15 Vdc (Refer to Table 3B and Table 3C)	VS-7213-3XX-4-P	VS-9213-3XX-4-P	—	VS-9213-3XX-5-P	—	—
	MS-7913, MS-7923	(Refer to Table 3G)	VM-7213-3XX-4-P	VM-9213-3XX-4-P	—	VM-9213-3XX-5-P	—	—
No Normal Position (Non-Spring Return) (Refer to Table 3)	MF-22XX3[a], MF-631X3	Floating SPDT Multiple Input (Refer toTable 3C or Table 3E)	VF-7213-25X-4-P VF-7213-3XX-4-P	VF-9213-30X-4-P	VF-7214-25X-4-P	VF-9213-30X-5-P	—	—
	MS-22353	2 to 10 Vdc, 4 to 20 mAdc (Refer to Table 3C)	VS-7213-256-4-P	—	—	—	—	—
	MC-351, MC-4X1, MC-4XX1	SPDT, Snap Acting (Refer to Table 3A)	VC-7213-4XX-4-P	VC-9213-4XX-4-P	—	VC-9213-4XX-5-P	—	—
	MP-38X, MP-445, MP-48X, MP-48XX	(Refer to Table 3C)	VP-7213-4XX-4-P	VP-9213-4XX-4-P	—	VP-9213-4XX-5-P	—	—
	MP-9XXX	(Refer to Table 3C)	—	—	—	VP-9213-9XX-5-P	—	—
	MP-481-600	2 to 15 Vdc, TAC System 8000 (Refer to Table 3B and Table 3C)	VS-7213-4XX-4-P	VS-9213-4XX-4-P	—	VS-9213-4XX-5-P	—	—
	MM-400-XXX or MMR-400-XXX	(Refer to Table 3E)	VM-7213-4XX-4-P	VM-9213-4XX-4-P	—	VM-9213-4XX-5-P	—	—
Flow Type			Equal % (Refer to page 170)				Modified Linear (Refer to page 170)	
Material	Body		Bronze	Bronze	Bronze	Cast Iron	Bronze	Bronze
	Seat		Bronze	Bronze	Bronze	Bronze	Stainless Steel	Stainless Steel
	Stem		Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
	Plug		Brass	Brass	Brass	Brass	Stainless Steel	Stainless Steel
	Packing		Spring Loaded TFE	Spring Loaded TFE	Spring Loaded TFE	Spring Loaded TFE	Spring Loaded TFE	Spring Loaded TFE
	Disc		Composition	Composition	Composition	Composition	Teflon	None
ANSI Pressure Class (psig) Refer to page 169			250 (up to 400 psig below 150°F)			125 (200 psig below 150°F)	250 (up to 400 psig below 150°F)	
Maximum Inlet Pressure Steam psig (kPa)			35 (241)			35 (241)	100 (690)	150 (1034)
Allowable Control Media Temp [b]			20 to 281°F (-7 to 138°C)	40 to 281°F (4 to 138°C)	20 to 281°F (-7 to 138°C)	40 to 281°F (4 to 138°C)	20 to 340°F (-7 to 171°C)	20 to 400°F (-7 to 205°C)
Allowable Differential Pressure for Water psig (kPa)[c] Full Open			35 psi (241) Max. for normal life (Refer to page 172 for cavitation limits)				35 (241)	35 (241)
Allowable Differential Pressure for Steam Full Open			20 psi (138 kPa)	20 psi (138 kPa)	20 psi (138 kPa)	20 psi (138 kPa)	35 psi (241 kPa)	50 psi (345 kPa)

NOTE: These charts are color coded as shown below to assist valve selection. Note it is possible to select either a valve assembly or component parts (actuator, valve linkage, valve body).

1. **Valve Assembly:** **VS-9213-462-5-14**
2. **Valve Body:** **VB-9213-0-5-14**
   Actuator: MP-481-600
   Linkage: AV-352

- ❒ Valve Body Data less P Code (Size, Cv Rating, Port Code) or Valve Assembly less Actuator Code (XXX) and less P Code (Size, Cv Rating, Port Code)
- ❒ P Code (Size, Cv Rating, Port Code)
- ❒ Actuator or Actuator Code (XXX) for Valve Assemblies
- ❒ Valve Linkage

TO SELECT A PORT CODE(P).

P Code	Valve Size in.	Cv					
-1[d]	1/2	0.4		0.4		0.4	0.4
-2[c]		1.3		1.3		1.3	1.3
-3[c]		2.2		2.2		2.2	2.2
-4		4.4		4.4		4.4	4.4
-5[c]	3/4	5.5		5.5		5.5	5.5
-6		7.5	—	7.5	—	7.5	7.5
-7[c]	1	10		10		10	10
-8		14		14		12	12
-9	1-1/4	20		20		20	20
-10	1-1/2	28		28		28	28
-11	2	40		40		40	40
-12	2-1/2		65		56		
-13	3		85		85		
-14	4				145		
-15	5	—	—	—	235	—	—
-16	6				350		

[a] MF-22203 for hot water and steam applications only.

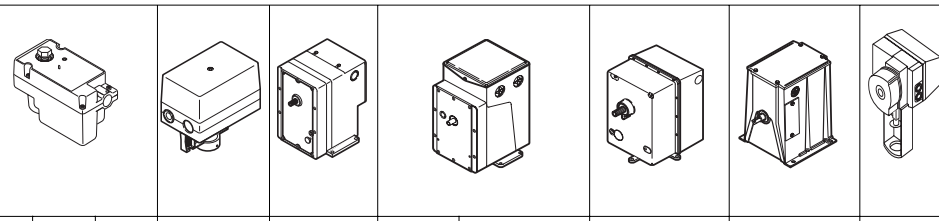
[b] CAUTION: Freeze protection required for fluid temperatures below 32°F (0°C). Avoid ice formation on stems.

[c] Less than 20 psi recommended for quieter service.

[d] Factory assemblies are not available for two-position applications using reduced port valve bodies.

2-Way Globe Valves, Screwed (1/2 to 3 in.), Union Sweat (1/2 to 2 in.) and Flanged (2-1/2 to 6 in.) with Electric Gear Train Actuators

TABLE 2. Select Actuator Type or Actuator Code (XXX) series with correct Input Signal having sufficient close-off for the application. If selecting Component Parts, select Valve Linkage.



Input Signal		Floating SPDT	Refer to Table 3C	Floating SPDT	Floating SPDT and Multiple Input		Two-Position SPST	Refer to Table 3B and Table 3C	Refer to Table 3A, Table 3B, and Table 3C		Refer to Table 3C		Refer to Table 3E		Refer to Table 3C
Valve Linkage	1/2 to 1-1/4 in.	Included with actuator			—		AV-391	AV-391	AV-393	—	—	—	AV-630 or AV-630-010		
	1-1/2 to 2 in.	—	—	11	—		AV-391	AV-391	AV-393				AV-630 or AV-630-010		AV-680
	2-1/2 to 4 in.	—	—	—	AV-672 (order separately)		AV-395	AV-395	AV-396	AV-352	AV-357		AV-630 or AV-630-030		AV-681
	5 to 6 in.	—	—		—		—	—	—	AV-352	AV-357	AV-358	—		--
Normal Position		None	None	None	None		N.O. or N.C.	N.O. or N.C.	None	None	None	None	N.O. or N.C.	None	N.O. or N.C.
Valve Assembly Type		VF	VS	VF	VF		VA	VP or VS	VC, VP, VS		VP		VM		VS
Actuator Code (XXX)		252 255 256	256	262 265 266	301	303	3XX	3XX	40X 41X 42X 44X	46X	903	951	301 311	401	365 366
Actuator Types		MF-22XX3[a]	MS-22353	MF-23XX3[b]	MF-63103	MF-63123	MA-318-XXX MA-418-XXX	MP-361, 371, 465, 475	MC-351, 4XX, 4XX1, MP-38X		MP-9750 (5 and 6 in.)	MP-9810	MM-500 MMR-500	MM-400 MMR-400	MS-7913 MS-7923

Factory Available Valve Assemblies[c]	Valve Body	P Code	Size in.	ACTUATOR CLOSE-OFF PRESSURE RATING (psi)[d e]											
VX-7211-5XX-4-P VA-7213-3XX-4-P VC-7213-4XX-4-P VF-7213-2XX-4-P VM-7213-XXX-4-P VP-7213-XXX-4-P VS-7213-XXX-4-P VF-7213-3XX-4-P	VB-7211-0-4-P VB-7213-0-4-P VB-7214-0-4-P VB-7253-0-4-P VB-7273-0-4-P	-1-2-3-4	1/2	130	130	250	250	250	250	250	—	—	—	250	250	—
		-5-6	3/4	80	80	170								180		
		-7-8	1	40	40	80	240	150	150					120		—
		-9	1-1/4	25	25	50	150	90	90	200				80	200	—
		-10	1-1/2	15	15	33	100	60	60	140				50	140	60
		-11	2	6	6	16	50	35	35	80				25	80	35
VA-9213-3XX-4-P VC-9213-4XX-4-P VF-9213-3XX-4-P VM-9213-XXX-4-P VP-9213-XXX-4-P VS-9213-XXX-4-P	VB-9213-0-4-P	-12	2-1/2	—		—	35	22	22	50	110	—	—	16	50	20
		-13	3			—	25	14	14	35	70			10	35	12
VA-9213-3XX-5-P VC-9213-4XX-5-P VF-9213-3XX-5-P VM-9213-XXX-5-P VP-9213-5XX-5-P VS-9213-XXX-5-P	VB-9213-0-5-P	-12	2-1/2			—	35	22	22	50	110			16	50	20
		-13	3			—	25	14	14	35	70			10	35	12
		-14	4			—	13	7	7	19	40	70		4	17	6
		-15	5			—	—	—	—	—	18	45	60	—	—	—
		-16	6			—					11	30	40			

[a] MF-222X3 for hot water and steam applications only.

[b] Controller must time out drive signal in a given direction after 3 min. or less.

[c] Consult price guide for factory available valve assemblies.

[d] See "Valve General Information" section for seat leakage ratings.

[e] Close-off pressure ratings describe only the differential pressure which the actuator can close-off with adequate seating force. Consult valve body specifications for other limitations.

TABLE 3. Factory Assemblies VA-92XX), Two-Position SPST Input, select exact Actuator Code (XXX). Any MA-31X or MA-41X electric gear train actuator can be assembled to valve bodies with the close-off pressure ratings listed in Table 2. Select Actuator Type having sufficient close-off for the application. Select actuator, linkage, valve body and field assemble.

Input Signal	Normal Position	Voltage	Hz	VA	Aux. Switch	Actuator	Actuator Code (XXX) for Factory Available Assembly
Two-Position SPST	Normally Open	24	60	92	No	MA-318	301
		120		108		MA-418	303
Two-Position SPST	Normally Closed	24	60	92		MA-318	311
		120		108		MA-418	313

2-Way Globe Valves, Screwed (1/2 to 3 in.), Union Sweat (1/2 to 2 in.) and Flanged (2-1/2 to 6 in.) with Electric Gear Train Actuators

TABLE 3A. Factory Assemblies (VC-72XX, 92XX), Two-Position SPDT Input, select Actuator Code (XXX). Any MC-3XX or MC-4XX electric gear train actuator can be assembled to valve bodies with the close-off pressure ratings listed in Table 2. Select Actuator Type having sufficient close-off for the application. Select actuator, linkage, valve body and field assemble.

Input Signal	Normal Position	Voltage	Hz	VA	Aux. Switch	Actuator	Actuator Code (XXX) for Factory Available Assembly
Two-Position SPDT	None (Non-Spring Return)	24	60	96	Yes	MC-351	401
		120				MC-431	413
						MC-431 w/ AV-352	461 (5 and 6 in. only)
		240	50			MC5-4311	424

TABLE 3B. Factory Assemblies (VS-72XX, 92XX), 2 to 15 Vdc TAC System 8000 input, select exact Actuator Code (XXX).

Input Signal	Normal Position	Voltage	Hz	VA	Aux. Switch	Actuator	Actuator Code (XXX) for Factory Available Assembly
2-15 Vdc, TAC System 8000, start 6 Vdc, Factory set Adj. 2-12 Vdc, 3 Vdc span, Positive Positioning	Normally Closed	24	60		Yes	MP-361-600	301
						MP-361-691	306
	Normally Open					MP-371-600	302
	Normally Closed	120		50		MP-461-600	311
						MP-461-691	319
	Normally Open					MP-471-600	312
						MP-471-691	320
	None					MP-481-600	414
						MP-481-691	418
						MP-481-600 w/AV-352	462
2-10 Vdc or 4-20 mAdc, Fixed span and Start point		24	60	50	No	MS-22353	256

2-Way Globe Valves, Screwed (1/2 to 3 in.), Union Sweat (1/2 to 2 in.) and Flanged (2-1/2 to 6 in.) with Electric Gear Train Actuators

TABLE 3C. Factory Assemblies (VF-72XX, VP-72XX, VP-92XX, VS-72XX), Multiple Input (refer toTable 3C below), select exact Actuator Code (XXX). Any MF-22XX3, MS-22353, MP-3XX, 4XX or 9XXX electric gear train actuator can be assembled to valve bodies with the close-off pressure ratings listed in Table 2. Select Actuator Type having sufficient close-off for the application. Select actuator, linkage, valve body and field assemble.

Normal Position	Input signal								Voltage Vac (Hz)	Aux. Switch	Actuator Part Number	Actuator Code (XXX) for Factory Available Assembly
	2 to 15 Vdc TAC System 8000	2 to 10 Vdc	4 to 20 mA etc.	Slidewire (Series 90)	SPST	SPDT Snap Acting	Pneumatic to Electric	SPDT Floating Direct Digital Control				
Normally Closed	1		9				11		24 (60)		MP-361	301
	3		4, 10				8, 12		120 (60)		MP-465	313
	5		4		Yes		8		240 (50)		MP5-4651	342
Normally Open	1		9				11		24 (60)		MP-371	302
	3		4, 10				8, 12		120 (60)		MP-475	314
	5		4				8		240 (50)		MP5-4751	344
None	1		9				11		24 (60)	Yes	MP-381	401
	3		4, 10				8, 12		120 (60)		MP-485	415
	5	—	4				8		240 (50)		MP5-4851	443
	1		9		—		11		24 (60)		MP-381 w/AV-352	461
	3		4, 10				8, 12		120 (60)		MP-485 w/AV-352	463
	3		4, 10				8, 12		120 (60)		MP-9750	903
	6		4	7			8		120 (60)		MP-9810	951
	—		—	—	Yes		—	Yes	24 (60)		MF-22203	252
									24 (60)		MF-22303	255
									24 (60)		MF-22323	256
					—	—			24 (60)		MS-22353	256
Non-Spring Return	—	—	—	—	Yes	Yes	—		24 (60)	No	MF-23206	262
	—	—	—	—	Yes	Yes	—		24 (60)		MF-23303	265
	—	—	—	—	—	—	—		24 (60)		MF-23323	266
	—	—	—	—	Yes	Yes	—		24 (60)		MF-23203	262
	—	—	—	—	Yes	Yes	—		24 (60)		MF-23303	265
	—	—	—	—	—	—	—		24 (60)		MF23323	266
	—	—	—	—	—	—	—		24 (50/60)	No	MF-63103	301
	—	—	—	—	—	—	—			Yes	MF-63103-500	302
	14	14	13	—	—	—	—			No	MF-63123	303
					—	—	—			Yes	MF-63123-500	304
Proportional Extended Spring Return	—	—	16	—	—	—	—	—		15	MS-7913	365
Proportional Retracted Spring Return										15	MS-7923	366

1. Requires CP-8301-024 or CP-930X ordered separately.
2. Requires AE-504 ordered separately.
3. Requires CP-8301-120 or CP-930X ordered separately.
4. Requires CP-8391-716 or CP-9302 ordered separately.
5. Requires CP-8301-240 or CP-930X ordered separately.
6. Requires CP-8391-456 or CP-930X ordered separately.
7. Requires AM-345 and AE-504 ordered separately.
8. Requires CP-8391-716 or CP-9302 and PP-8311 ordered separately.
9. Requires CP-8391-913 or CP-9301 ordered separately.
10. Requires CP-8391-910 or CP-9302 ordered separately.
11. Requires CP-8391-913 or CP-9301 and PP-8311 ordered separately.
12. Requires CP-8391-910 or CP-9302 and PP-8311 ordered separately.
13. Requires MFC-420 Control Module Cord for 4-20 mAdc, (ordered separately), (MF-63123 only).
14. Requires MFC-5000 Control Module Cord for 2-15 Vdc, (ordered separately), MF-63123 only).
15. AM-246 provides 2 auxiliary switches.
16. Compatible with 4 to 20 mAdc, factory set at 6 to 9 Vdc. Jumper settings for 1-5 Vdc, 2-10 Vdc, 0-10 Vdc, 4-7 Vdc, 6-9 Vdc and 8-11 Vdc.

TABLE 3D. Factory Assemblies, Modular Actuator and MF-631X3, select Actuator Code (XXX). Refer to Table 3E for optional inputs.

Normal Position	Voltage (50/60 Hz)	Aux. Switch	Actuator Part No.	Actuator Code (XXX) for Factory Assembly
Normally Open	24	No	MM-500	301
Normally Closed				311
None Non-Spring Return			MM-400	401

TABLE 3E. Input Signal for Modular Actuators MM/MMR-400 or MM/MMR-500), MF-631X3. Order these control modules separately.

Input Signal	Control Module (order separately)	
	MM/MMR-400 or MM/MMR-500	MF-63103 MF-63123
Two-Position, Floating	MMC-468	None (Base Actuator)
4 to 20 mAdc	MMC-420	MFC-420 [a]
135 Ω Slidewire	MMC-90	—
0 to 20 mAdc or 0 to 20 Vdc	MMC-8000	
4 to 20 mAdc with Drive-to-20 mA Position	MMC-421	—
6 to 9 Vdc	—	MFC-8000 [a]

[a] Other ranges available by Dip Switch setting on module.

TABLE 3F. Factory Assemblies, Floating Actuators, select Actuator Code (XXX). Refer to Table 3E for optional inputs.

Input Signal	Voltage	Hz	VA	Aux. Switch	Actuator	Actuator Code (XXX) for Factory Available Assembly.
SPDT Center Off Floating, Two SPST, or Two Triacs	24	50	60	no	MF-22203	252
					MF-22303	255
					MF-22323	256
SPDT Floating, Two SPST, or Triacs					MF-63103	301
					MF-63123	303

2-Way Globe Valves, Screwed (1/2 to 3 in.), Union Sweat (1/2 to 2 in.) and Flanged (2-1/2 to 6 in.) with Electric Gear Train Actuators

TABLE 4. Dimensions in Inches (Millimeters). (Refer to the following pages for illustrations.)

Valve Body					Actuator Series (Code)				
					MA-318-XXX MA-41X-XXX	MC-351, MP-38X, 48X, MP-36X, 37X, 47X	MC-351, MP-38X, 481 w/ AV-352	MP-9730 MP-9750 MP-9810	MM/MMR
Part Number	Size In.	A	B[a]	C	E	E	E	E	E
VB-7213-0-4-P VB-7214-0-4-P	1/2	3 (76)	4-3/16 (106)	1-1/16 (27)	12-13/16 (325)	13-1/2 (343)	13-1/2 (343)	—	11-1/4 (286)
	3/4	3-5/8 (92)	5-7/16 (138)	1-1/16 (27)	12-13/16 (325)	13-1/2 (343)	13-1/2 (343)	—	11-1/4 (286)
	1	4-5/8 (117)	6-5/8 (168)	1-1/8 (29)	13-1/2 (343)	14-3/16 (360)	14-3/16 (360)	—	11-15/16 (303)
	1-1/4	4-5/8 (117)	6-13/16 (173)	1-3/8 (35)	13-1/2 (343)	14-3/16 (360)	14-3/16 (360)	—	11-15/16 (303)
	1-1/2	5-3/8 (137)	8-5/16 (211)	1-1/2 (38)	13-9/16 (344)	14-1/4 (362)	14-1/4 (362)	—	12 (305)
	2	6-1/8 (156)	9-3/16 (233)	1-9/16 (40)	13-13/16 (351)	14-1/2 (368)	14-1/2 (368)	—	12-1/4 (311)
VB-7253-0-4-P VB-7273-0-4-P	1/2	3 (76)	4-3/16 (106)	1-3/16 (30)	12-13/16 (325)	13-1/2 (343)	13-1/2 (343)	—	11-1/4 (286)
	3/4	3-5/8 (92)	5-7/16 (138)	1-3/16 (30)	12-13/16 (325)	13-1/2 (343)	13-1/2 (343)	—	11-1/4 (286)
	1	4-5/8 (117)	6-5/8 (168)	1-1/8 (29)	13-1/2 (343)	14-3/16 (360)	14-3/16 (360)	—	11-15/16 (303)
	1-1/4	4-5/8 (117)	6-13/16 (173)	1-3/8 (35)	13-1/2 (343)	14-3/16 (360)	14-3/16 (360)	—	11-15/16 (303)
	1-1/2	5-3/8 (137)	8-5/16 (211)	1-1/2 (38)	13-9/16 (344)	14-1/4 (362)	14-1/4 (362)	—	12 (305)
	2	6-1/8 (156)	9-3/16 (233)	1-9/16 (40)	13-13/16 (351)	14-1/2 (368)	14-1/2 (368)	—	12-1/4 (311)
VB-9213-0-4-P	2-1/2	8-1/2 (216)	—	3-3/4 (95)	15-15/16 (405)	16-5/8 (422)	16-5/8 (422)	—	14-3/8 (365)
	3	9-1/2 (241)	—	4-1/4 (108)	16-3/8 (416)	17-1/8 (435)	17-1/8 (435)	—	14-13/16 (376)
VB-9213-0-5-P	2-1/2	8-1/2 (216)	—	3-1/2 (89)	15-1/8 (384)	15-13/16 (402)	15-13/16 (402)	—	13-9/16 (344)
	3	9-1/2 (241)	—	3-3/4 (95)	16-5/8 (422)	17-5/16 (440)	17-5/16 (440)	—	15-1/16 (383)
	4	11-1/2 (292)	—	4-1/2 (114)	17-1/2 (445)	18-3/16 (462	18-3/16 (462)	23 (584)	—
	5	13 (330)	—	5 (127)	18-5/8 (473)	19-1/4 (489)	19-1/4 (489)	24-1/4 (616)	—
	6	14 (356)	—	5-1/2 (140)	19-5/16 (491)	20 (508)	20 (508)	25-1/8 (638)	—

[a] Use B dimension for VB-7214.

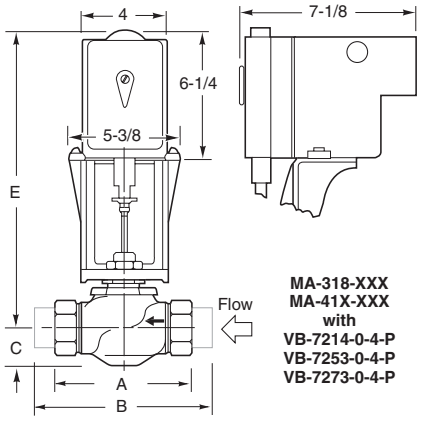
TABLE 5. Dimensions in Inches (Millimeters). (Refer to following pages for illustrations.)

Valve Body					Actuator Series (Code)		
					MF-22XX3 [a] MS-22353	MF-631X3	MS-79X3
Part Number	Size In.	A	B[b]	C	E	E	E
VB-7213-0-4-P VB-7214-0-4-P	1/2	3 (76)	4-3/16 (106)	1-1/16 (27)	4-1/8 (108)	7-1/8 (181)	—
	3/4	3-5/8 (92)	5-7/16 (138)	1-1/16 (27)	4-1/8 (108)	7-1/8 (181)	—
	1	4-5/8 (117)	6-5/8 (168)	1-1/8 (29)	4-13/16 (122)	7-13/16 (198)	—
	1-1/4	4-5/8 (117)	6-13/16 (173)	1-3/8 (35)	4-13/16 (122)	7-13/16 (198)	—
	1-1/2	5-3/8 (137)	8-5/16 (211)	1-1/2 (38)	4-7/8 (124)	7-7/8 (200)	12.9 (328)
	2	6-1/8 (156)	9-3/16 (233)	1-9/16 (40)	5-1/8 (130)	8-1/8 (206)	13.19 (335)
VB-7253-0-4-P VB-7273-0-4-P	1/2	3 (76)	4-3/16 (106)	1-3/16 (30)	4-1/8 (108)	7-1/8 (181)	—
	3/4	3-5/8 (92)	5-7/16 (138)	1-3/16 (30)	4-1/8 (108)	7-1/8 (181)	—
	1	4-5/8 (117)	6-5/8 (168)	1-1/8 (29)	4-13/16 (122)	7-13/16 (198)	—
	1-1/4	4-5/8 (117)	6-13/16 (173)	1-3/8 (35)	4-13/16 (122)	7-13/16 (198)	—
	1-1/2	5-3/8 (137)	8-5/16 (211)	1-1/2 (38)	4-7/8 (124)	7-7/8 (200)	12.92 (228)
	2	6-1/8 (156)	9-3/16 (233)	1-9/16 (40)	5-1/8 (130)	8-1/8 (206)	13.19 (335)
VB-9213-0-4-P	2-1/2	8-1/2 (216)	—	3-3/4 (95)	—	10-3/8 (264)	15.31 (390)
	3	9-1/2 (241)	—	4-1/4(108)	—	10-13/16 (275)	15.76 (400)
VB-9213-0-5-P	2-1/2	8-1/2 (216)	—	3-1/2 (89)	—	9-9/16 (243)	15.31 (390)
	3	9-1/2 (241)	—	3-3/4 (95)	—	11-1/16 (281)	15.76 (400)
	4	11-1/2 (292)	—	4-1/2 (114)	—	13-3/4 (349)	16.84 (430)

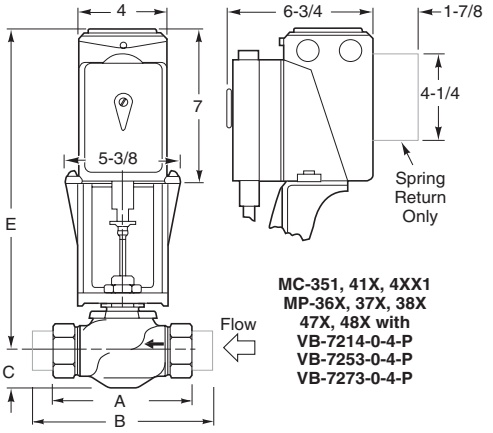
[a] MF-22203 for hot water and steam applications only.

[b] Use B dimension for VB-7214.

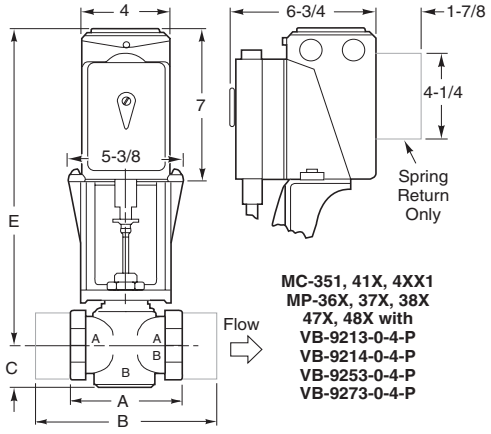
2-Way Globe Valves, Screwed (1/2 to 3 in.), Union Sweat (1/2 to 2 in.) and Flanged (2-1/2 to 6 in.) with Electric Gear Train Actuators



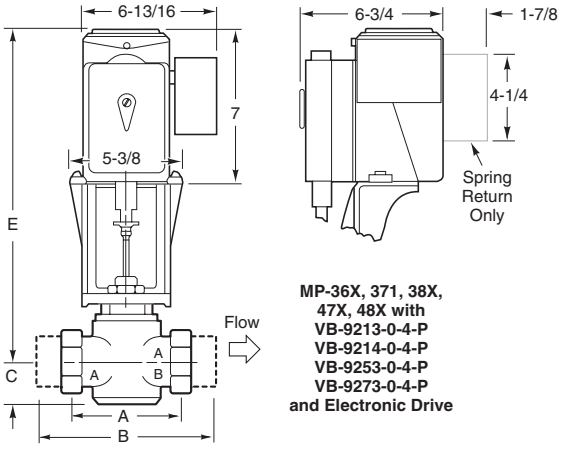
MA-318-XXX
MA-41X-XXX
with
VB-7214-0-4-P
VB-7253-0-4-P
VB-7273-0-4-P



MC-351, 41X, 4XX1
MP-36X, 37X, 38X
47X, 48X with
VB-7214-0-4-P
VB-7253-0-4-P
VB-7273-0-4-P

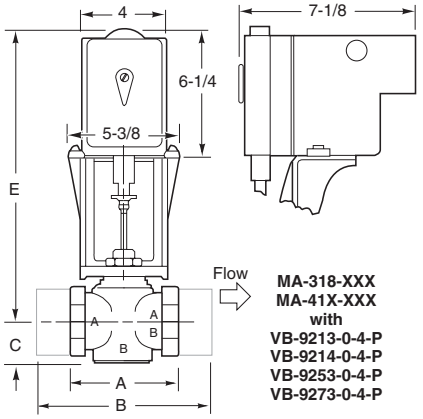


MC-351, 41X, 4XX1
MP-36X, 37X, 38X
47X, 48X with
VB-9213-0-4-P
VB-9214-0-4-P
VB-9253-0-4-P
VB-9273-0-4-P

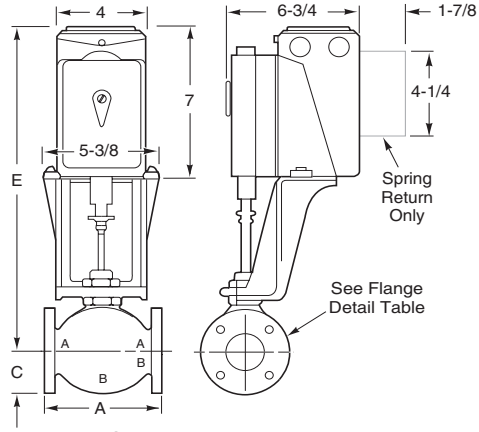


MP-36X, 371, 38X,
47X, 48X with
VB-9213-0-4-P
VB-9214-0-4-P
VB-9253-0-4-P
VB-9273-0-4-P
and Electronic Drive

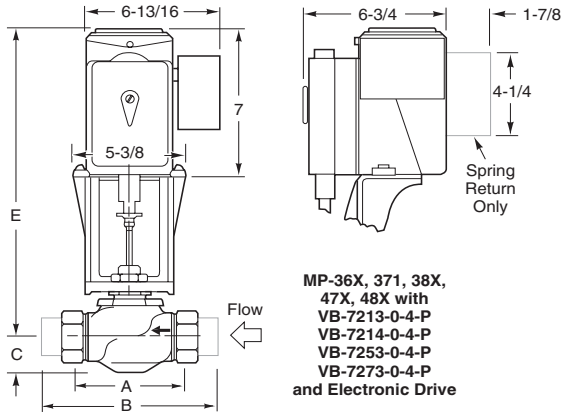
2-Way Globe Valves, Screwed (1/2 to 3 in.), Union Sweat (1/2 to 2 in.) and Flanged (2-1/2 to 6 in.) with Electric Gear Train Actuators



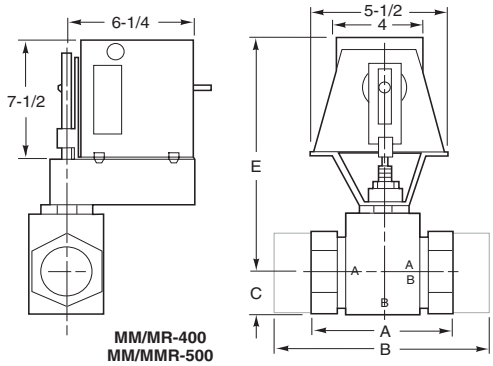
MA-318-XXX
MA-41X-XXX
with
VB-9213-0-4-P
VB-9214-0-4-P
VB-9253-0-4-P
VB-9273-0-4-P



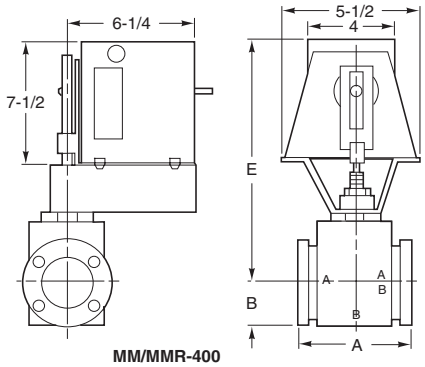
MC-351, 41X, 4XX1
MP-36X, 37X, 38X
445, 47X, 48X
with
VB-9213-0-5-P



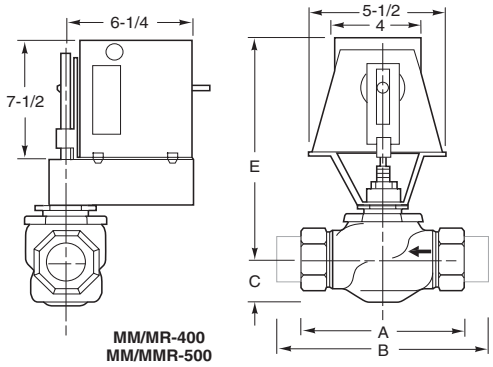
MP-36X, 371, 38X,
47X, 48X with
VB-7213-0-4-P
VB-7214-0-4-P
VB-7253-0-4-P
VB-7273-0-4-P
and Electronic Drive



MM/MR-400
MM/MMR-500
with
VB-9213-0-4-P

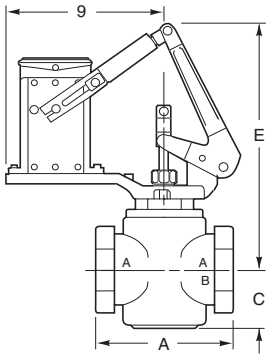


MM/MMR-400
MM/MMR-500 with
VB-9213-0-5-P

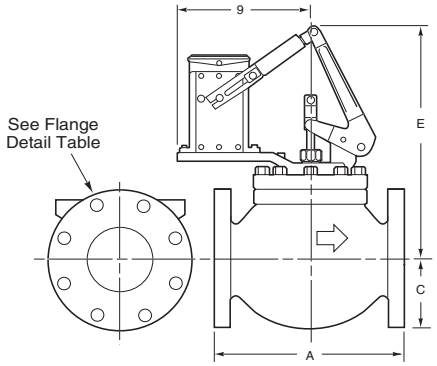


MM/MR-400
MM/MMR-500
with
VB-7214-0-4-P
VB-7253-0-4-P
VB-7273-0-4-P

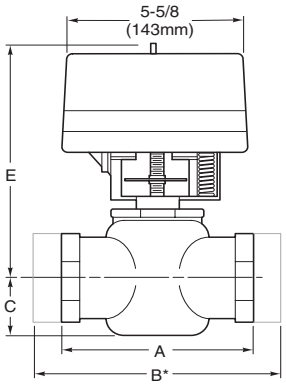
2-Way Globe Valves, Screwed (1/2 to 3 in.), Union Sweat (1/2 to 2 in.) and Flanged (2-1/2 to 6 in.) with Electric Gear Train Actuators

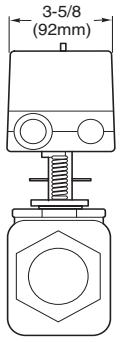


MC-351, 41X, 4XX1
MP-38X, 48X with
VB-9213-0-4-P
(2-1/2"–3") and
AV-352 Linkage

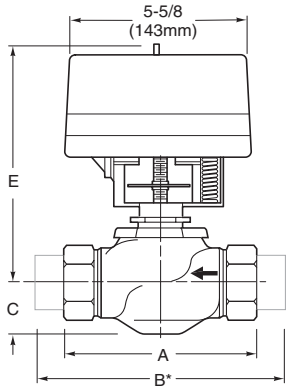


MC-351, 41X, 4XX1
MP-38X, 48X
with
VB-9213-0-5-P
and AV-352 Linkage

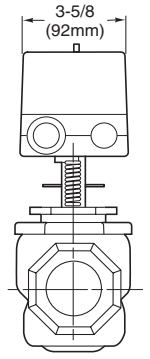




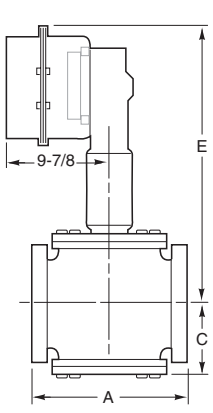
MF-631X3 with
VB-9213-000-4-P

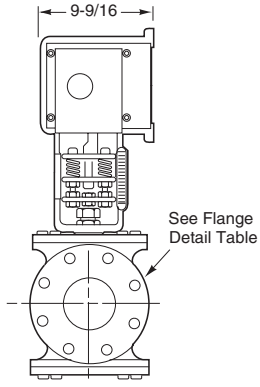


*** For VB-7214**

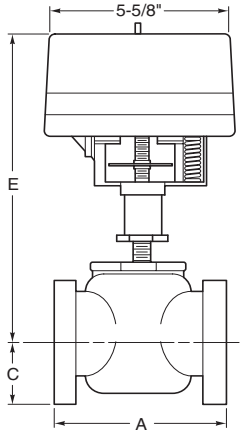


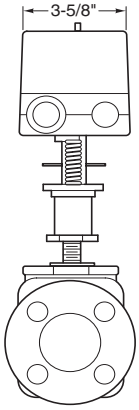
MF-631X3 with
VB-7213-000-4-P
VB-7214-000-4-P
VB-7253-000-4-P
VB-7273-000-4-P



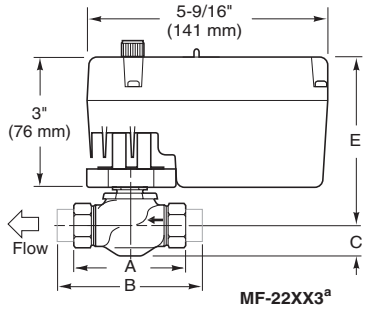


MP-9750
MP-9810
with
VB-9213-0-5-P





MF-631X3 with
VB-9213-000-5-P

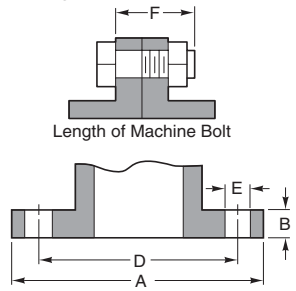


MF-22XX3[a]
MS-22353 with
VB-7213-0-4-P
VB-7214-0-4-P

a MF-22203 for hot water and steam applications only.

2-Way Globe Valves, Screwed (1/2 to 3 in.), Union Sweat (1/2 to 2 in.) and Flanged (2-1/2 to 6 in.) with Electric Gear Train Actuators

American Standard 125 lb. Cast Iron Pipe Flanges.



Flange Detail **Dimensions in Inches (Metric Conversion 25.4 mm = 1 in.).**

Nominal Pipe Size	Flanges		Drilling		Bolting		Length of Machine Bolts
	Flange Diameter A	Flange Thickness B	Diameter of Bolt Circle D	Diameter of Bolt Holes E	Number of Bolts	Diameter of Bolts	F
2-1/2	7	11/16	5-1/2	3/4	4	5/8	2-1/2
3	7-1/2	3/4	6	3/4	4	5/8	2-1/2
4	9	15/16	7-1/2	3/4	8	5/8	3
5	10	15/16	8-1/2	7/8	8	3/4	3
6	11	1	9-1/2	7/8	8	3/4	3-1/4

TABLE 6. Restrictions on Max. Ambient Temperature for Valve Actuators.

		Temperatures °F (°C)							
Actuator Code (XXX)		**3XX, 40X, 41X, 42X, 44X**	**46X**	**90X**	**25X**	**256**	**301**	**303**	**365 366**
					MF-22XX3[a]	**MS-22353**	**MF-63103**	**MF-63123**	**MS-79X3**
Maximum Ambient °F (°C)		136 (57)	136 (57)	130 (54)	140 (60)	140 (60)	140 (60)		122 (50)
Max. Allowable Fluid		260 (126)	260 (126)	260 (126)	220 (104)	220 (104)	260 (126)		260 (126)
VB-7213-0-4-P VB-7214-0-4-P VB-9213-0-4-P VB-9213-0-5-P	**Max. Fluid**	281 (138)	281 (138)	281 (138)	281 (138)	281 (138)	281 (138)		281 (138)
	Max. Allow. Ambient °F (°C)	125 (52)	125 (52)	125 (52)	115 (46)	115 (46)	125 (52)		115 (46)
VB-7273-0-4-P	**Max. Fluid**	366 (183)	—	—	281 (138)		340 (171)		340 (171)
	Max. Allow. Ambient °F (°C)	100 (38)			115 (46)		100 (38)		100 (38)
VB-7253-0-4-P	**Max. Fluid**	340 (171)			281 (138)		366 (185)		366 (171)
	Max. Allow. Ambient °F (°C)	100 (38)			115 (46)		100 (38)		100 (38)

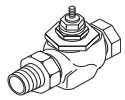
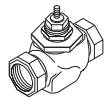
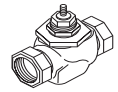
[a] MF-22203 for hot water and steam applications only.

The configuration of the valve assembly determines the valve stem position and flow, as shipped from the factory. See the table below.

Valve Assemblies	Valve Body Action	Factory Shipped Position		Action
		Valve Stem	Flow	
VX-721X-XXX-4-P	2-Way Stem Up Open	Up	Open	A to AB Flow decreases as actuator rotates CW
VX-722X-XXX-4-P	2-Way Stem Up Closed	Up	Closed	A to AB Flow increases as actuator rotates CW
VX-731X-XXX-4-P	3-Way Mixing	Up	Flow B to AB	A to AB Flow increases as actuator rotates CW B to AB Flow decreases as actuator rotates CW
VX-732X-XXX-4-P	3-Way Diverting	Up	Flow B to AB	B to A Flow increases as actuator rotates CW B to AB Flow decreases as actuator rotates CW

2-Way Globe Valves, Screwed (1/2 to 2 in.), Union Straightway (1/2 to 2 in.) with TAC DuraDrive™ Actuators

TABLE 1. Select Valve Body including P Code (Valve Size, Cv Rating, Port Code) or select Valve Assembly with correct Input Signal less Actuator Code (XXX) including the P Code (Size, Cv Rating, Port Code). (Refer to Pages 172 to 179 for Valve Sizing.)

			Application		
			Chilled or Hot Water 281°F Max. 35 psig Steam		Chilled or Hot Water 138°C Maximum 240 kPa (2.4 Bar) Steam
			Union, Straightway	Screwed NPT	Internal Parallel Pipe Thread per ISO 7/1, BS 21, JIS B0203
					
Size			1/2 to 1-1/4 in.	1/2 to 2 in.	15 to 50 mm
Valve Body (stem down to close) Actuator Provides Normal Position			VB-7211-0-4-P	VB-7213-0-4-P	VB-7215-0-4-P
Valve Body (stem open to close) Actuator Provides Normal Position			VB-7221-0-4-P	VB-7223-0-4-P	VB-7225-0-4-P
Normal Position	Actuator Series	Input Signal	Factory Available Assemblies		
N.O. or N.C.	MA40-704X, MA40-707X, MA40-715X	SPST	VA-7211-XXX-4-P VA-7221-XXX-4-P	VA-7213-XXX-4-P VA-7223-XXX-4-P	VA-7215-XXX-4-P VA-7225-XXX-4-P
	MS40-6043, MS40-6083, MS40-6153, MS40-7043, MS40-7073, MS40-7153, MS40-717X	2 to 10 Vdc	VS-7211-XXX-4-P VS-7221-XXX-4-P	VS-7213-XXX-4-P VS-7223-XXX-4-P	VS-7215-XXX-4-P VS-7225-XXX-4-P
	MF40-6043, MF40-6083, MF40-6153, MF40-7043, MF40-7073, MF40-7153, MF40-717X	Floating SPDT	VF-7211-XXX-4-P VF-7221-XXX-4-P	VF-7213-XXX-4-P VF-7223-XXX-4-P	VF-7215-XXX-4-P VF-7225-XXX-4-P
Flow Type			Equal % (Refer to page 170)		
Material	Body		Bronze		
	Seat		Bronze		
	Stem		Stainless Steel		
	Plug		Brass		
	Packing		Spring Loaded TFE		
	Disc		Composition		
ANSI Pressure Class (psig) Refer to page 169			250 psig (1724 kPa), up to 400 psig (2758 kPa) below 150°F (66°C)		PN16 (16 Bar)
Maximum Inlet Pressure Steam psig (kPa)			35 (241)		
Allowable Control Media Temp [a]			20 to 281°F (-7 to 138°C)		
Allowable Differential Pressure for Water psig (kPa)[b]			35 psi (241) Max. for normal life (Refer to page 172 for cavitation limits)		
Allowable Differential Pressure for Steam			20 psi (138 kPa)		

NOTE: These charts are color coded as shown below to assist valve selection. Note it is possible to select either a valve assembly or component parts (actuator, valve linkage, valve body).

1. **Valve Assembly:** **VS-7213-505-5-10**
2. **Valve Body:** **VB-7213-0-5-10**

   Actuator: MF40-6043

   Linkage: AV-604

- ❒ Valve Body Data less P Code (Size, Cv Rating, Port Code) or Valve Assembly less Actuator Code (XXX) and less P Code (Size, Cv Rating, Port Code)
- ❒ P Code (Size, Cv Rating, Port Code)
- ❒ Actuator or Actuator Code (XXX) for Valve Assemblies
- ❒ Valve Linkage

TO SELECT A PORT CODE (P).

P Code	Valve Size in.	Cv		
-1[c]	1/2	0.4	0.4	0.3
-2 [c]		1.3	1.3	1.1
-3 [c]		2.2	2.2	1.9
-4		4.4	4.4	3.8
-5 [c]	3/4	5.5	5.5	4.8
-6		7.5	7.5	6.5
-7 [c]	1	10	10	8.7
-8		14	14	12
-9	1-1/4	20	20	17
-10	1-1/2	—	28	24
-11	2	—	40	35
-12	2-1/2	—		
-13	3			
-14	4			
-15	5			
-16	6			

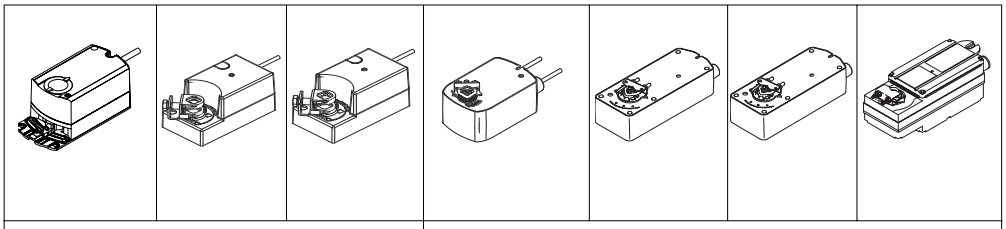
[a] CAUTION: Freeze protection required for fluid temperatures below 32°F (0°C). Avoid ice formation on stems.

[b] Less than 20 psi recommended for quieter service.

[c] Factory assemblies are not available for two-position applications using reduced port valve bodies.

2-Way Globe Valves, Screwed (1/2 to 2 in.), Union Straightway (1/2 to 2 in.) with TAC DuraDrive™ Actuators

TABLE 2. Select Actuator Type or Actuator Code (XXX) series with correct Input Signal having sufficient close-off for the application. If selecting Component Parts, select **Valve Linkage**



				Non-Spring Return			Spring Return			
			Input Signal	Floating and Proportional			SPDT, Floating and Proportional			
			Valve Linkage (Shaft Diameter)	AV-603 (1/2")	AV-605 (1/2")	AV-602 (3/4")	AV-605 (1/2")	AV-602 (3/4")		
			Actuator/Linkage Assembly	MF41-6043-200 MS41-6043-200	MF40-6083-200 MS40-6083-200	MF40-6153-200 MS40-6153-200	MA40-704X-200 MA40-704X-201 MF40-7043-200 MF40-7043-202 MS40-7043-200 MS40-7043-202 MS40-7043-MP MS40-7043-MP5	MA40-707X-200 MA40-707X-202 MF40-7073-200 MF40-7073-202 MS40-7073-200 MS40-7073-202	MA40-715X-200 MA40-715X-202 MF40-7153-200 MF40-7153-202 MS40-7153-200 MS40-7153-202	MA40-717X-200 MF40-7173-200 MS40-717X-200
			Normal Position	N.O. or N.C.						
			Valve Assembly Type	VF or VS			VA, VF or VS			
			Actuator Code (XXX)	505	506	508	532. 533. 534. 535. 536. 537, 538, 539	542, 543, 544, 545, 546, 547	552, 553, 554, 555, 556, 557	572, 574, 576
			Actuator Types	MF41-6043 MS41-6043	MF40-6083 MS40-6083	MF40-6153 MS40-6153	MA40-704X MF40-7043 MS40-7043	MA40-707X MF40-7073 MS40-7073	MA40-715X MF40-7153 MS40-7153	MA40-717X MF40-7173 MS40-717X
Factory Available Valve Assemblies[a]	Valve Body	P Code	Size in.	ACTUATOR CLOSE-OFF PRESSURE RATING (psi)[b c]						
VX-7211-5XX-4-P VX-7213-5XX-4-P VX-7215-5XX-4-P VX-7221-5XX-4-P VX-7223-5XX-4-P VX-7225-5XX-4-P	VB-7211-0-4-P VB-7213-0-4-P VB-7215-0-4-P VB-7221-0-4-P VB-7223-0-4-P VB-7225-0-4-P	1-2-3-4	1/2	225	—	—	250	—	—	—
		5-6	3/4	225	—	—	250	—	—	—
		7-8	1	100	130	—	125	180	—	—
		9	1-1/4	60	100	—	75	120	200	—
		10	1-1/2	40	70	140	50	100	140	160
		11	2	20	40	80	25	40	80	120

[a] Consult price guide for factory available valve assemblies.

[b] Seat leakage rating of ANSI class IV (.01%).

[c] Close-off pressure ratings describe only the differential pressure which the actuator can close-off with adequate seating force. Consult valve body specifications for other limitations.

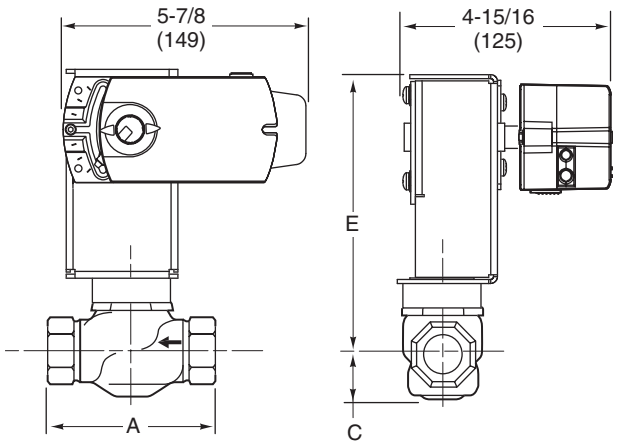
2-Way Globe Valves, Screwed (1/2 to 2 in.), Union Straightway (1/2 to 2 in.) with TAC DuraDrive™ Actuators

TABLE 3. Factory Assemblies, Two Position, Floating, Proportional Actuators, Select Actuator Code (XXX).

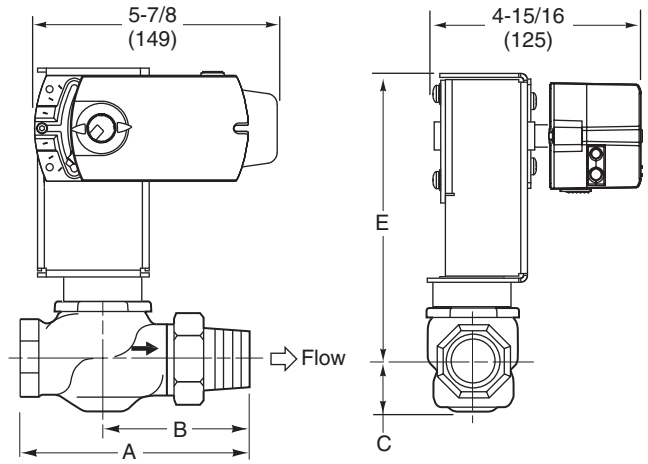
Input Signal	Voltage	Running VA		Auxiliary Switch	Actuator	Actuator Code for Factory Assembly
		50 Hz	60 Hz			
Two Position SPST	24 Vac ± 20%	4.4	4.2	No	MA40-7043	536
				One	MA40-7043-501	537
	120 Vac ± 10%	6.4	4.3	No	MA40-7040	532
				One	MA40-7040-501	533
	230 Vac ± 10%	5.8	4.6	No	MA40-7041	534
				One	MA40-7041-501	535
	24 Vac ± 20%	9.6	9.6	No	MA40-7173	576
	120 Vac ± 10%	11.4	11.4	No	MA40-7170	572
	240 Vac ± 10%	11.8	11.8	No	MA40-7171	574
	24 Vac ± 20%	11.6	11.2	No	MA40-7153	556
				Two	MA40-7153-502	557
	120 Vac ± 10%	12.5	10.6	No	MA40-7150	552
				Two	MA40-7150-502	553
	230 Vac ± 10%	16.1	11.1	No	MA40-7151	554
				Two	MA40-7151-502	555
	24 Vac ± 20%	4.8	4.6	No	MA40-7073	546
				Two	MA40-7073-502	547
	120 Vac ± 10%	10.7	5.6	No	MA40-7070	542
				Two	MA40-7070-502	543
	230 Vac ± 10%	17.0	8.0	No	MA40-7071	544
				Two	MA40-7071-502	545
Proportional	24 Vac +20/-15%	3	3	No	MS40-6043	505
	24 Vac ± 20%	5.6	5.6	No	MS40-6083	506
		5.8	5.8	No	MS40-6153	508
		4.1	4.3	No	MS40-7043	536
				One	MS40-7043-501	537
				No	MS40-7043-MP	538
				One	MS40-7043-MP5	539
		4.2	4.5	No	MS40-7073	546
				Two	MS40-7073-502	547
		15.7	14.9	No	MS40-7153	556
				Two	MS40-7153-502	557
		9.4	9.4	No	MS40-7173	576
	120 Vac ± 10%	11.1	11.1	No	MS40-7170	572
	240 Vac ± 10%	11.8	11.8	No	MS40-7171	574
Floating	24 Vac +20/-15%	2	2	No	MF40-6043	505
	24 Vac ± 20%	5.6	5.6	No	MF40-6083	506
		5.8	5.8	No	MF40-6153	508
		8.3	7.8	No	MF40-7043	536
				One	MF40-7043-501	537
		4.2	4.5	No	MF40-7073	546
				Two	MF40-7073-502	547
		15.9	14.9	No	MF40-7153	556
				Two	MF40-7153-502	557
		10.0	10.0	No	MF40-7173	576

TABLE 4. MX40-6043 Dimensions in Inches (Millimeters).

Valve Assembly Part Number	Valve Size in.	Valve Dimensions in inches (millimeters)			
		Two-Way (Refer to following illustrations			
		A	B	C	E
Union Straightway VX-7211-505-4-P VX-7221-505-4-P	1/2	4-3/16 (106)	2-11/16 (68)	1-3/16 (30)	6-3/8 (162)
	3/4	4-15/16 (125)	3-3/16 (81)	1-3/16 (30)	6-3/8 (162)
	1	6 (152)	3-5/8 (92)	1-1/8 (29)	7-1/16 (179)
	1-1/4	6-1/4 (159)	3-15/16 (100)	1-3/8 (35)	7-1/16 (179)
NPT Two-Way VX-7213-505-4-P	1/2	3 (76)	N/A	1-1/16 (27)	6-3/8 (162)
	3/4	3-5/8 (92)	N/A	1-1/16 (27)	6-3/8 (162)
	1	4-5/8 (117)	N/A	1-1/8 (29)	7-1/16 (179)
	1-1/4	4-5/8 (117)	N/A	1-3/8 (35)	7-1/16 (179)
	1-1/2	5-3/8 (136)	N/A	1-1/2 (138)	7-1/8 (181)
	2	6-1/8 (156)	N/A	1-9/16 (40)	7-3/8 (187)
NPT VX-7223-505-4-P	1/2	3 (76)	N/A	1-3/8 (35)	6-3/8 (162)
	3/4	3-5/8 (92)	N/A	1-3/16 (30)	6-3/8 (162)
	1	4-5/8 (117)	N/A	1-3/4 (44)	6-7/16 (164)
	1-1/4	4-5/8 (117)	N/A	1-3/4 (44)	6-11/16 (170)
	1-1/2	5-3/8 (136)	N/A	1-13/16 (46)	6-13/16 (173)
	2	6-1/8 (156)	N/A	1-7/8 (48)	6-7/8 (175)



MF40-6043
MS40-6043
With Two-Way Globe Valve



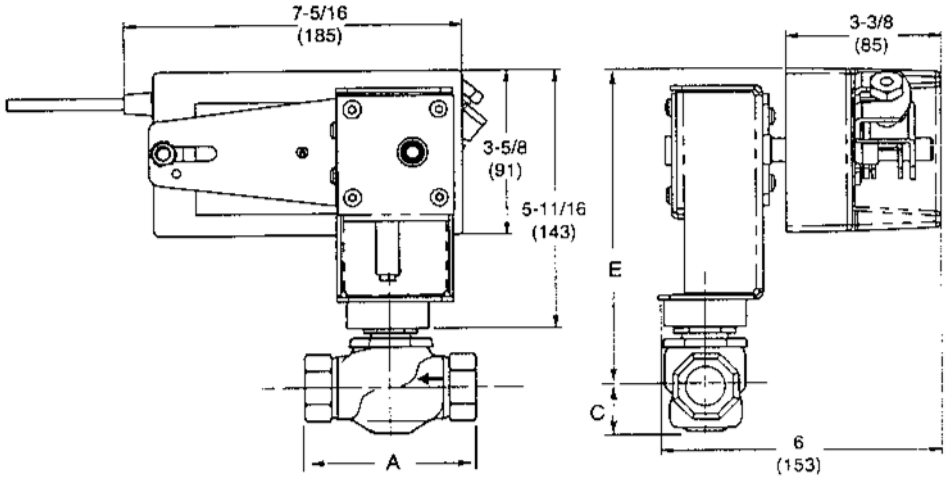
MF40-6043
MS40-6043
With Two-Way Union Straightway Globe Valve

2-Way Globe Valves, Screwed (1/2 to 2 in.), Union Straightway (1/2 to 2 in.) with TAC DuraDrive™ Actuators

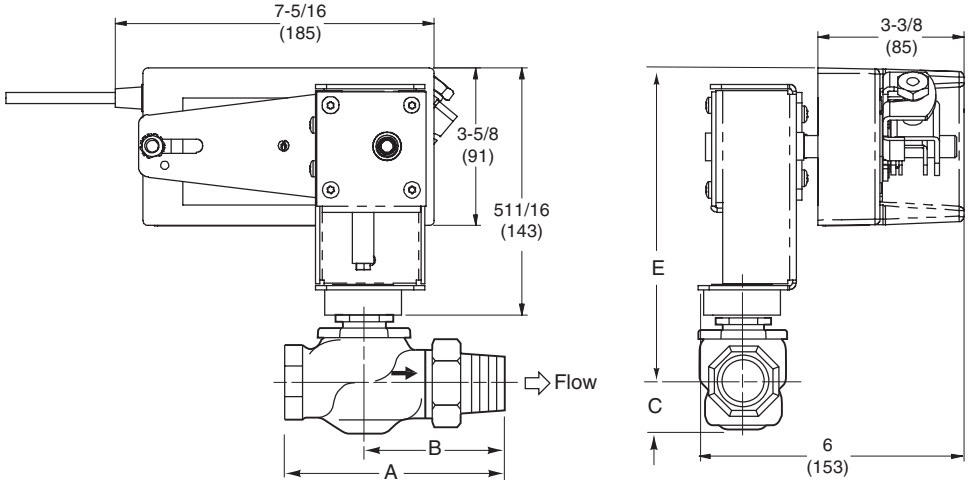
TABLE 5. MX40-6083 and MX40-6153 Dimensions in Inches (Millimeters). Refer to illustrations below.

Valve Assembly Part Number	Valve Size in.	Valve Dimensions in inches (millimeters)			
		Two-Way			
		A	B	C [a]	E
Union Straightway VX-7211-XXX-4-P VX-7221-XXX-4-P	1	6 (152)	3-5/8 (92)	1-1/8 (29)	7-15/16 (202)
	1-1/4	6-1/4 (159)	3-15/16 (100)	1-3/8 (35)	7-9/16 (192)
NPT VX-7213-XXX-4-P VX-7223-XXX-4-P	1	4-5/8 (117)	N/A	1-1/8 (29)	8 (203)
	1-1/4	4-5/8 (117)	N/A	1-3/8 (35)	7-9/16 (192)
	1-1/2	5-3/8 (137)	N/A	1-1/2 (38)	7-3/8 (187)
	2	6-1/8 (156)	N/A	1-9/16 (40)	7-15/16 (202)

[a] These dimensions are for two-way valve assemblies having Cv ratings of 51.0 (3/4"), 177.0 (1-1/2"). or 389.0 (2").



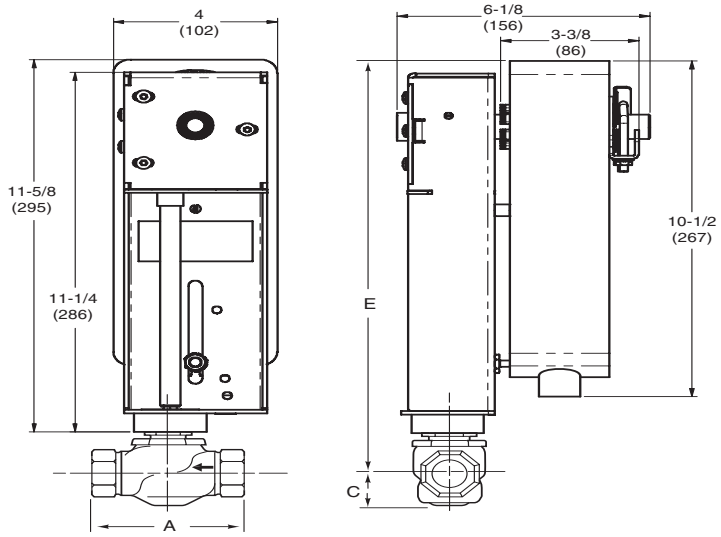
MX40-6083-2XX
MX40-6153-2XX
With Two-Way Globe Valves



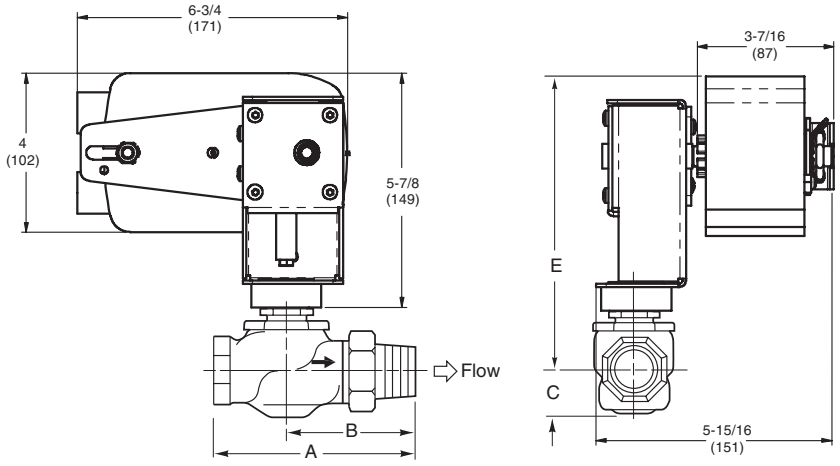
MX40-6083-2XX
MX40-6153-2XX
With Union Straightway
Globe Valve

TABLE 6. MX40-704X-2XX Dimensions in Inches (Millimeters). Refer to illustrations below.

Valve Assembly Part Number	Valve Size in.	Valve Dimensions in inches (millimeters)			
		Two-Way (Refer to following illustrations)			
		A	B	C	E
Union Straightway VX-7211-XXX-4-P VX-7221-XXX-4-P	1/2	4-3/16 (106)	2-11/16 (68)	1-1/16 (27)	6-7/8 (175)
	3/4	4-15/16 (125)	3-3/16 (81)	1-1/16 (27)	6-7/8 (175)
	1	6 (152)	3-5/8 (92)	1-1/8 (29)	7-9/16 (192)
	1-1/4	6-1/4 (159)	3-15/16 (100)	1-3/8 (35)	7-9/16 (192)
NPT VX-7213-XXX-4-P VX-7223-XXX-4-P	1/2	3 (76)	N/A	1-13/16 (30)	6-7/8 (175)
	3/4	3-5/8 (92)	N/A	1-13/16 (30)	6-7/8 (175)
	1	4-5/8 (117)	N/A	1-3/4 (44)	7-9/16 (192)
	1-1/4	4-5/8 (117)	N/A	1-3/4 (44)	7-9/16 (192)
	1-1/2	5-3/8 (137)	N/A	1-1/2 (38)	7-5/8 (194)
	2	6-1/8 (156)	N/A	1-9/16 (40)	7-7/8 (200)



MX40-704X-2XX With Two-Way Globe Valve



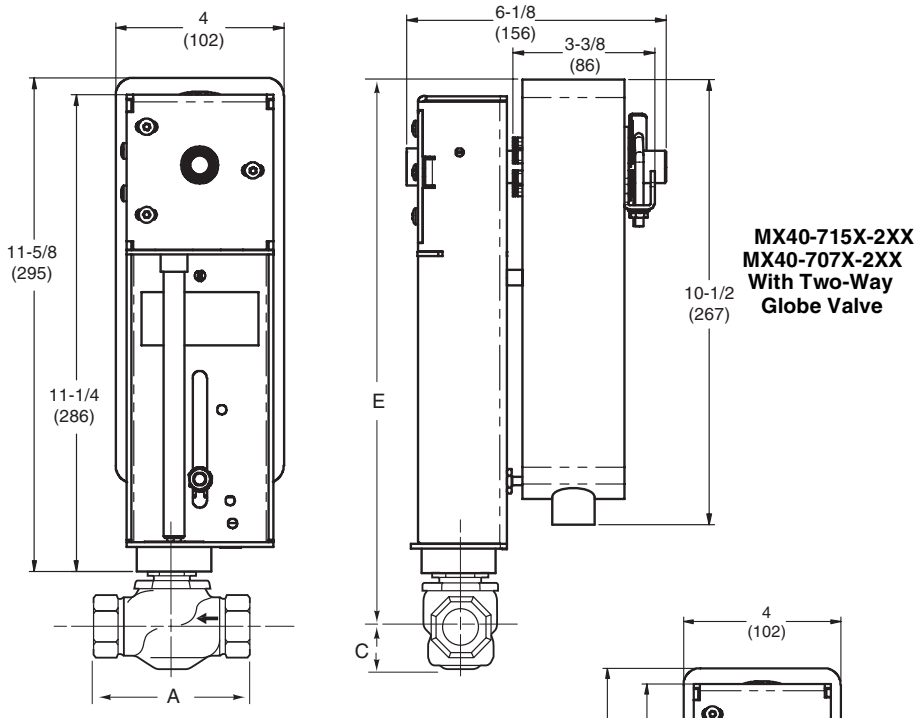
MX40-704X-2XX With Union Straightway Globe Valve

2-Way Globe Valves, Screwed (1/2 to 2 in.), Union Straightway (1/2 to 2 in.) with TAC DuraDrive™ Actuators

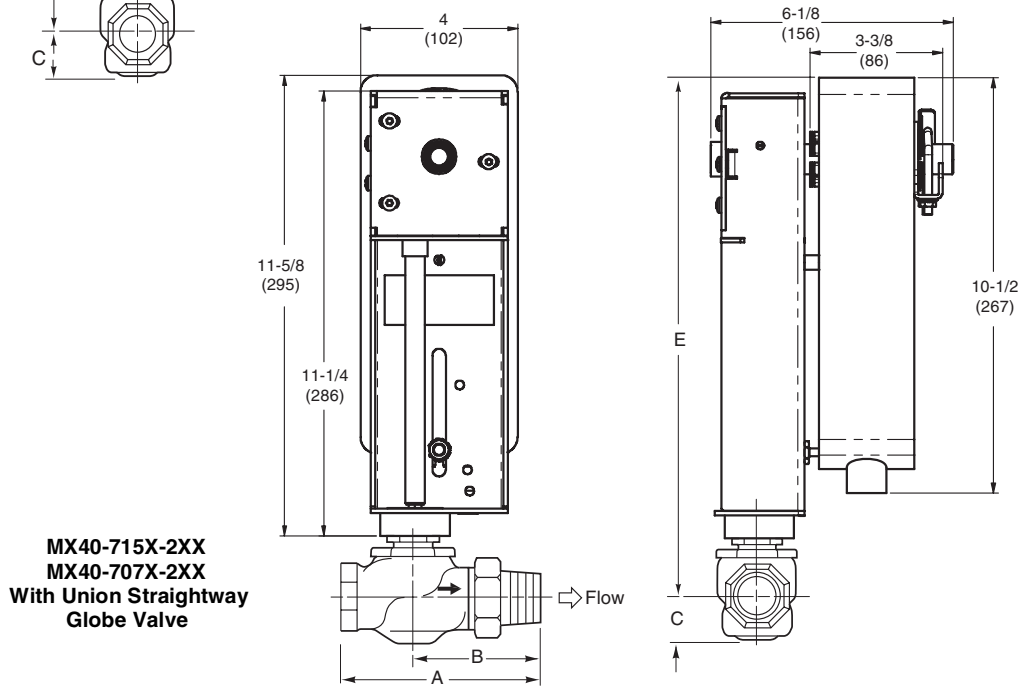
TABLE 7. MX40-715X-2XX and MX40-707X-2XX Dimensions in Inches (Millimeters). Refer to illustrations below.

Valve Assembly Part Number	Valve Size in.	Valve Dimensions in inches (millimeters)			
		Two-Way (Refer to illustrations below)			
		A	B	C [a]	E
Union Straightway VX-7211-XXX-4-P VX-7221-XXX-4-P	1	6 (152)	3-5/8 (92)	1-1/8 (29)	13-7/8 (352)
	1-1/4	6-1/4 (159)	3-15/16 (100)	1-3/8 (35)	12-15/16 (329)
NPT VX-7213-XXX-4-P VX-7223-XXX-4-P	1	4-5/8 (117)	N/A	1-1/8 (29)	13-15/16 (354)
	1-1/4	4-5/8 (117)	N/A	1-3/8 (35)	13-1/2 (343)
	1-1/2	5-3/8 (137)	N/A	1-1/2 (38)	13-5/16 (338)
	2	6-1/8 (156)	N/A	1-9/16 (40)	13-7/8 (352)

[a] These dimensions are for two-way valve assemblies having Cv ratings of 51.0 (3/4"), 177.0 (1-1/2"). or 389.0 (2").

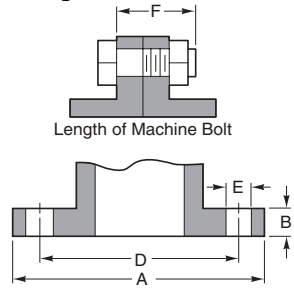


MX40-715X-2XX
MX40-707X-2XX
With Two-Way Globe Valve



MX40-715X-2XX
MX40-707X-2XX
With Union Straightway Globe Valve

American Standard 125 lb. Cast Iron Pipe Flanges.

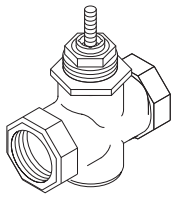


Flange Detail Dimensions in Inches (Metric Conversion 25.4 mm = 1 in.).

Nominal Pipe Size	Flanges		Drilling		Bolting		
	Flange Diameter A	Flange Thickness B	Diameter of Bolt Circle D	Diameter of Bolt Holes E	Number of Bolts	Diameter of Bolts	Length of Machine Bolts F
2-1/2	7	11/16	5-1/2	3/4	4	5/8	2-1/2
3	7-1/2	3/4	6	3/4	4	5/8	2-1/2
4	9	15/16	7-1/2	3/4	8	5/8	3
5	10	15/16	8-1/2	7/8	8	3/4	3
6	11	1	9-1/2	7/8	8	3/4	3-1/4

2-Way Stainless Steel Globe Valves, Screwed (1/2 to 3/4 in.) with Hydraulic, Pneumatic Actuators

TABLE 1. Select Valve Body including P Code. Use Table 2 to select actuator type having sufficient close-off for the application. Use Table 3 to select Actuator Part Number with correct voltage and input signal.

Application
Hot Water 300°F Max. 50 psig (344 kPa) Steam
Screwed NPT


Size		1/2 to 3/4 in.
Normally Closed Valves	Valve Body	VBS-9263-0-4-P
Flow Type		Modified Linear (Refer to page 170)
Material	**Body**	316 Stainless Steel
	Seat	316 Stainless Steel
	Stem	316 Stainless Steel
	Plug	316 Stainless Steel
	Packing	Spring loaded TFE
	Disc	EPDM
ANSI Pressure Class (psig)		250 (up to 400 psig below 150°F, see page 169)
Maximum Inlet Pressure Steam psig (kPa)		50 (344)
Allowable Control Media Temp [a]		20 to 300°F (-7 to 149°C)
Allowable Differential Pressure for Water psig (kPa)[b]		35 psi (241) Max. for normal life (Refer to page 172 for cavitation limits)
Allowable Differential Pressure for Steam		35 psi (241 kPa)

NOTE: These charts are color coded as shown below to assist valve selection. Select actuator, valve linkage and valve body. Example:.

1. **Valve Body: VBS-9263-0-4-31**

   Actuator: MP-5210

   Linkage: AV-600

- ❒ Valve Body Data less P Code (Size, Cv Rating, Port Code) or Valve Assembly less Actuator Code (XXX) and less P Code (Size, Cv Rating, Port Code)
- ❒ P Code (Size, Cv Rating, Port Code)
- ❒ Actuator or Actuator Code (XXX) for Valve Assemblies
- ❒ Valve Linkage

TO SELECT A PORT CODE (P).

P Code[c]	Valve Size in.	Cv[d]
-31	1/2	.10
-33		.22
-34		.30
-01		.40
-35		.75
-36		.95
-02		1.3
-37		1.75
-03		2.2
-38		2.8
-39		3.25
-04		3.6
-45	3/4	4.3
-05		5.0
-06		6.2

[a] CAUTION: Freeze protection required for fluid temperatures below 32°F (0°C). Avoid ice formation on stems. Do not use Hydraulic Actuators with fluid temperatures below 40°F (4°C).

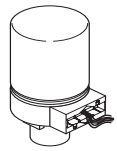
[b] Less than 20 psi recommended for quiet service.

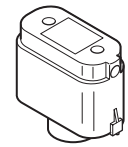
[c] Factory assemblies are not available for two-position applications using reduced port valve bodies.

[d] $k_{vs} = m^3/h$ ($\Delta P = 100$ kPa) $k_{vs} = C_v / 1.158$ $C_v = k_{vs} \times 1.156$

2-Way Stainless Steel Globe Valves, Screwed (1/2 to 3/4 in.) with Hydraulic, Pneumatic Actuators

TABLE 2. Select Actuator Type having sufficient close-off for the application. Also, select valve linkage. See Table 3 for actuator part number having correct voltage and input signal.





Input Signal				Two-Position SPST Floating SPDT	Electronic Vdc 4 to 20 mA 135 Ohm Slidewires	Pneumatic		
Valve Linkage	**1/2 to 3/4 in. Valve**			**AV-600**	**AV-600[a]**	**AV-400**		
Positive Positioner					—	**AK-42309-500**		
Actuator				MF-5X1X MA-521X-XXX	MP-5X1X MPR-5X1X	MK-2690		
Actuator Spring Range in psig					—	3 to 7	5 to 10	8 to 13
N.P.	**Valve Body**	**P Code**	**Size in.**	**ACTUATOR CLOSE-OFF PRESSURE RATING (psi)[b] [c]**				
N.O.	VBS-9263-0-6-P	-01	**1/2**	130	130	15	110	180
		-02						
		-03						
		-04						
		-31						
		-33						
		-34						
		-35						
		-36						
		-37						
		-38						
		-39						
		-05	**3/4**	80	80	—	40	70
		-06						
		45						

[a] MF-5X1X, MP-541X, MPR-5XXX use AV-600 and AV-601. Do not use AV-7400 or AV-7600-1 valve linkages on VBS-9263 valve bodies.

[b] Close-off rated for ANSI IV (.01%) with pressure at inlet (port A). Ratings for normally open valves are with indicated supply air pressure applied to actuator. Ratings for normally closed valves are within 1 psi or less applied to actuator (for kPa multiply C_v by 6.89).

[c] Close-off pressure ratings describe only the differential pressure which the actuator can close-off with adequate seating force. Consult valve body specifications for other limitations.

2-Way Stainless Steel Globe Valves, Screwed (1/2 to 3/4 in.) with Hydraulic, Pneumatic Actuators

TABLE 3. Select Actuator Part Number with correct voltage and input signal..

Input Signal	Voltage Vac 50/60 Hz	VA	Aux. Switch	Actuator Part No.
Two-Position SPST	24	18	No	MA-5213
	120			MA-5210
	240			MA-5211
2 to 15 Vdc. TAC System 8000, stroke occurs 6 to 9 Vdc approx., non-positive positioning	24			MP-5213
	120			MP-5210
	240			MP-5211
2 to 15 Vdc, TAC System 8000, start 6 Vdc factory set, adjustable 2 to 12 Vdc, 3 Vdc span, positive positioning	24			MP-5413
	120			MP-5410
	240			MP-5411
	24	60		MP-371-600
4 to 20 mA	24	18		MPR-5613
	120			MPR-5610
	240			MPR-5611
Floating SPDT	24	21		MF-5413
				MF-5513

TABLE 3A. Pneumatic Actuators, select exact Actuator or Actuator Code (XXX)

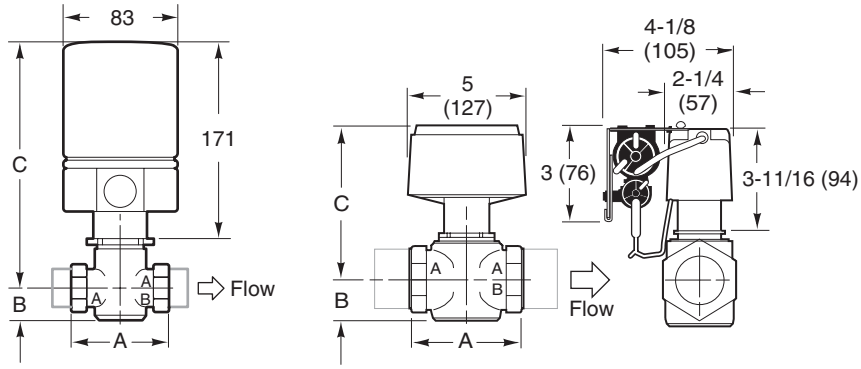
Input Signal[a]	Effective Area Sq. In.	Spring Range (psi)	Actuator Part No.
Pneumatic	6	3 to 7	MK-2690
		5 to 10	
		8 to 13	

TABLE 4. Dimensions in Inches (Millimeters).

Valve Body				Actuator Series	
				MA/MF/MP/ MPR-5XXX[a]	MK-2690
Part Number	Size In.	A	B	E	E
VBS-9263-0-4-P	1/2	3 (76)	1-27/64 (36)	7-13/16 (198)	4-3/4 (121)
	3/4	3-5/8 (92)	1-37/64 (40)	8-5/32 (207)	5-3/32 (129)

[a] Add 2-3/32 in. (53 mm) to the "E" dimension for a valve assembly using an AV-601 linkage extension.

NOTE: Allow 3 inches clearance above actuator for removal. Mount MA/MF/MP/MPR-5XXX actuators above the valve body at 45° from vertical on steam applications.



[a] AV-601 linkage extension (not shown) required for hot water applications for MF-5XXX, MP-54XX, MPR-5XXX, MP-55XX.

TABLE 5. Restrictions on Maximum Ambient Temperature for Valve Actuators.

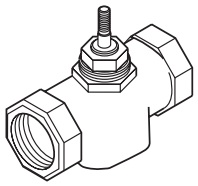
Temperatures °F (°C)					
Actuator Code (XXX)		20X, 21X, 22X		24X, 26X	2XX
Actuator Series		MA-521X-XXX MP-521X-XXX[a]	MA-521X-XXX MP-521X-XXX w/AV-601 Linkage Extension	MPR-561X, MPR-571X, MP-541X, MF-5X1X, MP-551X w/AV-601 Linkage Extension	MK-2690[a]
Maximum Ambient		140 (60)	140 (60)	140 (60)	220 (104)
Max. Allowable Fluid		181 (83)	281 (138)	140 (60)	250 (121
VBS-9263-0-4-P	Max. Allow. Ambient	100 (38)	100 (38)	93 (34)	220 (104)
	Maximum Fluid	340 (171)	340 (171)	340 (171)	250 (121

[a] Actuator condensation can be prevented by use of the "Linkage Extension."

CAUTION: Condensation can facilitate corrosion. Piping insulation must not cover any part of the actuator or mounting nut. With 40°F (4°C) water, the maximum allowable dew point temperature without a linkage extension is 68°F (20°C).

2-Way Ball Valves, Screwed (1/2 to 2 in.) with TAC DuraDrive™ Actuators

TABLE 1. Select Valve Body including P Code (Valve Size, Cv Rating, Port Code) or select Linked Valve Assembly with correct Input Signal (refer to Table 2 and Table 3 also) less Actuator Code (XXX) including the P Code (Size, Cv Rating, Port Code). (Refer to Pages 172 to 179 for Valve Sizing.)

Application
Hot Water 250°F Max. 15 psig (103 kPa) Steam
Screwed NPT


Size		1/2 to 2 in.
Normally Open Valves	Valve Body	VB-2253-0-8-P
Flow Type		Equal Percentage
Material	**Body**	Bronze (ASTM B584-C8440)
	Ball	316 Stainless Steel
	Seat	Multifill Teflon
	Stem	316 Stainless Steel
	Shaft	316 Stainless Steel
	Packing	Multifill Teflon
Maximum Working Pressure[a]		600 psig (4137 kPa)
Seat Leakage		ANSI Class IV (.01%)
STEAM		
Inlet Pressure		15 psig (103 kPa)
Fluid Temperature — Maximum		250°F (121°C)
WATER		
Fluid Temperature	**Minimum**	20°F (-7°C)
	Maximum	250°F (121°C)

NOTE: These charts are color coded as shown below to assist valve selection. Note it is possible to select either a valve assembly or component parts (actuator, valve body with linkage).

1. **Valve Assembly: VB-2253-505-8-P**
2. **Valve Body: VB-2253-0-8-P**

   Actuator: MF40-6043

- ❒ Valve Body Data less P Code (Size, Cv Rating, Port Code) or Valve Assembly less Actuator Code (XXX) and less P Code (Size, Cv Rating, Port Code)
- ❒ P Code (Size, Cv Rating, Port Code)
- ❒ Actuator or Actuator Code (XXX) for Valve Assemblies
- ❒ Valve Linkage

TO SELECT A PORT CODE (P).

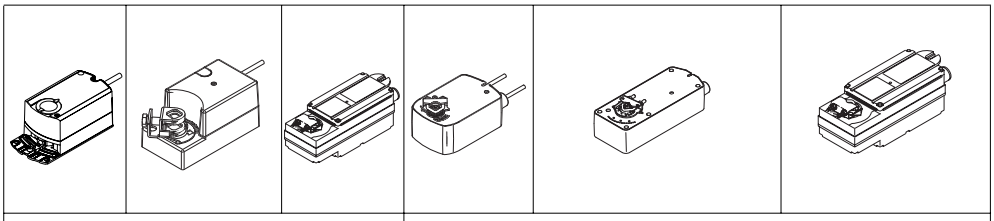
P Code	Valve Size in.	Cv[b]	Kvs[b]
20	1/2	1	0.9
22		2	1.7
24		4	3.5
26		15	13.0
44	3/4	30	26.0
46		51	44.1
54	1	43	37.2
56		68	58.8
64	1-1/4	48	41.5
74	1-1/2	84	72.7
76		177	153
86	2	108	93

[a] Maximum water pressure. Refer to actuator specifications for pressure-temperature ratings.

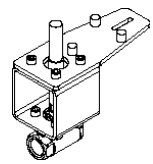
[b] $k_{vs} = m^3/h$ (ΔP = 100 kPa) $k_{vs} = C_v / 1.158$ $C_v = k_{vs} \times 1.156$

2-Way Ball Valves, Screwed (1/2 to 2 in.) with TAC DuraDrive™ Actuators

TABLE 2. Select Actuator Type or Actuator Code (XXX) series with correct Input Signal having sufficient close-off for the application.



				Non-Spring Return [a]				Spring Return					
	Input Signal			Floating and Proportional				SPDT, Floating and Proportional					SPDT
	Ball Valve with Linkage Assembly			VB-2253-505-8-XX	VB-2253-506-8-XX		VB-2253-510-8-XX	VB-2253-506-8-XX	VB-2253-550-8-XX	—		VB-2253-510-8-XX	—
	Normal Position			N.C.				N.O.					
	Valve Assembly Type			VF or VS				VA, VF or VS					VA
	Actuator Code (XXX)			505	506	508	512, 514, 516	532. 533. 534. 535. 536. 537	542, 543, 544, 545, 546, 547	552, 553, 554, 555, 556, 557	562, 563, 564, 565, 566, 567	572, 574, 576	582, 584, 586
	Actuator Types			MF40-6043 MS40-6043	MF40-6083 MS40-6083	MF40-6153 MS40-6153	MF40-6343 MS40-634X	MA40-704X MF40-7043 MS40-7043	MA40-707X MF40-7073 MS40-7073	MA40-715X MF40-7153 MS40-7153		MA40-717X MF40-7173 MS40-717X	MA40-717X
Factory Available Valve Assemblies[a]	P Code	Size in.	Cv	VALID VALVE/ACTUATOR COMBINATIONS[bc]									
VX-2253-XXX-8-P	20	1/2	1	X	X	X	—	X	X	X	—	—	—
	22		2	X	X	X	—	X	X	X	—	—	—
	24		4	X	X	X	—	X	X	X	—	—	—
	26		15	X	X	X	—	X	X	X	—	X	—
	44	3/4	30	—	—	X	—	X	X	X	—	X	—
	46		51	—	—	X	—	X	X	X	—	X	—
	54	1	43	—	—	X	X	—	—	X	—	X	—
	56		68	—	—	—	X	—	—	—	X	X	X
	64	1-1/4	48	—	—	—	X	—	—	X	X	X	—
	74	1-1/2	84	—	—	—	X	—	—	—	X	—	X
	76		177	—	—	—	X	—	—	—	—	—	X
	86	2	108	—	—	—	X	—	—	—	X	—	X



Valve Assembly Part Number	P Code	Valve Size (in.)	C_v [d]	k_{vs} [d]	Ball Valve & Linkage Only (-XXX-)[e]									
VX-2253-XXX-8-P[f]	20	1/2	15	13.0	—	—	—	—	—	—	—	—	—	—
	22		2	1.7	—	—	—	—	—	—	—	—	—	—
	24		4	3.5	—	—	—	—	—	—	—	—	—	—
	26		15	13.0	505	506	506	—	530	550	550	—	510	—
	44	3/4	30	26.0	—	—	506	—	506	550	550	—	510	—
	46		51	44.1	—	—	506	—	506	550	550	—	510	—
	54	1	43	37.2	—	—	506	510	—	—	550	—	510	—
	56		68	58.8	—	—	—	510	—	—	—	—	510	—
	64	1-1/4	48	41.5	—	—	—	510	—	—	550	—	510	—
	74	1-1/2	84	72.7	—	—	—	510	—	—	—	—	—	—
	76		177	153	—	—	—	—	—	—	—	—	—	—
	86	2	108	93	—	—	—	510	—	—	—	—	—	—

[a] Consult price guide for factory available valve assemblies.

[b] Non-spring return two-way ball valve assemblies are shipped normally closed, voltage rise to open.

[c] Seat leakage rating of ANSI class IV (.01%).

[d] $k_{vs} = m^3/h$ (ΔP = 100 kPa) $k_{vs} = C_v / 1.156$ $C_v = k_{vs} \times 1.156$

[e] Part number subcode (-XXX-) listed matching valid actuator/valve combinations in above table.

[f] To determine a specific part number, see the Ball Valve Assembly Part Numbering System,.

Using Pipe Reducers with Two-Way Ball Valve Assemblies

The following table provides estimated effective C_V's when using pipe reducers with two-way ball valve assemblies.

Caution: It is strongly recommended that the valve size not be reduced to less than one-half the line size. Installing a valve that is less than one-half the line size can cause flow disturbances that may result in stress failure at the pipe reduction area.

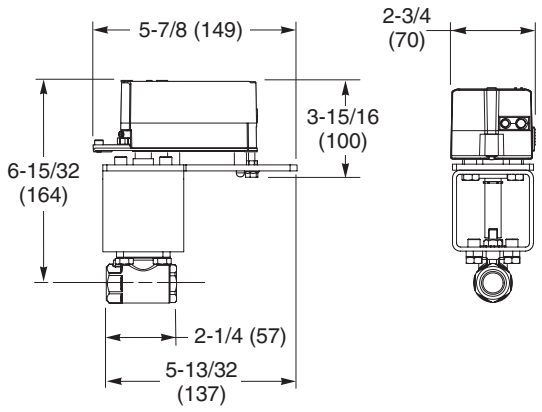
TABLE 3. Estimated Effective C_V when Using Pipe Reducers with Two-Way Ball Valve Assemblies.

Valve Size (in.)	P Code	C_V	Estimated Effective C_V (k_{VS})								
			Pipe Size - inches (NPT)								
			1/2	3/4	1	1-1/4	1-1/2	2	2-1/2	3	4
1/2	**20**	1.0	1.0 (0.9)	1.0 (0.9)	1.0 (0.9)	—	—	—	—	—	—
	22	2.0	2.0 (1.7)	2.0 (1.7)	1.9 (1.6)	—	—	—	—	—	—
	24	4.0	4.0 (3.5)	3.8 (3.3)	3.6 (3.1)	—	—	—	—	—	—
	26	15.0	15.0 (13.0)	8.9 (7.7)	7.1 (6.1)	—	—	—	—	—	—
3/4	**44**	30.0	—	30.0 (26.0)	22 (19.0)	17.0 (14.7)	16 (13.8)	—	—	—	—
	46	51.0	—	51.0 (44.1)	27.0 (23.4)	20.0 (17.3)	17.0 (14.7)	—	—	—	—
1	**54**	43.0	—	—	43.0 (37.2)	36.0 (31.1)	31.0 (26.8)	26.0 (22.5)	—	—	—
	56	68.0	—	—	68.0 (58.8)	48.0 (41.5)	37.0 (32.0)	29.0 (25.1)	—	—	—
1-1/4	**64**	48.0	—	—	—	48.0 (41.5)	45.0 (38.9)	38.0 (32.9)	35.0 (30.3)	—	—
1-1/2	**74**	84.0	—	—	—	—	84.0 (72.7)	70.0 (60.6)	60.0 (51.9)	55.0 (47.6)	—
	76	177.0	—	—	—	—	177.0 (153.1)	102.0 (88.2)	77.0 (66.6)	68.0 (58.8)	—
2	**86**	108.0	—	—	—	—	—	108.0 (93.4)	100.0 (86.5)	92.0 (79.6)	83.0 (71.8)
	88	389.0	—	—	—	—	—	389.0 (336.5)	222.0 (192.0)	160.0 (138.4)	123.0 (106.4)

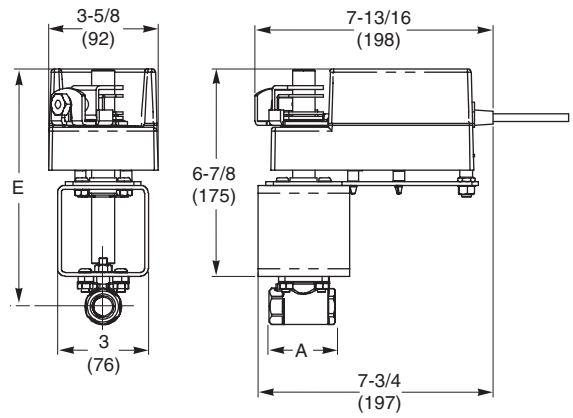
TABLE 4. Dimensions in Inches (Millimeters). (Refer to the following pages for illustrations.)

Ball Valve Assembly Dimensions					
Valve Assembly Part Number	Valve Size in.	Valve Dimensions in inches (millimeter)			
		A	B	C	E
MX40-6083 or MX40-6153					
VX-2253-50X-8-P	1/2	2-1/4 (57)	N/A	N/A	7-13/16 (198)
	3/4	3 (76) 3-1/8 (80)[a]	N/A	N/A	8-3/16 (208) 8-5/16 (211)
	1	3-3/8 (86)	N/A	N/A	8-13/16 (224)
MX40-634X					
VX-2253-XXX-8-P	1	3-3/8 (86) 3-5/8 (92)	N/A	N/A	11-1/16 (281)
	1-1/4	4-3/8 (111)	N/A	N/A	11-13/16 (300)
	1-1/2	4-3/8 (111) 4-3/4 (121)[a]	N/A	N/A	12-9/32 (312)
	2	5/12 (140) 5-3/8 (136)[a]	N/A	N/A	12-9/16 (319)
MX40-704X					
VX-2253-53X-8-P	1/2	2-1/4 (57)	N/A	N/A	7-7/16 (189)
	3/4	3 (76) 3-1/8 (80)	N/A	N/A	7-13/16 (198) 8 (203)
MX40-707X or MX40-715X					
VX-2253-XXX-8-P	1/2	2-1/4 (57)	N/A	N/A	7-13/16 (198)
	3/4	3 (76) 3-1/8 (79)	N/A	N/A	8-1/4 (210) 8-3/8 (213)
	1	3-3/8 (86)	N/A	N/A	8-3/8 (213)
	1-1/4	4-1/16 (103)	N/A	N/A	8-7/8 (225)
MX40-717X					
VX-2253-57X-8-P	1/2	2-1/4 (57)	N/A	N/A	8-3/4 (222)
	3/4	3 (76) 3-1/8 (79)[b]	N/A	N/A	9-3/16 (233) 9-5/16 (237)
	1	3-3/8 (86) 3-5/8 (92)[a]	N/A	N/A	9-5/16 (237) 9-5/8 (244)
	1-1/4	4-1/16 (103)	N/A	N/A	9-3/4 (248)

[a] These dimensions are for two-way valve assemblies having Cv rating of 51.0 (3/4").
[b] These dimensions are for two-way valve assemblies having Cv ratings of 51.0 (3/4"), 68.0 (1").

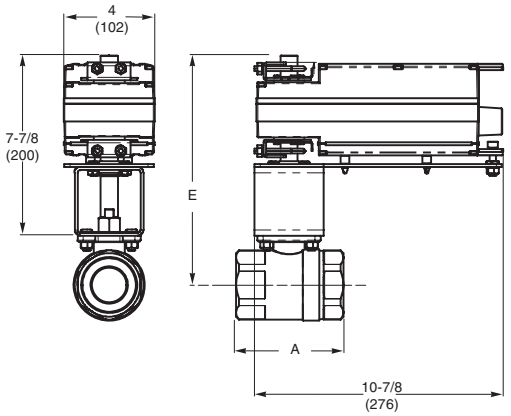


MF40-6043
MS40-6043

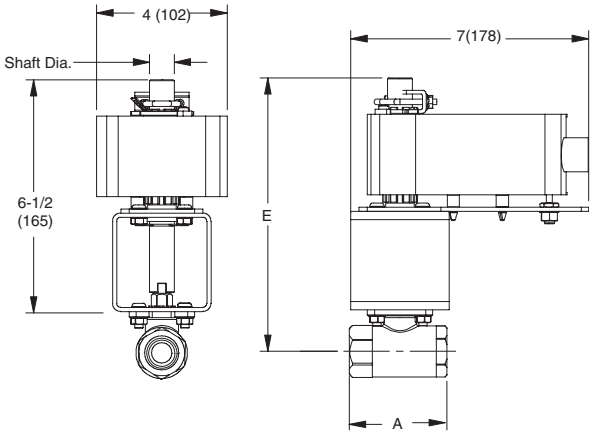


MX40-6083
MX40-6153

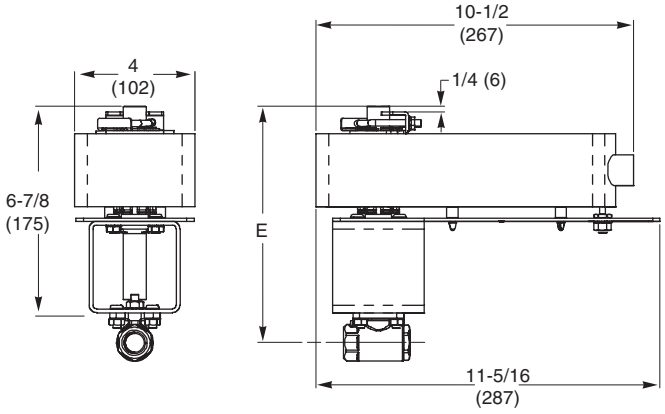
2-Way Ball Valves, Screwed (1/2 to 2 in.) with TAC DuraDrive™ Actuators



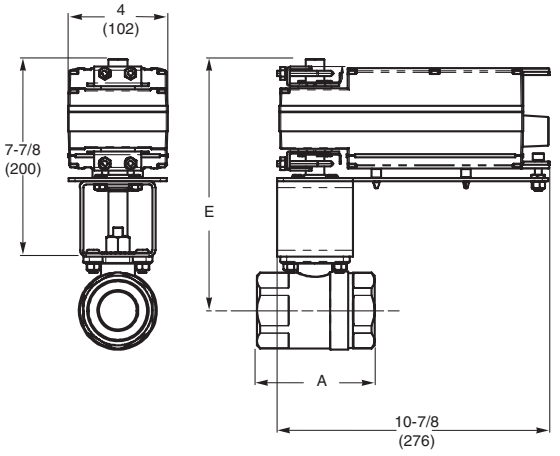
MX40-634X



MX40-704X



MX40-717X
MX40-707X



MX40-717X

2-Way Butterfly Valves, Flangeless (2 to 24 in.) with Electric Gear Train and Pneumatic Actuators

TABLE 1. Select Valve Assembly with correct Input Signal (refer to Table 3, Table 3A and Table 3B also) less Actuator Code (XXX) including the P Code (Size, Cv Rating, Port Code). (Refer to Pages 172 to 179 for Valve Sizing.)

			Application	
			Chilled or Hot Water	
			35 psig Steam	15 psig Steam
			Flangeless Wafer[a]	2 in. -6 in. Lug 8 in. -12 in. Wafer
				
Size			2 to 24 in.	2 to 12 in.
Actuator	Normal Position	Input Signal	Valve Assemblies	
MC-431	None	SPDT	VC-6064-113-2-P	VC-6164-113-2-P
MK4-7121	Normally Open or Closed; specify when ordered	Pneumatic	VK-6064-221-2-P	VK-6164-221-2-P
MK4-7121 and MK-7121		Pneumatic	VK-6064-321-2-P	VK-6164-321-2-P
MP-485	None	Electric (Refer to Table 3B)	VP-6064-103-2-P	VP-6164-103-2-P
MP-9750	None		VP-6065-906-2-P	VP-6165-906-2-P
MP-9810	None		VP-6065-908-2-P	VP-6165-908-2-P
MP-4851	None	Electric (Refer to Table 3B)	VP-6064-442-2-P VP-6065-442-2-P	VP-6164-442-2-P VP-6165-442-2-P
		Flow Type	Equal %	Equal %
		Material — Body	Iron	Iron
		Material — Seat	1.5 to 3% Leakage	EPDM (EPT) Rubber Liner
		Material — Stem	Stainless Steel	Stainless Steel
		Material — Packing	Graphited Teflon	"O" Ring
		Material — Disc	Iron	Aluminum Bronze
		STEAM		
		Pressure psig (kPa) — Static	150 (1034)	150 (1034)
		Pressure psig (kPa) — Inlet	35 (241)	15 (103)
		Pressure psig (kPa) — Recom. Diff	Refer to Table 2	
		Fluid Temp. °F (°C) — Max.	281 (138)	275 (135)
		WATER		
		Pressure psig (kPa) — Static	150 (1034)	150 (1034)
		Pressure psig (kPa) — Recom. Diff.	Refer to Table 2	
		Fluid Temp. °F (°C)[b] — Min.	-10 (-23)	-10 (-23)
		Fluid Temp. °F (°C)[b] — Max.	350 (177)	250 (121)

NOTE: These charts are color coded as shown below to assist valve selection. Note it is only possible to select a valve assembly.

ORDERING EXAMPLES:

1. **Valve Assembly:**
   VK-6164-321-2-16
   - ❒ Valve Assembly
     less Actuator Code (XXX) and less P Code (Size, Cv Rating, Port Code)
   - ❒ P Code (Size, Cv Rating, Port Code)
   - ❒ Actuator Code (XXX) for
     Valve Assemblies

TO SELECT A PORT CODE (P).

P Code	Valve Size in.[c]	Cv[d]	
-11	2	54	47
-12	2-1/2	95	80
-13	3	155	136
-14	4	275	249
-15	5	435	404
-16	6	630	597
-17	8	1115	1200
-18	10	1740	1890
-19	12	2515	2860
-20	14	3013	—
-21	16	4000	—
-22	18	5125	—
-23	20	6390	—
-24	24	9350	—

[a] Flangeless wafer with four alignment holes for mounting between two 125/150 ASA flanges.

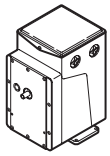
[b] CAUTION: Freeze protection required for fluid temperatures below 32°F (0°C).

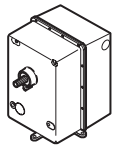
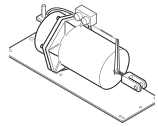
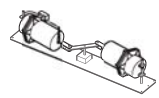
[c] CAUTION: Fittings and/or pipe schedules must meet or exceed working static pressure requirements.

[d] Based on 60° opening for optimum control characteristics.

2-Way Butterfly Valves, Flangeless (2 to 24 in.) with Electric Gear Train and Pneumatic Actuators

TABLE 2. Factory Assemblies, select Actuator Code (XXX) series with correct Input Signal having sufficient close-off for the application.



Input Signal			Refer to Table 3A and Table 3B		Refer to Table 3B		Refer to Table 3A and Table 3B		Pneumatic		Pneumatic	
Actuator Actuator Code (XXX)			MC-431 (113) MP-485 (103) MP-4851 (442)		MP-9750 (906)		MP-9810 (908)		MK4-7121 (221)[a]		MK4-7121 and MK-7121 (321)[a]	
Valve Assemblies	**P Code**	**Size in.**	**Close-Off (psi) 0°[b]**	**Max. Recom. Diff. Press. Full Open (psi) (60°)**	**Close-Off (psi) 0°[b]**	**Max. Recom. Diff. Press. Full Open (psi) (60°)**	**Close-Off (psi) 0°[b]**	**Max. Recom. Diff. Press. Full Open (psi) (60°)**	**Close-Off (psi) 0°[b]**	**Max. Recom. Diff. Press. Full Open (psi) (60°)**	**Close-Off (psi) 0°[b]**	**Max. Recom. Diff. Press. Full Open (psi) (60°)**
VC-6064-113-2-P VK-6064-221-2-P VK-6064-321-2-P VP-6064-103-2-P VP-6065-906-2-P VP-6065-908-2-P	-11	**2**	150	3.8[c]	—	—	—	—	150	3.8[c]	—	—
	-12	**2-1/2**		2.5[c]	—	—	—	—		2.5[c]	—	—
	-13	**3**		2.2[c]	—	—	—	—		2.2[c]	—	—
	-14	**4**	125	2.1[c]	—	—	—	—	125	2.1[c]	—	—
	-15	**5**	100		—	—	—	—	100		—	—
	-16	**6**	50	2.0[c]	—	—	—	—	80	2.0	—	—
	-17	**8**	30	1.9[c]	90	1.9[c]	90	1.9[c]	83	1.9[c]	90	1.9[c]
	-18	**10**	25	1.6[c]	70	2.0[c]	70	2.0[c]	36	2.0[c]	70	2.0[c]
	-19	**12**	15	1.0[c]	50	1.9[c]	50	1.9[c]	27	1.9[c]	50	1.9[c]
	-20	**14**	10	0.7[c]	30	2.0[c]	30	2.0[c]	16	1.7	30	2.0[c]
	-21	**16**	—	—		1.7	40	2.0[c]	13	1.2	27	
	-22	**18**	—	—	20	1.1	30	1.9	—	—	17	1.8
	-23	**20**	—	—	15	0.8	25	1.4	—	—	13	1.4
	-24	**24**	—	—	10	0.5	15	0.8	—	—	8	0.8
VC-6164-113-2-P VK-6164-221-2-P VK-6164-321-2-P VP-6164-103-2-P VP-6165-906-2-P VP-6165-908-2-P	-11	**2**	50[d]	2.8[c]	—	—	—	—	50[d]	5.0[c]	—	—
	-12	**2-1/2**		3.7[c]	—	—	—	—		3.5[c]	—	—
	-13	**3**		3.0[c]	—	—	—	—		2.8[c]	—	—
	-14	**4**		2.2[c]		2.2[c]	—	—		2.5[c]	—	—
	-15	**5**		1.4[c]	50[d]	1.4[c]		1.4[c]		2.4[c]	—	—
	-16	**6**	—	—		1.3[c]	50[d]	1.3[c]		2.3[c]	50[d]	2.3[c]
	-17	**8**	—	—		1.3[c]		1.3[c]	—	—		1.7[c]
	-18	**10**	—	—	—	—	25[d e]		—	—	Consult Factory	Consult Factory
	-19	**12**	—	—	—	—		1.3[c]	—	—		

[a] Ratings based on 20 psi main pressure.

[b] For steam applications close-off ratings are 35 psig metal seat / 15 psig rubber lined maximum unless listed close-off is lower.

[c] Based on 10 ft./sec. fluid velocity. Contact factory concerning higher rating.

[d] Bubble tight.

[e] Based on wet service.

TABLE 3. Factory Assemblies (VK-6X64), Pneumatic Input, select exact Actuator Code (XXX).

Input Signal	Normal Position	Effective Area	Spring Range (psig)	Positive Positioner	Actuator(s)	Actuator Code (XXX) for Factory Available Assembly
Pneumatic	N.O. or N.C. specify when ordered	20 sq. in.	8 to 13	Yes	MK4-7121	221
		40 sq. in.			MK4-7121 and MK-7121	321

TABLE 3A. Factory Assemblies (VC-6X64), SPDT (Snap Acting) Input, select exact Actuator Code (XXX).

Input Signal	Normal Position	Voltage Vac	Hz	VA	Auxiliary Switch	Actuator	Actuator Code (XXX) for Factory Available Assembly
SPDT Snap Acting	None	120	60	96	Yes	MC-431	113

TABLE 3B. Factory Assemblies VP-6X6X), Multiple Input (refer to table below), select exact Actuator Code (XXX). Any 220 lb-in. MP-3XX, MP-4XX, or MP-9XXX electric gear train actuator can be assembled to valve bodies with the close-off pressure ratings listed in Table 2. Select Actuator Type having sufficient close-off for the application. Select actuator, linkage, valve body and field assemble.

Normal Position	INPUT SIGNAL							Voltage Vac (Hz)	Aux. Switch	Actuator Part Number	Actuator Code (XXX) for Factory Avail. Assem.
	2 to 15 Vdc TAC System 8000	4 to 20 mA etc.	Slidewire (Series 90)	SPST	SPDT Snap Acting	Pneumatic	SPDT Floating Direct Digital Control				
None	1	2, 8	3	—	Yes	4, 9	Yes	120 (60)	Yes	MP-485	103
										MP-9750	906
	6	2	7			4				MP-9810	908

1. Requires CP-8301-120, CP-9301 or CP-9302 ordered separately.
2. Requires CP-8391-716 or CP-9302 ordered separately.
3. Requires AE-504 ordered separately.
4. Requires CP-8391-716 or CP-9302 and PP-8311.
6. Requires CP-8391-456 or CP-930X ordered separately.
7. Requires AE-504 and AM-345 ordered separately.
8. Requires CP-8391-910 or CP-9302 ordered separately.
9. Requires CP-8391-910 or CP-9302 and PP-8311 ordered separately.

TABLE 4. Optional Input signal Interface to Pneumatic.

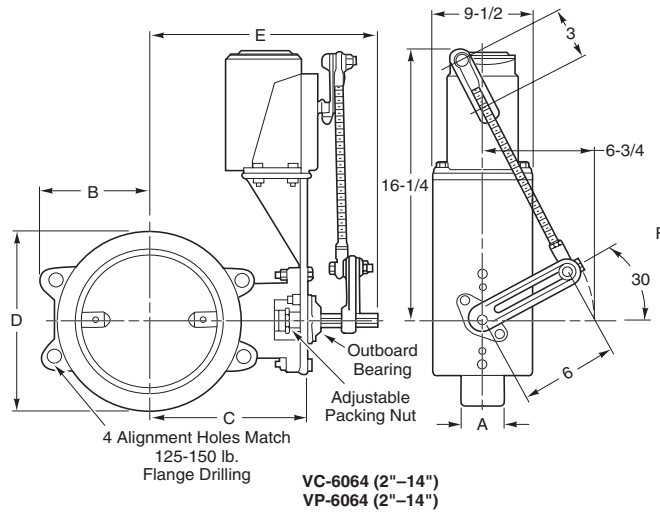
Input Signal Type	Interface Module Required
Two-Position, SPST (Electric)	AL-1XX
Two-Position, SPDT Snap Acting (Electric)	AL-1XX
Voltage 2 to 15 Vdc, TAC System 8000	CP-8511-XXX
Current Input 4 to 20 mA etc.	CP-8511-XXX, CP-8551

2-Way Butterfly Valves, Flangeless (2 to 24 in.) with Electric Gear Train and Pneumatic Actuators

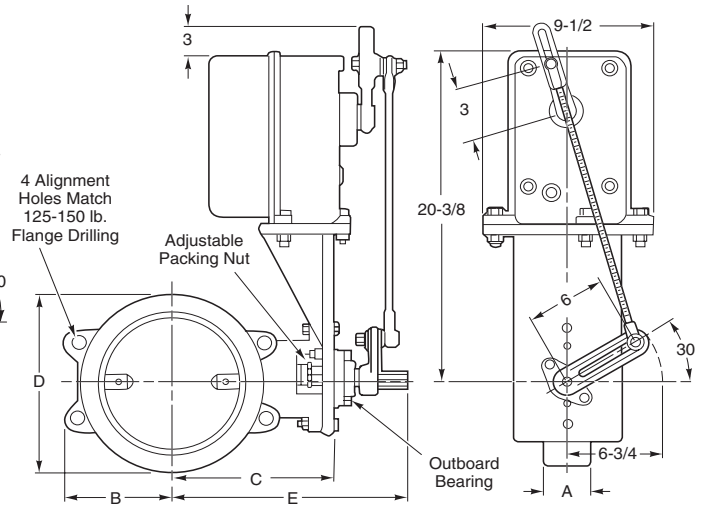
TABLE 5. Dimensions in Inches (Millimeters). (Refer to page 63)

Valve						
Part Number	**Size**	**A**	**B**	**C**	**D**	**E**
VC-6064 VK-6064 VP-6064 VP-6065	**2**	1-1/2 (38)	2-3/4 (70)	5-3/8 (137)	3-7/8 (98)	10-1/2 (267)
	2-1/2		3 (76)	5-5/8 (143)	4-5/8 (118)	10-3/4 (273)
	3		3-1/8 (79)	5-7/8 (149)	5-1/4 (133)	11 (279)
	4		4-1/4 (108)	6-3/8 (162)	6-3/8 (162)	11-5/8 (295)
	5		4-7/8 (129)	6-7/8 (175)	7-1/2 (191)	12-1/8 (308)
	6		5-3/8 (137)	7-3/8 (187)	8-1/2 (216)	12-5/8 (321)
	8	1-7/8 (48)	6-1/2 (165)	9-5/8 (244)	10-3/4 (273)	15-3/8 (391)
	10		8 (203)	10-5/8 (270)	13 (330)	16-3/8 (416)
	12		9-1/2 (241)	11-5/8 (295)	15-1/4 (387)	17-3/8 (441)
	14		10-1/2 (267)	12-1/8 (308)	16-3/8 (416)	17-7/8 (454)
	16	2-3/8 (60)	12-3/4 (324)	14-1/2 (368)	18-1/4 (464)	20-1/4 (514)
	18		13-7/8 (352)	15-1/2 (394)	20-3/4 (527)	21-1/4 (565)
	20		14-7/8 (378)	16-1/2 (419)	22-3/4 (578)	22-1/4 (565)
	24		17-1/4 (438)	18-1/2 (470)	27 (686)	23-1/4 (591)
VC-6164 VK-6164 VP-6164 VP-6165	**2**	1-5/8 (41)	2-7/8 (73	5-3/4 (146)	6-1/8 (156)	—
	2-1/2	1-3/4 (45)	3-1/8 (79)	6-1/4 (159)	6-7/8 (175)	—
	3		3-1/2 (89)	6-1/2 (165)	7-1/4 (184)	—
	4	2 (51)	4-1/2 (114)	7-1/4 (184)	8-3/4 (222)	—
	5	2-1/8 (54)	5-5/8 (143)	7-3/4 (197)	9-7/8 (251)	—
	6		6-1/4 (159)	8-3/4 (222)	11 (279)	—
	8	2-3/8 (60)	7-7/8 (200)	9-5/8 (245)	12 (305)	—
	10	2-3/4 (70)	9-1/4 (235)	11 (279)	14-1/2 (368)	—
	12	3 (76)	10-5/8 (270)	12-1/2 (318)	16-1/8 (410)	—

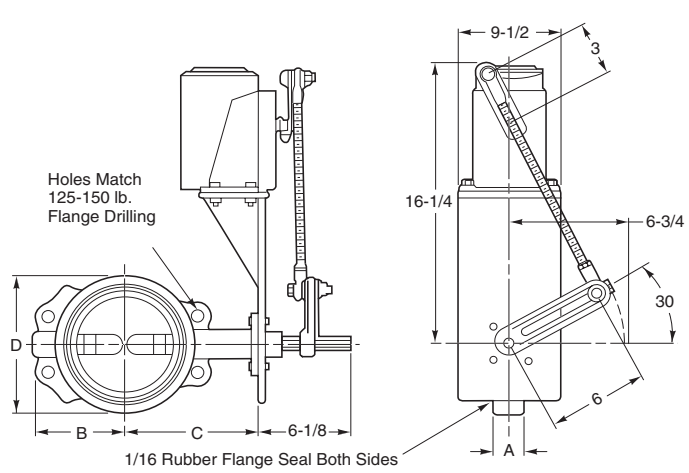
2-Way Butterfly Valves, Flangeless (2 to 24 in.) with Electric Gear Train and Pneumatic Actuators



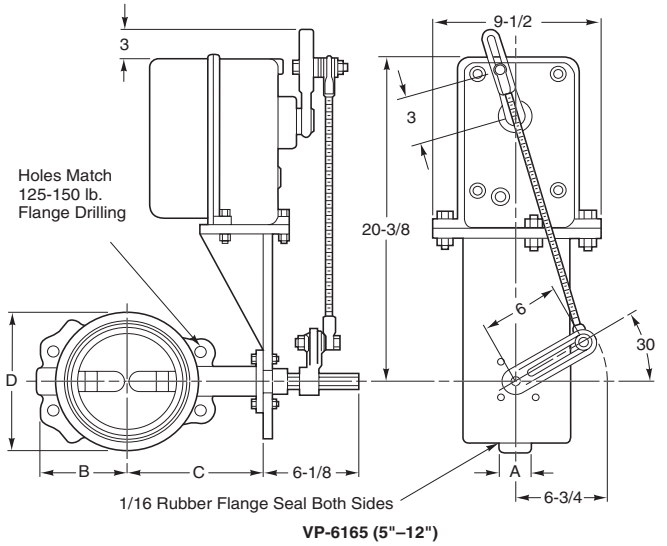
VC-6064 (2"–14")
VP-6064 (2"–14")



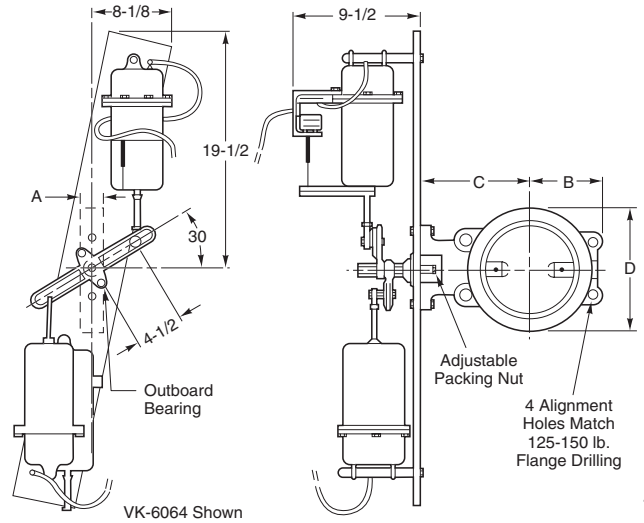
VP-6065 (8"–24")



VC-6164 (2"–5")
VP-6164 (2"–5")

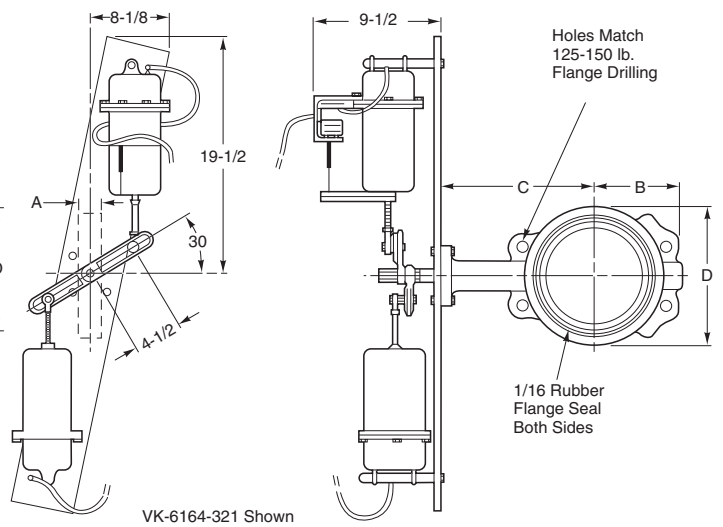


VP-6165 (5"–12")



VK-6064 Shown
(VK-6064-221 Have One Actuator)

VK-6064-221 (2"–16")
VK-6064-321 (8"–24")



VK-6164-321 Shown
(VK-6164-221 Have One Actuator)

VK-6164-221 (2"–6")
VK-6164-321 (6"–8")

2-Way Zone Valves, Brass Threaded, Sweat, Flare, Inverted Flare (1/2 to 1-1/4 in.) with Electric Actuators

Part Numbering System

Two Position, Spring Return Actuator Zone Valve

Body Type & Temperature
T = On/Off (General)
S = On/Off (Steam)
High temperature actuator must be used.

Configuration
2 = 2-Way

Valve Size
2 = 1/2"
3 = 3/4"
4 = 1"
5= 1-1/4"

Connection Type	Availability
1 = Sweat	1/2", 3/4", 1", 1-1/4"
2 = Threaded NPT	1/2", 3/4", 1"
3 = Threaded Rp	1/2", 3/4", 1"
4 = Inverted Flare (Retrofit) 3	3/4"
5 = SAE Flare	1/2"

CV Size

No.	2-way	Size	Connection Type
1 =	1.0	1/2"	1, 2, 3, 5
		3/4"	4
2 =	2.5	1/2"	1, 2, 3, 5
		3/4"	1, 2, 3, 4
3 =	3.5	1/2"	1, 2, 3, 5
		3/4"	1, 2, 3, 4
		1"	1
5 =	5.0	3/4"	1, 2, 3
		1"	1
7 =	7.5	3/4"	1, 2, 3
	8.0	1"	1, 2, 3
		1-1/4"	1

Options
0 = No Options
A = End Switch (required with terminal block)

Electrical Leads
00 = 6" Motor Wires
01 = Terminal Block with End Switch (General Temp., 24 VAC only)
02 = 18" (Standard) Wire Leads

Voltage
A = 24 VAC, 50/60 HZ
B = 110/120 VAC, 50/60 HZ
D = 208 VAC, 60 HZ (High Temp only)
T = 277 VAC, 50/60 HZ (High Temp only)
U = 220/230 VAC, 50/60 HZ

Temperature Ratings
3 = General Temperature
4 = High Temperature

Spring Return
1 = Normally Closed
2 = Normally Open

Actuator Type
G = On/Off (General Close-Off)
H = On/Off (High Close-off)

1 When ordering valve body only: use the first six positions to configure the valve.

2 When ordering actuator only: use the last seven positions to configure the actuator. Prefex with the letter "A".

3 TAC inverted flare fittings must be ordered separately. See actuator accessories for fitting part numbers.

4 All voltages UL Listed or Recognized except 24 V 50 Hz.

Body & Actuator Combination Requirements

Temperature Configurations

Body Configuration
V T X X X X

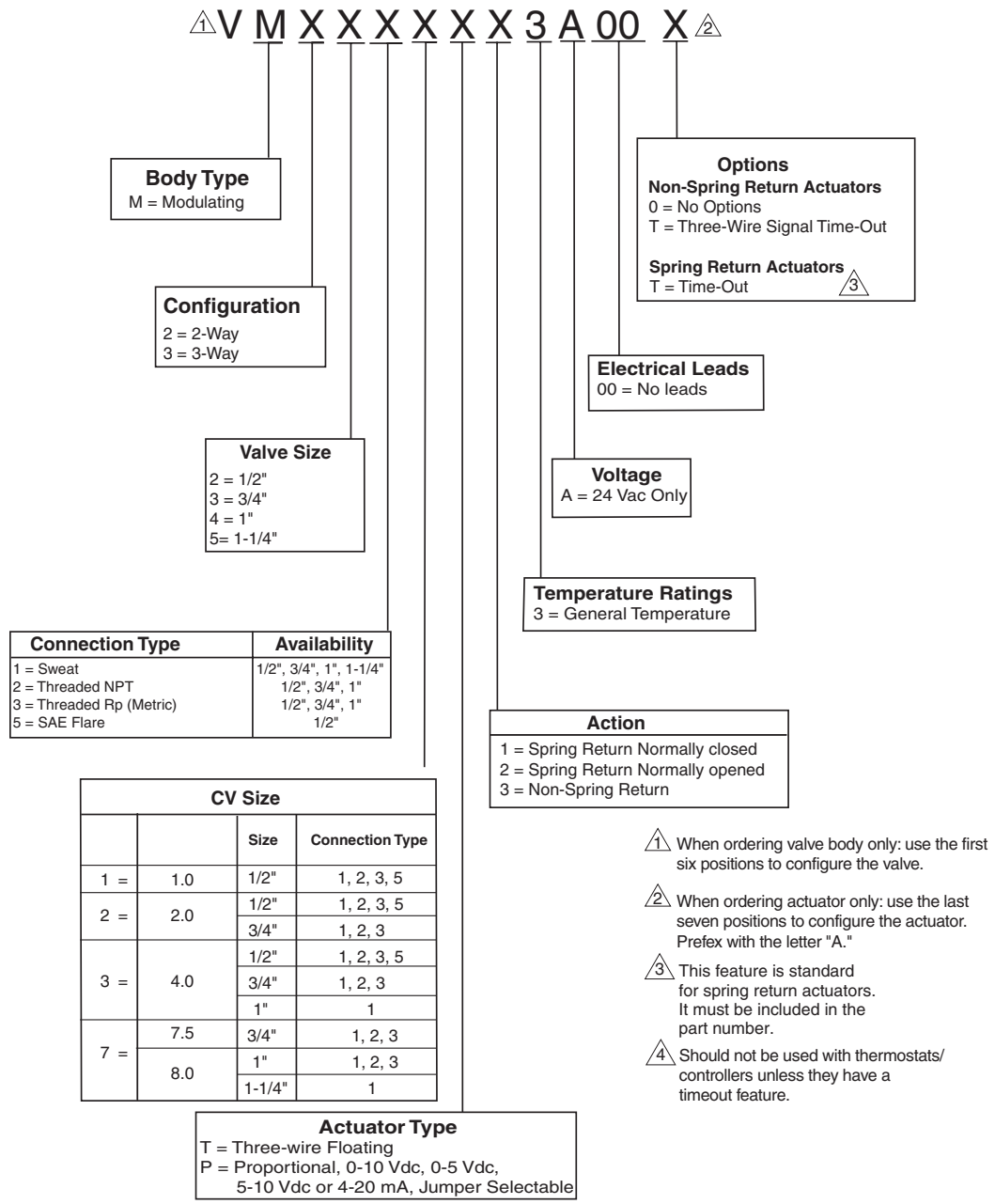
T = General
S = Steam
If body configuration is T, actuator temp rating can be 3 or 4.
If body configuration is S, actuator temp rating must be 4.

Actuator Spring Return Mode
A X X 3 A X X X

3 = General Temperature
4 = High Temperature
If actuator temp rating is 3, body style must be T.
If actuator temp rating is 4, body style can be S or T.

Part Numbering System
Modulating Spring and Non-Spring Return Zone Valve

Part Numbering System
Modulating Spring and Non-Spring Return Zone Valves



1 When ordering valve body only: use the first six positions to configure the valve.

2 When ordering actuator only: use the last seven positions to configure the actuator. Prefex with the letter "A."

3 This feature is standard for spring return actuators. It must be included in the part number.

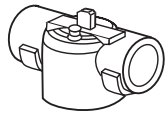
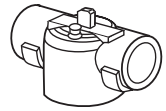
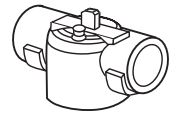
4 Should not be used with thermostats/ controllers unless they have a timeout feature.

Available Actuators

Part Number	Action	Position	Actuator Type	Option
AT13A00T	Spring Return	N.C.	Three Wire Floating	With Time-Out
AT23A00T	Spring Return	N.O.	Three Wire Floating	With Time-Out
AT33A000	Non-Spring Return		Three Wire Floating	None 4
AT33A00T	Non-Spring Return		Three Wire Floating	With Time-Out
AP13A000	Spring Return	N.C.	Proportional	None
AP23A000	Spring Return	N.O.	Proportional	None
AP33A000	Non-Spring Return		Proportional	None

2-Way Zone Valves, Brass Threaded, Sweat, Flare, Inverted Flare (1/2 to 1-1/4 in.) with Electric Actuators

TABLE 1. Select Valve Body (Valve Size, Cv Rating, Configuration) less actuator or select Valve Assembly with correct Input Signal (Refer to Pages 172 to 179 for Valve Sizing).

		Application		
		200°F (93°C)	260°F (151°C)	200°F (93°C)
				
Size		1/2 to 1-1/4 in.		
Valve Body		VT2XXX	VS2XXX	VM2XXX
Flow Type		On/Off		Modulating
Material	**Body**	Forged Brass		
	Seat	Brass		
	Stem	Nickel Plated Brass		
	Paddle/Plug	Buna N	Highly Saturated Nitrile	
Maximum Static Pressure		300 psi (2068 kPa)		
Maximum Inlet Pressure Steam		—	15 psi (103 kPa)	—

NOTE: These charts are color coded as shown below to assist valve selection. Note it is only possible to select a valve assembly or component parts (actuator, valve body).

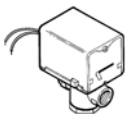
ORDERING EXAMPLES:

1. **Valve Assembly:**
   VT2215G13B02

❒ Valve Body: VT2215

❒ Actuator: G13B02

TABLE 2. Use the zone valve numbering system on pages 64 and 65 to configure the valve body. Select the actuator type with correct input signal and having sufficient close-off for the application. Use the zone valve numbering system on pages 64 and 65 to configure the actuator or the valve/actuator assembly.




Actuator		AGXXXXXX		AHXXXXXX		AX33A00X		AXX3A00X		
Input Signal		2 Position SPST		2 Position SPST		ATXXXXXX = 24 Vac Three Wire Floating APXXXXXX = Jumper Selectable: 0 to 10V, 4 to 20 mA, 0 to 5 Vdc or 5 to 10 Vdc				
Voltage Impedance		—		—		Voltage 200KΩ Current 300K Ω		Open/Close Current 3.9K Ω		
		ACTUATOR CLOSE-OFF PRESSURE RATING - PSI (kPa)[a] [b]								
Valve Body	**Size in.**	**Cv (Kv)**	**Close-off ΔP (kPa)**	**Cv (Kv)**	**Close-off ΔP (kPa)**	**Cv (Kv)**	**Close-off ΔP (kPa)**	**Cv (Kv)**	**Close-off ΔP (kPa)**	
									Non-Spring Return Driven Closed	**Spring Return Spring Closed**
VT22X1	1/2	1.0 (0.9)	60 (414)	1.0 (0.9)	75 (517)	—	—	—	—	—
VT23X1	3/4									
VT22X2	1/2	2.5 (2.2)	40 (276)	2.5 (2.2)	50 (344)					
VT23X2	3/4									
VT22X3	1/2	3.5 (3.0)	25 (172)	3.5 (3.0)	30 (208)					
VT23X3	3/4									
VT2413	1									
VT23X5	3/4	5.0 (4.3)	17 (117)	5.0 (4.3)	25 (172)					
VT2415	1									
VT23X7	3/4	7.5 (6.5)	17 (117)	7.5 (6.5)	20 (137)					
VT24X7	1	8.0 (7.5)	17 (117)	8.0 (6.9)	20 (137)					
VT2517	1-1/4									
VS22X1	1/2	1.0 (0.9)	60 (414)	1.0 (0.9)	75 (517)					
VS23X1	3/4									
VS22X2	1/2	2.5 (2.2)	40 (276)	2.5 (2.2)	50 (344)					
VS23X2	3/4									
VS22X3	1/2	3.5 (3.0)	25 (172)	3.5 (3.0)	30 (208)					
VS23X3	3/4									
VS2413	1									
VS23X5	3/4	5.0 (4.3)	20 (137)	5.0 (4.3)	25 (172)					
VS2415	1									
VS23X7	3/4	7.5 (6.5)	17 (117)	7.5 (6.5)	20 (137)					
VS24X7	1	8.0 (7.5)	17 (117)	8.0 (6.9)	20 (137)					
VS2517	1-1/4									
VM22X1	1/2	—	—	—	—	1.0 (0.9)	50 (344)	1.0 (0.9)	50 (344)	50 (344)
VM23X1	3/4									
VM22X2	1/2					2.0 (1.8)	50 (344)	2.0 (1.7)	50 (344)	20 (137)
VM23X2	3/4									
VM22X3	1/2					4.0 (3.5)	35 (242)	4.0 (3.5)	35 (242)	20 (137)
VM23X3	3/4									
VM2413	1									
VM23X7	3/4					7.5 (6.5)	35 (242)	7.5 (6.5)	35 (242)	15 (103)
VM24X7	1					8.0 (7.5)	35 (242)	8.0 (6.9)		
VM2517	1-1/4									

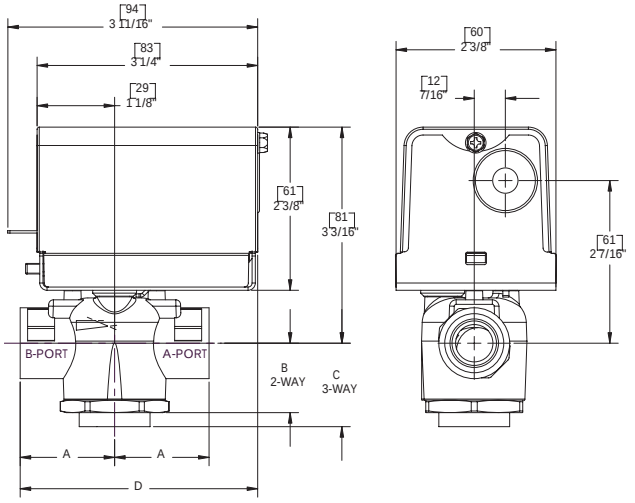
[a] Close-off rated for ANSI IV (.01%) with pressure at inlet (port B).

[b] Close-off pressure ratings describe only the differential pressure which the actuator can close-off with adequate seating force. Consult valve body specifications for other limitations.

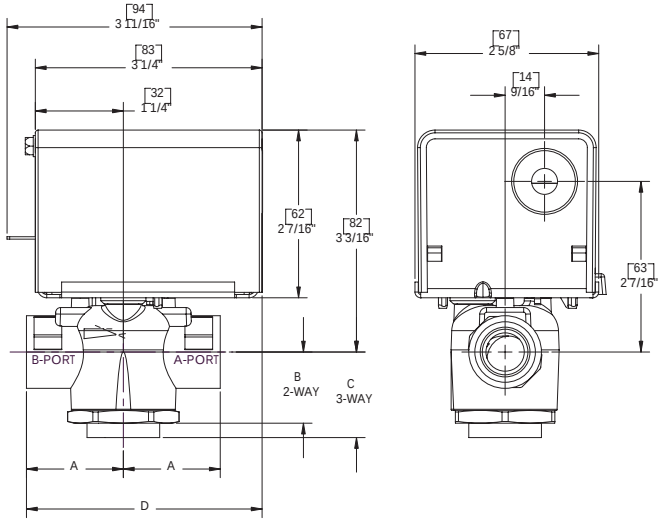
2-Way Zone Valves, Brass Threaded, Sweat, Flare, Inverted Flare (1/2 to 1-1/4 in.) with Electric Actuators

TABLE 3. Dimensions in Inches (Millimeters).

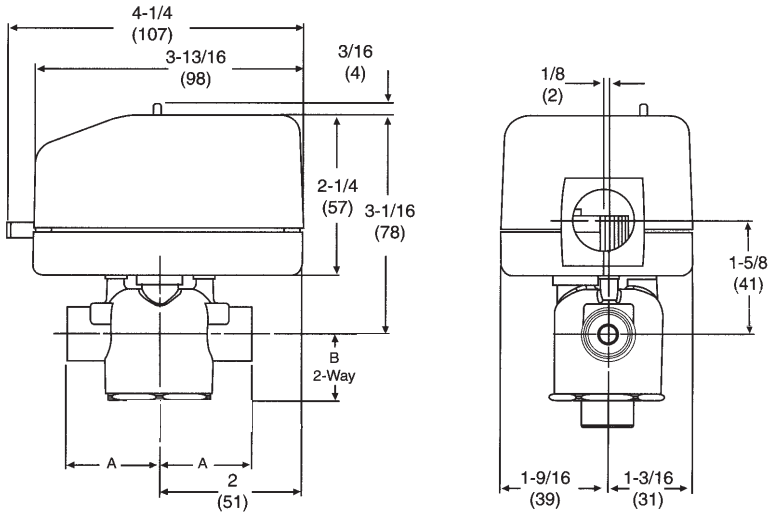
Valve Body				Actuator Series		
				AGXXXXXX	AHXXXXXX	AX33A00X AXX3A00X
Part Number	Size In.	A	B	D	D	D
VTXXXX VSXXXX VMXXXX	1/2 Sweat	1.29 (33)	0.9 (23)	3.30 (84)	3.62 (92)	—
	3/4 Sweat	1.37 (35)	0.9 (23)	3.38 (86)	3.74 (95)	—
	1 Sweat	1.69 (43)	0.9 (23)	3.62 (92)	4.0 (102)	—
	1-1/4 Sweat	1.85 (47)	1 (25)	3.70 (94)	4.13 (105)	—
	1/2 NPT, Rp	1.37 (35)	0.9 (23)	3.38 (86)	3.62 (92)	—
	3/4 NPT, Rp	1.69 (43)	0.9 (23)	3.62 (92)	4.0 (102)	—
	1 NPT Rp	1.85 (47)	1 (25)	3.70 (94)	4.13 (105)	—
	1/2 SAE Flare	2.24	0.31 (8)	—	—	—
VTXXXX VSXXXX	3/4 Inverted Flare	A1: 2.20 (56) / A2: 1.32 (34)	0.9 (23)	3.38 (86)	3.62 (92)	—



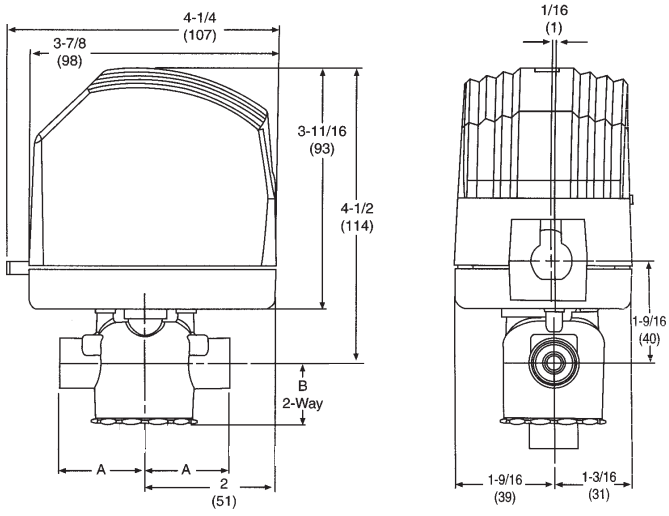
VT2XXXGXXXXXX



VS2XXXHXXXXX



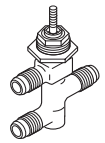
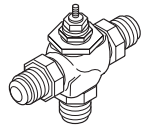
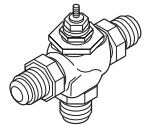
VM2XXXX33A00X



VM2XXXXX3A00X

3-Way Mixing and Sequencing Globe Valves, Flared (5/8 in. O.D.) with Electric, Hydraulic, and Pneumatic Actuators

TABLE 1. Select Valve Body including P Code (Valve Size, Cv Rating, Port Code) or select Valve Assembly with correct Input Signal (refer to Table 3 and Table 3A also) less Actuator Code (XXX) including the P Code (Size, Cv Rating, Port Code). (Refer to Pages 172 to 179 for Valve Sizing.)

		Application		
		Chilled or Hot Water		
		Flared	Flared	Flared
				
Size		**1/2 in. O.D. Tube SAE Flare**	**5/8 in. O.D., SAE Flare**	**5/8 in. O.D., SAE Flare**
Valve Body		**VB-324-0-5-4**	**VB-7312-0-4-P**	**VB-7332-0-4-P**
Valve Assembly Floating SPDT		VF-3249-2XX-5-4	VF-7312-XXX-4-P	—
Valve Assembly Pneumatic Input		VK-3249-2XX-5-4	VK-7312-XXX-4-P	VK-7332-XXX-4-P
Valve Assembly 2 to 15 Vdc TAC System 8000 Input. 4 to 20 mA. 0 to 10 mA		VS-3249-2XX-5-4	VS-7312-XXX-4-P	VS-7332-XXX-4-P
Valve Assembly Two-Position SPST		VA-3249-2XX-5-4	VA-7312-XXX-4-P	—
Flow Type		3-Way Mixing, Top Port Normally Closed, Bottom Port Normally Open	Mixing	Sequencing
Material	**Body**	Brass	Bronze	Bronze
	Seat	Brass	Bronze	Bronze
	Stem	Stainless Steel	Stainless Steel	Stainless Steel
	Plug	Brass	Brass	Brass
	Packing	PTFE	Spring Loaded TFE	Spring Loaded TFE
	Disc	None	None	None
ANSI Pressure Class (psig)[a]		250 (Refer to page 169)		
Allowable Control Media Temp [b]		20 to 281°F (-7 to 138°C)		20 to 281°F (-7 to 138°C)
Allowable Differential Pressure for Water psig (kPa)[c]			35 psi (241) max. for normal life (See page 172 for cavitation limits)	

TO SELECT A PORT CODE (P).

P Code	Valve Size in.[d]	Cv[e]		
-2 [d]	1/2 or 5/8	—	2.2	—
-3		—	—	2.2
-4		1.5	4.4	4.4

NOTE: These charts are color coded as shown below to assist valve selection. Note it is possible to select either a valve assembly or component parts (actuator, valve linkage, valve body).

1. **Valve Assembly . .** VS-7312-211-4-2
2. **Valve Body . . . . .** VB-7312-0-4-2
   Actuator MP-5210
   Linkage AV-7600-1

- ❒ Valve Body Data less P Code (Size, Cv Rating, Port Code) or Valve Assembly less Actuator Code (XXX) and less P Code (Size, Cv Rating, Port Code)
- ❒ P Code (Size, Cv Rating, Port Code)
- ❒ Actuator or Actuator Code (XXX) for Valve Assemblies
- ❒ Valve Linkage

[a] CAUTION: Fittings and/or pipe schedules must meet or exceed working static pressure requirements.

[b] CAUTION: Freeze protection required for temperatures below 32°F (0°C). Avoid ice formation on stems. With fluid temperatures below 40°F (4°C) use AV-601 with hydraulic actuators for thermal isolation.

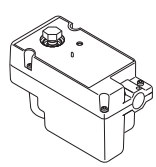
[c] Less than 20 psi recommended for quiet service.

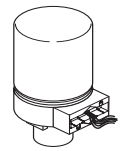
[d] Factory assemblies are not available for two-position applications using reduced port valve bodies.

[e] CAUTION: When valves are in series at both ends of the coil as shown in the four-pipe diagram, the C_v of the combination is less than that of a single valve. See piping diagram chart for flow calculations.

3-Way Mixing and Sequencing Globe Valves, Flared (5/8 in. O.D.) with Electric, Hydraulic, and Pneumatic Actuators

TABLE 2. SPST and 2 to 15 Vdc TAC System 8000 inputs, select Actuator Type or Actuator Code (XXX) with correct Input Signal having sufficient close-off for the application. If selecting Component Parts, select Valve Linkage.



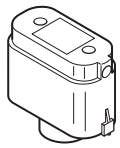


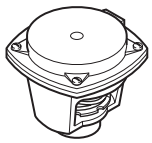
					Non-Spring Return		Spring Return - Up						
		Input Signal			Floating DDC or SPDT	2 to 10 Vdc 4 to 20 mA	2 to 15 Vdc[a]		SPST		Floating SPDT	
		Valve Linkage			**Included with actuator**		**AV-7600-1[b]**		**AV-7600-1**		**AV-7600-1[b]**	
		Actuator Type			MF-22XX3[c]	MS-22353	MP-521X-XXX, MPR-561X MP-541X, MPR-571X MP-551X		MA-521X-XXX		MF-5X1X	
		Actuator Code (XXX)			25X	256	2XX		2XX		22X	
Normal Position	**Factory Available Valve Assembly**	**Valve Body**	**P Code**	**Size in.**	**ACTUATOR CLOSE -OFF PRESSURE RATING (psi)[d]**							
					SU[c]	**SD[c]**	**SU[c]**	**SD[c]**	**SU[c]**	**SD[c]**	**SU[c]**	**SD[c]**
Stem Up	VA-3249-2XX-5-4 VF-3249-2XX-5-4 VK-3249-2XX-5-4 VS-3249-2XX-5-4	VB-324-0-5-4	-4	1/2	100	100	100	100	100	100	100	100
Stem Up Flow "B" to "AB"	VA-7312-2XX-4-P VF-7312-22X-4-P VS-7312-2XX-4-P	VB-7312-0-4-P	-2-4	5/8			100	100	180	100	100	100
Stem Up Flow "B" to "AB"	VS-7332-2XX-4-P	VB-7332-0-4-P	-2-3-4		—	—	35[e]	35[e]	—	—	—	—

[a] Do not use on 4 pipe, single coil sequencing systems.
[b] MP-541X, MPR-561X, MPR-571X, and MPR-581X use AV-7600-1 and AV-601.
[c] MF-22203 for hot water and steam applications only.
[d] Close-off ratings for mixing valves: (SU = "A" port, SD = "B" port). "A" port (SU) ratings equal pressure at port "A" minus pressure at port "B"; "B" port (SD) ratings equal pressure at port "B" minus pressure at port "A".
[e] 35 psi from either A or B port to AB.

3-Way Mixing and Sequencing Globe Valves, Flared (5/8 in. O.D.) with Electric, Hydraulic, and Pneumatic Actuators

TABLE 2A. Pneumatic Input, select Actuator Type or Actuator Code (XXX) series with correct Input Signal having sufficient close-off for the application. If selecting Component Parts, select Valve Linkage and Positive Positioner if required.





Input Signal					Pneumatic																			
Valve Linkage					AV-7400									AV-401										
Positive Positioner					AK-42309-500									AK-42309-500										
Actuator Code (XXX)					201			202			203			301			302			303			313	
Actuator Type					MK-2690									MK-4601			MK-4611			MK-4621			MK-4621-422	
Spring Range (psig)					3 to 7			5 to 10			8 to 13			3 to 6			5 to 10			10 to 13			10 to 11.25	
ACTUATOR CLOSE-OFF PRESSURE RATING (psi)[a] [b]																								
Supply Air Pressure (psig)					15/20	15	20	15/20	15	20	15/20	15	20	15/20	15	20	15/20	15	20	15/20	15	20	15/20	15	20
Stem Position[c]					SU	SD	SD	SU	SD	SD	SU	SU	SD	SU	SD	SD	SU	SD	SD	SU	SD	SD	SU	SD	SD
NP[d]	Valve Assembly	Valve Body	P Code	Size in.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	VA-3249-XXX-5-4 VF-3249-XXX-5-4 VK-3249-XXX-5-4 VS-3249-XXX-5-4	VB-324-0-5-4	-1, -2, -3	1/2	20	200	250	130	90	250	250	0	165	80	200	200	200	200	200	200	200	200	200	50	200
SU[c]	VK-7312-XXX-4-P	VB-7312-0-4-P	-2-4	5/8	5	100	175	60	50	135	95	5	85	35	250	250	130	110	240	250	30	170	—	—	—
	VK-7332-XXX-4-P	VB-7332-0-4-P	-2-3-4		—	—	—	—	—	—	35[e]	—	35[e]	—	—	—	—	—	—	35[e]	—	35[e]	35[e]	—	35[e]

[a] Close-off ratings for mixing valves: (SU = "A" port, SD = "B" port) "A" port (SU) ratings equal pressure at Port "A" minus pressure at port "B"; "B" port (SD) ratings equal pressure at port "B" minus pressure at port "A". Close-off ratings in the table are true only when the indicated supply air pressure is applied to the actuator. A change in air pressure at the actuator alters the actual close-off pressure.

[b] Close-off pressure ratings describe only the differential pressure which the actuator can close-off to standards with adequate seating force. Consult valve body specifications for the limitations.

[c] SU — Stem Up (Flow "B" to "AB"); SD — Stem Down (Flow "A" to "AB"); Normal Position Step Up (Flow "B" to "AB").

[d] NP = Normal Position.

[e] VK-7332-203-4-X is used as the inlet valve and VK-7332-313-4-X is used as the outlet valve on a four pipe angle coil system. 20 psig signal is required. Neutral valve position (both parts just close) have 35 psig close-off pressure between "A" or "B" port minus "AB" port for all actuators. (Refer to page 74 for four-pipe details.)

TABLE 3. Factory Assemblies (Two-Position SPST, TAC System 8000 2 to 15 Vdc, 4 to 20 mA), select exact Actuator Code (XXX). Any MA-52XX, MF-22XX3, MP-5XXX, MPR-5X1X, MS-22353 can be assembled to 1/2 in. to 1-1/4 in. valve bodies with the close-off pressure ratings listed in Table 2 and Table 2A. Select below listed Hydraulic Actuators or Actuator Codes (XXX) for factory available assemblies. For applications that factory assemblies are not available, select actuator, linkage, body and field assemble.

Input Signal	Voltage Vac 50/60 Hz	VA	Aux. Switch	Actuator Part No.	Actuator Code (XXX) for Factory Available Assembly		
					VA-7312	VS-7312, 7332	VF-7312
Two-Position SPST	24	18	No	MA-5213	201	—	—
	120			MA-5210	211	—	—
	240			MA-5211	221	—	—
Floating SPDT	24	1.5		MF-22203[a]	—	—	252
	24			MF-22303	—	—	255
	24			MF-22323	—	—	256
2 to 15 Vdc, TAC System 8000, Stroke Occurs 6 to 9 Vdc Approximately	24	18		MP-5213	—	201	—
	120			MP-5210	—	211	—
	240			MP-5211	—	221	—
2 to 15 Vdc, TAC System 8000, 3 Volt Span, Start 6 Vdc Factory Set, Adj. 2 to 12 Vdc, Positive Positioning	24	18		MP-5413	—	247[b]	—
	120			MP-5410	—	244[b]	—
	240			MP-5411	—	245[b]	—
0 to 10 Vdc, TAC System 8000, Start 0.5 Vdc Factory Set, Positive Positioning	24			MP-5513		257[b]	
	120			MP-5510		254[b]	
	240			MP-5511		255[b]	
4 to 20 mA	24	18		MPR-5613	—	267[b]	—
	120			MPR-5610	—	264[b]	—
	240			MPR-5611	—	265[b]	—
Floating SPDT	24	21		MF-5413	—	—	221[a]
	24	21		MF-5513	—	—	223[a]
2 to 10 Vdc	24	4		MS-22353	—	256	—
4 to 20 mA					—		—

[a] MF-22203 for hot water and steam applications only.

[b] Includes AV-601.

TABLE 3A. Factory Assemblies (Pneumatic Actuators), select exact Actuator Code (XXX).

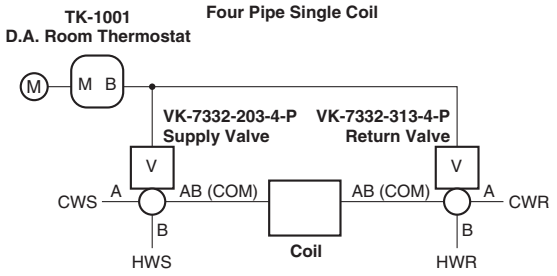
Input Signal	Effective Area (sq. in.)	Spring Range (lbs)	Actuator Part No.	Actuator Code (XXX) for Factory Available Assembly
Pneumatic	6	3 to 7	MK-2690	201
		5 to 10		202
		8 to 13		203[a]
	11	3 to 6	MK-4601	301
		5 to 10	MK-4611	302
		10 to 13	MK-4621	303[a]
		10 to 11.25	MK-4621-422	313[a]

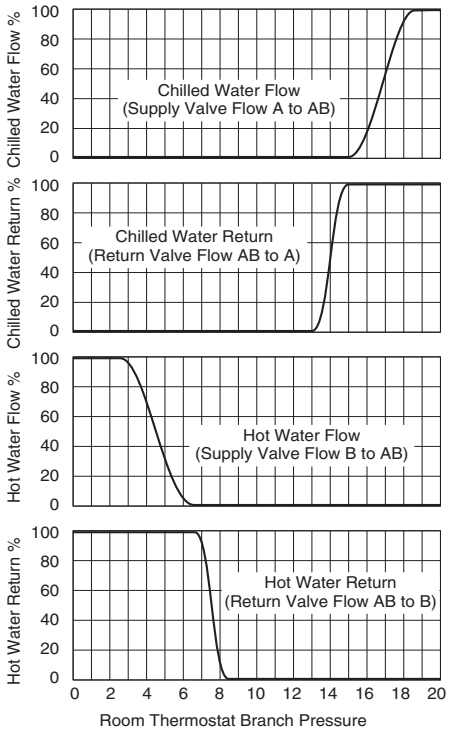
[a] VK-7332 factory assemblies available only with these codes.

TABLE 4. Optional Input Signal Interface to Pneumatic.

Input Signal Type	Interface Module Required
Two-Position, SPST (Electric)	AL-1XX
Two-Position, SPDT Snap Acting (Electric)	AL-1XX
Voltage 2 to 15 Vdc TAC System 8000	CP-8511-XXX
Current Input 4 to 20 mA etc.	CP-8511-XXX, CP-8551

3-Way Mixing and Sequencing Globe Valves, Flared (5/8 in. O.D.) with Electric, Hydraulic, and Pneumatic Actuators





Flow Calculation Chart.

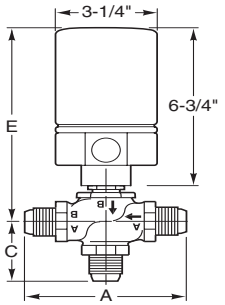
	Supply	Return	Combined
Port Code	-3	-3	—
Cv	2.2	2.2	1.5
Port Code	-3	-4	—
Cv	2.2	4.4	2.0
Port Code	-4	-4	—
Cv	4.4	4.4	3.1

TABLE 5. Dimensions in Inches (Millimeters).

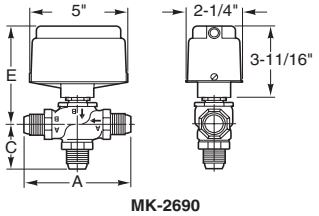
Valve Body				Valve Assembly (Actuator Type)			
				VK-73X2-2XX (MK-2690)	VK-73X2-3XX (MK-46X1)	VA-7312-2X1, VS-73X2-2X1 (MX-5X1X, PR-5X1X)[a]	VF-7312-2XX VS-7312-2XX (MF-22XX3, MS-22353)
Part Number Series	**Size (in.)**	**A**	**C**	**E**	**E**	**E**	**E**
VB-7312	**5/8**	4 (102)	2-1/4 (57)	4-13/16 (122)	5 (127)	7-7/8 (200)	4-1/8 (105)
VB-7332							

[a] Add 2-1/32 in. (52 mm) to the "E" dimension for a valve assembly using an AV-601 linkage extension.

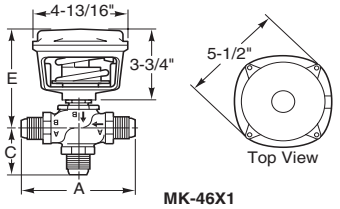
NOTE: Allow 3 inches clearance above actuator for removal.



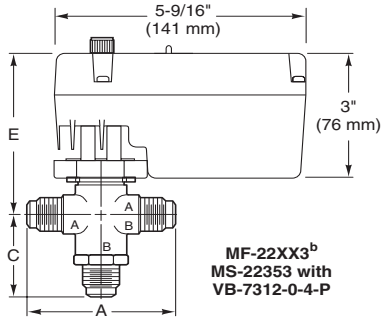
MA-521X
MP-5X1X[a]
MPR-5X1X[a]
MF-5X1X[a]
MP-5X1X[a]
with
VB-7312
VB-7332



MK-2690
with
VB-7312
VB-7332



MK-46X1
with
VB-7312
VB-7332



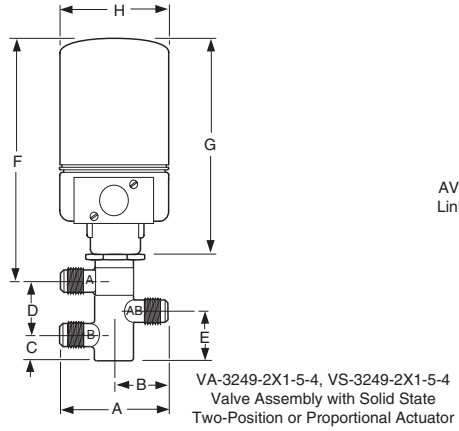
MF-22XX3[b]
MS-22353 with
VB-7312-0-4-P

[a] AV-601 linkage extension (not shown) required for hot water applications. Refer to Table 3.

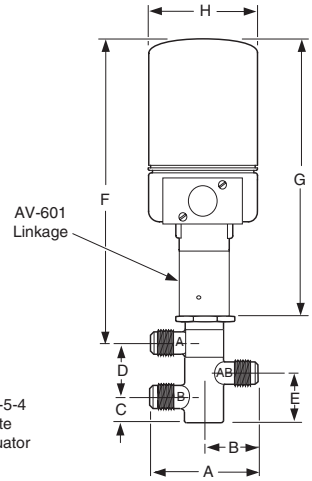
[b] MF-22203 for hot water and steam applications only.

TABLE 6. 3-Way Valve Dimensions in Inches (millimeters).

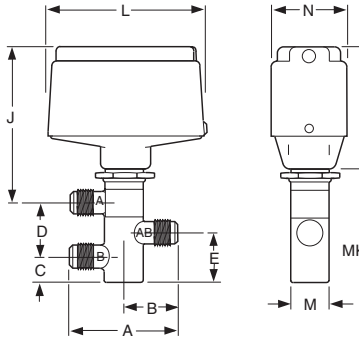
Valve Body							Actuator														
Part Number	**Size In.**	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**J**	**K**	**L**	**M**	**N**	**P**	**Q**	**R**	**S**	**T**	**U**
VA-3249-2X1-5--4 VS-3249-2X1-5-4	1/2"	3-1/8 (79)	1-5/8 (41)	3/4 (19)	1-7/8 (48)	1-5/8 (41)	8-1/8 (206)	6-3/4 (171)	3-1/4 (83)	—										
VF-3249-22X-5-4 VS-3249-24X-5-4 VS-3249-26X-5-4							10-5/32 (258)	8-25/32 (223)												
VK-3249-20X-5-4							—			5 (127)	3-5/8 (92)	5 (127)	1-1/16 (27)	2-1/4 (57)	—					
VB-324-0-5-4 Valve with MK-46X1 Actuator (Factory Assembly Not Available)							—								5-1/4 (133)	3-7/8 (98)	4-3/4 (121)	—		
VA-3249-XXX-5-**4** VF-3249-XXX-5-**4** VK-3249-XXX-5-**4** VS-3249-XXX-5-**4**							—											4-3/4 (121)	5-9/16 (141)	3 (76)



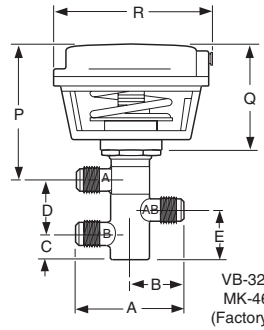
VA-3249-2X1-5-4, VS-3249-2X1-5-4
Valve Assembly with Solid State
Two-Position or Proportional Actuator



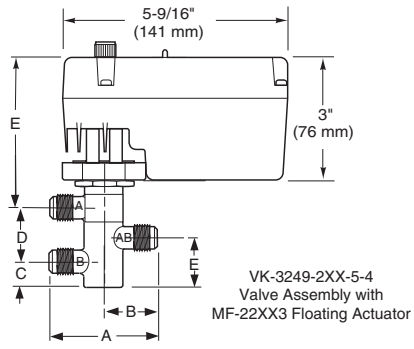
VF-3249-22X-5-4,
VS-3249-24X-5-4, VS-3249-26X-5-4
Valve Assembly with Solid State
Floating or Proportional Actuator



VK-3249-20X-5-4
Valve Assembly with
MK-2690 Pneumatic Actuator



VB-324-0-5-4 Valve Body with
MK-46X1 Pneumatic Actuator
(Factory Assembly Not Available)



VK-3249-2XX-5-4
Valve Assembly with
MF-22XX3 Floating Actuator

3-Way Mixing and Sequencing Globe Valves, Flared (5/8 in. O.D.) with Electric, Hydraulic, and Pneumatic Actuators

TABLE 7. Flow Pattern.

Body Part Number	Flow Type	Stem Up (SU) (Normal Position)		Stem Down (SD)	
		Flow	Closed Port	Flow	Closed Port
VB-7312-0-4-P VB-7332-0-4-P	Mixing	B to AB	A	A to AB	B
	Sequencing	B to AB	A	A to AB	B

TABLE 8. Ambient Temperature Restrictions for Valve Actuators.

Temperatures °F (°C)					
		MP-521X-XXX w/ AV-601 Linkage Extension	MF-5X1X w/ AV-601 Linkage Extension	MK-2690[a] MK-46X1	MF-22XX3[b] MS-22353
Maximum Ambient		140 (60)	140 (60)	220 (104)	140 (60)
Max. Allowable Fluid		281 (138)	140 (60)	250 (121)	220 (104)
VB-7312-0-4-P VB-7332-0-4-P	Maximum Fluid	281 (138)	281 (138)	281 (138)	281 (138)
	Max. Allw. Ambient	140 (46)	103 (39)	160 (71)	115 (46)

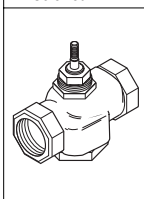
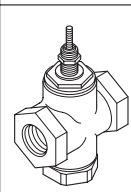
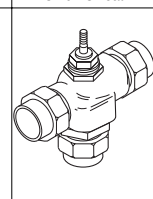
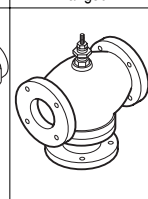
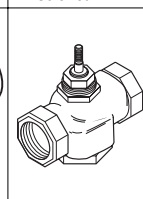
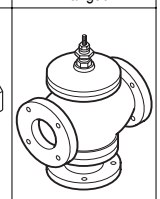
[a] Actuator condensation can be prevented by use of the Linkage Extension."

[b] MF-22203 for hot water and steam applications only.

CAUTION: Condensation can facilitate corrosion. Piping insulation must not cover any part of the actuator or mounting nut. With 40°F (4°C) water, the maximum allowable dew point temperature without a linkage extension is 68°F (20°C).

3-Way Globe Valves, Mixing (1/2 to 6 in.), Diverting (1/2 to 6 in.), Screwed (1/2 to 3 in.), Union Sweat (1/2 to 2 in.) and Flanged (2-1/2 to 6 in.) with Pneumatic Actuators

TABLE 1. Select Valve Body including P Code (Valve Size, Cv Rating, Port Code) or select Valve Assembly with correct Input Signal (refer to Table 2B also) less Actuator Code (XXX) including the P Code (Size, Cv Rating, Port Code). (Refer to Pages 172 to 179 for Valve Sizing.)

		Application					
		Chilled or Hot Water					
		Screwed NPT	Screwed NPT	Union Sweat	Flanged	Screwed NPT	Flanged
							
Size		1/2 to 2 in.	2-1/2 & 3 in.	1/2 to 2 in. I.D.	2-1/2 to 6 in.	1/2 to 2 in.	2-1/2 to 6 in.
Valve Body		VB-7313-0-4-P	VB-9313-0-4-P	VB-7314-0-4-P	VB-9313-0-5-P	VB-7323-0-4-P	VB-9323-0-5-P[a]
Valve Assembly Pneumatic without Positive Positioner		VK-7313-XXX-4-P	VK-9313-XXX-4-P	—	VK-9313-XXX-5-P	—	—
Valve Assembly Pneumatic with Positive Positioner		VK4-7313-XXX-4-P	VK4-9313-XXX-4-P	VK4-7314-XXX-4-P	VK4-9313-XXX-5-P	—	—
Normal Position		Stem Up Flow "B" to "AB"	Stem Up Flow "B" to "AB"	Stem Up Flow "B" to "AB"	Stem Up Flow "B" to "AB"	Stem Up Flow "B" to "AB"	Stem Up Flow "C" to "L"
Flow Type		Mixing	Mixing	Mixing	Mixing	Diverting	Diverting[a]
Material	Body	Bronze	Bronze	Bronze	Iron	Bronze	Iron
	Seat				Bronze		Bronze
	Stem	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
	Plug	Brass	Brass	Brass	Brass	Brass	
	Packing	Spring Loaded TFE	Spring Loaded TFE	Spring Loaded TFE	Spring Loaded TFE	Spring Loaded TFE	Grafoil
	Disc	None	None	None	None	None	None
ANSI Pressure Class (psig) Refer to page 169		250 (up to 400 psig below 150°F)			125 (200 psig below 150°F)	250 (up to 400 psig below 150°F)	125 (200 psig below 150°F)
Allowable Control Media Temp [b]		20 to 300°F (-7 to 149°C)	40 to 300°F (4 to 149°C)	20 to 300°F (-7 to 149°C)	40 to 300°F (4 to 149°C)	20 to 300°F (-7 to 149°C)	40 to 300°F (4 to 149°C)
Allowable Differential Pressure for Water psig (kPa)[c]		35 psi (241) max. for normal life (Refer to page 172 for cavitation limits)					

NOTE: These charts are color coded as shown below to assist valve selection. Note it is possible to select either a valve assembly or component parts (actuator, valve linkage, valve body).

ORDERING EXAMPLES:

1. **Valve Assembly:** **VK-7313-611-4-11**
2. **Valve Body:** **VB-7313-0-4-11**
   Actuator: **MK-6601**
   Linkage: **AV-430**

- ❒ Valve Body Data less P Code (Size, Cv Rating, Port Code) or Valve Assembly less Actuator Code (XXX) and less P Code (Size, Cv Rating, Port Code)
- ❒ P Code (Size, Cv Rating, Port Code)
- ❒ Actuator or Actuator Code (XXX) for Valve Assemblies
- ❒ Valve Linkage

TO SELECT A PORT CODE (P).

P Code	Valve Size[d]	Cv						
-2	1/2	2.2		2.2		—		
-4		4.4		4.4		4.4		
-6	3/4	7.5		7.5		7.5		
-8	1	14	—	14	—	15	—	
-9	1-1/4	20		20		20		
-10	1-1/2	28		28		28	Port	
-11	2	41		41		40	"U"	"L"
-12	2-1/2		67		74		68	75
-13	3		91		101		85	95
-14	4				170		160	180
-15	5	—		—	290	—	195	220
-16	6		—		390		250	275

[a] Leakage ratings on 2 1/2 to 6 inch VB-9323 diverting valves are ANSI II (0.5%). Maximum differential pressure between opposite end ports is 50 psi.

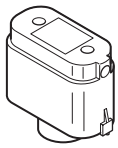
[b] CAUTION: Freeze protection required for fluid temperatures below 32°F (0°C). Avoid ice formation on stems.

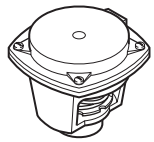
[c] Less than 20 psi recommended for quiet service.

[d] CAUTION: Solder, tubing and/or pipe schedules must meet or exceed working static pressure requirements.

3-Way Globe Valves, Mixing (1/2 to 6 in.), Diverting (1/2 to 6 in.), Screwed (1/2 to 3 in.), Union Sweat (1/2 to 2 in.) and Flanged (2-1/2 to 6 in.) with Pneumatic Actuators

TABLE 2. 1/2 to 1-1/4 in. Valves, select Actuator or Actuator Code (XXX) having sufficient close-off for the application. If selecting Component Parts, select Valve Linkage and Positive Positioner if required.





Effective Area				6 Sq. In.									11 Sq. In.							
Valve Linkage				**AV-7400**									**AV-401**							
Positive Positioner				AK-42309-500									AK-42309-500							
Factory Assembly with Positive Positioner				No			Yes			Yes			No			Yes			Yes	
Actuator Code (XXX)				201			202			203			301			302			303	
Actuator				**MK-2690**									**MK-4601**			**MK-4611**			**MK-4621**	
Spring Range (psig)				3 to 7			5 to 10			8 to 13			3 to 6			5 to 10			10 to 13	
				ACTUATOR CLOSE-OFF PRESSURE RATING[a b c]																
Supply Air Pressure (psig)				**15/20**	**15**	**20**	**15/20**	**15**	**20**	**15/20**	**15**	**20**	**15/20**	**15**	**20**	**15/20**	**15**	**20**	**15/20**	**15**	**20**
Stem Position[d]				**SU**	**SD**	**SD**	**SU**	**SD**	**SD**	**SU**	**SD**	**SD**	**SU**	**SD**	**SD**	**SU**	**SD**	**SD**	**SU**	**SD**	**SD**
Valve Assembly	**Valve Body**	**P Code**	**Size in.**	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
VK-7313-XXX-4-P VK4-7313-XXX-4-P VK-7314-XXX-4-P VK4-7314-XXX-4-P	VB-7313-0-4-P VB-7314-0-4-P	-2-4	**1/2**	—	150	150	50	60	170	100	—	90	30	250	250	100	150	250	250	35	200
		-6	**3/4**	—	60	120	30	40	100	60	—	60	20	180	230	70	80	180	160	15	120
		-8	**1**	—	30	60	9	15	50	30	—	25	5	90	150	30	40	100	60	5	65
		-9	**1-1/4**	—	—	—	—	8	30	15	—	15	—	50	90	15	25	60	40	—	40
		-10	**1-1/2**	—	—	—	—	—	20	10	—	9	—	30	60	10	15	40	35	—	25
		-11	**2**	—	—	—	—	—	10	—	—	—	—	15	30	—	5	20	15	—	10
VK-7323-XXX-4-P VK4-7323-XXX-4-P	VB-7323-0-4-P	-4	**1/2**	—	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250
		-6	**3/4**	—																	
		-8	**1**	—																	
		-9	**1-1/4**	—																	
		-10	**1-1/2**	—																	
		-11	**2**	—																	

[a] Close-off ratings for mixing or sequencing valves: (SU = "A", SD = "B" port). "A" port (SU) ratings equal pressure at port "A" minus pressure at port "B". "B" port (SD) ratings equal pressure at port "B" minus pressure at port "A". Close-off ratings in the table are true only when the indicated supply air pressure is applied to the actuator. A change in air pressure at the actuator alters the actual close-off pressure.

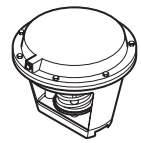
[b] Close-off pressure ratings describe only the differential pressure which the actuator can close-off with adequate seating force. Consult valve body specifications for other limitations.

[c] Mixing valves are not to be used in diverting applications. Diverting valves may be used in mixing applications with minor affects on flow.

[d] SU — Stem Up; SD — Stem Down. Refer to Table 5 for flow pattern, port designations and normal position.

3-Way Globe Valves, Mixing (1/2 to 6 in.), Diverting (1/2 to 6 in.), Screwed (1/2 to 3 in.), Union Sweat (1/2 to 2 in.) and Flanged (2-1/2 to 6 in.) with Pneumatic Actuators

TABLE 2A. 1/2 to 4 in. Valves, select Actuator or Actuator Code (XXX) having sufficient close-off for the application. If selecting Component Parts, select Valve Linkage and Positive Positioner if required. (Also refer to Table 2B).



Effective Area (stroke)	50 Sq. In. (1/2 In.)			50 Sq. In. (1 In.)			50 Sq. In. (1-1/2 in.)
Valve Linkage VB-7313-0-4-P	AV-430			—			—
Valve Linkage VB-9313-0-5-P & VB-9313-0-4-12 & 13	—			AV-495			—
Valve Linkage VB-7323-0-X-P & VB-9323-0-X-P	AV-430			AV-430			AV-430
Positive Positioner	AK-42309-500			AK-42309-500			AK-42309-500
Factory Assembly with Positive Positioner	No	Yes	Yes	No	Yes	Yes	Yes
Actuator Code (XXX)	611	612	613	601	602	603	653
Actuator	MK-6601	MK-6611	MK-6621	MK-6801	MK-6811	MK-6821	MK-6921
Spring Range (psig)	3 to 8	5 to 10	8 to 13	3 to 8	5 to 10	8 to 13	8 to 13

ACTUATOR CLOSE-OFF PRESSURE RATING (psi)[abce]

Supply Air Pressure (psig)				15/20	15	20	15/20	15	20	15/20	15	20	15/20	15	20	15/20	15	20	15/20	15	20	20	20
Stem Position[d]				SU	SD	SD	SU	SD	SD	SU	SD	SD	SU	SD	SD	SU	SD	SD	SU	SD	SD	SU	SD
Valve Assembly	Valve Body	P Code	Size in.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
VK-7313-XXX-4-P VK4-7313-XXX-4-P	VB-7313-0-4-P VB-7314-0-4-P	-10	1-1/2	40	170	250	80	110	230	170	30	160	—	—	—	—	—	—	—	—	—	—	—
		-11	2	20	90	160	50	60	120	90	15	90	—	—	—	—	—	—	—	—	—	—	—
VK-9313-XXX-4-P VK4-9314-XXX-4-P	VB-9313-0-4-P	-12	2-1/2	—	—	—	—	—	—	—	—	—	10	60	110	30	40	91	60	9	60	—	—
		-13	3	—	—	—	—	—	—	—	—	—	5	41	75	20	27	62	40	5	40	—	—
VK-9313-XXX-5-P VK4-9313-XXX-5-P	VB-9313-0-5-P	-12	2-1/2	—	—	—	—	—	—	—	—	—	10	60	110	30	40	91	60	9	60	—	—
		-13	3	—	—	—	—	—	—	—	—	—	5	40	75	20	27	62	40	5	40	—	—
		-14	4	—	—	—	—	—	—	—	—	—		22	40	10	14	33	20	—	22	—	—
VK-7323-XXX-4-P VK4-7323-XXX-4-P	VB-7323-0-4-P	-10	1-1/2	250	250	250	250	250	250	250	250	250	—	—	—	—	—	—	—	—	—	—	—
		-11	2										—	—	—	—	—	—	—	—	—	—	—
VK-9323-XXX-5-P VK4-9323-XXX-5-P	VB-9323-0-5-P[e]	-12	2-1/2	—	—	—	—	—	—	—	—	—	—	—	—	100	100	100	100	—	100	—	—
		-13	3	—	—	—	—	—	—	—	—	—	—	—	—					—		—	—
		-14	4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	125	125
		-15	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		
		-16	6	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		

[a] Close-off ratings for mixing or sequencing valves: (SU = "A", SD = "B" port). "A" port (SU) ratings equal pressure at port "A" minus pressure at port "B". "B" port (SD) ratings equal pressure at port "B" minus pressure at port "A". Close-off ratings in the table are true only when the indicated supply air pressure is applied to the actuator. A change in air pressure at the actuator alters the actual close-off pressure.

[b] Close-off pressure ratings describe only the differential pressure which the actuator can close-off to standards with adequate seating force. Consult valve body specifications for other limitations.

[c] Mixing valve are not to be used in diverting applications. Diverting valves may be used in mixing applications with minor affects on flow.

[d] SU — Stem Up; SD — Stem Down. Refer to Table 5 for flow pattern, port designations and normal position.

[e] Leakage ratings on 2 1/2 to 6 inch VB-9323 diverting valves are ANSI II (0.5%). Maximum differential pressure between opposite end ports is 50 psi.

3-Way Globe Valves, Mixing (1/2 to 6 in.), Diverting (1/2 to 6 in.), Screwed (1/2 to 3 in.), Union Sweat (1/2 to 2 in.) and Flanged (2-1/2 to 6 in.) with Pneumatic Actuators

TABLE 2B. 2-1/2 to 6 in. Valves, select Actuator or Actuator Code (XXX) having sufficient close-off for the application. If selecting Component Parts, select Valve Linkage and Positive Positioner if required.

Effective Area (Stroke)				100 Sq. In. (1 in.)									100 Sq. In. (2 in.)							
Valve Linkage				**AV-496**									**AV-496**							
Positive Positioner				AK-42309-500									AK-42309-500							
Factory Assembly with Positive Positioner				No			Yes			Yes			No			Yes			Yes	
Actuator Code (XXX)				—			802			803			—			812			813	
Actuator				MK-8801			MK-8811			MK-8821			MK-8901			MK-8911			MK-8921	
Spring Range (psig)				3 to 8			5 to 10			8 to 13			3 to 8			5 to 10			8 to 13	
				ACTUATOR CLOSE-OFF PRESSURE RATING (psi)[a] [b]																
Supply Air Pressure (psig)				**15/20**	**15**	**20**	**15/20**	**15**	**20**	**15/20**	**15**	**20**	**15/20**	**15**	**20**	**15/20**	**15**	**20**	**15/20**	**15**	**20**
Stem Position[c]				**SU**	**SD**	**SD**	**SU**	**SD**	**SD**	**SU**	**SD**	**SD**	**SU**	**SD**	**SD**	**SU**	**SD**	**SD**	**SU**	**SD**	**SD**
Valve Assemblies	**Valve Body**	**P Code**	**Size in.**	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
VK4-9313-80X-4-P[d]	VB-9313-0-4-P	-12	**2-1/2**	30	125		60	91		120	30	125	—	—	—	—	—	—	—	—	—
		-13	**3**	20	90		40	62		90	19	90	—	—	—	—	—	—	—	—	—
VK4-9313-802-5-P[d] VK4-9313-803-5-P[d]	VB-9313-0-5-P	-12	**2-1/2**	30	125	125	60	91	125	120	30	125	—	—	—	—	—	—	—	—	—
		-13	**3**	20	90		40	62		90	19	90	—	—	—	—	—	—	—	—	—
		-14	**4**	10	48	89	25	33	73	49	10	48	—	—	—	—	—	—	—	—	—
VK4-9313-812-5-P[d] VK4-9313-813-5-P[d]	VB-9313-0-5-P	-15	**5**	—	—	—	—	—	—	—	—	—	5	30	56	15	20	45	30	5	30
		-16	**6**	—	—	—	—	—	—	—	—	—	3	20	38	10	13	30	20	3	20

[a] Close-off ratings for mixing valves: (SU = “A”, SD = “B” port). “A” port (SU) ratings equal pressure at port “A” minus pressure at port “B”. “B” port (SD) ratings equal pressure at port “B” minus pressure at port “A”. Close-off ratings in the table are true only when the indicated supply air pressure is applied to the actuator. A change in air pressure at the actuator alters the actual close-off pressure.

[b] Close-off pressure ratings describe only the differential pressure which the actuator can close-off with adequate seating force. Consult valve body specifications for other limitations.

[c] SU — Stem Up; SD — Stem Down. Refer to Table 5 for flow pattern, port designations and normal position.

[d] Factory valve assemblies are only available with positive positioner.

TABLE 3. Optional Input Signal Interface to Pneumatic.

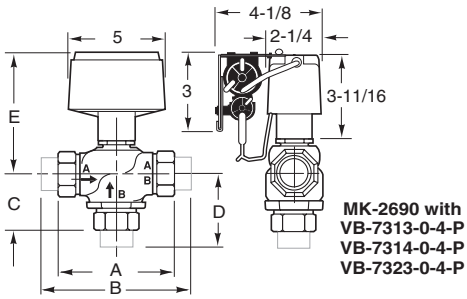
Input Signal Type	Interface Module Required
Two-Position, SPST (Electric)	AL-1XX
Two-Position, SPDT Snap Acting (Electric)	AL-1XX
Voltage 2 to 15 Vdc TAC System 8000	CP-8511-XXX
Current Input 4 to 20 mA etc.	CP-8511-XXX, CP-8551

3-Way Globe Valves, Mixing (1/2 to 6 in.), Diverting (1/2 to 6 in.), Screwed (1/2 to 3 in.), Union Sweat (1/2 to 2 in.) and Flanged (2-1/2 to 6 in.) with Pneumatic Actuators

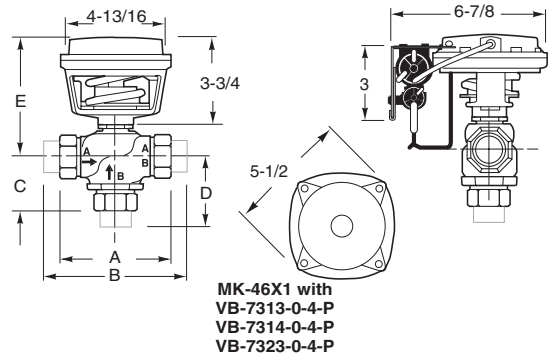
TABLE 4. Dimensions in Inches (Millimeters).

Valve Body						Actuator Code (XXX) (Actuator)				
						2XX (MK-2690)	30X (MK-46X1)	6XX (MK-6XX1)	652 (MK-6911)	81X (MK-8XX1)
Part Number	Size in.	A	B[a]	C	D[a]	E	E	E	E	E
VB-7313-0-4-P VB-7314-0-4-P[a] VB-7323-0-4--P	1/2	3 (76)	4-3/16 (106)	1-3/8 (35)	2-5/16 (59)	4-13/16 (122)	4-7/8 (124)	13-5/8 (346)	—	—
	3/4	3-5/8 (92)	5-7/16 (138)	1-11/16 (43)	2-5/8 (67)	4-13/16 (122)	4-7/8 (124)	13-5/8 (346)	—	—
	1	4-5/8 (117)	6-5/8 (168)	1-9/16 (40)	3-1/8 (79)	4-7/8 (124)	4-15/16 (125)	13-11/16 (348)	—	—
	1-1/4		6-13/16 (173)	1-5/8 (41)	3-7/16 (86)	5-1/8 (130)	5-1/8 (130)	13-15/16 (354)	—	—
	1-1/2	5-3/8 (137)	8-5/16 (211)	1-5/8 (41)	3-3/4 (95)	5-1/4 (133)	5-1/4 (133)	14-1/16 (357)	—	—
	2	6-1/8 (156)	9-3/16 (233)	1-7/8 (48)	4-3/16 (106)	5-5/16 (135)	5-3/8 (136)	14-1/8 (359)	—	—
VB-9313-0-4-P	2-1/2	8-1/2 (216)	—	4-5/8 (117)	—	—	—	16-13/16 (427)	—	20-15/16 (532)
	3	9-1/2 (241)	—	5 (127)	—	—	—	17-3/16 (437)	—	21-5/16 (541)
VB-9313-0-5-P	2-1/2	8-1/2 (216)	—	5-3/8 (136)	—	—	—	15-5/8 (397)	—	20-3/4 (527)
	3	9-1/2 (241)	—	6-3/8 (162)	—	—	—	16-1/4 (413)	—	21 (533)
	4	11-1/2 (292)	—	8-1/2 (216)	—	—	—	16-7/8 (429)	—	21-5/8 (549)
	5	13 (330)	—	8-3/4 (222)	—	—	—	—	—	24-1/2 (622)
	6	14 (356)	—	9-3/4 (248)	—	—	—	—	—	25-1/2 (648)
VB-9323-0-5-P	2-1/2	9 (229)	—	7 (178)	—	—	—	17-1/8 (435)	—	—
	3	10 (254)	—	8 (203)	—	—	—	18 (457)	—	—
	4	12 (305)	—	10 (254)	—	—	—	—	21-1/8 (537)	—
	5	13 (330)	—	10-1/2 (267)	—	—	—	—	21-3/4 (552)	—
	6	14-1/8 (359)	—	11-1/8 (283)	—	—	—	—	22-3/8 (568)	—

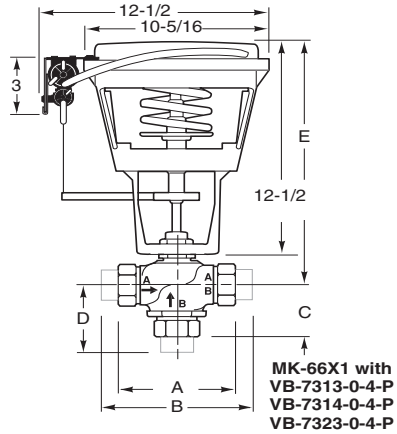
[a] Use B and D dimensions for VB-7314 valve body.



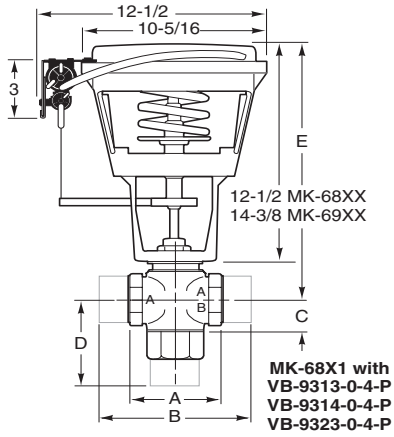
MK-2690 with
VB-7313-0-4-P
VB-7314-0-4-P
VB-7323-0-4-P



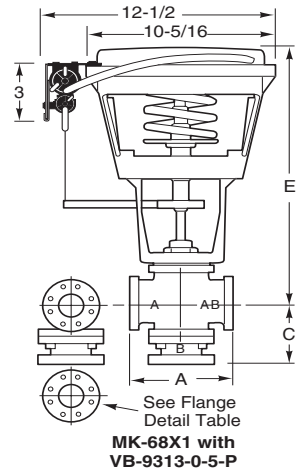
MK-46X1 with
VB-7313-0-4-P
VB-7314-0-4-P
VB-7323-0-4-P



MK-66X1 with
VB-7313-0-4-P
VB-7314-0-4-P
VB-7323-0-4-P

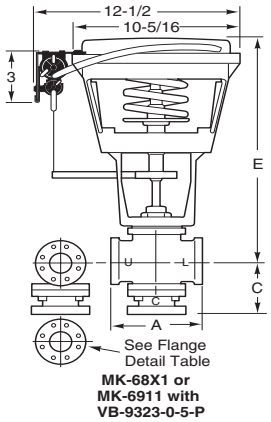


MK-68X1 with
VB-9313-0-4-P
VB-9314-0-4-P
VB-9323-0-4-P

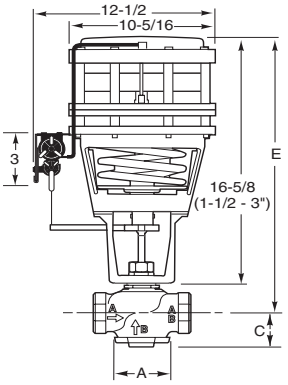


MK-68X1 with
VB-9313-0-5-P

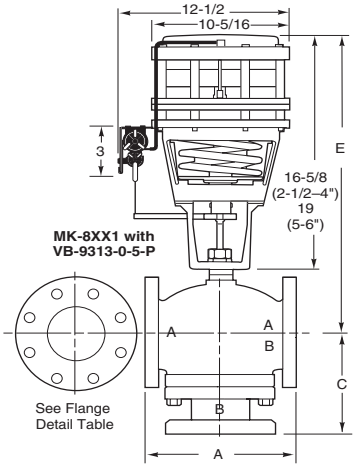
3-Way Globe Valves, Mixing (1/2 to 6 in.), Diverting (1/2 to 6 in.), Screwed (1/2 to 3 in.), Union Sweat (1/2 to 2 in.) and Flanged (2-1/2 to 6 in.) with Pneumatic Actuators



MK-68X1 or MK-6911 with VB-9323-0-5-P

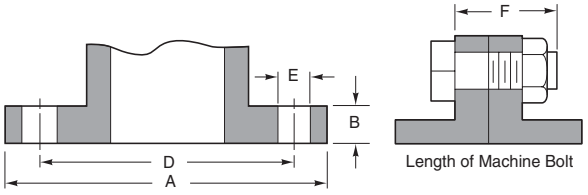


MK-8XX1 with VB-7313-0-4-P



MK-8XX1 with VB-9313-0-5-P

American Standard 125 lb. Cast Iron Pipe Flanges.



Flange Detail.

Nominal Pipe Size	Flanges		Drilling		Bolting		Length of Machine Bolts
	Flange Diameter A	Flange Thickness B	Diameter of Bolt Circle D	Diameter of Bolt Holes E	Number of Bolts	Diameter of Bolts	F
2-1/2	7	11/16	5-1/2	3/4	4	5/8	2-1/2
3	7-1/2	3/4	6				
4	9	15/16	7-1/2		8		3
5	10		8-1/2	7/8		3/4	
6	11	1	9-1/2				3-1/4

TABLE 5. Flow Pattern.

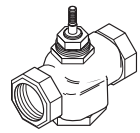
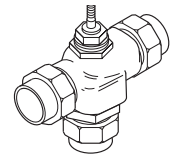
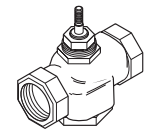
Body Part Number	Flow Type	Stem Up (SU) (Normal Position)		Stem Down (SD)	
		Flow	Closed Port	Flow	Closed Port
VB-7313-0-4-P **VB-7314-0-4-P** **VB-9313-0-4-P**	Mixing	B to AB	A	A to AB	B
VB-7323-0-4-P **VB-9323-0-4-P**	Diverting			B to A	AB
VB-9313-0-5-P	Mixing			A to AB	B
VB-9323-0-5-P	Diverting	C to L	U	C to U	L

TABLE 6. Restrictions on Maximum Ambient Temperature for Valve Actuators.

TEMPERATURES °F (°C)		
Actuators		All
Maximum Ambient		220 (104)
Max. Allowable Fluid		250 (121)
VB-9313-0-5-P	**Maximum Fluid**	300 (149)
VB-9323-0-5-P	**Max. Allowable Ambient**	100 (38)
VB-7313-0-4-P **VB-7314-0-4-P**	**Maximum Fluid**	281 (138)
VB-7323-0-4-P **VB-9313-0-4-P** **VB-9323-0-4-P**	**Max. Allowable Ambient**	160 (71)

3-Way Globe Valves, Mixing (1/2 to 2 in.), Diverting (1/2 to 2 in.), and Screwed, Union Sweat (1/2 to 2 in.) with Hydraulic Actuators

TABLE 1. Select Valve Body including P Code (Valve Size, Cv Rating, Port Code) or select Valve Assembly with correct Input Signal (refer to Table 4 also) less Actuator Code (XXX) including the P Code (Size, Cv Rating, Port Code). (Refer to Pages 172 to 179 for Valve Sizing.)

		Application		
		Chilled or Hot Water		
		Screwed NPT	Union Sweat	Screwed NPT
				
Size		**1/2 to 2 in.**	**1/2 to 2 in. I.D.**	**1/2 to 2 in.**
Valve Body		VB-7313-0-4-P	VB-7314-0-4-P	VB-7323-0-4-P
Valve Assembly 2 to 15 Vdc, TAC System 8000, 4 to 20 mA		VS-7313-XXX-4-P	—	VS-7323-XXX-4-P
Valve Assembly Two-Position SPST		VA-7313-XXX-4-P	—	VA-7323-XXX-4-P
Valve Assembly Floating SPDT		VF-7313-XXX-4-P	—	VF-7323-XXX-4-P
Normal Position		Stem Up Flow "B" to "AB"	Stem Up Flow "B" to "AB"	Stem Up Flow "B" to "AB"
Flow Type		Mixing	Mixing	Diverting
Material	**Body**	Bronze	Bronze	Bronze
	Seat	Bronze	Bronze	Bronze
	Stem	Stainless Steel	Stainless Steel	Stainless Steel
	Plug	Brass	Brass	Stainless Steel
	Packing	Spring Loaded TFE	Spring Loaded TFE	Spring Loaded TFE
	Disc	None	None	None
ANSI Pressure Class (psig)[a]		250 (up to 400 psig below 150°F, see page 169)		
Allowable Control Media Temp [b]		20 to 300°F (-7 to 149°C)		
Allowable Differential Pressure for Water psig (kPa)[c]		35 psi (241) maximum for normal life (Refer to page 172 for cavitation limits)		

NOTE: These charts are color coded as shown below to assist valve selection. Note it is possible to select either a valve assembly or component parts (actuator, valve linkage, valve body).

ORDERING EXAMPLES:

1. **Valve Assembly:** VS-7313-244-4-6
2. **Valve Body:** VB-7313-0-4-6
   Actuator: MP-5410
   Linkage: AV-7600-1 **and** AV-601

- ❒ Valve Body Data less P Code (Size, Cv Rating, Port Code) or Valve Assembly less Actuator Code (XXX) and less P Code (Size, Cv Rating, Port Code)
- ❒ P Code (Size, Cv Rating, Port Code)
- ❒ Actuator or Actuator Code (XXX) for Valve Assemblies
- ❒ Valve Linkage

TO SELECT A PORT CODE (P).

P Code	Valve Size in.[a]	Cv		
-2[d]	1/2	2.2	2.2	
-4		4.4	4.4	4.4
-6	3/4	7.5	7.5	7.5
-8	1	14	14	15
-9	1-1/4	20	20	20
-10	1-1/2	28	28	28
-11	2	41	41	41

[a] CAUTION: Solder, tubing and/or pipe schedules must meet or exceed working static pressure requirements.

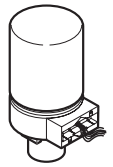
[b] CAUTION: Freeze protection required for fluid temperatures below 32°F (0°C). Avoid ice formation on stems. Do not use Hydraulic Actuators with fluid temperatures below 40°F (4°C).

[c] Less than 20 psi recommended for quiet service.

[d] Factory assemblies are not available for two-position applications using reduced port valve bodies.

3-Way Globe Valves, Mixing (1/2 to 2 in.), Diverting (1/2 to 2 in.), and Screwed, Union Sweat (1/2 to 2 in.) with Hydraulic Actuators

TABLE 2. Select Actuator Type or Actuator Code (XXX) series with correct Input Signal having sufficient close-off for the application. If selecting Component Parts, select Valve Linkage. See Table 3 for controller calibration.



Valve Linkage (1/2 to 2 in.)				AV-7600-1[a]		AV-7600-1	
Input Signal				Electronic Vdc and 4 to 20 mA		SPDT Floating and Two Position	
Actuator Code (XXX)				2XX		2XX	
Actuator Type				MP-5X1X-XXX[b] MPR-561X MPR-571X		MA-521X[c] MF-5413 MF-5513	
Factory Available Valve Assemblies	Valve Body	P Code	Size (in.)	ACTUATOR CLOSE-OFF PRESSURE RATINGS (psi)[d e f]			
				SU[g] "A"	SD[g] "B"	SU[g] "A"	SD[g] "B"
VA-7313-XXX-4-P VS-7313-XXX-4-P	VB-7313-0-4-P VB-7314-0-4-P	-2-4	1/2	130		—	—
		-6	3/4	80		—	—
		-8	1	40		—	—
		-9	1-1/4	25		—	—
		-10	1-1/2	15		—	—
		-11	2	10		—	—
VA-7323-XXX-4-P VS-7323-XXX-4-P	VB-7323-0-4-P	-4	1/2	250		250	
		-6	3/4	250		250	
		-8	1	250		250	
		-9	1-1/4	250		250	
		-10	1-1/2	250		250	
		-11	2	250		250	
VF-7313-XXX-4-P	VB-7312-0-4-P VB-7313-0-4-P VB-7314-0-4-P	-2-4	1/2 or 5/8	—		200	130
		-6	3/4	—		130	80
		-8	1	—		50	40
		-9	1-1/4	—		35	25
		-10	1-1/2	—		20	15
		-11	2	—		14	10

[a] MP-541X, MPR-5XXX use AV-7600-1 and AV-601 or AV-600.

[b] Factory shipments have unpainted large springs. For 0 to 10 volt and 4-20 mA controllers, use blue and booster springs (Table 3).

[c] MF-5413 and MF-5513 actuators require AV-601 Electronic Valve Linkage Extension Kit for thermal isolation.

[d] Close-off ratings for mixing or sequencing valves: (SU = "A" port, SD = "B" port). "A" port (SU) ratings equal pressure at port "A" minus pressure at port "B"; "B" port (SD) ratings equal pressure at port "B" minus pressure at port "A".

[e] Close-off pressure ratings describe only the differential pressure which the actuator can close-off to standards with adequate seating force. Consult valve body specifications for other limitations.

[f] Diverting valves may be used in mixing applications with minor affects on flow.

[g] SU — Stem Up; SD — Stem Down. Refer to Table 7 for flow pattern, port designations, and normal position.

TABLE 3. Controller Calibration with Spring Usage for VB-7XXX Valves with MP-521X Series Actuator.

Valve	Size in. (mm)	Spring	Controller Calibration	Nominal Control Range
VB-731X-Mixing VB-732X-Diverting VB-7332-Sequencing	1/2 thru 2 (15 to 50)	Large Unpainted	7.5 Volts	6 to 9 Volts
		PNV-145-48 blue with small unpainted booster	7.5 volts 15 mA	7 to 8 volts 14 to 16 mA

3-Way Globe Valves, Mixing (1/2 to 2 in.), Diverting (1/2 to 2 in.), and Screwed, Union Sweat (1/2 to 2 in.) with Hydraulic Actuators

TABLE 4. Factory Assemblies, select exact Actuator Code (XXX). Any MA-52XX, MF-5X1X, MP-5XXX, MPR-5X1X can be assembled to 1/2 to 1-1/4 in. valve bodies with the close-off pressure ratings listed in Table 2. Select below listed Hydraulic Actuators or Actuator Codes (XXX) for factory available assemblies. For applications that factory assemblies are not available, select actuator, linkage, valve body and field assemble.

Input Signal	Voltage Vac 50/60 Hz	VA	Aux. Switch	Actuator Part No.	Actuator Code (XXX) for Factory Available Assembly		
					VA-73X3	VS-73X3	VF-7313
Two-Position SPST	24	18	No	MA-5213	201	—	—
	120			MA-5210	211	—	—
	240			MA-5211	221	—	—
2 to 15 Vdc, TAC System 8000, stroke occurs 6 to 9 Vdc approx., non-positive positioning	24	18		MP-5213	—	201	—
	120			MP-5210	—	211	—
	240			MP-5211	—	221	—
2 to 15 Vdc, TAC System 8000, start 6 Vdc factory set, adjustable 2 to 12 Vdc, 3 Vdc span, positive positioning	24	18		MP-5413	—	247[a]	—
	120			MP-5410	—	244[a]	—
	240			MP-5411	—	245[a]	—
0 to 10 Vdc, System 800, Start 0.5 Vdc Factory Set, Positive Positioning	24			MP-5513		257[a]	
	120			MP-5510		254[a]	
	240			MP-5511		255[a]	
4 to 20 mA	24	18		MPR-5613	—	267[a]	—
	120			MPR-5610	—	264[a]	—
	240			MPR-5611	—	265[a]	—
Floating SPDT	24	21		MF-5413	—	—	221[a]
				MF-5513	—	—	223[a]

[a] includes AV-601.

TABLE 5. Dimensions in Inches (Millimeters).

Valve Body						Actuator Series
						MA/MF/MP/MPR-5XXX[a]
Part Number	Size (in.)	A	B[b]	C	D[b]	E
VB-7313-0-4-P VB-7314-0-4-P VB-7323-0-4-P	1/2	3 (76)	4-3/16 (106)	1-3/8 (35)	2-5/16 (59)	7-7/8 (200)
	3/4	3-5/8 (92)	5-7/16 (138)	1-11/16(43)	2-5/8 (67)	7-7/8 (200)
	1	4-5/8 (117)	6-5/8 (168)	1-9/16 (40)	3-1/8 (79)	7-15/16 (202)
	1-1/4		6-13/16 (173)	1-5/8 (41)	3-7/16 (86)	8-3/16 (208)
	1-1/2	5-3/8 (137)	8-5/16 (211)	1-9/16 (40)	3-3/4 (121)	8-5/16 (211)
	2	6-1/8 (156)	9-3/16 (233)	1-7/8 (48)	4-3/16 (106)	8-3/8 (213)

[a] Add 2-3/32 in. (53 mm) to the "E" dimension for a valve assembly using an AV-601 linkage extension.

[b] Use B and D dimensions for VB-7314 valve body.

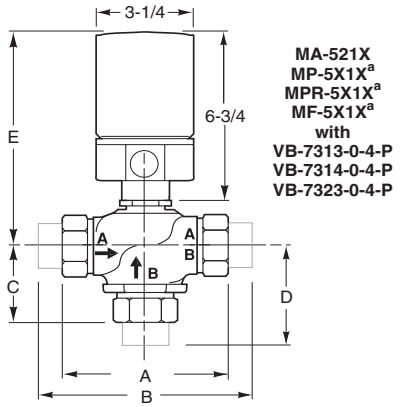
TABLE 6. Ambient Temperature Restrictions for Valve Actuators.[a]

		Temperatures °F (°C)	
		MF-5X13, MPR-561X, MP-521X-XXX w/AV-601 Linkage Extension	MF-5X13, MPR-561X, MP-5X1X-XXX w/AV-601 Linkage Extension
Maximum Ambient		140 (60)	140 (60)
Maximum Allowable Fluid		281 (138)	140 (60)
VB-73XX--0-4-P	Maximum Fluid	281 (138)	281 (138)
	Max. Allw.Ambient	140 (46)	103 (39)

[a] Actuator condensation can be prevented by use of the "Linkage Extension."

CAUTION: Condensation can facilitate condensation. Piping insulation must not cover any part of the actuator or mounting nut. With 40°F (4°C) water, the maximum allowable dew point temperature without a linkage extension is 68°F (20°C).

3-Way Globe Valves, Mixing (1/2 to 2 in.), Diverting (1/2 to 2 in.), and Screwed, Union Sweat (1/2 to 2 in.) with Hydraulic Actuators



MA-521X
MP-5X1X[a]
MPR-5X1X[a]
MF-5X1X[a]
with
VB-7313-0-4-P
VB-7314-0-4-P
VB-7323-0-4-P

[a] AV-601 linkage extension (not shown) required for hot water applications. Refer to Table 4.

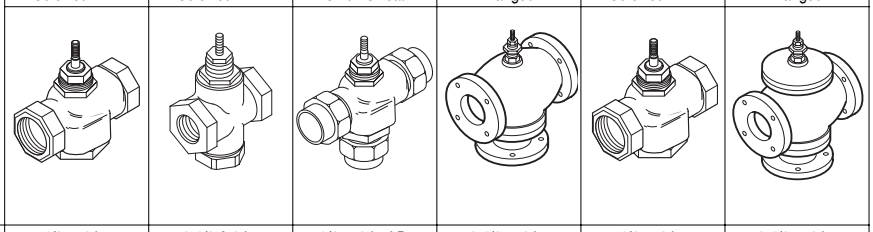
TABLE 7. Flow Pattern.

Part Number	Flow Type	Stem Up (SU) (Normal Position)		Stem Down (SD)	
		Flow	Closed Port	Flow	Closed Port
VB-7313-0-4-P	Mixing	B to AB	A	A to AB	B
VB-7314-0-4-P					
VB-7323-0-4-P	Diverting	B to AB	A	B to A	AB

CAUTION: Avoid condensation which can facilitate corrosion. With 40°F (4°C) water, the maximum allowable ambient dew point temperature is 68°F (20°C). Piping insulation must not stop drainage at actuator mounting nut. Do not use Hydraulic Actuators with fluid temperatures below 40°F (4°C).

3-Way Globe Valves, Mixing (1/2 to 6 in.), Diverting (1/2 to 6 in.), Screwed (1/2 to 3 in.), Union Sweat (1/2 to 2 in.) and Flanged (2-1/2 to 6 in) with Electric Gear Train Actuators

TABLE 1. Select Valve Body including P Code (Valve Size, CV Rating, Port Code) or select Valve Assembly with correct Input Signal (refer to Table 3A also) less Actuator Code (XXX) including the P Code (Size, Cv Rating, Port Code). (Refer to Pages 172 to 179 for Valve Sizing.)

		Application					
		Chilled or Hot Water					
		Screwed NPT	Screwed NPT	Union Sweat	Flanged	Screwed NPT	Flanged
							
Size		1/2 to 2 in.	2-1/2 & 3 in.	1/2 to 2 in. I.D.	2-1/2 to 6 in.	1/2 to 2 in.	2-1/2 to 6 in.
Valve Body, Actuator Provides Normal Position[a]		VB-7313-0-4-P	VB-9313-0-4-P	VB-7314-0-4-P	VB-9313-0-5-P	VB-7323-0-4-P	VB-9323-0-5-P
Actuator Types	Input Signal	Factory Available Valve Assemblies					
MA-318-XXX, MC-418-XXX, MC-419-XXX	SPST (Refer to Table 3)	VA-7313-XXX-4-P	VA-9313-XXX-4-P	VA-7314-0-4-P	VA-9313-3XX-5-P	VA-7323-XXX-4-P	VA-9323-30X-5-P
MC-351, MC-421, MC-431, MC-4311, MC5-4311	SPDT (Refer to Table 3)	VC-7313-XXX-4-P	VC-9313-XXX-4-P	VC-7314-0-4-P	VC-9313-XXX-5-P	—	VC-9323-4XX-5-P
MP-461-600, MP-471-600, MP-481-600	2 to 15 Vdc TAC System 8000 (Refer to Table 3)	VS-7313-XXX-4-P	VS-9313-XXX-4-P	VS-7314-0-4-P	VS-9313-XXX-5-P	VS-7323-XXX-4-P	VP-9323-XXX-5-P
MM/MMR-400-XXX MM/MMR-500-XXX	(Refer to Table 3B)	VM-7313-XXX-4-P	VM-9313-XXX-4-P	—	VM-9313-XXX-5-P	—	—
MF-22XX3[b], MF-631X3	Floating SPDT Multiple Input (Refer to Table 3C)	VF-7313-25X-4-P	VF-9313-30X-4-P	VF-7314-0-4-P	VF-9313-30X-5-P	—	—
MP-361, MP-371, MP-38X, MP-46X, MP-47X, MP-48X, MP-4851,MP-9XXX	(Refer to Table 3A)	VP-7313-XXX-4-P	VP-9313-XXX-4-P	VP-7314-XXX-4-P	VP-9313-XXX-5-P	—	VP-9323-XXX-5-P
MS-7913, MS-7923	(Refer toTable 3D)	VS-7313-36X-4-P	VS-9313-36X-4-P	—	VS-9313-36X-5-P	—	—
Flow Type		Mixing	Mixing	Mixing	Mixing	Diverting	Diverting
Material	Body	Bronze	Bronze	Bronze	Iron	Bronze	Iron
	Seat				Bronze		Bronze
	Stem	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
	Plug	Brass	Brass	Brass	Brass		Bronze
	Packing	Spring Loaded TFE	Spring Loaded TFE	Spring Loaded TFE	Spring Loaded TFE	Spring Loaded TFE	Grafoil
	Disc	None	None	None	None	None	None
ANSI Pressure Class[c] (psig) Refer to page 169		250 (up to 400 psig below 150°F)			125 (200 psig below 150°F)	250 (up to 400 psig below 150°F)	125 (200 psig below 150°F)
Allowable Control Media Temp [d]		20 to 300°F (-7 to 149°C)	40 to 300°F (4 to 149°C)	20 to 300°F (-7 to 149°C)	40 to 300°F (4 to 149°C)	20 to 300°F (-7 to 149°C)	40 to 300°F (4 to 149°C)
Allowable Differential Pressure for Water psig (kPa)[e]		35 psi (241)Max. for normal life (Refer to page 172 for cavitation limits)					

NOTE: These charts are color coded as shown below to assist valve selection. Note it is possible to select either a valve assembly or component parts (actuator, valve linkage, valve body).

ORDERING EXAMPLES:

1. **Valve Assembly:** VP-7313-301-4-10
2. **Valve Body:** VB-7313-0-4-10
   Actuator: MP-361
   Linkage: AV-391

- ❒ Valve Body Data less P Code (Size, Cv Rating, Port Code) or Valve Assembly less Actuator Code (XXX) and less P Code (Size, Cv Rating, Port Code)
- ❒ P Code (Size, Cv Rating, Port Code)
- ❒ Actuator or Actuator Code (XXX) for Valve Assemblies
- ❒ Valve Linkage

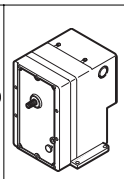
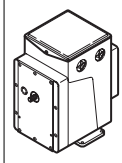
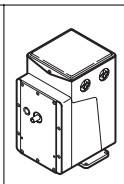
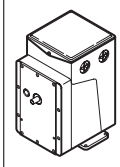
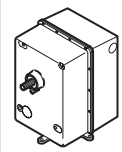
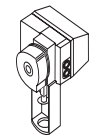
TO SELECT A PORT CODE (P).

P Code	Valve Size[c] in.	Cv						
-2[f]	1/2	2.2		2.2		—		
-4		4.4		4.4		4.4		
-6	3/4	7.5		7.5		7.5		
-8	1	14	—	14	—	15	—	
-9	1-1/4	20		20		20		
-10	1-1/2	28		28		28	Port	
-11	2	41		41		40	"U"	"L"
-12	2-1/2		67		74		68	75
-13	3		91		101		85	95
-14	4				170		160	180
-15	5	—		—	290	—	195	220
-16	6		—		390		250	275

a Refer to Table 3 and Table 7 for flow pattern, port designations, and normal position.
b MF-22203 for hot water and steam applications only.
c CAUTION: Solder, tubing and/or pipe schedules must meet or exceed working static pressure requirements.
d CAUTION: Freeze protection required for fluid temperatures below 32°F (0°C).
e Less than 20 psi recommended for quiet service.
f Factory assemblies are not available for two-position application using reduced port valve bodies.

3-Way Globe Valves, Mixing (1/2 to 6 in.), Diverting (1/2 to 6 in.), Screwed (1/2 to 3 in.), Union Sweat (1/2 to 2 in.) and Flanged (2-1/2 to 6 in) with Electric Gear Train Actuators

TABLE 2. Select Actuator Type or Actuator Code (XXX) series with correct Input Signal having sufficient close-off for the application. If selecting Component Parts, select Valve Linkage.

Input Signal		Refer to Table 3C		Two-Position SPST		Refer to Table 3 and Table 3A		Refer to Table 3 and Table 3A		Refer to Table 3A		Refer to Table 3D	
Valve Linkage VB-7313, VB-7314, VB-7323	1/2 to 2 in.	AV-630 or AV-630-010		AV-391		AV-391		AV-393		—		—	AV-680
Valve Linkage VB-9313 and VB-9314	2-1/2 to 4 in.	AV-630 or AV-630-030		AV-395		AV-395		AV-396		AV-352		AV-357	AV-681
	5 to 6 in.	—		—		—		—					
Valve Linkage	2-1/2 to 3 in.	AV-630 or AV-630-040		AV-300 and AV-29		V-300 and AV-29		AV-300 and AV-30		—		—	—
	4 to 6 in.	—		—		—		AV-352		—		—	—
Normal Position		Refer to Table 3B	None	Refer to Table 3		Refer to Table 3 and Table 3A		None		None		Stem Up	Stem Down
Actuator Code (XXX)		301, 311	401	3XX		3XX		40X, 41X, 42X, 44X		46X		903	365	366
Actuator Types		MM-500 MMR-500	MM-400 MMR-400	MA-318-XXX MA-418-XXX		MP-X6XX MP-X7XX		MC-351, MC-4XX MP-38X, MP-48X				MP-9730 (4 in.) MP-9750 (5 and 6 in.)	MP-7913	MP-7923

Valve Assembly	Valve Body	P Code	Size in.	ACTUATOR CLOSE-OFF PRESSURE RATING (psi)[a b c d]															
				SU	SD	SU	SD	SU	SD	SU	SD	SU	SD	SU	SD	SU	SD	SU	SD
VA-731X-3XX-4-P	VB-7313-0-4-P VB-7314-0-4-P	-2-4	1/2	210	178	250	250	250	250	250	250	250	250	—	—	—	—	—	—
VC-731X-4XX-4-P		-6	3/4	108	98			200	200	200	200			—	—	—	—	—	—
VM-731X-XXX-4-P		-8	1	70	70			150	150	150	150			—	—	—	—	—	—
VP-731X-XXX-4-P		-9	1-1/4	40	40	160	160	90	90	90	90	200	200	—	—	—	—	—	—
VS-731X-XXX-4-P		-10	1-1/2	30	30	110	110	60	60	60	60	140	140	—	—	—	—	60	60
		-11	2	16	16	60	60	35	35	35	35	80	80	—	—	—	—	35	35
VA-9313-3XX-4-P VC-9313-4XX-4-P VM-9313-XXX-4-P VP-9313-XXX-4-P VS-9313-XXX-4-P	VB-9313-0-4-P	-12	2-1/2	10	10	40	40	20	20	20	20	50	50	110	110	—	—	20	20
		-13	3	8	8	29	29	12	12	12	12	35	35	70	70	—	—	12	12
VA-9313-3XX-5-P	VB-9313-0-5-P	-12	2-1/2	10	10	42	40	20	20	20	20	50	50	110	110	—	—	20	20
VC-9313-4XX-5-P		-13	3	8	8	29	29	12	12	12	12	35	35	70	70	—	—	12	12
VM-9313-X01-5-P		-14	4	4	4	16	16	6	6	6	6	17	17	40	40	70	70	6	6
VP-9313-XXX-5-P		-15	5	—	—	—	—	—	—	—	—	—	—	18	18	45	45	—	—
VS-9313-XXX-5-P		-16	6	—	—	—	—	—	—	—	—	—	—	11	11	30	30	—	—
VA-7323-3XX-4-P	VB-7323-0-4-P	-4	1/2	250	250	250	250	250	250	250	250	250	250	—	—	—	—	—	—
VC-7323-4XX-4-P		-6	3/4											—	—	—	—	—	—
VM-7323-X01-4-P		-8	1											—	—	—	—	—	—
VP-7323-XXX-4-P		-9	1-1/4											—	—	—	—	—	—
VS-7323-XXX-4-P		-10	1-1/2											—	—	—	—	—	—
		-11	2											—	—	—	—	—	—
VA-9323-3XX-5-P	VB-9323-0-5-P [d]	-12	2-1/2	125	125	125	125	125	125	125	125	125	125	—	—	—	—	—	—
VC-9323-4XX-5-P		-13	3											—	—	—	—	—	—
VM-9323-X01-5-P		-14	4	—	—	—	—	—	—	—	—	—	—	125	125	—	—	—	—
VP-9323-XXX-5-P		-15	5	—	—	—	—	—	—	—	—	—	—	125	125	—	—	—	—
VS-9323-XXX-5-P		-16	6	—	—	—	—	—	—	—	—	—	—	—	—	125	125	—	—

[a] Close-off ratings for mixing or diverting valves: (SU = "A" port, SD = "B" port). "A" port (SU) ratings equal pressure at port "A" minus pressure at port "B". "B" port (SD) ratings equal pressure at port "B" minus pressure at port "A".

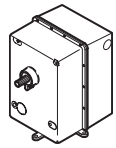
[b] SU — Stem Up; SD — Stem Down. Refer to Table 3 and Table 7 for flow pattern, port designations, and normal position.

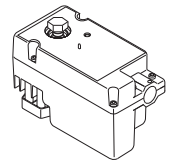
[c] Close-off pressure ratings describe only the differential pressure which the actuator can close-off to standards with adequate seating force. Consult valve body specifications for the limitations.

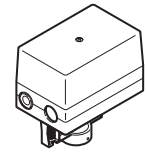
[d] Leakage ratings on 2 1/2 to 6 inch VB-9323 diverting valves are ANSI II (0.5%). Maximum differential pressure between opposite end ports is 50 psi.

3-Way Globe Valves, Mixing (1/2 to 6 in.), Diverting (1/2 to 6 in.), Screwed (1/2 to 3 in.), Union Sweat (1/2 to 2 in.) and Flanged (2-1/2 to 6 in) with Electric Gear Train Actuators

TABLE 2A. Select Actuator Type or Actuator Code (XXX) series with correct Input Signal having sufficient close-off for the application. If selecting Component Parts, select Valve Linkage.







Input Signal		Refer to Table 3A	Floating SPDT	Proportional	Floating SPDT	Floating SPDT and Multiple Input	
Valve Linkage for VB-7313	**1/2 to 2 in.**	—	**(Included)**	**(Included)**	(Included)	**—**	
Valve Linkage for VB-9313	**2-1/2 to 4 in.**	—	—	—	—	**AV-672**	
	5 to 6 in.	**AV-358**	—	—	—	**—**	
Valve Linkage VB-7314, VB-7323	**1/2 to 2 in.**	—	**(Included)**	**(Included)**	**(Included)**	**AV-671 (Included)**	
Actuator Code (XXX)		951	252 255 256	256	262 265 266	301	303
Actuator Types		MP-9810	MF-22XX3[a]	MS-22353	MF-23XX3[b]	MF-63103	MF-63123

Valve Assembly	Valve Body	P Code	Size in.	ACTUATOR CLOSE-OFF PRESSURE RATING (psi)[c d e f]						
				SD	SU	SU/SD	SU/SD	SU/SD	SD	SU
VF-7313-25X-4-P VS-7313-256-4-P	VB-7313-0-4-P VB-7314-0-4-P	-2-4	1/2 or 5/8	—	—	130	130	250	250	250
		-6	3/4	—	—	80	80	170		
		-8	1	—	—	40	40	80	230	230
		-9	1-1/4	—	—	25	25	50	140	140
		-10	1-1/2	—	—	15	15	33	90	90
		-11	2	—	—	6	6	16	50	50
VP-9313-30X-4-P VP-9313-30X-5-P	VB-9313-0-4-P VB-9313-0-5-P	-12	2-1/2	—	—	—	—	—	35	35
		-13	3	—	—	—	—	—	25	25
		-14	4	—	—	—	—	—	13	13
		-15	5	60	60	—	—	—	—	—
		-16	6	40	40	—	—	—	—	—
VF-7323-25X-4-P VS-7323-25X-4-P	VB-7323-0-4-P	-4	1/2	—	—	—	—	250	250	250
		-6	3/4	—	—					
		-8	1	—	—					
		-9	1-1/4	—	—					
		-10	1-1/2	—	—					
		-11	2	—	—					

[a] MF-222X3 for hot water and steam applications only.

[b] Controller must time out drive signal in a given direction after 3 min. or less.

[c] Close-off ratings for mixing or diverting valves: (SU = "A" port, SD = "B" port). "A" port (SU) ratings equal pressure at port "A" minus pressure at port "B". "B" port (SD) ratings equal pressure at port "B" minus pressure at port "A".

[d] SU — Stem Up; SD — Stem Down. Refer to Table 3 and Table 7 for flow pattern, port designations and normal position.

[e] Close-off pressure ratings describe only the differential pressure which the actuator can close-off to standards with adequate seating force. Consult valve body specifications for other limitations.

[f] Do not use mixing valves on diverting applications. Diverting valves may be used in mixing applications with minor affect on flow.

3-Way Globe Valves, Mixing (1/2 to 6 in.), Diverting (1/2 to 6 in.), Screwed (1/2 to 3 in.), Union Sweat (1/2 to 2 in.) and Flanged (2-1/2 to 6 in) with Electric Gear Train Actuators

TABLE 3. Factory Assemblies (VA-X3XX, VC-X3XX and VS-X3XX), select exact Actuator Code (XXX). Any MA-3XX, MC-3XX, MC-4XX, MF-221X3, MS-22353, and 220 lb-in. MP-4XX electric gear train actuator can be assembled to valve bodies with the close-off pressure ratings listed in Table 2 and Table 2A. Select Actuator Type having sufficient close-off for the application. Select actuator, linkage, valve body, and field assemble.

Input Signal	Normal Position	Voltage	Hz	VA	Aux. Switch	Actuator Part Number	Assembly Series	Actuator Code for Factory Assembly
Two-Position SPST	Stem Up (Spring Return)	24	60	92	No	MA-318	VA-73X3 VA-93X3	301
		120		108		MA-418		303
Two-Position SPDT	None (Non-Spring Return)	24	60	96	Yes	MC-351	VC-73X3 VC-93X3	401
		120				MC-431		413
						MC-431 w/AV-352		461
		240				MC5-4311		424
Floating SPDT	None (Non-Spring Return)	24	60	24	No	MF-22203	VF-73X3	252
						MF-22303		255
						MF-22323		256
2 to 10 Vdc or 4 to 20 mAdc	None (Non-Spring Return)	24	60	4	No	MS-22353	VS-73XX	256
2 to 15 Vdc TAC System 8000	Stem Down	120	60	50	Yes	MP-461-600	VS-73X3 VS-93X3	311
	Stem Up					MP-471-600		312
	None					MP-481-600 w/AV-39X		414
						MP-481-600 w/AV-352		462

3-Way Globe Valves, Mixing (1/2 to 6 in.), Diverting (1/2 to 6 in.), Screwed (1/2 to 3 in.), Union Sweat (1/2 to 2 in.) and Flanged (2-1/2 to 6 in) with Electric Gear Train Actuators

TABLE 3A. Factory Assemblies (VP-93XX), Multiple Input (refer to table below), select exact Actuator Code (XXX). Any 220 lb-in. MP-4XX, MP-9XXX electric gear train or MS-8305X hydraulic actuator can be assembled to valve bodies with the close-off pressure ratings listed in Table 2 and Table 2A. Select Actuator Type having sufficient close-off for the application. Select actuator, linkage, valve body and field assemble.

Normal Position	INPUT SIGNAL							Voltage Vac (Hz)	Aux. Switch	Actuator Part Number	Actuator Code (XXX) for Factory Available Assembly
	2 to 15 Vdc TAC System 8000	4 to 20 mA etc.	Slidewire (Series 90)	SPST	SPDT Snap Acting	Pneumatic to Electric	SPDT Floating Direct Digital Control				
Stem Down	1	9	2	Yes	Yes	11	Yes	24 (60)	Yes	MP-361	301
	3	4, 10				8, 12		120 (60)		MP-465	313
	5	4				8		240 (50)		MP5-4651	342
Stem Up	1	9				11		24 (60)		MP-371	302
	3	4, 10				8, 12		120 (60)		MP-475	314
	5	4				8		240 (50)		MP5-4751	344
None	1	9		—		11		24 (60)		MP-381	401
	3	4, 10				8, 12		120 (60)		MP-485	415
	5	4				8		240 (50)		MP5-4851	443
Non-Spring Return	1	9				11		24 (60)		MP-381 w/ AV-352	461
	3	4, 10				8, 12		120 (60)		MP-485 w/ AV-352	463
										MP-9730, MP-9750	903
	6	4	7			8				MP-9810	951

1. Requires CP-8301-024 or CP-930X ordered separately.
2. Requires AE-504 ordered separately.
3. Requires CP-8301-120 or CP-930X ordered separately.
4. Requires CP-8391-716 or CP-9302 ordered separately.
5. Requires CP-8301-240 or CP-930X ordered separately.
6. Requires CP-8391-456 or CP-930X ordered separately.
7. Requires AM-345 and AE-504 ordered separately.
8. Requires CP-8391-716 or CP-9302 and PP-8311 ordered separately.
9. Requires CP-8391-913 or CP-9301 ordered separately.
10. Requires CP-8391-910 or CP-9302 ordered separately.
11. Requires CP-8391-913 or CP-9301 and PP-8311 ordered separately.
12. Requires CP-8391-910 or CP-9302 and PP-8311 ordered separately.

TABLE 3B. Factory Assemblies VM-93XX for Modular Actuator, and VF-93XX for MF-631X3, select Actuator Code (XXX). Refer to Table 3C for optional inputs.

Normal Position	Voltage (50/60 Hz)	Aux. Switch	Actuator Part No.	Actuator Code (XXX) for Factory Assembly
Stem Up	24	No	MM-500	301
Stem Down				311
None Non-Spring Return			MM-400	401
None Non-Spring Return			MF-63103	301
			MF-63123	303

TABLE 3C. Input Signal for Modular Actuators (MM/MMR-400 or MM/MMR-500 and MF-63123). Order these control modules separately.

Input Signal	Control Module (order separately)	
	MM/MMR-400 or MM/MMR-500	MF-63123
Two-Position, Floating	MMC-468	None (Base Actuator)
4 to 20 mAdc	MMC-420	MFC-420[a]
135 Ω Slidewire	MMC-90	—
2 to 20 mAdc or 1 to 20 Vdc	MMC-8000	—
4 to 20 mAdc with Drive-to-20 mA Position	MMC-421	—
6 to 9 Vdc	—	MFC-8000[a]

[a] Other ranges available by Dip Switch setting on module.

3-Way Globe Valves, Mixing (1/2 to 6 in.), Diverting (1/2 to 6 in.), Screwed (1/2 to 3 in.), Union Sweat (1/2 to 2 in.) and Flanged (2-1/2 to 6 in) with Electric Gear Train Actuators

TABLE 4. Dimensions in Inches (Millimeters). (Refer to the following pages for illustrations.)

Valve Body						Actuator Series				
						MA-318-XXX MA-41X-XXX	MC-351, MP-38X, MP-48X MP-X6XX, X7XX	MC-351, MP-38X, 48X w /AV-352	MP-9750 MP-9810	MM-400, 500 MMR-400, 500
Part Number	Size In.	A	B[a]	C	D[a]	E[b]	E	E	E	E
VB-7313-0-4-P VB-7314-0-4-P VB-7323-0-4-P	1/2	3 (76)	4-3/16 (106)	1-3/8 (35)	2-5/16 (59)	12-13/16 (325)	13-9/16 (344)	13-9/16 (344)	—	11-1/4 (286)
	3/4	3-5/8 (92)	5-7/16 (138)	1-11//16 (43)	2-5/8 (67)	12-13/16 (325)	13-9/16 (344)	13-9/16 (344)	—	11-1/4 (286)
	1	4-5/8 (117)	6-5/8 (168)	1-9/16 (40)	3-1/8 (79)	12-7/8 (327)	13-5/8 (346)	13-5/8 (346)	—	11-5/16 (287)
	1-1/4		6-13/16 (173)	1-5/8 (41)	3-7/16 (86)	13-1/8 (333)	13-7/8 (352)	13-7/8 (352)	—	11-9/16 (294)
	1-1/2	5-3/8 (137)	8-5/16 (211)	1-5/8 (41)	3-3/4 (95)	13-1/4 (337)	14 (356)	14 (356)	—	11-11/16 (297)
	2	6-1/8 (156)	9-3/16 (233)	1-7/8 (48)	4-3/16 (106)	13-5/16 (338)	14-1/16 (357)	14-1/16 (357)	—	11-3/4 (298)
VB-9313-0-4-P	2-1/2	8-1/2 (216)	—	4-5/8 (117)	—	15-15/16 (405)	16-11/16 (424)	16-11/16 (424)	—	14-3/8 (365)
	3	9-1/2 (241)	—	5 (127)	—	16-3/8 (416)	17-1/8 (435)	17-1/8 (435	—	14-7/8 (378)
VB-9313-0-5-P	2-1/2	8-1/2 (216)	—	5-3/8 (136)	—	15-1/8 (384)	15-7/8 (403)	15-7/8 (403)	—	14-1/4 (362)
	3	9-1/2 (241)	—	6-3/8 (162)	—	16-5/8 (422)	17-3/8 (441)	17-3/8 (441)	—	14-7/8 (378)
	4	11-1/2 (292)	—	8-1/2 (216)	—	17-1/2 (445)	18-1/4 (464)	18-1/4 (464)	22 (559)	14-1/4 (362)
	5	13 (330)	—	8-3/4 (222)	—	—	—	18 (457)	24-3/8 (629)	—
	6	14 (356)	—	9-3/4 (248)	—	—	—	18-1/2 (470)	25-1/8 (638)	—
VB-9323-0-5-P	2-1/2	9 (229)	—	7 (178)	—	16-13/16 (351)	—	—	—	16 (406)
	3	10 (254)	—	8 (203)	—	17-9/16 (446)	—	—	—	16-3/4 (425)
	4	12 (305)	—	10 (254)	—	—	—	—	—	—
	5	13 (330)	—	10-1/2 (267)	—	—	—	—	—	—
	6	14-1/8 (359)	—	11-1/8 (283)	—	—	—	—	—	—

[a] Use B and D dimensions for VB-7314 valve body.

[b] Subtract 3/4 in. (19 mm) on VA assemblies.

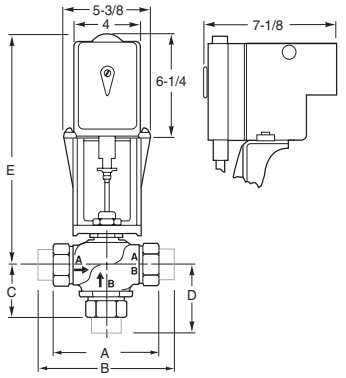
TABLE 5A. Dimensions in Inches (Millimeters). (Refer to the pages following pages for illustrations.)

Valve Body						Actuator Series		
						MF-22XX3[a] MS-22353	MF-631X3	MS-7913 MS-7923
Part Number	Size In.	A	B[b]	C	D[b]	E	E	E
VB-7313-0-4-P VB-7314-0-4-P VB-7323-0-4-P	1/2	3 (76)	4-3/16 (106)	1-3/8 (35)	2-5/16 (59)	4-1/8 (105)	7-1/8 (181)	—
	3/4	3-5/8 (92)	5-7/16 (138)	1-11/16 (43)	2-5/8 (67)	4-1/8 (105)	7-1/8 (181)	—
	1	4-5/8 (117)	6-5/8 (168)	1-9/16 (40)	3-1/8 (79)	4-3/16 (106)	7-3/16 (183)	—
	1-1/4		6-13/16 (173)	1-5/8 (41)	3-7/16 (86)	4-7/16 (113)	7-7/16 (189)	—
	1-1/2	5-3/8 (137)	8-5/16 (211)	1-5/8 (41)	3-3/4 (95)	4-9/16 (116)	7-1/2 (191)	—
	2	6-1/8 (156)	9-3/16 (233)	1-7/8 (48)	4-3/16 (106)	4-5/8 (117)	7-5/8 (194)	—
VB-9313-0-4-P	2-1/2	8-1/2 (216)	—	4-5/8 (117)	—	—	10-3/8 (264)	—
	3	9-1/2 (241)	—	5 (127)	—	—	10-13/16 (275)	—
VB-9313-0-5-P	2-1/2	8-1/2 (216)	—	5-3/8 (136)	—	—	10-1/4 (260)	—
	3	9-1/2 (241)	—	6-3/8 (162)	—	—	10-1/2 (267)	—
	4	11-1/2 (292)	—	8-1/2 (216)	—	—	11-1/4 (286)	—

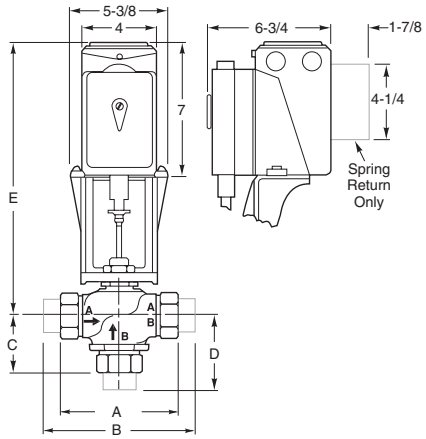
[a] **MF-22203 for hot water and steam applications only.**

[b] Use B and D dimensions for VB-7314 valve body.

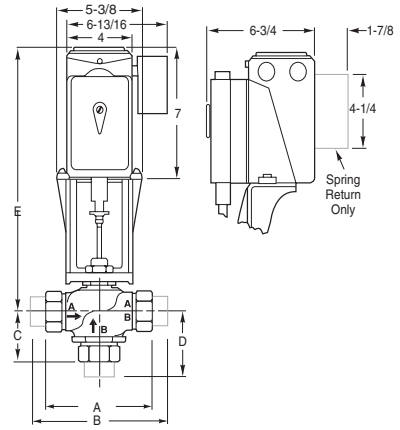
3-Way Globe Valves, Mixing (1/2 to 6 in.), Diverting (1/2 to 6 in.), Screwed (1/2 to 3 in.), Union Sweat (1/2 to 2 in.) and Flanged (2-1/2 to 6 in) with Electric Gear Train Actuators



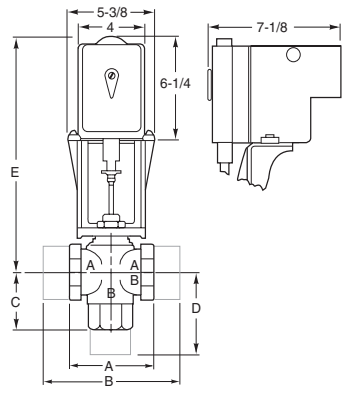
MA-318-XXX
MA-41X-XXX
with
VB-7313-0-4-P
VB-7314-0-4-P
VB-7323-0-4-P



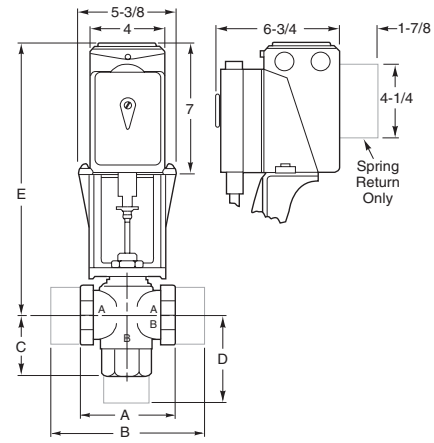
MC-351, 4XX
MP-38X, 48X
MP-X6XX, X7XX
with
VB-7313-0-4-P
VB-7314-0-4-P
VB-7323-0-4-P



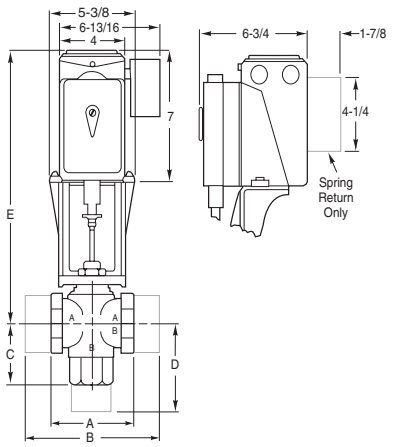
MP-38X, 48X
MP-X6XX, X7XX
with
VB-7313-0-4-P
VB-7314-0-4-P
VB-7323-0-4-P
and Electronic Drive



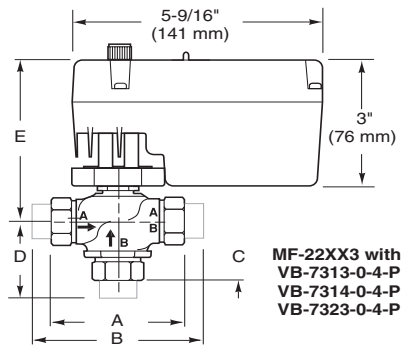
MA-318-XXX
MA-41X-XXX
with
VB-9313-0-4-P
VB-9314-0-4-P
VB-9323-0-4-P



MC-351, 4XX
MP-38X, 48X
MP-X6XX, X7XX
with
VB-9313-0-4-P
VB-9314-0-4-P
VB-9323-0-4-P

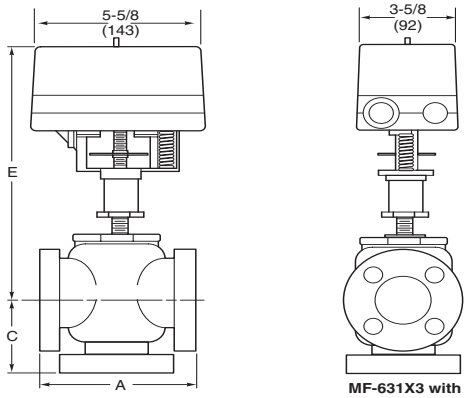


MP-38X, 48X
MP-X6XX, X7XX
with
VB-9313-0-4-P
VB-9314-0-4-P
VB-9323-0-4-P
and Electronic Drive

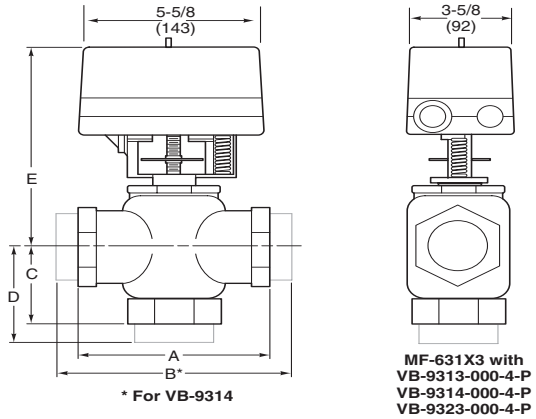


MF-22XX3 with
VB-7313-0-4-P
VB-7314-0-4-P
VB-7323-0-4-P

3-Way Globe Valves, Mixing (1/2 to 6 in.), Diverting (1/2 to 6 in.), Screwed (1/2 to 3 in.), Union Sweat (1/2 to 2 in.) and Flanged (2-1/2 to 6 in) with Electric Gear Train Actuators

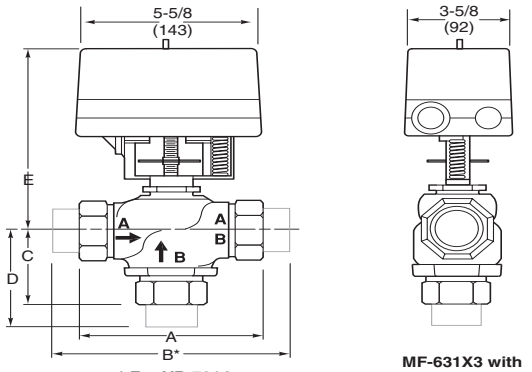


MF-631X3 with
VB-9313-000-5-P
No Factory Assemblies



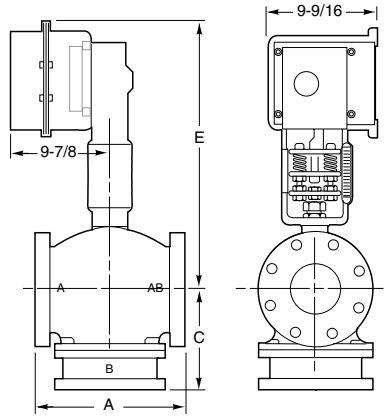
* For VB-9314

MF-631X3 with
VB-9313-000-4-P
VB-9314-000-4-P
VB-9323-000-4-P

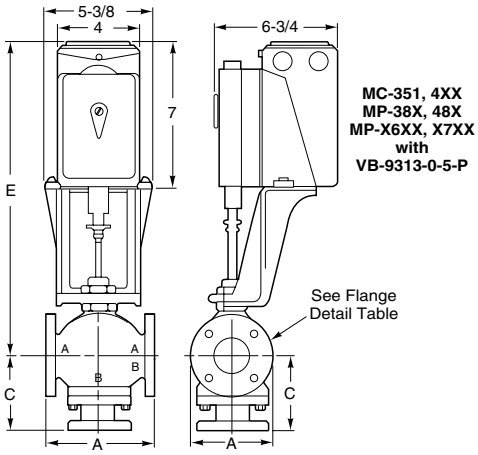


* For VB-7314

MF-631X3 with
VB-7313-000-4-P
VB-7314-000-4-P
VB-7323-000-4-P

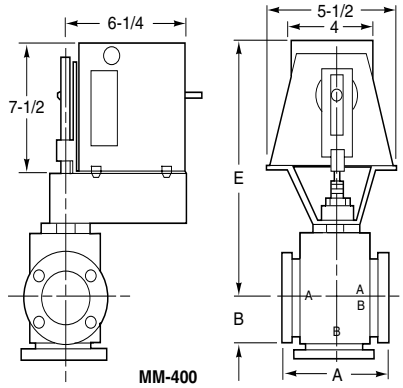


MP-9750
MP-9810 with
VB-9313-0-5-P



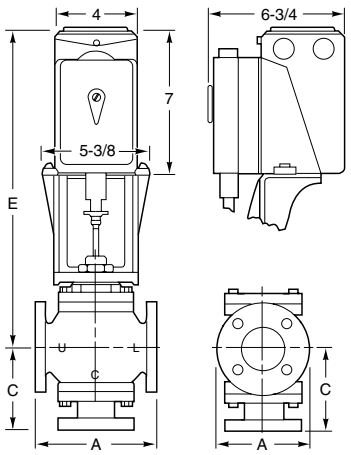
MC-351, 4XX
MP-38X, 48X
MP-X6XX, X7XX
with
VB-9313-0-5-P

MS-79X3 and VB-7313, VB-9313

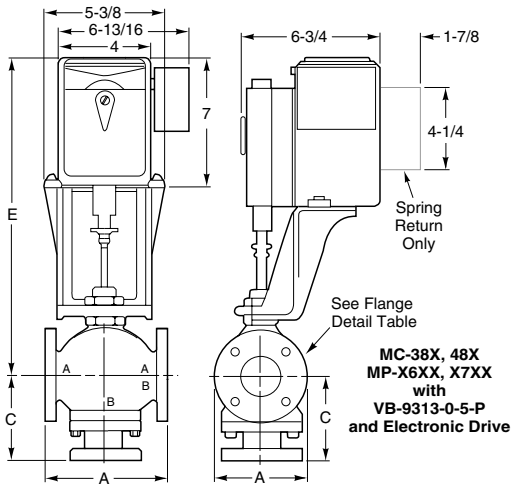


MM-400
MM-500 with
VB-9313-0-5-P

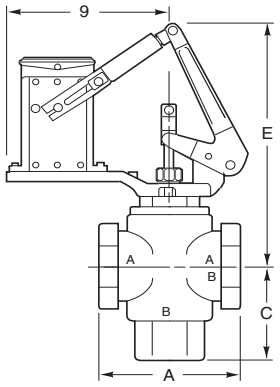
3-Way Globe Valves, Mixing (1/2 to 6 in.), Diverting (1/2 to 6 in.), Screwed (1/2 to 3 in.), Union Sweat (1/2 to 2 in.) and Flanged (2-1/2 to 6 in) with Electric Gear Train Actuators



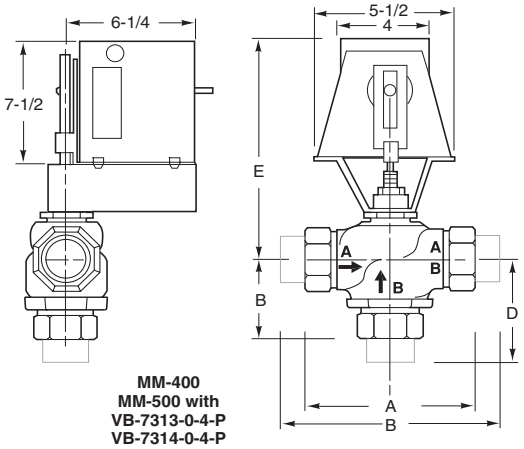
MC-351, 4XX
MP-38X, 48X
MP-X6XX, X7XX
with
VB-9323-0-5-P



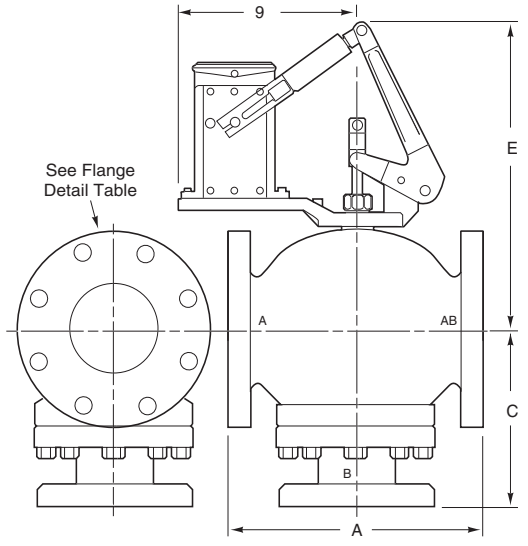
MC-38X, 48X
MP-X6XX, X7XX
with
VB-9313-0-5-P
and Electronic Drive



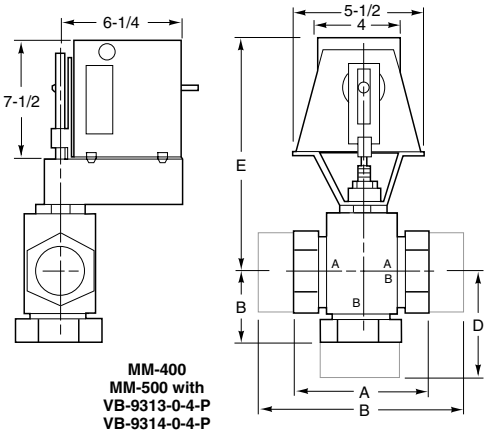
MC-351, 4XX
MP-38X, 48X
with VB-9313-0-4-P
(2-1/2"–3") and
AV-352 Linkage



MM-400
MM-500 with
VB-7313-0-4-P
VB-7314-0-4-P
VB-7323-0-4-P

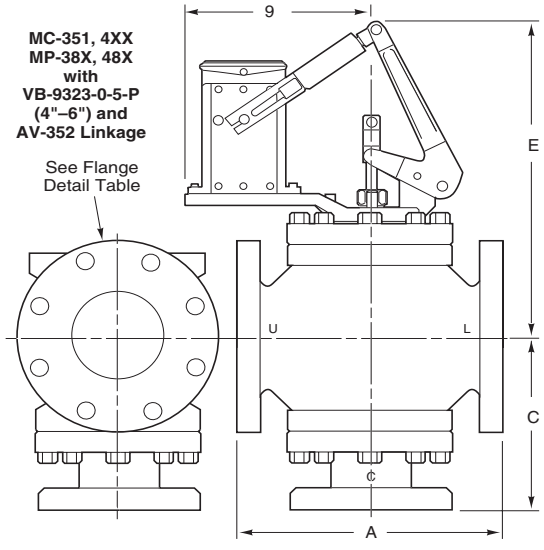


MC-351, 4XX
MP-38X, 48X
with
VB-9313-0-5-P
and AV-352 Linkage



MM-400
MM-500 with
VB-9313-0-4-P
VB-9314-0-4-P
VB-9323-0-4-P

MC-351, 4XX
MP-38X, 48X
with
VB-9323-0-5-P
(4"–6") and
AV-352 Linkage



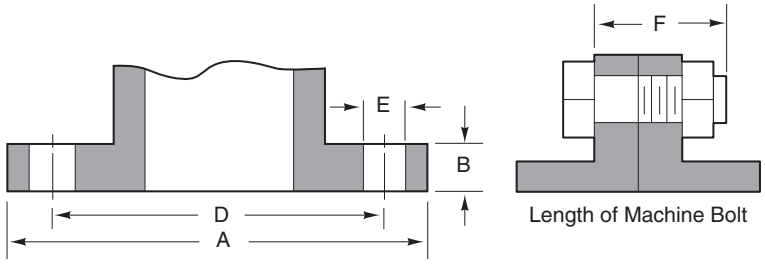
3-Way Globe Valves, Mixing (1/2 to 6 in.), Diverting (1/2 to 6 in.), Screwed (1/2 to 3 in.), Union Sweat (1/2 to 2 in.) and Flanged (2-1/2 to 6 in) with Electric Gear Train Actuators

TABLE 6. Restrictions on Maximum Ambient Temperature for Valve Actuators.

TEMPERATURES °F (°C)								
Actuator Code		**3XX**	**251[a]**	**253[a]**	**30X**	**40X, 41X, 42X**	**46X**	**90X**
Actuator Series		**MA-318-XXX MA-41X-XXX MP-X6XX, X7XX MM-500, MMR-500**	**MF-22X03**	**MF-22X23**	**MF-631X3**	**MC-351, 4XX MP-38X, 48X MM-400, MMR-400**	**MC-351, 4XX MP-38X, 48X w/AV-352**	**MP-9730 MP-9750 MP-9810**
Maximum Ambient		136 (57)	140 (60		140 (60)	136 (57)	136 (57)	130 (54)
Max. Allowable Fluid		260 (127)	220 (140)		260 (126)	260 (127)	260 (127)	260 (127)
VB-9313-0-5-P VB-9323-0-5-P	**Maximum Fluid**	300 (149)	281 (138)		300 (149)	300 (149)	300 (149)	300 (149)
	Max. Allowable Ambient	100 (38)	115 (46)		100 (38)	100 (38)	100 (38)	100 (38)
VB-7313-0-4-P VB-7314-0-4-P VB-7323-0-4-P	**Maximum Fluid**	281 (138)	281 (138)		281 (138)	281 (138)	281 (138)	—
VB-9313-0-4-P VB-9323-0-4-P	**Max. Allowable Ambient**	125 (52)	115 (46)		125 (52)	125 (52)	125 (52)	—

[a] MF-221X3 for hot water and steam applications only.

.



Flange Detail Dimensions in Inches (Metric conversion 25.4 mm = 1 in.).

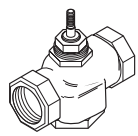
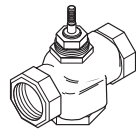
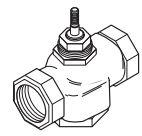
Nominal Pipe Size	Flanges		Drilling		Bolting		Length of Machine Bolts F
	Flange Diameter A	Flange Thickness B	Diameter of Bolt Circle D	Diameter of Bolt Holes E	Number of Bolts	Diameter of Bolts	
2-1/2	7	11/16	5-1/2	3/4	4	5/8	2-1/2
3	7-1/2	3/4	6	3/4	4	5/8	2-1/2
4	9	15/16	7-1/2	3/4	8	5/8	3
5	10	15/16	8-1/2	7/8	8	3/4	3
6	11	1	9-1/2	7/8	8	3/4	3-1/4

TABLE 7. Flow Pattern.

Body Part Number	Flow Type	Stem Up (SU)		Stem Down (SD)	
		Flow	Closed Port	Flow	Closed Port
VB-7313-0-4-P VB-7314-0-4-P VB-9313-0-5-P	Mixing	B to AB	A	A to AB	B
VB-7323-0-4-P	Diverting			B to A	AB
VB-9323-0-5-P		C to L	U	C to U	L

3-Way Globe Valves, Mixing (1/2 to 2 in.), Diverting (1/2 to 2 in.), Screwed (1/2 to 2 in.) with TAC DuraDrive™ Actuators

TABLE 1. Select Valve Body including P Code (Size, Cv Rating, Port Code). (Refer to Pages 172 to 175 for Valve Sizing.)

		Application		
		Chilled or Hot Water		
		Screwed NPT	Internal Parallel Pipe Thread per ISO 7/1, BS 21, JIS B0203	Screwed NPT
				
Size		1/2 to 2 in.	15 to 50 mm	1/2 to 2 in.
Valve Body, Actuator Provides Normal Position[a]		VB-7313-0-4-P	VB-7315-0-4-P	VB-7323-0-4-P
Actuator Types	Input Signal	Factory Available Valve Assemblies		
MA40-704X, MA40-707X, MA40-715X, MA40-717X	SPST	VA-7313-XXX-4-P	VA-7315-XXX-4-P VA-7325-XXX-4-P	VA-7323-XXX-4-P
MS40-6043, MS40-6083, MS40-6153, MS40-7043, MS40-7073, MS40-7153, MS40-7170	2 to 15 Vdc	VS-7313-XXX-4-P	VS-7315-XXX-4-P VS-7325-XXX-4-P	VS-7323-XXX-4-P
MF40-6043, MF40-6083, MF40-6153, MF40-7043, MF40-7073, MF40-7153, MF40-7173	Floating SPDT	VF-7313-25X-4-P	VF-7315-XXX-4-P VF-7325-XXX-4-P	—
Flow Type		Mixing		Diverting
Material	Body	Bronze	Bronze	Bronze
	Seat			
	Stem	Stainless Steel	Stainless Steel	Stainless Steel
	Plug	Brass	Brass	
	Packing	Spring Loaded TFE		
	Disc	None		
ANSI Pressure Class[b] (psig) Refer to page 169		250 (1724 kPa), up to 400 psig (2758 kPa) below 150°F (66°C[c])		
Allowable Control Media Temp[d]		20 to 300°F (-7 to 149°C)		
Allowable Differential Pressure for Water psig (kPa)[e]		35 psi (241)Max. for normal life (Refer to page 172 for cavitation limits)		

NOTE: These charts are color coded as shown below to assist valve selection. Note it is possible to select either a valve assembly or component parts (actuator, valve linkage, valve body).

ORDERING EXAMPLES:

1. **Valve Assembly:** **VP-7313-301-4-10**
2. **Valve Body:** **VB-7313-0-4-10**
   Actuator: MF40-6043
   Linkage: AV-391

- ❒ Valve Body Data less P Code (Size, Cv Rating, Port Code) or Valve Assembly less Actuator Code (XXX) and less P Code (Size, Cv Rating, Port Code)
- ❒ P Code (Size, Cv Rating, Port Code)
- ❒ Actuator or Actuator Code (XXX) for Valve Assemblies
- ❒ Valve Linkage

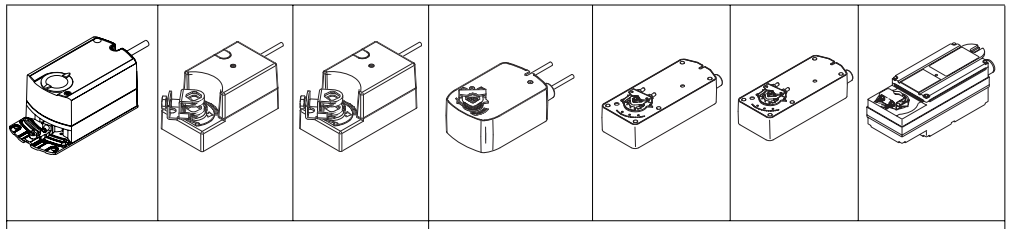
TO SELECT A PORT CODE (P).

P Code	Valve Size[c] in.	Cv (Kvs)		
-2[f]	1/2	2.2 (1/9)	1.9	—
-4		4.4 (3.8)	3.8	4.4 (3.8)
-6	3/4	7.5 (6.5)	6.5	7.5 (6.5)
-8	1	14 (12)	12	15 (12)
-9	1-1/4	20 (17)	17	20 (17)
-10	1-1/2	28 (24)	24	28 (24)
-11	2	41 (36)	36	41 (36)
-12	2-1/2	—	—	—
-13	3			
-14	4			
-15	5			
-16	6			

[a] Refer to Table 2 and Table 9 for flow pattern and normal position.
[b] CAUTION: Solder, tubing and/or pipe schedules must meet or exceed working static pressure requirements.
[c] Do not apply the above pressure rating to the piping system.
[d] CAUTION: Freeze protection required for fluid temperatures below 32°F (0°C).
[e] Less than 20 psi recommended for quiet service.
[f] Factory assemblies are not available for two-position application using reduced port valve bodies.

3-Way Globe Valves, Mixing (1/2 to 2 in.), Diverting (1/2 to 2 in.), Screwed (1/2 to 2 in.) with TAC DuraDrive™ Actuators

TABLE 2. Select Actuator Type or Actuator Code (XXX) series with correct Input Signal having sufficient close-off for the application. If selecting Component Parts, select Valve Linkage.



			Non-Spring Return			Spring Return			
	Input Signal		Floating and Proportional			SPDT, Floating and Proportional			
	Valve Linkage (Shaft Dia.)		AV-603 (1/2 in.)	AV-605 (1/2 in.)	AV-602 (1/2 in.)	AV-605 (1/2 in.)	AV-602 (3/4 in.)		
	Actuator/Linkage Assembly		MF40-6043-200 MS40-6043-200	MF40-6083-200 MS40-6083-200	MF40-6153-200 MS40-6153-200	MA40-704X-200 MA40-704X-201 MF40-7043-200 MF40-7043-201 MS40-7043-200 MS40-7043-201 MS40-7043-MP MS40-7043-MP5	MA40-707X-200 MA40-707X-202 MF40-7073-200 MF40-7073-202 MS40-7073-200 MS40-7073-202	MA40-715X-200 MA40-715X-202 MF40-7153-200 MF40-7153-202 MS40-7153-200 MS40-7153-202	MA40-717X-200 MF40-7173-200 MS40-7173-200
	Normal Position		N.O. or N.C.						
	Valve Assembly Type		VF or VA			VA, VF or VS			
	Actuator Code (XXX)		505	506	508	532. 533. 534. 535, 536, 537, 538, 539	542, 543, 544, 545, 546, 547	552, 553, 554, 555, 556, 557	572, 574, 576
	Actuator Types		MF40-6043 MS40-6043	MF40-6083 MS40-6083	MF40-6153 MS40-6153	MA40-704X MF40-7043 MS40-7043	MA40-707X MF40-7073 MS40-7073	MA40-715X MF40-7153 MS40-7152	MA40-717X MF40-7173 MS40-7173
Factory Available Valve Assemblies[a]	Valve Body	P Code	Size in.	ACTUATOR CLOSE-OFF PRESSURE RATING (psi)[b c]						
VA-7313-XXX-4-P VF-7315-XXX-4-P	VB-731X-0-4-P	2-4	1/2	225	—	—	250	—	—	—
		6	3/4	225	—	—	250	—	—	—
		8	1	100	180	—	125	180	—	—
		9	1-1/4	60	120	—	75	120	—	—
		10	1-1/2	40	75	140	50	75	140	160
		11	2	20	40	80	25	40	80	120
VA-7323-XXX-4-P	VB-7323X-0-4-P	2-4	1/2	250	—	—	250	—	—	—
		6	3/4	250	—	—	250	—	—	—
		8	1	250	—	—	250	—	—	—
		9	1-1/4	250	—	—	250	—	—	—
		10	1-1/2	250	—	—	250	—	—	—
		11	2	250	—	—	250	—	—	—

[a] Consult price guide for factory available valve assemblies.

[b] Seat leakage rating of ANSI class IV (.01%).

[c] Close-off pressure ratings describe only the differential pressure which the actuator can close-off with adequate seating force. Consult valve body specifications for other limitations.

TABLE 3. Factory Assemblies, Two Position, Floating, Proportional Actuators, Select Actuator Code (XXX).

Input Signal	Voltage	Running VA		Auxiliary Switch	Actuator	Actuator Code for Factory Assembly
		50 Hz	60 Hz			
Two Position SPST	24 Vac ± 20%	4.4	4.2	No	MA40-7043	536
				One	MA40-7043-501	537
	120 Vac ± 10%	6.4	4.3	No	MA40-7040	532
				One	MA40-7040-501	533
	230 Vac ± 10%	5.8	4.6	No	MA40-7041	534
				One	MA40-7041-501	535
	24 Vac ± 20%	9.6	9.6	No	MA40-7173	576
	120 Vac ± 10%	11.4	11.4	No	MA40-7170	572
	240 Vac ± 10%	11.8	11.8	No	MA40-7171	574
	24 Vac ± 20%	11.6	11.2	No	MA40-7153	556
				Two	MA40-7153-502	557
	120 Vac ± 10%	12.5	10.6	No	MA40-7150	552
				Two	MA40-7150-502	553
	230 Vac ± 10%	16.1	11.1	No	MA40-7151	554
				Two	MA40-7151-502	555
	24 Vac ± 20%	4.8	4.6	No	MA40-7073	546
				Two	MA40-7073-502	547
	120 Vac ± 10%	10.7	5.6	No	MA40-7070	542
				Two	MA40-7070-502	543
	230 Vac ± 10%	17.0	8.0	No	MA40-7071	544
				Two	MA40-7071-502	545
Proportional	24 Vac +20/-15%	3	3	No	MS40-6043	505
	24 Vac ± 20%	5.6	5.6	No	MS40-6083	506
		5.8	5.8	No	MS40-6153	508
		4.1	4.3	No	MS40-7043	536
				One	MS40-7043-501	537
				No	MS40-7043-MP	538
				One	MS40-7043-MP5	539
		4.2	4.5	No	MS40-7073	546
				Two	MS40-7073-502	547
		15.7	14.9	No	MS40-7153	556
				Two	MS40-7153-502	557
		9.4	9.4	No	MS40-7173	576
	120 Vac ± 10%	11.1	11.1	No	MS40-7170	572
	240 Vac ± 10%	11.8	11.8	No	MS40-7171	574
Floating	24 Vac +20/-15%	2	2	No	MF40-6043	505
	24 Vac ± 20%	5.6	5.6	No	MF40-6083	506
		5.8	5.8	No	MF40-6153	508
		8.3	7.8	No	MF40-7043	536
				One	MF40-7043-501	537
		4.2	4.5	No	MF40-7073	546
				Two	MF40-7073-502	547
		15.9	14.9	No	MF40-7153	556
				Two	MF40-7153-502	557
		10.0	10.0	No	MF40-7173	576

3-Way Globe Valves, Mixing (1/2 to 2 in.), Diverting (1/2 to 2 in.), Screwed (1/2 to 2 in.) with TAC DuraDrive™ Actuators

TABLE 4. MX40-6043 Dimensions in Inches (Millimeters). Refer to illustration below.

Valve Assembly Part Number	Valve Size in.	Valve Dimensions in inches (millimeters)		
		Three-Way (Refer to illustration below)		
		A	C	E
NPT VX-7313-505-4-P VX-7323-505-4-P	1/2	3 (76)	1-3/8 (35)	6-3/8 (162)
	3/4	3-5/8 (92)	1-11/16 (43)	6-3/8 (162)
	1	4-5/8 (117)	1-3/4 (44)	6-7/16 (164)
	1-1/4	4-5/8 (117)	1-5/8 (41)	6-11/16 (170)
	1-1/2	5-3/8 (136)	1-9/16 (40)	6-13/16 (173)
	2	6-1/8 (156)	2-1/16 (52)	6-7/8 (175)

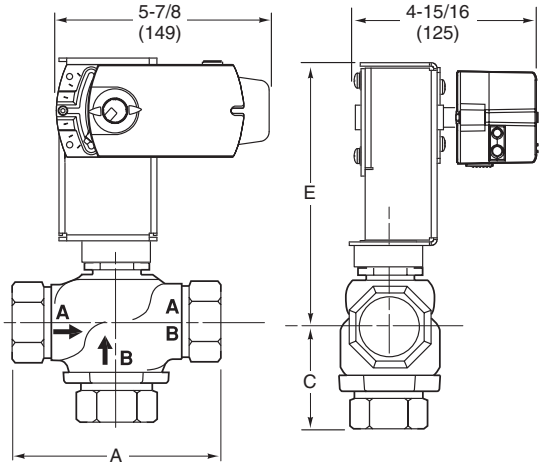


TABLE 5. MX40-6083 and MX40-6153-2XX Dimensions in Inches (Millimeters). Refer to illustration below.

Valve Assembly Part Number	Valve Size in.	Valve Dimensions in inches (millimeters)		
		Three-Way (Refer to illustration below)		
		A	C	E
NPT VX-73XX-XXX-4-P	1	4-5/8 (117)	1-3/4 (44)	8 (203)
	1-1/4	4-5/8 (117)	1-5/8 (41)	7-11/16 (195)
	1-1/2	5-3/8 (137)	1-5/8 (41)	7-13/16 (198)
	2	6-1/8 (156)	1-7/8 (48)	7-13/16 (198)

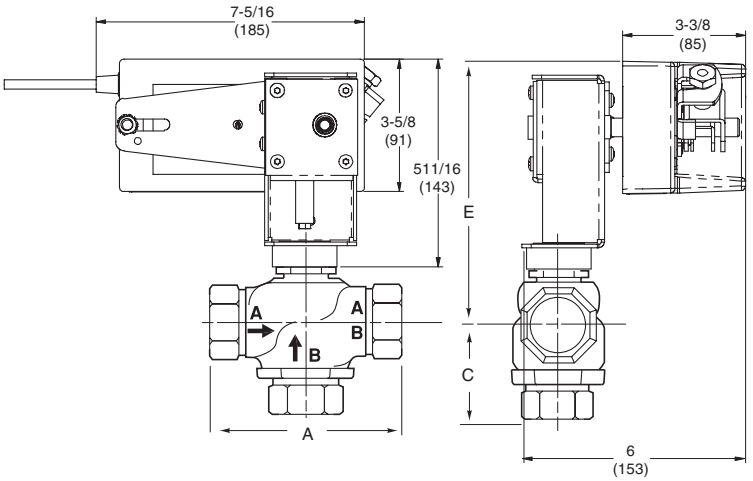


TABLE 6. MX40-704X-2XX Dimensions in Inches (Millimeters). Refer to illustration below.

Valve Assembly Part Number	Valve Size in.	Valve Dimensions in inches (millimeters)		
		Three-Way (Refer to illustration)		
		A	C	E
NPT VX-73XX-XXX-4-P	1/2	3 (76)	1-3/8 (35)	6-7/8 (175)
	3/4	3-5/8 (92)	1-11/16 (43)	6-7/8 (175)
	1	4-5/8 (117)	1-9/16 (40)	6-15/16 (176)
	1-1/4	4-5/8 (117)	1-5/8 (41)	7-3/16 (182)
	1-1/2	5-3/8 (137)	1-9/16 (40)	7-5/16 (186)
	2	6-1/8 (156)	1-7/8 (48)	7-3/8 (187)

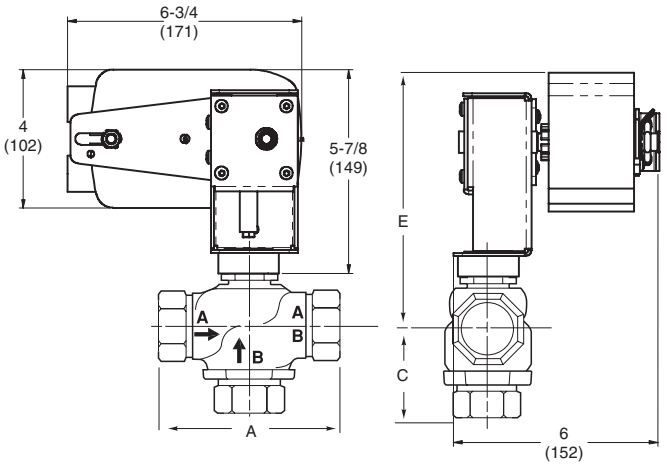
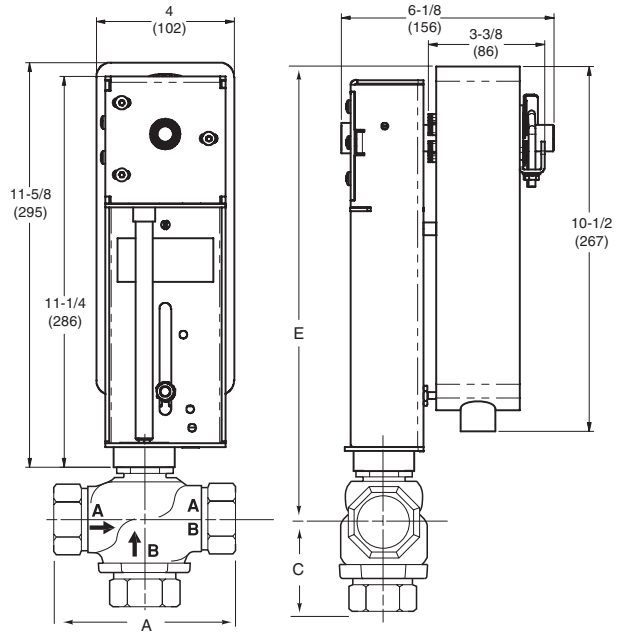


TABLE 7. MX40-715X-2XX and MX40-707X-2XX Dimensions in Inches (Millimeters). Refer to illustration below.

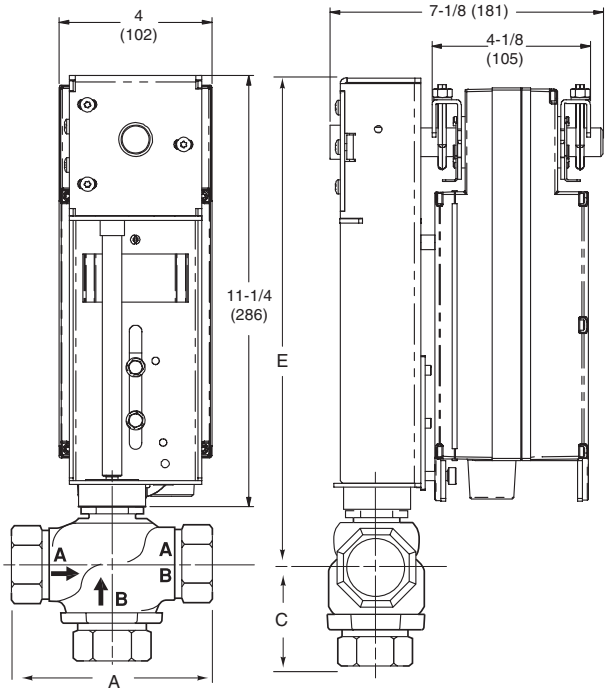
Valve Assembly Part Number	Valve Size in.	Valve Dimensions in inches (millimeters)		
		Three-Way (Refer to illustration below)		
		A	C	E
NPT VX-73XX-XXX-4-P	1	4-5/8 (117)	1-3/4 (44)	14 (356)
	1-1/4	4-5/8 (117)	1-5/8 (41)	13-1/4 (337))
	1-1/2	5-3/8 (137)	1-5/8 (41)	13-5/16 (338)
	2	6-1/8 (156)	1-7/8 (48)	13-5/16 (338)

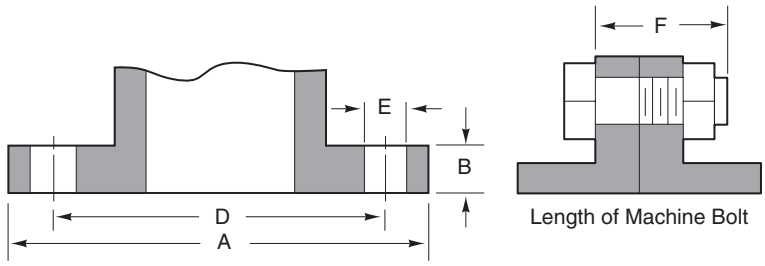


3-Way Globe Valves, Mixing (1/2 to 2 in.), Diverting (1/2 to 2 in.), Screwed (1/2 to 2 in.) with TAC DuraDrive™ Actuators

TABLE 8. MX40-717X Dimensions in Inches (Millimeters). Refer to illustration below.

Valve Assembly Part Number	Valve Size in.	Valve Dimensions in inches (millimeters)		
		Three-Way (Refer to illustration below)		
		A	C	E
NPT VX-73XX-XXX-4-P	1-1/2	5-3/8 (137)	1-5/8 (41)	12-7/8 (327)
	2	6-1/8 (156)	1-7/8 (48)	12-7/8 (327)





Flange Detail Dimensions in Inches (Metric conversion 25.4 mm = 1 in.).

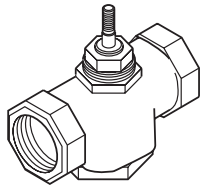
Nominal Pipe Size	Flanges		Drilling		Bolting		Length of Machine Bolts
	Flange Diameter A	Flange Thickness B	Diameter of Bolt Circle D	Diameter of Bolt Holes E	Number of Bolts	Diameter of Bolts	F
2-1/2	7	11/16	5-1/2	3/4	4	5/8	2-1/2
3	7-1/2	3/4	6	3/4	4	5/8	2-1/2
4	9	15/16	7-1/2	3/4	8	5/8	3
5	10	15/16	8-1/2	7/8	8	3/4	3
6	11	1	9-1/2	7/8	8	3/4	3-1/4

TABLE 9. Flow Pattern.

Body Part Number	Flow Type	Stem Up (SU)		Stem Down (SD)	
		Flow	Closed Port	Flow	Closed Port
VB-7313-0-4-P **VB-7314-0-4-P**	Mixing	B to AB	A	A to AB	B
VB-7323-0-4-P	Diverting			B to A	AB

3-Way Ball Valves, Screwed (1/2 to 2 in.) with TAC DuraDrive™ Actuators

TABLE 1. Select Valve Body including P Code (Valve Size, Cv Rating, Port Code) or select Linked Valve Assembly with correct Input Signal (refer to Table 2 and Table 3 also) less Actuator Code (XXX) including the P Code (Size, Cv Rating, Port Code). (Refer to Pages 172 to 179 for Valve Sizing.)

Application
Hot Water 250°F Max. 15 psig (103 kPa) Steam
Screwed NPT


Size		1/2 to 2 in.
Valve Body		VB-2353-0-8-P
Flow Type		Linear
Material	**Body**	Bronze (ASTM B584-C8440)
	Ball	316 Stainless Steel
	Seat	Multifill Teflon
	Stem	316 Stainless Steel
	Shaft	316 Stainless Steel
	Packing	Multifill Teflon and EPDM O-Ring
Maximum Working Pressure[a]		400 psig (2758 kPa)
STEAM		
Inlet Pressure		
Fluid Temperature — Maximum		—
WATER		
Fluid Temperature	**Minimum**	—
	Maximum	20°F (-7°C)

NOTE: These charts are color coded as shown below to assist valve selection. Note it is possible to select either a valve assembly or component parts (actuator, valve linkage, valve body).

1. **Valve Assembly: VB-2253-505-8-P**
2. **Valve Body: VB-2253-0-8-P**

   Actuator: MF40-6043

   Linkage: AV-606

- ❒ Valve Body Data less P Code (Size, Cv Rating, Port Code) or Valve Assembly less Actuator Code (XXX) and less P Code (Size, Cv Rating, Port Code)
- ❒ P Code (Size, Cv Rating, Port Code)
- ❒ Actuator or Actuator Code (XXX) for Valve Assemblies
- ❒ Valve Linkage

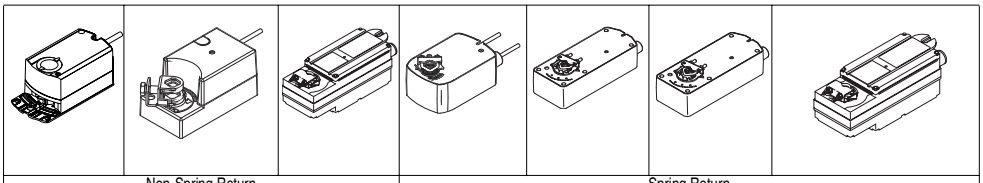
TO SELECT A PORT CODE (P).

P Code	Valve Size in.	Cv[b]	Kvs[b]
21	1/2	5.4	4.7
41	3/4	12.0	10.4
51	1	14.0	12.1
61	1-1/4	21.0	18.2
71	1-1/2	34.0	29.4
81	2	47.0	40.6

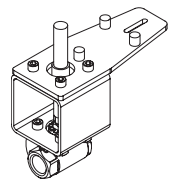
[a] Maximum water pressure. Refer to actuator specifications for pressure-temperature ratings.

[b] $k_{vs} = m^3/h$ ($\Delta P = 100$ kPa) $k_{vs} = C_v / 1.158$ $C_v = k_{vs} \times 1.156$

TABLE 2. Select Actuator Type or Actuator Code (XXX) series with correct Input Signal having sufficient close-off for the application.



		Non-Spring Return				Spring Return						
Input Signal		Floating and Proportional				SPDT, Floating and Proportional						SPDT
Ball Valve with Linkage Assembly		VB-2353-505-8-XX	VB-2353-506-8-XX		VB-2353-510-8-XX	VB-2353-506-8-XX	VB-2353-550-8-XX	—		VB-2353-510-8-XX		—
Normal Position		N.C.				N.O.						
Valve Assembly Type		VF or VS				VA, VF or VS						VA
Actuator Code (XXX)		505	506	508	512, 514, 516	532. 533. 534. 535. 536. 537	542, 543, 544, 545, 546, 547	552, 553, 554, 555, 556, 557	562, 563, 564, 565, 566, 567	572, 574, 576		582, 584, 586
Actuator Types		MF40-6043 MS40-6043	MF40-6083 MS40-6083	MF40-6153 MS40-6153	MF40-6343 MS40-634X	MA40-704X MF40-7043 MS40-7043	MA40-707X MF40-7073 MS40-7073	MA40-715X MF40-7153 MS40-7153		MA40-717X MF40-7173 MS40-717x		MA40-717X
Factory Available Valve Assemblies[a]	P Code	Size in.	Cv	VALID VALVE/ACTUATOR COMBINATIONS[bc]								
VX-2353-XXX-8-P	21	1/2	5.4	X[d]	X	X	—	X	X	X	—	X	—
	41	3/4	12.0	—	X[d]	X[d]	—	X	X	X	—	X	—
	51	1	14.0	—	—	X	X	—	—	X	—	X	—
	61	1-1/4	21.0	—	—	—	X	—	—	—	X	X[d]	X
	71	1-1/2	34.0	—	—	—	X	—	—	—	X	—	X
	81	2	47.0	—	—	—	X[d]	—	—	—	X[d]	—	X[d]



Valve Assembly Part Number	P Code	Size in.	Cv	k_{vs}[e]	Ball Valve & Linkage Only (-XXX-)[f]									
VX-2353-XXX-8-P[g]	21	1/2	5.4	4.7	505	506	506	—	530	550	550	—	510	—
	41	3/4	12.0	10.4	—	506	506	—	506	550	550	—	510	—
	51	1	14.0	12.1	—	—	506	510	—	—	550	—	510	—
	61	1-1/4	21.0	18.2	—	—	—	510	—	—	—	—	510	—
	71	1-1/2	34.0	29.4	—	—	—	510	—	—	—	—	—	—
	81	2	47.0	40.6	—	—	—	510	—	—	—	—	—	—

[a] Consult price guide for factory available valve assemblies.

[b] Non-spring return two-way ball valve assemblies are shipped normally closed, voltage rise to open.

[c] Seat leakage rating of ANSI class IV (.01%).

[d] Do not use these ball valve assemblies when the frequency of operation is les than once every 30 days. It is recommended that the next larger size actuator is selected.

[e] k_{vs} = m^3/h (ΔP = 100 kPa)k_{vs} = C_v / 1.158C_v = k_{vs} x 1.156

[f] Part number subcode (-XXX-) listed matching valid actuator/valve combinations in above table.

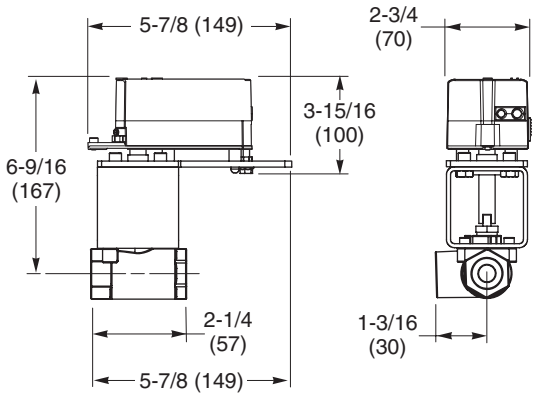
[g] To determine a specific part number, see the Ball Valve Assembly Part Numbering System,.

TABLE 3. Estimated Effective C_V when Using Pipe Reducers with Three-Way Ball Valve Assemblies.

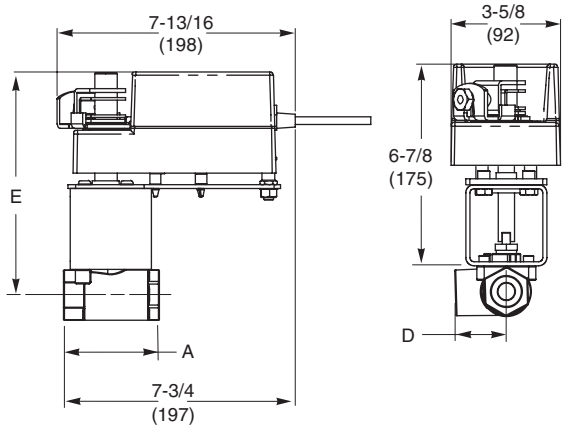
Valve Size (in.)	P Code	C_v	Estimated Effective C_v (k_{vs}) Pipe Size - inches (NPT)								
			1/2	3/4	1	1-1/4	1-1/2	2	2-1/2	3	4
1/2	**21**	5.4	5.4 (4.7)	4.8 (4.2)	4.5 (3.9)	—	—	—	—	—	—
3/4	**41**	12.0	—	12.0 (10.4)	11.2 (9.7)	10.5 (9.1)	10.0 (8.6)	—	—	—	—
1	**51**	14.0	—	—	14.0 (12.1)	13.7 (11.8)	13.3 (11.5)	12.9 (11.2)	—	—	—
1-1/4	**61**	21.0	—	—	—	21.0 (18.2)	20.7 (17.9)	19.9 (17.2)	19.4 (16.8)	—	—
1-1/2	**71**	34.0	—	—	—	—	34.0 (29.4)	32.8 (28.4)	31.6 (27.3)	30.8 (26.6)	—
2	**81**	47.0	—	—	—	—	—	47.0 (40.6)	46.3 (40.0)	45.4 (39.3)	44.2 (38.2)

TABLE 4. Dimensions in Inches (Millimeters). (Refer to the following pages for illustrations.)

Ball Valve Assembly Dimensions					
Valve Assembly Part Number	Valve Size in.	Valve Dimensions in inches (millimeters)			
		A	B	D	E
MX40-6083 or MX40-6153					
VX-2353-50X-8-P	1/2	2-1/4 (57)	N/A	1-3/16 (30)	7-7/16 (189)
	3/4	3 (76)	N/A	1-5/8 (41)	7-5/8 (194)
	1	3-3/16 (81)	N/A	1-3/4 (44)	7-3/4 (197)
MX40-634X					
VX-2353-XXX-8-P	1	3-3/16 (81)	N/A	1-23/32 (44)	9-19/32 (244)
	1-1/4	4 (102)	N/A	2 (51)	9-7/8 (251)
	1-1/2	4-13/32 (112)	N/A	2-3/8 (60)	10-1/4 (260)
	2	4-11/16 (119)	N/A	2-1/2 (64)	10-3/8 (264)
MX40-704X					
VX-2353-53X-8-P	1/2	2-1/4 (157)	N/A	1-3/16 (30)	7-1/8 (181)
	3/4	3 (76)	N/A	1-5/8 (41)	7-5/16 (188)
MX40-707X or MX40-715X					
VX-2353-XXX-8-P	1/2	2-1/4 (57)	N/A	1-3/16 (30)	7-1/2 (191)
	3/4	3 (76)	N/A	1-5/8 (41)	7-11/16 (195)
	1	3-3/16 (81)	N/A	1-3/4 (44)	7-13/16 (198)
	1-1/4	N/A	N/A	N/A	N/A
MX40-717X					
VX-2353-57X-8-P	1/2	2-1/4 (57)	N/A	1-3/16 (30)	8-7/16 (214)
	3/4	3 (76)	N/A	1-5/8 (41)	8-5/8 (219)
	1	3-3/16 (81)	N/A	1-3/4 (44)	8-34 (222)
	1-1/4	4 (102)	N/A	2-/1/8 (54)	8-15/16 (227)

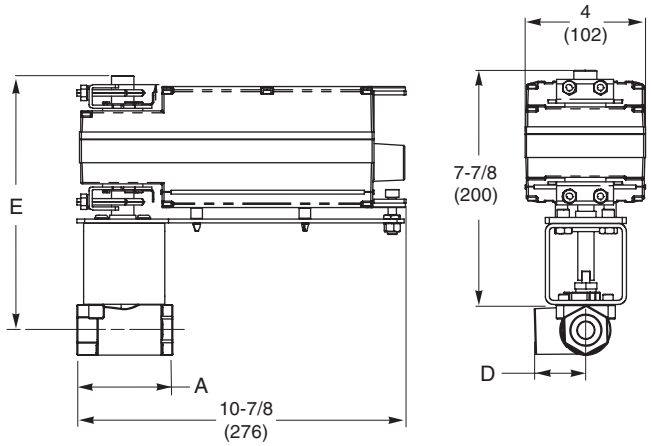


MF40-6043
MS40-6043

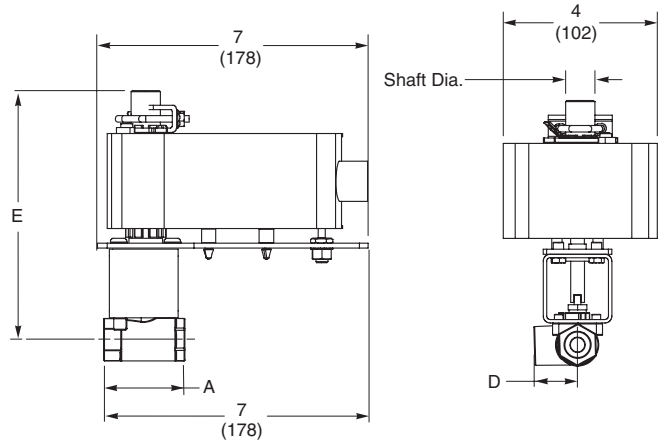


MX40-6083
MX40-6153

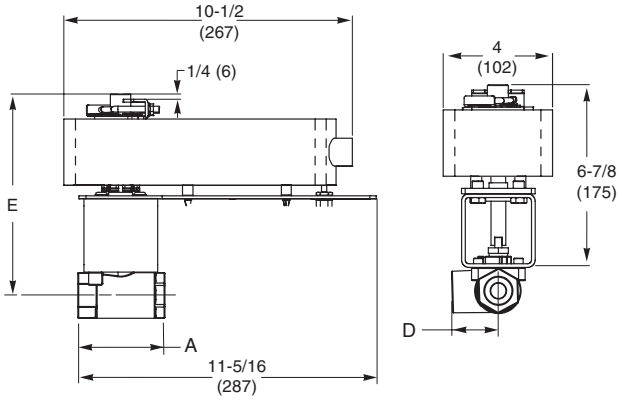
3-Way Ball Valves, Screwed (1/2 to 2 in.) with TAC DuraDrive™ Actuators



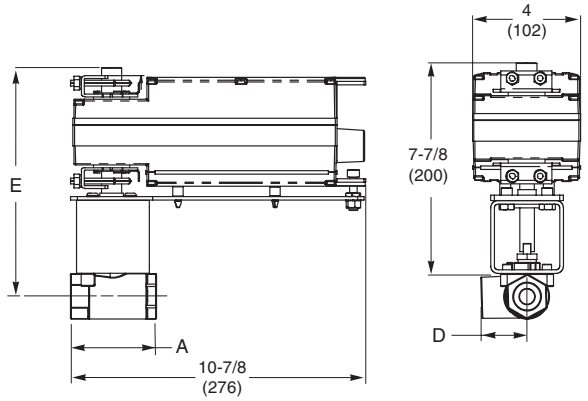
MX40-634X



MX40-704X



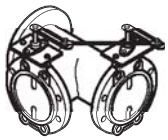
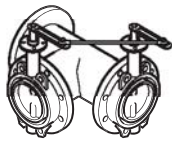
MX40-715X
MX40-707X



MX40-717X

3-Way Mixing and Diverting Butterfly Valves, Flangeless (2 to 24 in.) with Electric Gear Train and Pneumatic Actuators

TABLE 1. Select Valve Assembly with correct Input Signal (refer to Table 3, Table 3A, and Table 3B also) less Actuator Code (XXX) including the P Code (Size, Cv Rating, Port Code). (Refer to Pages 172 to 179 for Valve Sizing.)

			Application	
			Chilled or Hot Water	
			Flangeless Wafer[a]	2 in. - 6 in. Lug 8 in. - 12 in. Wafer
				
Size			2 to 24 in.	2 to 12 in.
Actuator	Normal Position	Input Signal	Valve Assemblies	
MC-431	None	SPDT	VC-6664-113-2-P	VC-6764-113-2-P
MK4-7121	Normal Position; Specify When Ordered	Pneumatic	VK-6664-221-2-P	VK-6764-221-2-P
MK4-7121 and MK-7121		Pneumatic	VK-6664-321-2-P	VK-6764-321-2-P
MP-485	None	Electric (Refer to Table 3B)	VP-6664-103-2-P	VP-6764-103-2-P
MP-9750	None		VP-6665-906-2-P	VP-6765-906-2-P
MP-9810	None		VP-6665-908-2-P	VP-6765-908-2-P
MP-4851	None	(Refer to Table 3B)	VP-6664-442-2-P VP-6665-442-2-P	VP-6764-442-2-P VP-6765-442-2-P
Flow Type			Mixing or Diverting; Specify When Ordered	
Material	Body		Iron	Iron
	Seat		1.5 to 3% Leakage	EPDM (EPT) Rubber Liner
	Stem		Stainless Steel	Stainless Steel
	Packing		Graphited Teflon	"O" Ring
	Disc		Iron	Aluminum Bronze
WATER				
Pressure psig (kPa)	Static		125 (862)	125 (862)
	Recommended Differential		Refer to Table 2	
Fluid Temp. °F (°C)	Minimum		-10 (-23)	-10 (-23)
	Maximum		350 (177)	250 (121)

NOTE: These charts are color coded as shown below to assist valve selection. Note it is possible to select a valve assembly.

ORDERING EXAMPLES:

1. **Valve Assembly: VK-6764-221-2-12**

- ❒ Valve Assembly less Actuator Code (XXX) and less P Code (Size, Cv Rating, Port Code)
- ❒ P Code (Size, Cv Rating, Port Code)
- ❒ Actuator Code (XXX) for Valve Assemblies

TO SELECT A PORT CODE (P).

P Code	Valve Size[b] (in.)	Cv[c]	
-11	2	54	47
-12	2-1/2	95	80
-13	3	155	136
-14	4	275	249
-15	5	435	404
-16	6	630	597
-17	8	1115	1200
-18	10	1740	1890
-19	12	2515	2860
-20	14	3013	—
-21	16	4000	—
-22	18	5125	—
-23	20	6390	—
-24	24	9350	—

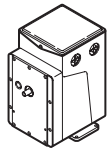
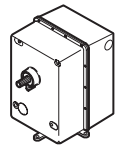
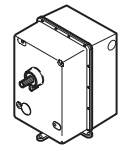
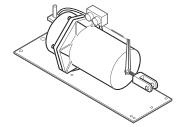
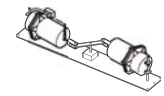
[a] Two flangeless wafers with 125/150 lb ASA flanges mounted on 125 lb cast iron tee. Refer to dimensional drawings.

[b] CAUTION: Fittings and/or pipe schedules must meet or exceed working static pressure requirements.

[c] Based on 60° opening for optimum control characteristics.

3-Way Mixing and Diverting Butterfly Valves, Flangeless (2 to 24 in.) with Electric Gear Train and Pneumatic Actuators

TABLE 2. Select Actuator Type or Actuator Code (XXX) series with correct Input Signal having sufficient close-off for the application.

Actuator Actuator Code (XXX)			MC-431 (113) MP-485 (103) MP-4851 (442)		MP-9750 (906)		MP-9810 (908)		MK4-7121 (221)[a]		MK4-7121 and MK-7121 (321) [a]	
Valve Assemblies	**P Code**	**Size (in.)**	**Close-Off 0°**	**Max. Recom. Diff. Press. Full Open (60°) (psi)**	**Close-Off 0°**	**Max. Recom. Diff. Press. Full Open (60°) (psi)**	**Close-Off 0°**	**Max. Recom. Diff. Press. Full Open (60°) (psi)**	**Close-Off 0°**	**Max. Recom. Diff. Press. Full Open (60°) (psi)**	**Close-Off 0°**	**Max. Recom. Diff. Press. Full Open (60°) (psi)**
VC-6664-113-2-P VK-6664-221-2-P VK-6664-321-2-P VP-6664-103-2-P VP-6665-906-2-P VP-6665-908-2-P VP-6665-442-2-P	-11	**2**	150	3.8[b]	—	—	—	—	150	3.8[b]	—	—
	-12	**2-1/2**		2.5[b]	—	—	—	—		2.5[b]	—	—
	-13	**3**		2.2[b]	—	—	—	—		2.2[b]	—	—
	-14	**4**	125	2.1[b]	—	—	—	—	125	2.1[b]	—	—
	-15	**5**	100		—	—	—	—	100		—	—
	-16	**6**	50	2.0[b]	80	2.0[b]	80	2.0[b]	80	2.0[b]	—	—
	-17	**8**	30	1.9[b]	90	2.0[b]	90	1.9[b]	83	1.9[b]	90	1.9[b]
	-18	**10**	25	1.4[b]	70	1.9[b]	70	2.0[b]	36	2.0[b]	70	2.0[b]
	-19	**12**	15	0.9[b]	50	1.9[b]	50	1.9[b]	27	1.9[b]	50	1.9[b]
	-20	**14**	—	—	30	1.9[b]	30	2.0[b]	16	1.8	30	2.0[b]
	-21	**16**	—	—		1.6[b]	40	1.9[b]	13	1.3	27	
	-22	**18**	—	—	20	1[b]	30	1.7	—	—	17	1.6
	-23	**20**	—	—	15	0.8[b]	25	1.3	—	—	13	1.3
	-24	**24**	—	—	10	0.5[b]	15	0.7	—	—	8	0.7
VC-6764-113-2-P VK-6764-221-2-P VK-6764-321-2-P VP-6764-103-2-P VP-6765-906-2-P VP-6765-908-2-P	-11	**2**	50[c]	2.8[b]	—	—	—	—	50[c]	5.0[b]	—	—
	-12	**2-1/2**		3.7[b]	—	—	—	—		3.5[b]	—	—
	-13	**3**		3.0[b]	—	—	—	—		2.8[b]	—	—
	-14	**4**		2.2[b]	50[c]	2.2[b]	—	—		2.5[b]	—	—
	-15	**5**		1.4[c d]		1.4[b]	50[c]	1.4[b]		2.4[b]	—	—
	-16	**6**	—	—		1.3[b]		1.3[b]		2.3[b]	50[c]	2.3[b]
	-17	**8**	—	—		1.3[b]		1.3[b]	—	—		1.7[b]
	-18	**10**	—	—	—	—	25[c]	1.3[c d b]	—	—	Consult Factory	
	-19	**12**	—	—	—	—		1.3[c d b]	—	—		

[a] Ratings based on 20 psi main pressure in actuator.

[b] Based on 10 ft/sec. fluid velocity. Contact factory concerning higher rating.

[c] Bubble tight.

[d] Based on wet service application only.

TABLE 3. Factory Assemblies (VK-6X64), Pneumatic Input, select exact Actuator Code (XXX).

Input Signal	Normal Position	Effective Area	Spring Range (psig)	Positive Positioner	Actuator(s)	Actuator Code (XXX) for Factory Available Assembly
Pneumatic	Specify When Ordered	20 sq. in.	8 to 13	Yes	MK4-7121	221
		40 sq. in.			MK4-7121 and MK-7121	321

TABLE 3A. Factory Assemblies (VC-6X64), SPDT (Snap Acting) Input, select exact Actuator Code (XXX).

Input Signal	Normal Position	Voltage Vac	Hz	VA	Auxiliary Switch	Actuator	Actuator Code (XXX) for Factory Available Assembly
SPDT Snap Acting	None	120	60	96	Yes	MC-431	113

3-Way Mixing and Diverting Butterfly Valves, Flangeless (2 to 24 in.) with Electric Gear Train and Pneumatic Actuators

TABLE 3B. Factory Assemblies (VP-6X6X and VS-6X64), Multiple Input (refer to table below), select exact Actuator Code (XXX). Any 220 lb-in. MP-3XX, MP-4XX, or MP-9XXX electric gear train actuator can be assembled to valve bodies with the close-off pressure ratings listed in Table 2. Select Actuator Type having sufficient close-off for the application. Select actuator, linkage, valve body and field assemble.

Normal Position	Input Signal							Voltage Vac (Hz)	Aux. Switch	Actuator Part Number	Actuator Code (XXX) for Factory Avail. Assem.
	2 to 15 Vdc TAC System 8000	4 to 20 mA etc.	Slidewire (Series 90)	SPST	SPDT Snap Acting	Pneumatic	SPDT Floating Direct Digital Control				
None	1	2, 8	3	—	Yes	4, 9	Yes	120 (60)	Yes	MP-485	103
										MP-9750	906
	6	2	7			4				MP-9810	908

1. Requires CP-8301-120 or CP-930X ordered separately.
2. Requires CP-8391-716 or CP-9302 ordered separately.
3. Requires AE-504 ordered separately.
4. Requires CP-8391-716 or CP-9302 and PP-8311.
6. Requires CP-8391-456 or CP-930X ordered separately.
7. Requires AE-504 and AM-345 ordered separately.
8. Requires CP-8391-910 or CP-9302 ordered separately.
9. Requires CP-8391-910 or CP-9302 and PP-8311 ordered separately.

TABLE 4. Optional Input Signal Interface to Pneumatic.

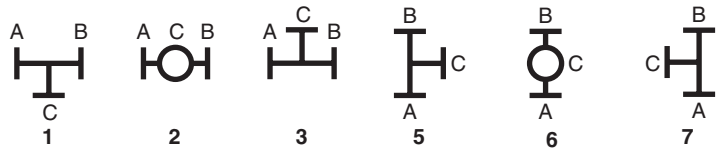
Input Signal Type	Interface Module Required
Two-Position SPST (Electric)	AL-1XX
Two-Position SPDT Snap Acting (Electric)	AL-1XX
Voltage 2 to 15 Vdc TAC System 8000	CP-8511-XXX
Current Input 4 to 20 mA etc.	CP-8511-XXX, CP-8551

TABLE 5. Dimensions in Inches (Millimeters). (Refer to following pages for illustrations.)

Part Number	Size	Dimensions (in.)					
		Valve				Tee (3-Way)	
		A	B	C	D	E	F
VC-6664 VK-6664 VP-6664 VP-6665	2	1-1/2 (38)	2-3/4 (70)	5-3/8 (137)	3-7/8 (98)	4-1/2 (114)	5-1/8 (130)
	2-1/2		3 (76)	5-5/8 (143)	4-5/8 (118)	5 (127)	
	3		3-1/8 (79)	5-7/8 (149)	5-1/4 (133)	5-1/2 (140)	
	4		4-1/4 (108)	6-3/8 (162)	6-3/8 (162)	6-1/2 (165)	5-1/4 (133)
	5		4-7/8 (129)	6-7/8 (175)	7-1/2 (191)	7-1/2 (191)	
	6		5-3/8 (137)	7-3/8 (187)	8-1/2 (216)	8 (203)	
	8	1-7/8 (48)	6-1/2 (165)	9-5/8 (244)	10-3/4 (273)	9 (229)	5-3/4 (146)
	10		8 (203)	10-5/8 (270)	13 (330)	11 (279)	
	12		9-1/2 (241)	11-5/8 (295)	15-1/4 (387)	12 (309)	
	14		10-1/2 (267)	12-1/8 (308)	16-3/8 (416)	14 (356)	
	16	2-3/8 (60)	12-3/4 (324)	14-1/2 (368)	18-1/4 (464)	15 (381)	
	18		13-7/8 (352)	15-1/2 (394)	20-3/4 (527)	16-1/2 (419)	
	20		14-7/8 (378)	16-1/2 (419)	22-3/4 (578)	18 (457)	
	24		17-1/4 (438)	18-1/2 (470)	27 (686)	22 (559)	
VC-6764 VK-6764 VP-6764 VP-6765	2	1-5/8 (41)	2-7/8 (73)	5-3/4 (146)	6-1/8 (156)	4-1/2 (114)	—
	2-1/2	1-3/4 (45)	3-1/8 (79)	6-1/4 (159)	6-7/8 (175)	5 (127)	
	3		3-1/2 (89)	6-1/2 (165)	7-1/4 (184)	5-1/2 (140)	
	4	2 (51)	4-1/2 (114)	7-/14 (184)	8-3/4 (222)	6-1/2 (165)	
	5	2-1/8 (54)	5-5/8 (143)	7-3/4 (197)	9-7/8 (251)	7-1/2 (191)	
	6		6-1/4 (159)	8-3/4 (222)	11 (279)	8 (203)	
	8	2-3/8 (60)	7-7/8 (200)	9-5/8 (245)	12 (305)	9 (229)	
	10	2-3/4 (70)	9-1/4 (235)	11 (279)	14-1/2 (368)	11 (279)	
	12	3 (76)	10-5/8 (270)	12-1/2 (318)	16-1/8 (410)	12 (309)	

3-Way Mixing and Diverting Butterfly Valves, Flangeless (2 to 24 in.) with Electric Gear Train and Pneumatic Actuators

The 3-Way Assemblies are shipped as a complete unit, assembled, mounted and tested, fully ready for field installation. Two valves are mounted on a 125 lb. cast iron tee; one valve complete with power actuator, the second valve controlled through connecting slave linkage. The valves are linked so that as one valve opens, the other valve closes. The tee arrangement desired should be specified by indicating the appropriate tee position (1 through 7 below), and the placement of both the power valve and slave valve respectively as on:



Tee Selection Numbers
(1, 2, 3, 4, 5, 6, 7)

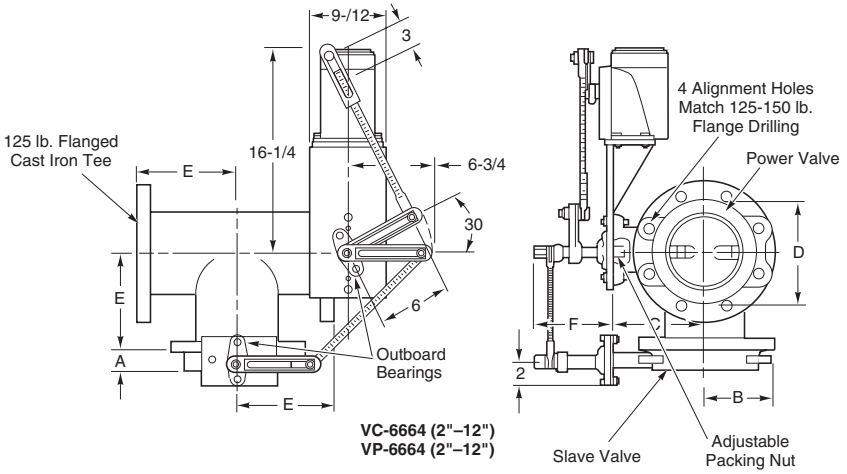
1.) Each port on Tee is designated by A, B, or C.

2.) All Tee arrangement numbers are based on Plan View of the Tee (Elevation: Looking down on Tee and Top of valve shaft as shown in example below).

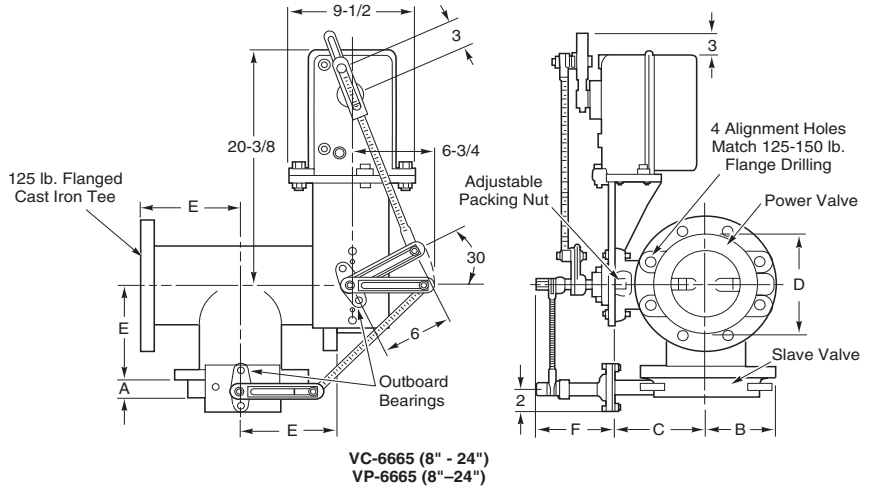
3.) Power valve (valve with actuator) is designated by the first letter after the Tee Selection Number. Either A, B, or C.

4.) All Tee arrangements are based on the bracket for the power valve to be positioned at 12:00 O'clock in the Plan View.

As an example, the plan view shown below are tee arrangements: 1 B C.



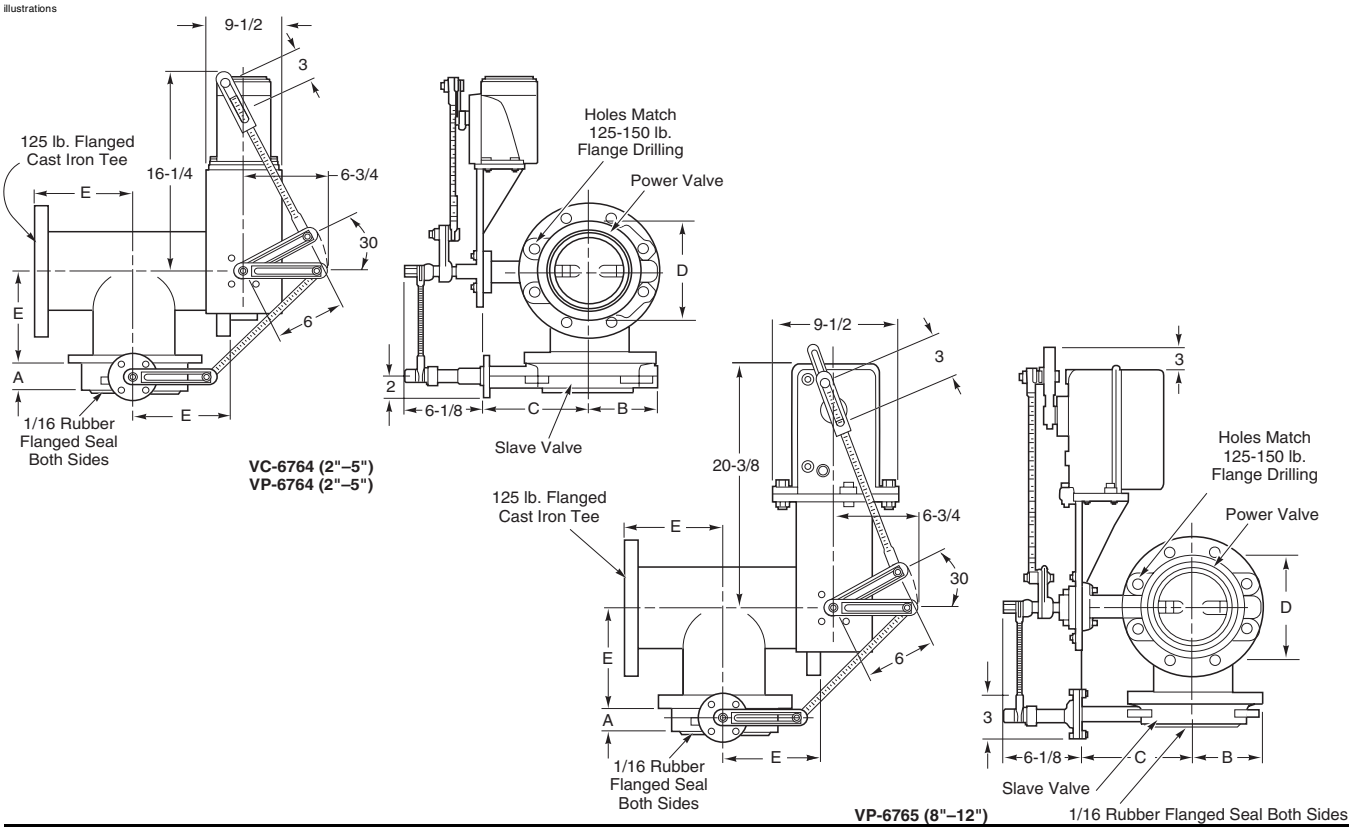
VC-6664 (2"–12")
VP-6664 (2"–12")

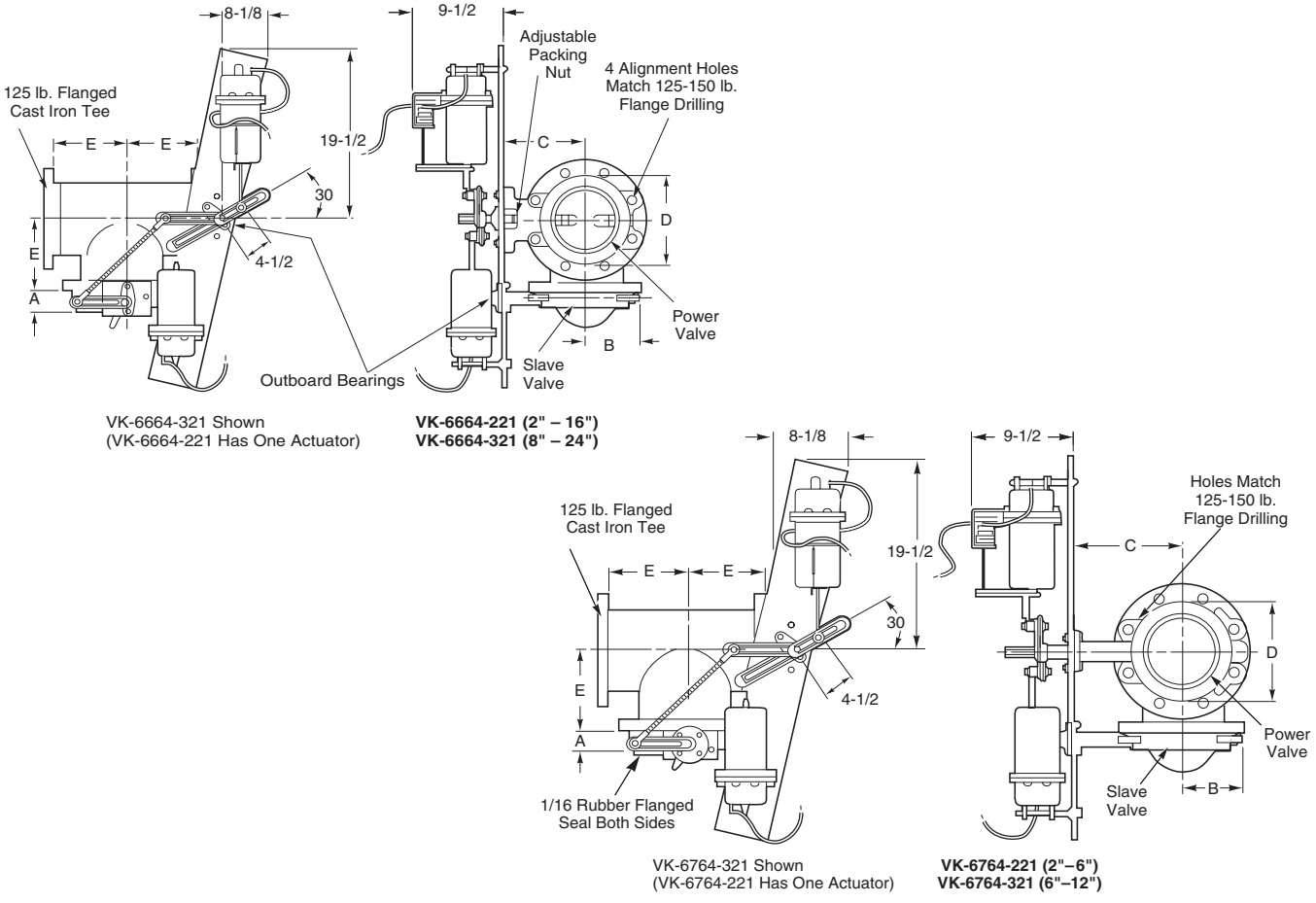


VC-6665 (8" - 24")
VP-6665 (8"–24")

3-Way Mixing and Diverting Butterfly Valves, Flangeless (2 to 24 in.) with Electric Gear Train and Pneumatic Actuators

illustrations





Part Numbering System

Two Position, Spring Return Actuator Zone Valve

⚠1 V X X X X X X X X X XX X ⚠2

Body Type & Temperature
T = On/Off (General)
S = On/Off (Steam)
High temperature actuator must be used.

Configuration
2 = 2-Way

Valve Size
2 = 1/2"
3 = 3/4"
4 = 1"
5= 1-1/4"

Connection Type	Availability
1 = Sweat	1/2", 3/4", 1", 1-1/4"
2 = Threaded NPT	1/2", 3/4", 1"
3 = Threaded Rp	1/2", 3/4", 1"
4 = Inverted Flare (Retrofit) ⚠3	3/4"
5 = SAE Flare	1/2"

Spring Return
1 = Normally Closed

Temperature Ratings
3 = General Temperature
4 = High Temperature

Voltage
A = 24 VAC, 50/60 HZ
B = 110/120 VAC, 50/60 HZ
D = 208 VAC, 60 HZ (High Temp only)
T = 277 VAC, 50/60 HZ (High Temp only)
U = 220/230 VAC, 50/60 HZ

Electrical Leads
00 = 6" Motor Wires
01 = Terminal Block with End Switch (General Temp., 24 VAC only)
02 = 18" (Standard) Wire Leads

Options
0 = No Options
A = End Switch (required with terminal block)

Actuator Type
G = On/Off (General Close-Off)
H = On/Off (High Close-off)

CV Size

No.	2-way	Size	Connection Type
1 =	1.0	1/2"	1, 2, 3, 5
		3/4"	4
2 =	2.5	1/2"	1, 2, 3, 5
		3/4"	1, 2, 3, 4
3 =	3.5	1/2"	1, 2, 3, 5
		3/4"	1, 2, 3, 4
		1"	1
5 =	5.0	3/4"	1, 2, 3
		1"	1
7 =	7.5	3/4"	1, 2, 3
	8.0	1"	1, 2, 3
		1-1/4"	1

⚠1 When ordering valve body only: use the first six positions to configure the valve.

⚠2 When ordering actuator only: use the last seven positions to configure the actuator. Prefex with the letter "A".

⚠3 TAC inverted flare fittings must be ordered separately. See actuator accessories for fitting part numbers.

⚠4 All voltages UL Listed or Recognized except 24 V 50 Hz.

Body & Actuator Combination Requirements

Temperature Configurations

Body Configuration
V T X X X X

T = General
S = Steam
If body configuration is T, actuator temp rating can be 3 or 4.
If body configuration is S, actuator temp rating must be 4.

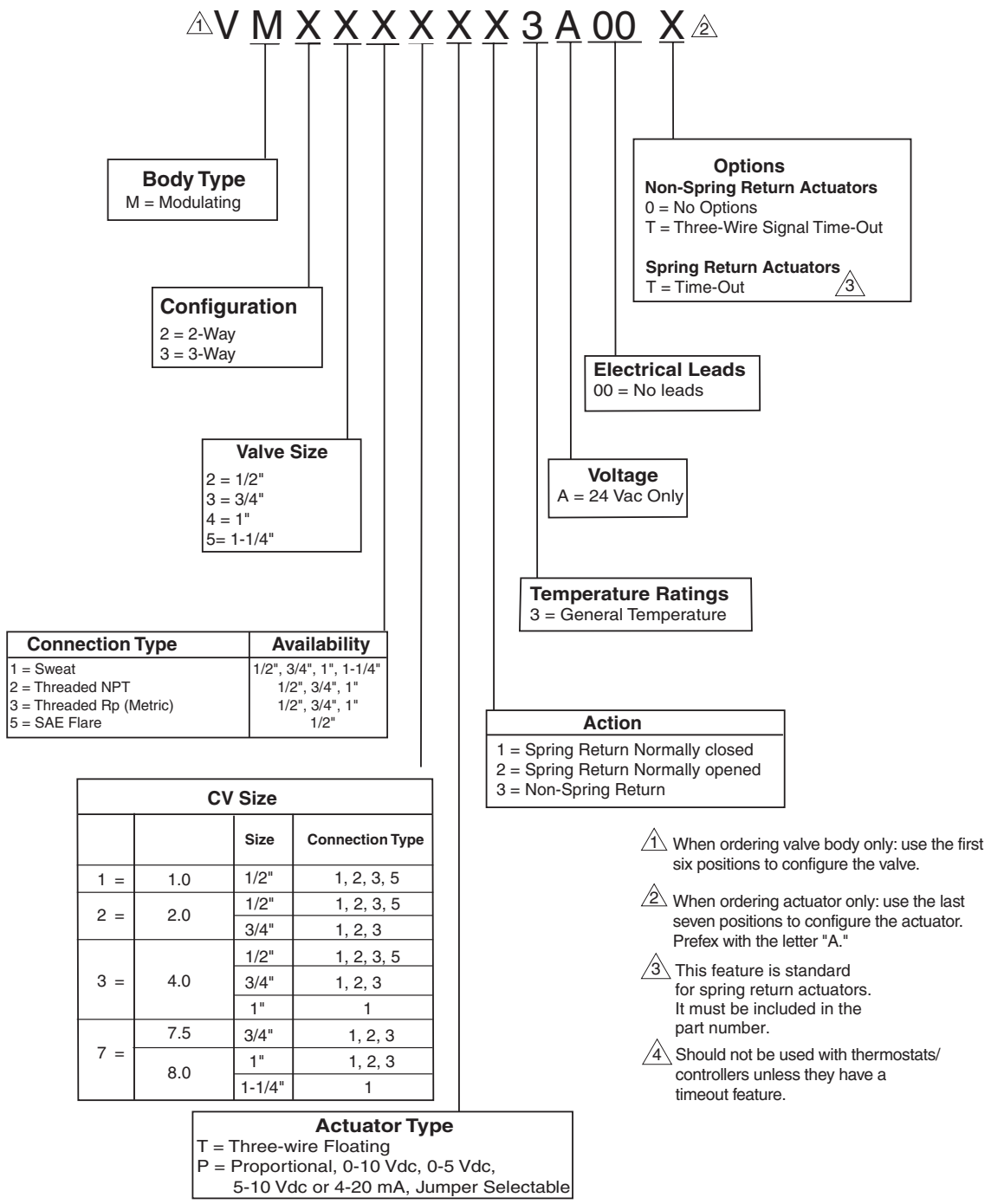
Actuator Spring Return Mode
A X X 3 A X X X

3 = General Temperature
4 = High Temperature
If actuator temp rating is 3, body style must be T.
If actuator temp rating is 4, body style can be S or T.

3-Way Zone Valves, Brass Threaded (1/2 to 1 in.), Sweat (1/2 to 1-1/4 in.) with Electric Actuators

Part Numbering System

Modulating Spring and Non-Spring Return Zone Valve



1 When ordering valve body only: use the first six positions to configure the valve.

2 When ordering actuator only: use the last seven positions to configure the actuator. Prefex with the letter "A."

3 This feature is standard for spring return actuators. It must be included in the part number.

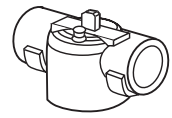
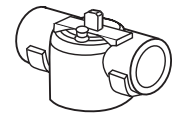
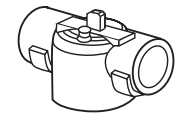
4 Should not be used with thermostats/ controllers unless they have a timeout feature.

Available Actuators

Part Number	Action	Position	Actuator Type	Option	
AT13A00T	Spring Return	N.C.	Three Wire Floating	With Time-Out	
AT23A00T	Spring Return	N.O.	Three Wire Floating	With Time-Out	
AT33A000	Non-Spring Return		Three Wire Floating	None	4
AT33A00T	Non-Spring Return		Three Wire Floating	With Time-Out	
AP13A000	Spring Return	N.C.	Proportional	None	
AP23A000	Spring Return	N.O.	Proportional	None	
AP33A000	Non-Spring Return		Proportional	None	

3-Way Zone Valves, Brass Threaded (1/2 to 1 in.), Sweat (1/2 to 1-1/4 in.) with Electric Actuators

TABLE 1. Select Valve Body less actuator (Valve Size, Cv Rating, Configuration) or select Valve Assembly with correct Input Signal (Refer to Pages 172 to 175 for Valve Sizing).

		Application		
		200°F (93°C)	260°F (151°C)	200°F (93°C)
		Threaded NPT		
				
Size		1/2 to 1-1/4 in. (15 to 32mm.)		
Valve Body		VT3XXX	VS3XXX	VM3XXX
Flow Type		Mixing Or Diverting		
Material	**Body**	Forged Brass		
	Seat	Brass		
	Stem	Nickel Plated Brass		
	Paddle\Plug	Buna N	Highly Saturated Nitrile	
Maximum Static Pressure		300 psi (2068 kPa)		

NOTE: These charts are color coded as shown below to assist valve selection. Note it is only possible to select a valve assembly or component parts (actuator, valve body).

ORDERING EXAMPLES:

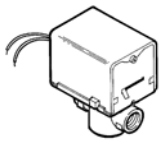
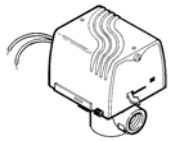
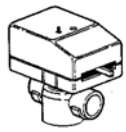
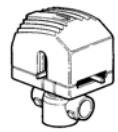
1. **Valve Assembly:**
   VT3215G13B02

❒ Valve Body: VT3215

❒ Actuator: G13B02

3-Way Zone Valves, Brass Threaded (1/2 to 1 in.), Sweat (1/2 to 1-1/4 in.) with Electric Actuators

TABLE 2. Using the numbering system on Pages 783 or 784 select the actuator type with correct input signal and having sufficient close-off for the application.

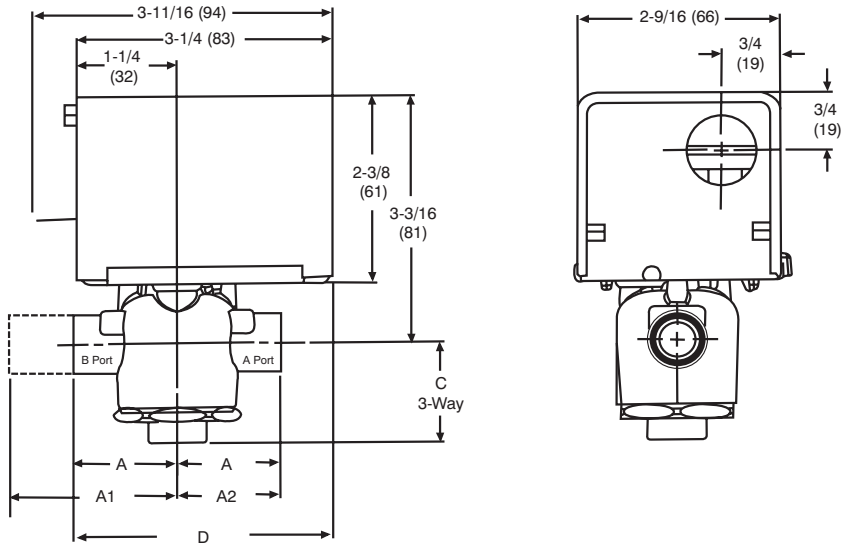
Actuator		AGXXXXXX		AHXXXXXX		AX33A00X		AXX3A00X		
Input Signal		2 Position SPST		2 Position SPST		ATXXXXXX = 24 Vac Three Wire Floating APXXXXXX = Jumper Selectable: 0 to 10V, 4 to 20 mA, 0 to 5 Vdc or 5 to 10 Vdc				
Voltage Impedance		—		—		Voltage 200KΩ Current 300K Ω		Open/Close Current 3.9K Ω		
Valve Body	Size in.	ACTUATOR CLOSE-OFF PRESSURE RATING - PSI (kPa)[a] [b]								
		Cv (Kv)	Close-off ΔP (kPa)	Cv (Kv)	Close-off ΔP (kPa)	Cv (Kv)	Close-off ΔP (kPa)	Cv (Kv)	Close-off ΔP (kPa) Non-Spring Return Driven Closed	Close-off ΔP (kPa) Spring Return Spring Closed
VT32X1	1/2	1.5 (1.3)	50 (350)	1.5 (1.3)	75 (525)					
VT33X1	3/4									
VT32X2	1/2	3.0 (2.6)	30 (210)	3.0 (2.6)	50 (350)					
VT33X2	3/4									
VT32X3	1/2	4.0 (3.4)	20 (140)	4.0 (3.4)	30 (210)					
VT33X3	3/4									
VT3413	1									
VT33X5	3/4	5.0 (4.3)	13 (90)	5.0 (4.3)	25 (175)					
VT3415	1									
VT33X7	3/4	7.5 (6.5)	10 (70)	7.5 (6.5)	15 (105)					
VT34X7	1	8.0 (7.5)	15 (103)	8.0 (6.9)	20 (140)					
VT3517	1-1/4									
VS32X1	1/2	1.5 (1.3)	15 (103)	1.5 (1.3)	15 (103)					
VS33X1	3/4									
VS32X2	1/2	3.0 (2.6)	15 (103)	3.0 (2.6)	15 (103)					
VS33X2	3/4									
VS32X3	1/2	4.0 (3.4)	15 (103)	4.0 (3.4)	15 (103)					
VS33X3	3/4									
VS3413	1									
VS33X5	3/4	5.0 (4.3)	15 (103)	5.0 (4.3)	15 (103)					
VS3415	1									
VS33X7	3/4	7.5 (6.5)	15 (103)	7.5 (6.5)	15 (105)					
VS34X7	1	8.0 (7.5)	15 (103)	8.0 (6.9)	20 (140)					
VS3517	1-1/4									
VT32X1	1/2					—	—	—	—	—
VT33X1	3/4									
VT32X2	1/2									
VT33X2	3/4									
VT32X3	1/2									
VT33X3	3/4									
VT3413	1									
VT33X5	3/4									
VT3415	1									
VT33X7	3/4									
VT34X7	1									
VT3517	1-1/4									
VM32X1	1/2					1.0 (0.9)	50 (344)	1.0 (0.9)	50 (344)	50 (344)
VM33X1	3/4									
VM32X2	1/2					2.0 (1.7)	50 (344)	2.0 (1.8)	50 (344)	20 (137)
VM33X2	3/4									
VM32X3	1/2					4.0 (3.5)	35 (242)	4.0 (3.5)	35 (242)	20 (137)
VM33X3	3/4									
VM3413	1									
VM33X7	3/4					7.5 (6.5)	35 (242)	7.5 (6.5)	35 (242)	15 (103)
VM34X7	1					8.0 (6.9)	35 (242)	8.0 (7.5)		
VM3517	1-1/4									

[a] Close-off rated for ANSI IV (.01%) with pressure at inlet (port B).

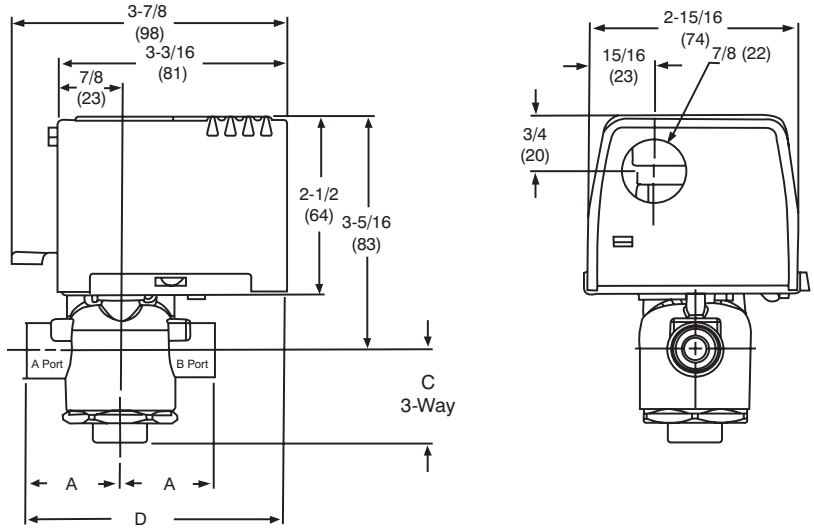
[b] Close-off pressure ratings describe only the differential pressure between the inlet and outlet ports which the actuator can close-off with adequate seating force. Consult valve body specifications for other limitations.

TABLE 3. Dimensions in Inches.

Valve Body					Actuator Series		
					GXXXXXX	HXXXXXX	X33A00X XX3A00X
Part Number	Size In.	A		C	D	D	D
VTXXXX VSXXXX VMXXXX	1/2 Sweat	1.29		3.30	3.30	3.62	—
	3/4 Sweat	1.37		1.69	3.38	3.74	—
	1 Sweat	1.69		1.69	3.62	4.0	—
	1-1/4 Sweat	1.85		1.85	3.70	4.13	—
	1/2 NPT, Rp 1/2	1.37		3.30	3.38	3.62	—
	3/4 NPT, Rp 3/4	1.69		1.45	3.62	4.0	—
	1 NPT Rp 1	1.85		1.69	3.70	4.13	—
	1/2 SAE Flare	2.24		2.24	—	—	—
VTXXXX VSXXXX	3/4 Inverted Flare	A1	A2	0.9 (23)	1.29 (33)	3.38 (86)	3.62 (92)
		2.20 (56)	1.32 (34)				

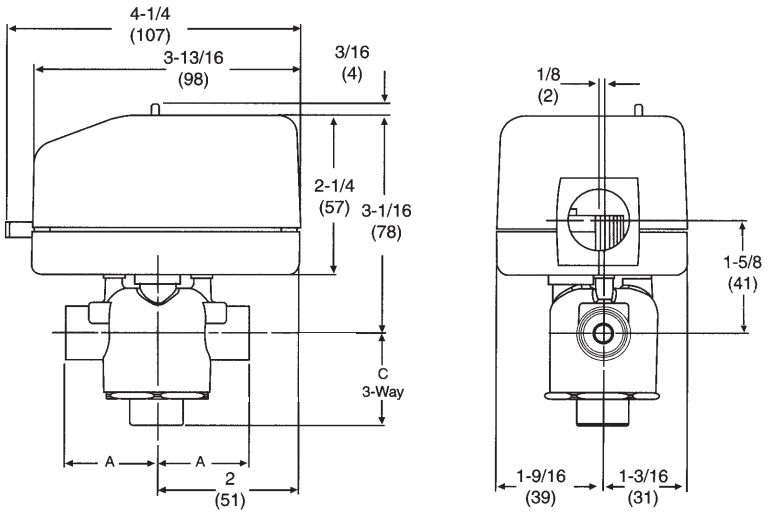


VTXXXXGXXXXXX

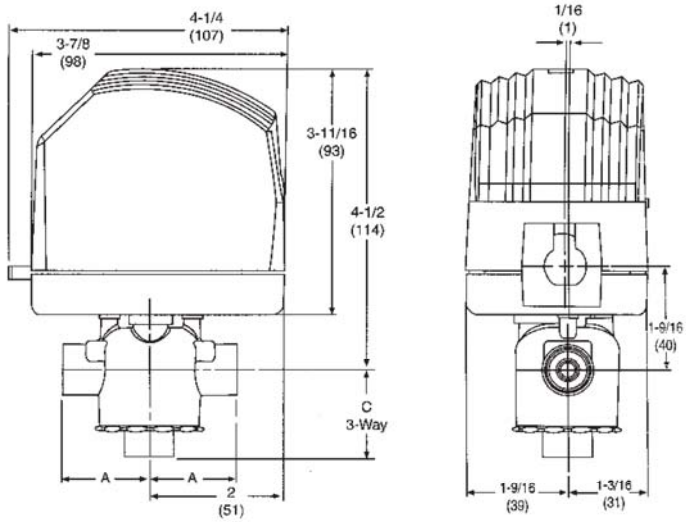


VSXXXXHXXXXXX

3-Way Zone Valves, Brass Threaded (1/2 to 1 in.), Sweat (1/2 to 1-1/4 in.) with Electric Actuators



VMXXXXX33A00X

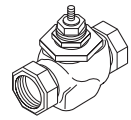
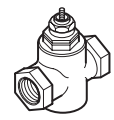


VMXXXXXX3A00X

METRIC VALVES

2-Way Globe Valves, Screwed End (15 to 80 mm) with Pneumatic Actuators

TABLE 1. Select Valve Body including P Code (Valve Size, k_{VS} Rating, Port Code).

		Application		
		Chilled or Hot Water 138°C Maximum 240 kPa (2.4 Bar) Steam		Chilled or Hot Water 138°C Maximum 240 kPa (2.4 Bar) Steam
		Internal Parallel Pipe Thread per ISO 7/1, BS 21, JIS B0203		Internal Parallel Pipe Thread per ISO 7/1, BS 21, JIS B0203
				
Size		**15 to 50 mm**		**65 & 80 mm**
Valve Body		VB-7215-0-4-P	VB-7225-0-4-P	VB-9215-0-4-P
Action		Stem Up Open	Stem Up Closed	Stem Up Open
Flow Type		Equal % (Refer to 170)		
Material	**Body**	Bronze		Bronze
	Seat			
	Stem	Stainless Steel		Stainless Steel
	Plug	Brass		Brass
	Packing	Spring Loaded TFE		Spring Loaded TFE
	Disc	Composition		Composition
Pressure Class (PN)		PN16 (16 Bar)		
Maximum Inlet Pressure Steam kPa (Bar)		240 (2.4)		
Allowable Control Media Temp [a]		-7 to 138°C		-4 to 138°C
Allowable Differential Pressure for Water psig (kPa)		240 max. for normal life (Refer to page 172 for cavitation limits)		
Allowable Differential Pressure for Steam		137 kPa		

NOTE: These charts are color coded as shown below to assist valve selection.

ORDERING EXAMPLES:

Valve Body: VB-9215-0-4-12

Actuator: MK-6801

Linkage: AV-495

Positive Positioner: AK-42309-500

- ❒ Valve Body Data less P Code (Size, k_{VS} Rating, Port Code)
- ❒ Actuator
- ❒ P Code (Size, k_{VS} Rating, Port Code)
- ❒ Valve Linkage

TO SELECT A PORT CODE (P).

P Code	Valve Size in mm (R_p)[b]	k_{VS}[c]	k_{VS}[c]
-1	15 (1/2)	0.3	—
-2		1.1	—
-3		1.9	—
-4		3.8	—
-5	20 (3/4)	4.8	—
-6		6.5	—
-7	25 (1)	8.7	—
-8		12	—
-9	32 (1-1/4)	17	—
-10	40 (1-1/2)	24	—
-11	50 (2)	35	—
-12	65 (2-1/2)	—	56
-13	80 (3)	—	73

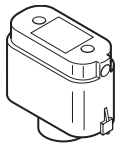
[a] CAUTION: Freeze protection required for fluid temperatures below (0°C). Avoid ice formation on stems.

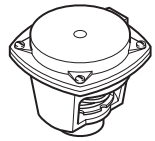
[b] R_p = internal parallel pipe thread.

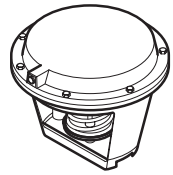
[c] $k_{VS} = m^3/h$ (Δp = 100 kPa) $C_V = k_{VS} \times 1.156$

2-Way Globe Valves, Screwed End (15 to 80 mm) with Pneumatic Actuators

TABLE 2. 15 to 50 mm Valves, select Actuator with correct Input Signal having sufficient close-off for the application. Select Valve Linkage and Positive Positioner if required.







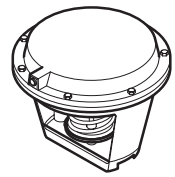
Effective Area			39 cm^2						71 cm^2						323 cm^2					
Valve Linkage			**AV-400**						**AV-401**						**AV-430**					
Positive Positioner			AK-42309-500						AK-42309-500						AK-42309-500					
Actuator			**MK-2690**						**MK-4601**		**MK-4611**		**MK-4621**		**MK-6601**		**MK-6611**		**MK-6621**	
Spring Range (kPa)			21 to 48		34 to 69		55 to 90		21 to 41		34 to 69		69 to 90		21 to 55		34 to 69		55 to 90	
ACTUATOR CLOSE-OFF PRESSURE RATING (kPa)[a b]																				
N.P.	**Valve Body**	**P Code**	**Size mm (R_p)**	**Supply Air Pressure**						**Supply Air Pressure**						**Supply Air Pressure**					
				103	**138**	**103**	**138**	**103**	**138**	**103**	**138**	**103**	**138**	**103**	**138**	**103**	**138**	**103**	**138**	**103**	**138**
N.O.	VB-7215-0-4-P	-1, -2, -3, -4	**15 (1/2)**	890	1500	410	1170	—	620	1720	1720	820	1720	68	1379	—	—	—	—	—	—
		-5, -6	**20 (3/4)**	550	880	270	820	—	410	1240	1720	550	1240	—	820	—	—	—	—	—	—
		-7, -8	**25 (1)**	240	480	100	340	—	170	620	1030	240	680	—	440	—	—	—	—	—	—
		-9	**32 (1-1/4)**	130	270	50	200	—	100	340	620	130	410	—	270	—	—	—	—	—	—
		-10	**40 (1-1/2)**	90	200	—	130	—	60	200	410	60	270	—	170	1170	1720	750	1580	270	1103
		-11	**50 (2)**	40	90	—	70	—	—	100	200	—	130	—	60	620	1100	410	860	130	621
N.C.	VB-7225-0-4-P	-1, -2, -3, -4	**15 (1/2)**	—		340		890		200		680		1720		—		—		—	
		-5, -6	**20 (3/4)**	—		200		410		130		480		1100		—		—		—	
		-7, -8	**25 (1)**	—		60		208		34		200		410		—		—		—	
		-9	**32 (1-1/4)**	—		—		100		—		100		270		—		—		—	
		-10	**40 (1-1/2)**	—		—		5		—		68		240		270		550		1170	
		-11	**50 (2)**	—		—		—		—		—		100		130		340		620	

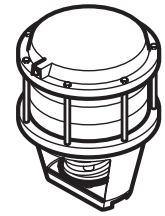
[a] Close-off rated for ANSI IV (.01%) with pressure at inlet (port A). Ratings for normally open valves are with indicated supply air pressure applied to actuator. Ratings for normally closed valves are within 7 kpa or less applied to actuator. See “Valve General Information” section for seat leakage ratings.

[b] Close-off pressure ratings describe only the differential pressure which the actuator can close-off with adequate seating force. Consult valve body specifications for other limitations.

2-Way Globe Valves, Screwed End (15 to 80 mm) with Pneumatic Actuators

TABLE 2A. 65 to 80 mm Valves, select Actuator with correct Input Signal having sufficient close-off for the application. Select Valve Linkage and Positive Positioner if required.





Effective Area			323 cm^2				645 cm^2					
Valve Linkage			**AV-495**				**AV-496**					
Positive Positioner			AK-42309-500				AK-42309-500					
Actuator			**MK-6801**	**MK-6811**	**MK-6821**		**MK-8801**	**MK-8811**	**MK-8821**			
Spring Range (kPa)			21 to 55	34 to 69	55 to 90		21 to 55	34 to 69	55 to 90			
ACTUATOR CLOSE-OFF PRESSURE RATING (kPa)[a] [b]												
N.P.	**Valve Body**	**P Code**	**Size in mm (R_p)**	**Supply Air Pressure**						**Supply Air Pressure**					
				103	**138**	**103**	**138**	**103**	**138**	**103**	**138**	**103**	**138**	**103**	**138**
N.O.	VB-9215-0-4-P	-12	65 (2-1/2)	410	750	270	620	60	410	860	860	620	860	200	860
		-13	80 (3)	280	510	180	420	34	280	620		420		130	620

[a] Close-off rated for ANSI IV (.01%) with pressure at inlet (port A). Ratings for normally open valves are with indicated supply air pressure applied to actuator. Ratings for normally closed valves are within 7 kPa or less applied to actuator (for kPa multiply C_V by 6.89). See "Valve General Information" section for seat leakage ratings.

[b] Close-off pressure ratings describe only the differential pressure which the actuator can close-off with adequate seating force. Consult valve body specifications for other limitations.

TABLE 3. Optional Input Signal Interface Modules for Pneumatic.

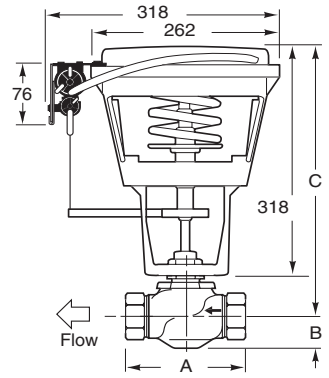
Input Signal Type	Interface Module Required
Two-Position, SPST (Electric)	AL-1XX
Two-Position, SPDT Snap Acting (Electric)	AL-1XX
Voltage 2 to 15 Vdc TAC System 8000	CP-8511-XXX
Current Input 4 to 20 mA etc.	CP-8511-XXX, CP-8551

TABLE 4. Dimensions (mm). (Refer to following page for illustrations.)

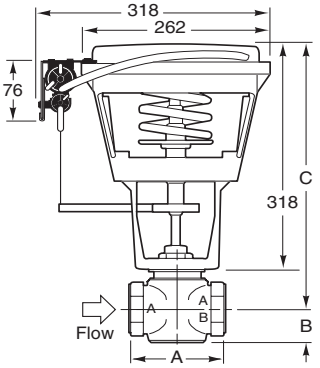
Valve Body				Actuator			
				MK-2690	**MK-46X1**	**MK-6XX1**	**MK-8XX1**
Part Number	**Size mm**	**A**	**B**	**C**	**C**	**C**	**C**
VB-7215-0-4-P	15	76	27	122	124	346	—
	20	92	27	122	124	346	—
	25	117	29	140	140	364	—
	32		35	140	140	364	—
	40	137	38	141	143	365	—
	50	156	40	148	149	371	—
VB-9215-0-4-P	65	216	95	—	—	411	532
	80	241	108	—	—	437	541
VB-7225-0-4-P	15	76	32	122	124	346	—
	20	92	32	122	124	346	—
	25	117	44	122	125	347	—
	32		44	129	130	354	—
	40	137	46	312	135	357	—
	50	156	52	135	138	358	—

2-Way Globe Valves, Screwed End (15 to 80 mm) with Pneumatic Actuators

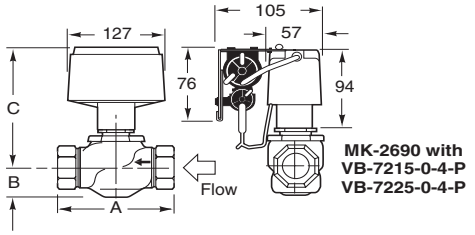
Valve Body				Actuator			
				MK-2690	MK-46X1	MK-6XX1	MK-8XX1
Part Number	Size mm	A	B	C	C	C	C
VB-9225-0-4-P	65	216	95			427	532
	80	241	102			436	541



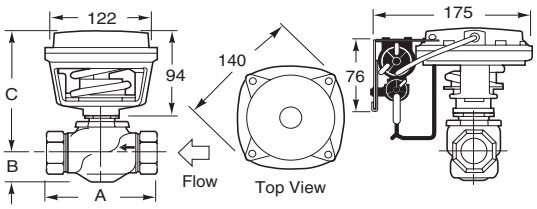
MK-66X1 with
VB-7215-0-4-P
VB-7225-0-4-P



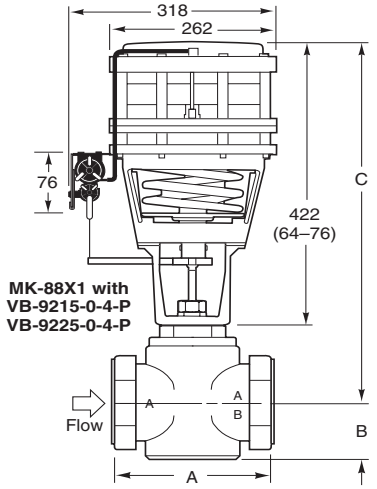
MK-68X1 with
VB-9215-0-4-P
VB-9225-0-4-P



MK-2690 with
VB-7215-0-4-P
VB-7225-0-4-P



MK-46X1 with
VB-7215-0-4-P
VB-7225-0-4-P



MK-88X1 with
VB-9215-0-4-P
VB-9225-0-4-P

TABLE 5. Restrictions on Maximum Ambient Temperature for Valve Actuators.

Temperatures °C					
Actuator		MK-2690	MK-46X1	MK-6XX1	MK-88X1
Maximum Ambient		104	104	104	104
Max. Allowable Fluid		121	121	121	121
VB-7215-0-4-P VB-7225-0-4-P	Maximum Fluid	138	138	138	138
VB-9215-0-4-P VB-9225-0-4-P	Max. Allow. Ambient	71	71	71	71

2-Way Globe Valves, Screwed End (15 to 50 mm) with Hydraulic Actuators

TABLE 1. Select Valve Body including P Code (Valve Size, k_{vs} Rating, Port Code).

NOTE: These charts are color coded as shown below to assist valve selection.

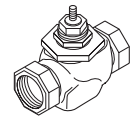
ORDERING EXAMPLES:

Valve Body: VB-7215-0-4-4

Actuator: MA-5213

Linkage: AV-7600-

- ❒ Valve Body Data less P Code (Size, k_{vs} Rating, Port Code)
- ❒ Actuator
- ❒ P Code (Size, k_{vs} Rating, Port Code)
- ❒ Valve Linkage

		Application
		Chilled or Hot Water 138°C Maximum 240 kPa (2.4 Bar) Steam
		Internal Parallel Pipe Thread per ISO 7/1, BS 21, JIS B0203
		
Size		**15 to 50 mm**
Valve Body		**VB-7215-0-4-P**
Valve Assembly 0 to 10 Vdc Input		**VS-7215-25X-4-P**
Action		Stem Up Open
Flow Type		Equal % (Refer to page 170)
Material	**Body**	Bronze
	Seat	
	Stem	Stainless Steel
	Plug	Brass
	Packing	Spring Loaded TFE
	Disc	Composition
Pressure Class (PN)		PN16 (16 Bar)
Maximum Inlet Pressure Steam kPa (Bar)		240 (2.4)
Allowable Control Media Temp [a]		-7 to 138°C
Allowable Differential Pressure for Water (kPa)		241 max. for normal life (Refer to page 172 for cavitation limits)
Allowable Differential Pressure for Steam		137 kPa

TO SELECT A PORT CODE (P).

P Code	Valve Size in mm (R_p) [b]	k_{vs} [c]
-1	15 (1/2)	0.3
-2		1.1
-3		1.9
-4		3.8
-5	20 (3/4)	4.8
-6		6.5
-7	25 (1)	8.7
-8		12
-9	32 (1-1/4)	17
-10	40 (1-1/2)	24
-11	50 (2)	35

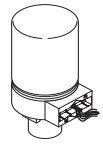
[a] CAUTION: Freeze protection required for fluid temperatures below (0°C). Avoid ice formation on stems. With fluid temperatures below 4°C use AV-601 for thermal isolation.

[b] R_p = internal parallel pipe thread.

[c] k_{vs} = m^3/h (Δp = 100 kPa) $C_v = k_{vs} \times 1.156$

2-Way Globe Valves, Screwed End (15 to 50 mm) with Hydraulic Actuators

TABLE 2. Select Actuator Type or Actuator Code (XXX) series with correct Input Signal having sufficient close-off for the application. If selecting Component Parts, select Valve Linkage .



Valve Linage					AV-7600-1	
Actuator Code (XXX)					2XX	2XX
Actuator					MA-521X MF-5XXX	MP-5XXX MPR-561X MPR-571X
	Factory Available Valve Assembly	Valve Body	P Code	Size MM	CLOSE-OFF PRESSURE RATING (kPa)[a]	
N.O.	VA-7215-2XX-4-P VS-7215-XXX-4-P	VB-7215-0-4-P	-1-2-3-4	15	910	
			-5-6	20	550	
			-7-8	25	270	
			-9	32	170	
			-10	40	410	
			-11	50	340	
N.C.	VA-7225-2XX-4-P VS-7225-XXX-4-P	VB-7225-0-4-P	-1-2-3-4	15	1300	900
			-5-6	20	910	550
			-7-8	25	340	270
			-9	32	240	170
			-10	40	240	170
			-11	50	140	95

[a] Close-off rated with pressure at inlet (port A). For kPa multiply C_v by 6.89.

TABLE 3. Controller Calibration and Spring Usage For VB-7XXX Valves.

			MP-512X Series[a]	
Valve	Size mm	Spring(s)	Controller Calibration[b]	Nominal Control Range[b]
VB-7215 VB-7255 VB-7275 Normally Open	15 to 32	Large unpainted	7.5 Volts 15 mA	6 to 9 Volts 12 to 18 mA
	15 to 50	Black[c] (highest close off)	5.0 Volts 10 mA	3.5 to 6.5 Volts 7 to 13 mA
VB-7225 VB-7265 VB-7285 Normally Closed	15 to 32	Large unpainted[d]	7.5 Volts 15 mA	6 to 9 Volts 12 to 18 mA
	15 to 50	Large and small unpainted booster (highest close off)	7.5 Volts 15 mA	6 to 9 Volts 12 to 18 mA

[a] MA, MF, MP-541X, and MP-55XX actuator positioning is independent of spring selected.

[b] When using TAC System 8000 controller or a 5 to 20 mA signal across a 500 ohm resistor to get the proper voltage.

[c] The black spring used on a normally open valves may eliminate the need for positive positioning actuators.

[d] The small unpainted spring may be added to provide additional close off.

TABLE 4. Factory Assemblies, select exact Actuator Code (XXX). Any MA-52XX, MF-5X1X, MP-5XXX, MPR-5X1X can be assembled to 1/2 to 1-1/4 in. valve bodies with the close-off pressure ratings listed in Table 2. Select below listed Hydraulic Actuators or Actuator Codes (XXX) for factory available assemblies. For applications that factory assemblies are not available, select actuator, linkage, valve body and field assemble.

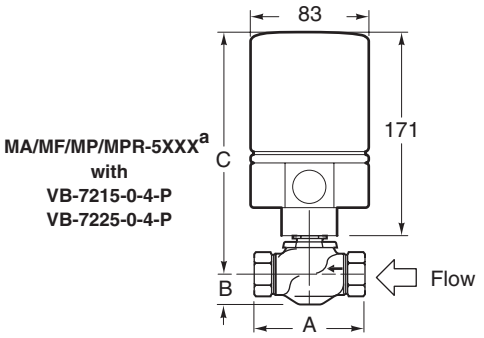
Input Signal	Voltage Vac 50/60 Hz	VA	Aux. Switch	Actuator Part No.	Actuator Code (XXX) for Factory Available Assembly		
					VA-72X3	VS-72X3	VF-72X3
Two-Position SPST	24	18	No	MA-5213	201	—	—
	120			MA-5210	211	—	—
	240			MA-5211	221	—	—
2 to 15 Vdc. TAC System 8000, non-positive positioning, see Calibration Chart.	24			MP-5213	—	201	—
	120			MP-5210	—	211	—
	240			MP-5211	—	221	—
2 to 15 Vdc,TAC System 8000, start 6 Vdc factory set, adjustable 2 to 12 Vdc, 3 Vdc span, positive positioning	24			MP-5413	—	247[a]	—
	120			MP-5410	—	244[a]	—
	240			MP-5411	—	245[a]	—
4 to 20 mA positive positioning	24	18		MPR-5613	—	267[a]	—
	120			MPR-5610	—	264[a]	—
	240			MPR-5611	—	265[a]	—
Floating SPDT	24	21		MF-5413	—	—	221[a]
				MF-5513	—	—	223[a]
0 to 10 Vdc	24	18	No	MP-5513	—	257	—
	120			MP-5510	—	254	—
	240			MP-5511	—	255	—

[a] Includes AV-601.

TABLE 5. Dimensions (mm).

Valve Body				Actuator Series
				MA/MF/MP/ MPR-5XXX[a]
Part Number	Size mm	A	B	C
VB-7215-0-4-P	15	76	27	170
	20	92	27	170
	25	117	29	217
	32		35	217
	40	137	38	219
	50	156	40	225
VB-7225-0-4-P	15	76	32	170
	20	92	32	170
	25	117	44	202
	32		44	208
	40	137	46	211
	50	156	52	213

[a] **Add 53 mm to the "C" dimension for a valve assembly using an AV-601 linkage extension.**



[a] AV-601 linkage extension (not shown) required for hot water applications for MF-5XXX, MP-54XX, MPR-5XXX, and MP-55XX.

TABLE 6. Ambient Temperature Restrictions for Valve Actuators

Temperatures °C					
Actuator		MA-521X-XXX MP-521X-XXX	MA-521X-XXX[a] MP-521X-XXX	MP-541X MP-551X MPR-5X1X	MF-5X13-XXX
			with AV-601 Linkage Extension		
Maximum Ambient		60°	60°	60°	60°
Maximum Allowable Fluid		83°	138°		126°
VB-7215-0-4-P	Max. Fluid	138°	138°	138°	138°
VB-7225-0-4-P	Max. Allow. Ambient	46°	46°	39°	52°

[a] **Actuator condensation can be prevented by use of the AV-601 Linkage Extension.**

CAUTION: Condensation can facilitate corrosion. Piping insulation must not cover any part of the actuator or mounting nut. With 4°C water, the maximum allowable dew point temperature without a linkage extension is 20°C.

2-Way Globe Valves, Screwed End (15 to 80 mm) with Electric Gear Train Actuators

TABLE 1. Select Valve Body including P Code (Valve Size, k_{vs} Rating, Port Code).

NOTE: These charts are color coded as shown below to assist valve selection.

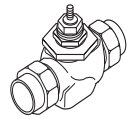
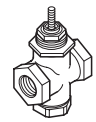
ORDERING EXAMPLES:

Valve Body: VB-7215-0-4-11

Actuator: MP-361

Linkage: AV-391

- ❒ Valve Body Data less P Code (Size, k_{vs} Rating, Port Code)
- ❒ Actuator or Actuator Code (XXX) for Valve Assemblies
- ❒ P Code (Size, k_{vs} Rating, Port Code)
- ❒ Valve Linkage

		Application			
		Chilled or Hot Water 138°C Maximum 240 kPa (2.4 Bar) Steam		Chilled or Hot Water 138°C Maximum 240 kPa (2.4 Bar) Steam	
		Internal Parallel Pipe Thread per ISO 7/1, BS 21, JIS B0203		Internal Parallel Pipe Thread per ISO 7/1, BS 21, JIS B0203	
					
Size		**15 to 50 mm**		**65 to 80 mm**	
Valve Body		VB-7215-0-4-P	VB-7225-0-4-P	VB-9215-0-4-P	VB-9225-0-4-P
Action		Stem Up Open	Stem Up Closed	Stem Up Open	Stem Up Closed
Flow Type		Equal % (Refer to page 170)			
Material	**Body**	Bronze			
	Seat				
	Stem	Stainless Steel			
	Plug	Brass			
	Packing	Spring Loaded TFE			
	Disc	Composition			
Pressure Class (PN)		PN16 (16 Bar)			
Maximum Inlet Pressure Steam kPa (Bar)		240 (2.4)			
Allowable Control Media Temp [a]		-7 to 138°C			
Allowable Differential Pressure for Water (kPa) [b]		241 max. for normal life (Refer to page 172 for cavitation limits)			
Allowable Differential Pressure for Steam		137 kPa			

TO SELECT A PORT CODE (P).

P Code	Valve Size in mm (R_p)[c]	k_{vs}[d]	
-1	**15 (1/2)**	0.3	—
-2		1.1	—
-3		1.9	—
-4		3.8	—
-5	**20 (3/4)**	4.8	—
-6		6.5	—
-7	**25 (1)**	8.7	—
-8		12	—
-9	**32 (1-1/4)**	17	—
-10	**40 (1-1/2)**	24	—
-11	**50 (2)**	35	—
-12	**65 (2-1/2)**	—	56
-13	**80 (3)**	—	73

[a] CAUTION: Freeze protection required for fluid temperatures below (0°C). Avoid ice formation on stems.

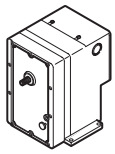
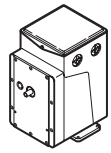
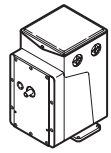
[b] Less than 140 kpa recommended for quiet service.

[c] R_p = internal parallel pipe thread.

[d] $k_{vs} = m^3/h$ (Δp = 100 kPa) $C_v = k_{vs} \times 1.156$

2-Way Globe Valves, Screwed End (15 to 80 mm) with Electric Gear Train Actuators

TABLE 2. 15 to 80 mm Valves, select Actuator Type with correct Input Signal having sufficient close-off for the application. Select Valve Linkage if required.

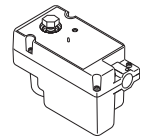
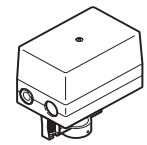
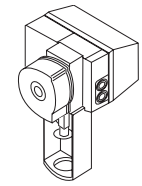

Input Signal			Two-Position SPST	Refer to Table 3B and Table 3C	Refer to Table 3A, Table 3B, and Table 3C		Refer to Table 3D, and Table 3E	
Valve Linkage	**15 to 32 mm (R_p 1/2 to 1-1/4)**		**AV-391**	**AV-391**	**AV-393**	—	**AV-630 or AV-630-010**	
	40 to 50 mm (R_p 1-1/2 to 2)		**AV-391**	**AV-391**	**AV-393**	—	**AV-630 or AV-630-010**	
	65 to 80 mm (R_p 2-1/2 to 3)		**AV-395**	**AV-395**	**AV-396**	**AV-352**	**AV-630 or AV-630-030**	
Normal Position			N.O. or N.C.	N.O. or N.C.	None	None	N.O. or N.C.	None
Actuator Types			MA-318-XXX MA-318-500 MA-418-XXX MA-419-XXX	MP-361, MP-371, MP-465, MP-475 MP5-361, MP5-46XX, MP5-47XX	MC5-351, MC5-4311 MP-38X, MP-48X, MP5-381, MP5-48XX		MM-500 MMR-500	MM-400 MMR-400
Valve Body	**P Code**	**Size in mm (R_p)**	**ACTUATOR CLOSE-OFF PRESSURE RATING (kPa)** [a] [b]					
VB-7215-0-4-P VB-7225-0-4-P	-1-2-3-4	**15 (1/2)**	1720	1720	1720	—	1720	1720
	-5-6	**20 (3/4)**				—	890	
	-7-8	**25 (1)**	1030	1030		—	480	
	-9	**32 (1-1/4)**	620	620	1370	—	270	1100
	-10	**40 (1-1/2)**	410	410	960	—	200	750
	-11	**50 (2)**	240	240	550	—	110	410
VB-9215-0-4-P VB-9225-0-4-P	-12	**65 (2-1/2)**	130	130	340	750	65	275
	-13	**80 (3)**	80	80	230	480	55	200

[a] Close-off rated with pressure at inlet (port A).

[b] Close-off pressure ratings describe only the differential pressure which the actuator can close-off with adequate seating force. Consult valve body specifications for other limitations.

2-Way Globe Valves, Screwed End (15 to 80 mm) with Electric Gear Train Actuators

TABLE 2A. 15 to 80 mm Valves, select Actuator Type with correct Input Signal having sufficient close-off for the application. Select Valve Linkage if required.

Input Signal		Floating SPDT		2-10 Vdc, 4 to 20 mAdc	Floating SPDT and Multiple Input	See Table 3B	
Valve Linkage	15 to 32 mm (R_p 1/2 to 1-1/4)	(Included)		(Included)	AV-671 (Included)	—	
	40 to 50 mm (R_p 1-1/2 to 2)	(Included)		(Included)	AV-671 (Included)	AV-680	
	65 to 80mm (R_p 2-1/2 to 3)	(Included)		(Included)	AV-672 (Order separately)	AV-681	
Normal Position		N.O.		N.O.	None	None	
Actuator Code (XXX)		25X		256	30X	365	366
Actuator Type		MF-23203 MF-233X3	MF-22XX3[a]	MS-22353	MF-631X3	MS-7913	MS-7923

Factory Available Valve Assemblies	Valve Body	P Code	Size in mm (R_p)	Actuator Close-off Pressure Rating (kPa)[b c]				
VF-7215-25X-4-P VF-7225-25X-4-P VF-7215-30X-4-P VF-7225-30X-4-P	VB-7215-0-4-P VB-7225-0-4-P	-1, -2, -3, -4	15 (1/2)	250	1172	1100	1600	—
		-5, -6	20 (3/4)	170	524	517		—
		-7, -8	25 (1)	80	283	276		—
		-9	32 (1-1/4)	50	179	172	1068	—
		-10	40 (1-1/2)	—	125	100	719	413
		-11	50 (2)	—	70	40	404	241
VF-9215-30X-4-P VF-9225-30X-4-P	VB-9215-0-4-P VB-9225-0-4-P	-12	65 (2-1/2)	—	—	—	253	137
		-13	80 (3)			—	171	83

[a] MF-221X3 for hot water and steam applications only.

[b] Close-off pressure ratings describe only the differential pressure which the actuator can close-off with adequate seating force. Consult valve body specifications for other limitations.

[c] Close-off rated with pressure at inlet (port A).

TABLE 3. Two-Position SPST Input. Any MA-31X or MA-41X electric gear train actuator can be assembled to valve bodies with the close-off pressure ratings listed in Table 2. Select Actuator Type having sufficient close-off for the application. Select actuator, linkage, valve body and field assemble.

Input Signal	Normal Position	Voltage	Hz	VA	Aux. Switch	Actuator
Two-Position SPST	Normally Open	24	50	92	Yes	MA5-318-500
		24	60	92	No	MA-318
		120		108		MA-418
		240	50	120		MA-419
Two-Position SPST	Normally Closed	24	50	92	Yes	MA5-318-500
		24	60	92	No	MA-318
		120		108		MA-418
		240	50	120		MA-419

TABLE 3A. Two-Position SPDT Input. Any MC-3XX or MC-4XX electric gear train actuator can be assembled to valve bodies with the close-off pressure ratings listed in Table 2. Select Actuator Type having sufficient close-off for the application. Select actuator, linkage, valve body and field assemble.

Input Signal	Normal Position	Voltage	Hz	VA	Aux. Switch	Actuator
Two-Position SPDT	None (Non-Spring Return)	24	60	96	Yes	MC-351
		120				MC-431
						MC-431 w/AV-352
		240	50			MC5-4311

2-Way Globe Valves, Screwed End (15 to 80 mm) with Electric Gear Train Actuators

TABLE 3B. Proportional Voltage/Current.

Input Signal	Normal Position	Voltage	Hz	VA	Aux. Switch	Actuator
2-15 Vdc, TAC System 8000, start 6 Vdc, Factory set Adj. 2-12 Vdc, 3 Vdc span, Positive Positioning	Normally Closed	120	60	50	Yes	MP-461-600
	Normally Open					MP-471-600
	None					MP-481-600
						MP-481-600 w/AV-352
2-10 Vdc 4-20 mAdc	None	24	50/60	4	No	MS-22353
6 - 9 V[a]	Extended	24	50/60	15	No	MS-7913
	Retracted					MS-7923

[a] Factor setting jumper is used to select other voltages: 8 to 11V, 4 to 7 V, 0 to 10 V, 2 to 10 V, 1 to 5 V.

TABLE 3C. Multiple Input. Any MP-3XX, 4XX or 9XXX electric gear train actuator can be assembled to valve bodies with the close-off pressure ratings listed in Table 2. Select Actuator Type having sufficient close-off for the application. Select actuator, linkage, valve body and field assemble.

Normal Position	Input Signal							Voltage Vac (Hz)	Aux. Switch	Actuator Part Number
	2 to 15 Vdc TAC System 8000	4 to 20 mA etc.	Slidewire (Series 90)	SPST	SPDT Snap Acting	Pneumatic to Electric	SPDT Floating Direct Digital Control			
Normally Closed	1	9	2	Yes	Yes	11	Yes	24 (60)	Yes	MP-361
	3	4, 10				8, 12		120 (60)		MP-465
	5	4				8		240 (50)		MP5-4651
Normally Open	1	9				11		24 (60)		MP-371
	3	4, 10				8, 12		120 (60)		MP-475
	5	4				8		240 (50)		MP5-4751
None	1	9		—		11		24 (60)		MP-381
	3	4, 10				8,12		120 (60)		MP-485
	5	4				8		240 (50)		MP5-4851
Non-Spring Return	1	9				11		24 (60)		MP-381 w/AV-352
	3	4, 10				8, 12		120 (60)		MP-485 w/AV-352

1 Requires CP-8301-024 ordered separately.
2 Requires AE-504 ordered separately.
3 Requires CP-8301-120 or CP-9301 ordered separately.
4 Requires CP-8391-716 or CP-9301 ordered separately.
5 Requires CP-8301-240 or CP-9301 ordered separately.
6 Requires CP-8391-456 or CP-9301 ordered separately.
7 Requires AM-345 and AE-504 ordered separately.
8 Requires CP-8391-716 or CP-9301 and PP-8311 ordered separately.
9 Requires CP-8391-913 or CP-9301 ordered separately.
10 Requires CP-8391-910 or CP-9302 ordered separately.
11 Requires CP-8391-913 or CP-9301 and PP-8311 ordered separately.
12 Requires CP-8391-910 or CP-9302 and PP-8311 ordered separately.

TABLE 3D. Modular Actuator. Refer to Table 3E for optional inputs.

Normal Position	Voltage (50/60 Hz)	Aux. Switch	Actuator Part No.
Normally Open	24	No	MM-500
Normally Closed			
None Non-Spring Return			MM-400

TABLE 3E. Input Signal for Modular Actuators MM/MMR-400 or MM/MMR-500, and MF-63123. Order these control modules separately.

Input Signal	Control Module (order separately)	
	MM/MMR-400 or MM/MMR-500	MF-63123
Two-Position, Floating	MMC-468	None (Base Actuator)
4 to 20 mAdc	MMC-420	MFC-420[a]
135 Ω Slidewire	MMC-90	—
0 to 20 mAdc or 0 to 20 Vdc	MMC-8000	
4 to 20 mAdc with Drive-to-20 mA Position	MMC-421	—
6 to 9 Vdc	—	MFC-8000 [a]

[a] Other ranges available by Dip Switch setting on module.

TABLE 4. Dimensions in mm.

Valve Body				Actuator Series		
				MS-22353	MF-631X3	MS-79X3
Part Number	Size in mm (R_p)	A	B	C	C	C
VB-7215-0-4-P VB-7225-0-4-P	15	76	27	108	181	—
	20	92	27	108	181	—
	25	117	29	122	198	—
	32		35	122	198	—
	40	137	38	124	200	—
	50	156	40	130	206	—
VB-9215-0-4-P VB-9225-0-4-P	65	216	95	—	264	—
	80	241	102	—	276	—

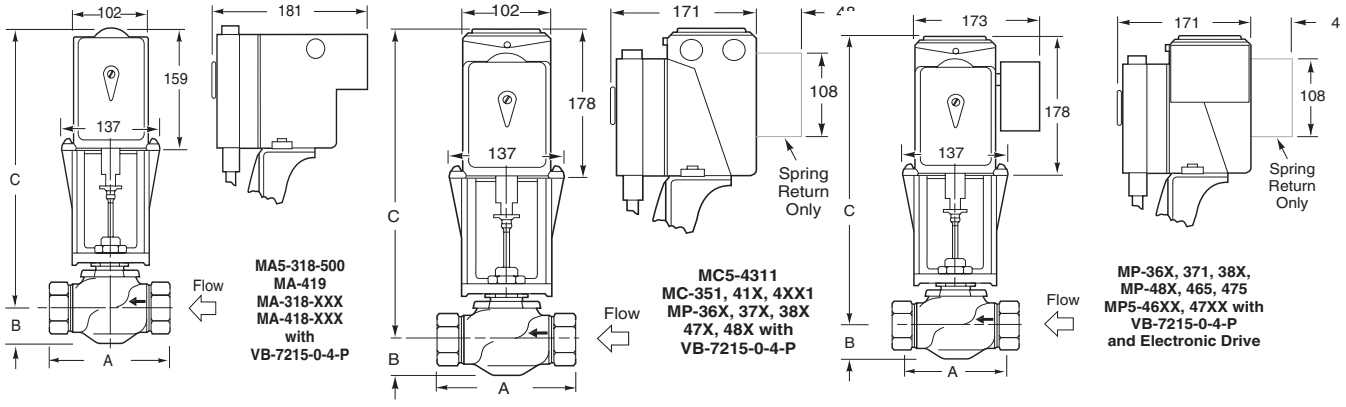
TABLE 5. Restrictions on Max. Ambient Temperature for Valve Actuators.

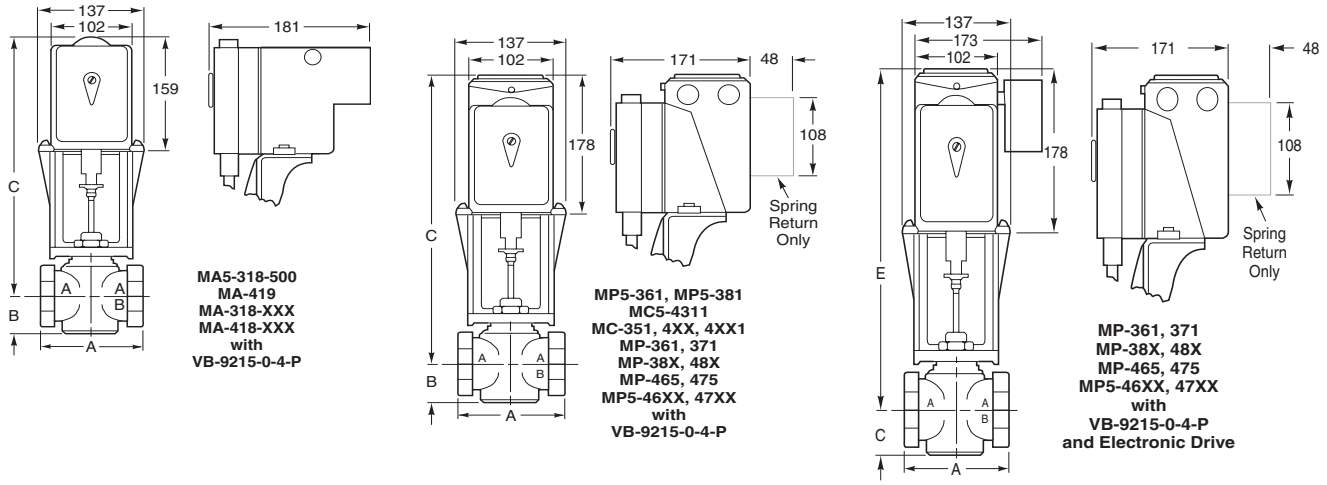
Temperatures °C			
Actuator		MA-318-XXX, MA-418-XXX MC-351, MM-400, MM-500, MMR-400, MM-500 MA5-318-500, MA-419, MP5-361, MC5-4311, MP5-381 MP-361, MP-371, MP-38X, MP-48X MP-465, MP-475 MP5-46XX, MP5-47XX	MF-221X3 MF-63103 MF-63103-500 MF-63123 MF-63123-500
Maximum Ambient		57	60
Max. Allowable Fluid		126	126
VB-7215-0-4-P VB-7225-0-4-P	Max. Allow. Ambient	52	52
VB-9215-0-4-P VB-9225-0-4-P	Max. Fluid	138	138

2-Way Globe Valves, Screwed End (15 to 80 mm) with Electric Gear Train Actuators

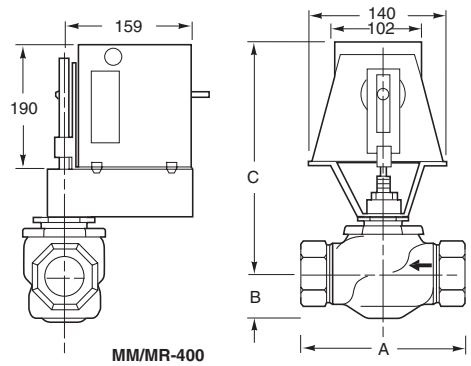
TABLE 6. Dimensions in mm.

Valve Body				Actuator Series			
				MA-318-XXX MA-418-XXX	MC-351, MP-361, MP-371 MP-38X, MP-48X MP-465, MP-475 MP5-46XX, 47XX	MC-351, MP-361, MP-371 MP-38X, 48X MP-465, 475 MP5-46XX, 47XX w/AV-352	MM-400, MM-500 MMR-400, MMR-500
Part Number	**Size mm**	**A**	**B**	**C**	**C**	**C**	**C**
VB-7215-0-4-P VB-7225-0-4-P	15	76	27	325	343	343	286
	20	92	27	325	343	343	286
	25	117	29	343	360	360	303
	32		35	343	360	360	303
	40	137	38	344	362	362	305
	50	156	40	351	368	368	311
VB-9215-0-4-P	65	216	95	405	422	422	365
VB-9225-0-4-P	80	241	102	416	435	435	376

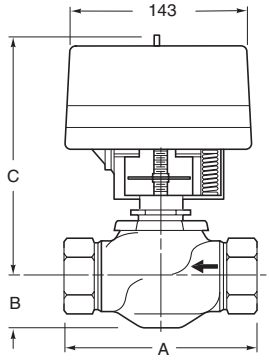


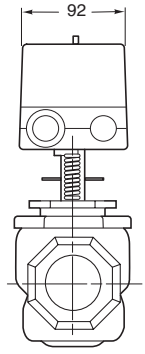


2-Way Globe Valves, Screwed End (15 to 80 mm) with Electric Gear Train Actuators

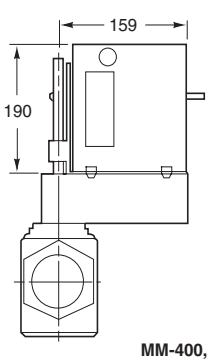


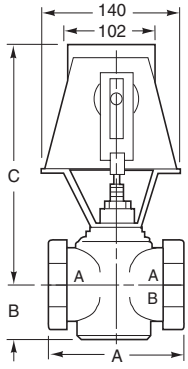
MM/MR-400
MM/MMR-500
with
VB-7215-0-4-P



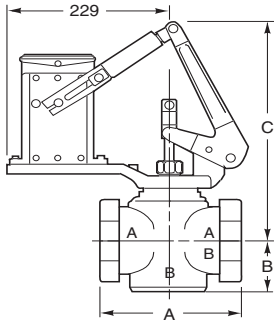


MF-631X3 with
VB-7215-000-4-P

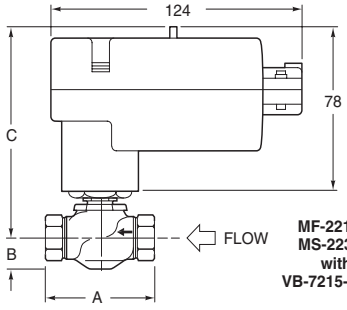




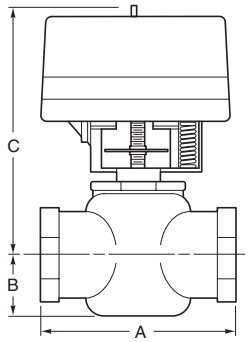
MM-400, 500
MMR-400, 500
with
VB-9215-0-4-P

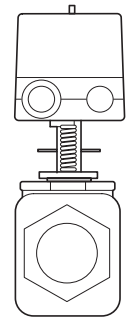


MC-351, 4XX, 4XX1
MP-361, 371
MP-38X, 48X
MP-465, 475
MP5-46XX, 47XX,
361, 381
with
(65-80 mm)
VB-9215-0-4-P
and
AV-352 Linkage
MC5-4311



MF-221X3
MS-22353
with
VB-7215-0-4-P

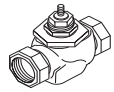




MF-631X3 with
VB-9215-0-4-P

Linked 2-Way Globe Valves, Screwed (15 to 50 mm), Union Straightway with TAC DuraDrive™ Actuators

TABLE 1. Select Valve Body including P Code (Valve Size, Cv Rating, Port Code) or select Valve Assembly with correct Input Signal less Actuator Code (XXX) including the P Code (Size, Cv Rating, Port Code). (Refer to Pages 172 to 179 for Valve Sizing.)

			Application
			Chilled or Hot Water 138°C Maximum 240 kPa (2.4 Bar) Steam
			Internal Parallel Pipe Thread per ISO 7/1, BS 21, JIS B0203
			
Size			15 to 50 mm
Valve Body (stem down to close) Actuator Provides Normal Position			VB-7215-0-4-P
Valve Body (stem open to close) Actuator Provides Normal Position			VB-7225-0-4-P
Normal Position	Actuator Series	Input Signal	
N.O. or N.C.	MA40-704X, MA40-707X, MA40-715X	SPST	VA-7215-XXX-4-P VA-7225-XXX-4-P
	MS40-6043, MS40-6083, MS40-6153, MS40-7043, MS40-7073, MS40-7153, MS40-717X	2 to 10 Vdc	VS-7215-XXX-4-P VS-7225-XXX-4-P
	MF40-6043, MF40-6083, MF40-6153, MF40-7043, MF40-7073, MF40-7153, MF40-717X	Floating SPDT	VF-7215-XXX-4-P VF-7225-XXX-4-P
Flow Type			Equal % (Refer to page 170)
Material	Body		Bronze
	Seat		Bronze
	Stem		Stainless Steel
	Plug		Brass
	Packing		Spring Loaded TFE
	Disc		Composition
ANSI Pressure Class (psig) Refer to page 169			PN16 (16 Bar)
Maximum Inlet Pressure Steam psig (kPa)			35 (241)
Allowable Control Media Temp [a]			20 to 281°F (-7 to 138°C)
Allowable Differential Pressure for Water psig (kPa)[b]			35 psi (241) Max. for normal life (Refer to page 172 for cavitation limits)
Allowable Differential Pressure for Steam			20 psi (138 kPa)

NOTE: These charts are color coded as shown below to assist valve selection. Note it is possible to select either a valve assembly or component parts (actuator, valve linkage, valve body).

1. **Valve Assembly: VS-7215-505-5-10**
2. **Valve Body: VB-7215-0-5-10**
   Actuator: MF40-6043
   Linkage: AV-604

- ❒ Valve Body Data less P Code (Size, Cv Rating, Port Code) or Valve Assembly less Actuator Code (XXX) and less P Code (Size, Cv Rating, Port Code)
- ❒ P Code (Size, Cv Rating, Port Code)
- ❒ Actuator or Actuator Code (XXX) for Valve Assemblies
- ❒ Valve Linkage

TO SELECT A PORT CODE (P).

P Code	Valve Size mm.	Kvs
-1[c]	15	.25
-2[c]		.94
-3[c]		1.64
-4		3.28
-5[c]	20	4.15
-6		5.61
-7[c]	25	7.51
-8		10.36
-9	32	14.68
-10	40	20.72
-11	50	30.22

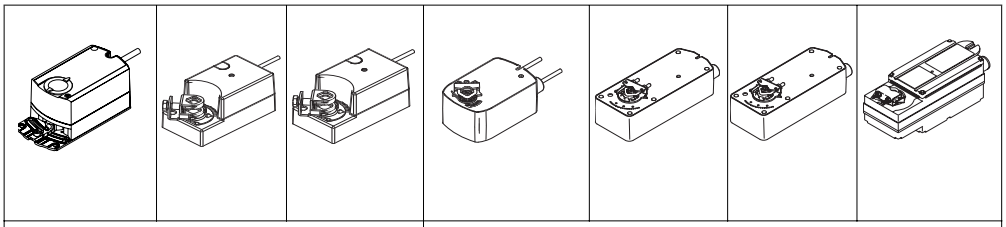
[a] CAUTION: Freeze protection required for fluid temperatures below 32°F (0°C). Avoid ice formation on stems.

[b] Less than 20 psi recommended for quieter service.

[c] Factory assemblies are not available for two-position applications using reduced port valve bodies.

Linked 2-Way Globe Valves, Screwed (15 to 50 mm), Union Straightway with TAC DuraDrive™ Actuators

TABLE 2. Select Actuator Type or Actuator Code (XXX) series with correct Input Signal having sufficient close-off for the application. If selecting Component Parts, select **Valve Linkage**



		Non-Spring Return			Spring Return			
	Input Signal	Floating and Proportional			SPDT, Floating and Proportional			
	Valve Linkage (Shaft Diameter)	AV-603 (15 mm.)	AV-605 (15 mm)	AV-602 (20 mm.)	AV-605 (15 mm.)	AV-602 (20 mm.)		
	Actuator/Linkage Assembly	MF40-6043-200 MS40-6043-200	MF40-6083-200 MS40-6083-200	MF40-6153-200 MS40-6153-200	MA40-704X-200 MA40-704X-201 MF40-7043-200 MF40-7043-202 MS40-7043-200 MS40-7043-202 MS40-7043-MP MS40-7043-MP5	MA40-707X-200 MA40-707X-202 MF40-7073-200 MF40-7073-202 MS40-7073-200 MS40-7073-202	MA40-715X-200 MA40-715X-202 MF40-7153-200 MF40-7153-202 MS40-7153-200 MS40-7153-202	MA40-717X-200 MF40-7173-200 MS40-717X-200
	Normal Position	N.O. or N.C.						
	Valve Assembly Type	VF or VS			VA, VF or VS			
	Actuator Code (XXX)	505	506	508	532. 533. 534. 535. 536. 537, 538, 539	542, 543, 544, 545, 546, 547	552, 553, 554, 555, 556, 557	572, 574, 576
	Actuator Types	MF40-6043 MS40-6043	MF40-6083 MS40-6083	MF40-6153 MS40-6153	MA40-704X MF40-7043 MS40-7043	MA40-707X MF40-7073 MS40-7073	MA40-715X MF40-7153 MS40-7153	MA40-717X MF40-7173 MS40-717X

Factory Available Valve Assemblies[a]	Valve Body	P Code	Size mm.	ACTUATOR CLOSE-OFF PRESSURE RATING (kPa)[b c]						
VX-7215-5XX-4-P VX-7225-5XX-4-P	VB-7215-0-4-P VB-7225-0-4-P	1-2-3-4	15	1551	—	—	1724	—	—	—
		5-6	20	1551	—	—	1724	—	—	—
		7-8	25	690	896	—	862	552	—	—
		9	32	414	690	—	517	828	1379	—
		10	40	276	483	965	344	690	965	1103
		11	50	138	276	552	172	276	552	896

[a] Consult price guide for factory available valve assemblies.

[b] Seat leakage rating of ANSI class IV (.01%).

[c] Close-off pressure ratings describe only the differential pressure which the actuator can close-off with adequate seating force. Consult valve body specifications for other limitations.

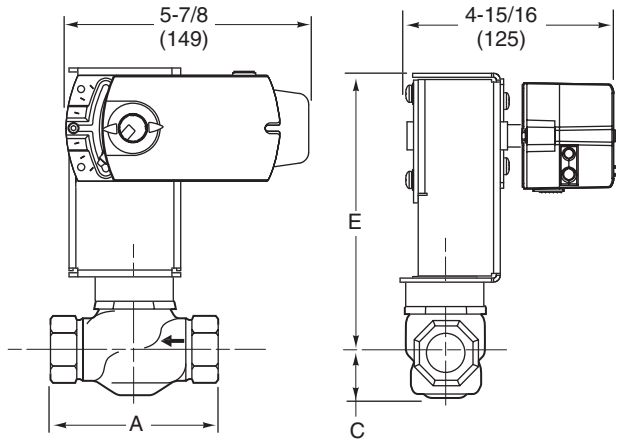
Linked 2-Way Globe Valves, Screwed (15 to 50 mm), Union Straightway with TAC DuraDrive™ Actuators

TABLE 3. Factory Assemblies, Two Position, Floating, Proportional Actuators, Select Actuator Code (XXX).

Input Signal	Voltage	Running VA		Auxillary Switch	Actuator	Actuator Code for Factory Assembly
		50 Hz	60 Hz			
Two Position SPST	24 Vac ± 20%	4.4	4.2	No	MA40-7043	536
				One	MA40-7043-501	537
	120 Vac ± 10%	6.4	4.3	No	MA40-7040	532
				One	MA40-7040-501	533
	230 Vac ± 10%	5.8	4.6	No	MA40-7041	534
				One	MA40-7041-501	535
	24 Vac ± 20%	9.6	9.6	No	MA40-7173	576
	120 Vac ± 10%	11.4	11.4	No	MA40-7170	572
	240 Vac ± 10%	11.8	11.8	No	MA40-7171	574
	24 Vac ± 20%	11.6	11.2	No	MA40-7153	556
				Two	MA40-7153-502	557
	120 Vac ± 10%	12.5	10.6	No	MA40-7150	552
				Two	MA40-7150-502	553
	230 Vac ± 10%	16.1	11.1	No	MA40-7151	554
				Two	MA40-7151-502	555
	24 Vac ± 20%	4.8	4.6	No	MA40-7073	546
				Two	MA40-7073-502	547
	120 Vac ± 10%	10.7	5.6	No	MA40-7070	542
				Two	MA40-7070-502	543
	230 Vac ± 10%	17.0	8.0	No	MA40-7071	544
				Two	MA40-7071-502	545
Proportional	24 Vac +20/-15%	3	3	No	MS40-6043	505
	24 Vac ± 20%	5.6	5.6	No	MS40-6083	506
		5.8	5.8	No	MS40-6153	508
		4.1	4.3	No	MS40-7043	536
				One	MS40-7043-501	537
				No	MS40-7043-MP	538
				One	MS40-7043-MP5	539
		4.2	4.5	No	MS40-7073	546
				Two	MS40-7073-502	547
		15.7	14.9	No	MS40-7153	556
				Two	MS40-7153-502	557
		9.4	9.4	No	MS40-7173	576
	120 Vac ± 10%	11.1	11.1	No	MS40-7170	572
	240 Vac ± 10%	11.8	11.8	No	MS40-7171	574
Floating	24 Vac +20/-15%	2	2	No	MF40-6043	505
	24 Vac ± 20%	5.6	5.6	No	MF40-6083	506
		5.8	5.8	No	MF40-6153	508
		8.3	7.8	No	MF40-7043	536
				One	MF40-7043-501	537
		4.2	4.5	No	MF40-7073	546
				Two	MF40-7073-502	547
		15.9	14.9	No	MF40-7153	556
				Two	MF40-7153-502	557
		10.0	10.0	No	MF40-7173	576

TABLE 4. MF40-6043 and MS40-6043 Dimensions in Millimeters. Refer to illlustration below

Valve Assembly Part Number	Valve Size mm.	Valve Dimensions in millimeters			
		Two-Way (Refer to illustration below)			
		A	B	C	E
VX-7215-505-4-P	15	76	—	27	162
	20	92	—	27	162
	25	117	—	29	179
	32	117	—	35	179
	40	136	—	138	181
	50	156	—	40	187
VX-7225-505-4-P	15	76	—	35	162
	20	92	—	30	162
	25	117	—	44	164
	32	117	—	44	170
	40	136	—	46	173
	50	156	—	48	175



Linked 2-Way Globe Valves, Screwed (15 to 50 mm), Union Straightway with TAC DuraDrive™ Actuators

TABLE 5. MF40-6083-2XX and MX40-6153-2XX Dimensions in Millimeters. Refer to illustration below.

Valve Assembly Part Number	Valve Size mm.	Valve Dimensions in millimeters			
		Two-Way (Refer to illustration below)			
		A	B	C	E
VX-7215-XXX-4-P VX-7225-XXX-4-P	15	117	—	29	203
	32	117	—	35	192
	38	137	—	38	187
	50	156	—	40	202

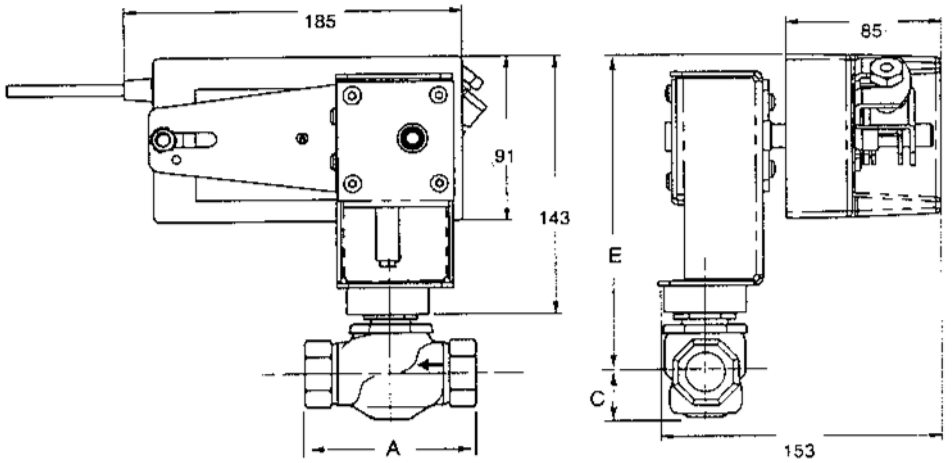


TABLE 6. MX40-715X-2XX and MX40-707X-2XX Dimensions in Millimeters. Refer to illustration below.

Valve Assembly Part Number	Valve Size mm.	Valve Dimensions in millimeters		
		Two-Way (Refer to illustration below)		
		A	C	E
VX-7215-XXX-4-P VX-7225-XXX-4-P	35	117	29	354
	32	117	35	343
	40	137	38	338
	50	156	40	352

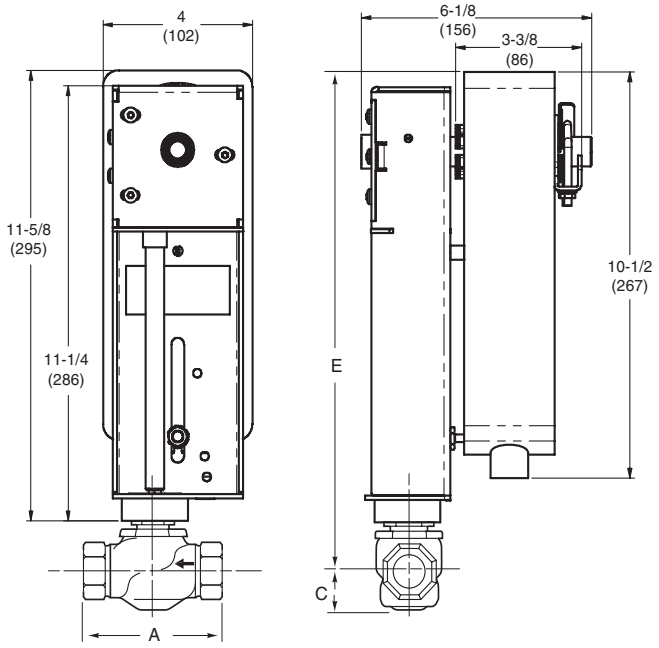
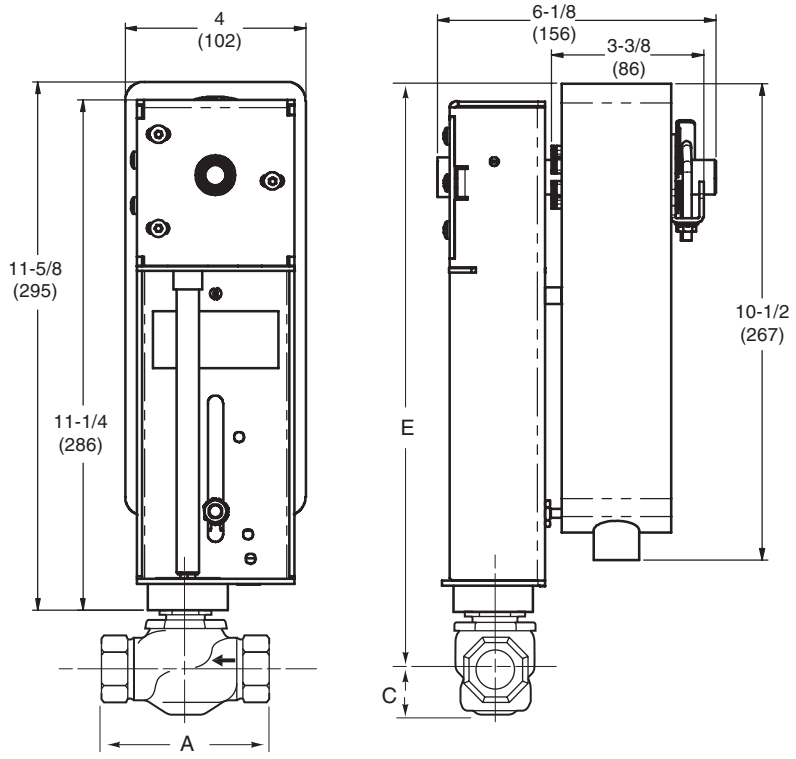


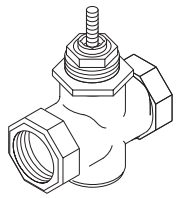
TABLE 7. MX40-717X Dimensions in Millimeters. Refer to illustration below.

Valve Assembly Part Number	Valve Size mm.	Valve Dimensions in millimeters			
		Two-Way (Refer to illustration below)			
		A	B	C	E
Metric Thread VX-7215-XXX-4-P VX-7225-XXX-4-P	40	137	—	38	327
	50	156	—	40	343



2-Way Stainless Steel Globe Valves, Screwed (15 to 20 mm) with Electric, Pneumatic Actuators

TABLE 1. Select Valve Body including P Code (Valve Size, k_{vs} Rating, Port Code) or select Valve Assembly with correct Input Signal (refer to Table 3 also) less Actuator Code (XXX) including the P Code (Size, k_{vs} Rating, Port Code). (Refer to Pages 172 to 179 for Valve Sizing).

Application	
Hot Water 149°C Max. 690 kPa Steam	
Screwed R_p (BSP)	
	
Size	15 to 20 mm
Normally Open Valves — **Valve Body**	VBS-9265-0-6-P
Flow Type	Modified Linear
Material — **Body**	316 Stainless Steel
Material — **Seat**	316 Stainless Steel
Material — **Stem**	316 Stainless Steel
Material — **Plug**	316 Stainless Steel
Material — **Packing**	Spring loaded TFE
Material — **Disc**	EPDM
ANSI Pressure Class kPa	PN16 (up to 2758 kPa below 65°C, see page 169)
Maximum Inlet Pressure Steam kPa	240
Allowable Control Media Temp [a]	-7 to 149°C
Allowable Differential Pressure for Water kPa[b]	241 kPa Max. for normal life (Refer to page 172 for cavitation limits)
Allowable Differential Pressure for Steam	241 kPa

NOTE: These charts are color coded as shown below to assist valve selection. Note it is possible to select component parts (actuator, valve linkage, valve body).

1. **Valve Body: VBS-9265-0-6-31**
   Actuator: MP-5210
   Linkage: AV-600

- ❒ Valve Body Data less P Code (Size, Cv Rating, Port Code) or Valve Assembly less Actuator Code (XXX) and less P Code (Size, k_{vs} Rating, Port Code)
- ❒ P Code (Size, k_{vs} Rating, Port Code)
- ❒ Actuator or Actuator Code (XXX) for Valve Assemblies
- ❒ Valve Linkage

TO SELECT A PORT CODE (P).

P Code[c]	Valve Size mm.	k_{vs}[d]
-31	15	.09
-33		.19
-34		.26
-01		.30
-35		.65
-36		.82
-02		1.1
-37		1.51
-03		1.9
-38		2.42
-39		2.81
-04		3.1
-45	20	3.7
-05		4.3
-06		5.4

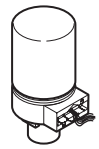
[a] CAUTION: Freeze protection required for fluid temperatures below 0°C. Avoid ice formation on stems. Do not use Hydraulic Actuators with fluid temperatures below 4°C.

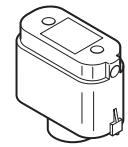
[b] Less than 140 kpa recommended for quiet service.

[c] Factory assemblies are not available for two-position applications using reduced port valve bodies.

[d] $k_{vs} = m^3/h$ ($\Delta P = 100$ kPa) $k_{vs} = C_v / 1.158$ $C_v = k_{vs} \times 1.156$

TABLE 2. Select Actuator Type or Actuator Code (XXX) series with correct Input Signal having sufficient close-off for the application. If selecting Component Parts, select Valve Linkage.





Input Signal					Electronic Vdc 4 to 20 mA Floating SPDT 135 Ohm Slidewire	Pneumatic		
Valve Linkage	**15 to 20 mm Valve**				**AV-600[a]**	**AV-400**		
Positive Positioner					—	**AK-42309-500**		
Actuator Code (XXX)					2XX	201	202	203
Actuator					MP-5X1X MPR-5X1X	MK-2690		
Actuator Spring Range in psig					—	21 to 48	34 to 69	55 to 90
N.P.	**Factory Available Valve Assembly[b]**	**Valve Body**	**P Code**	**Size mm (Rp)**	**ACTUATOR CLOSE-OFF PRESSURE RATING (kPa)[c] [d]**			
N.O.	Factory Assemblies Not Available	VBS-9265-0-6-P	-01	**15 (1/2)**	890	1030	750	1240
			-02					
			-03					
			-04					
			-31					
			-33					
			-34					
			-35					
			-36					
			-37					
			-38					
			-39					
			-05	**20 (3/4)**	550	—	270	480
			-06					
			45					

[a] MP-541X, MPR-5XXX use AV-600 and AV-601. Do not use AV-7400 or AV-7600-1 on VBS-9XXX valve bodies.

[b] Consult price guide for factory available valve assemblies.

[c] Close-off rated for ANSI IV (.01%) with pressure at inlet (port A). Ratings for normally open valves are with indicated supply air pressure applied to actuator. Ratings for normally closed valves are within 7 kPa or less applied to actuator.

[d] Close-off pressure ratings describe only the differential pressure which the actuator can close-off with adequate seating force. Consult valve body specifications for other limitations.

2-Way Stainless Steel Globe Valves, Screwed (15 to 20 mm) with Electric, Pneumatic Actuators

TABLE 3. Factory Assemblies, select exact Actuator Code (XXX). Any MA-52XX, MF-5X1X, MP-5XXX, MPR-5X1X can be assembled to 15 to 20 mm valve bodies with the close-off pressure ratings listed in Table 2. Select below listed Hydraulic Actuators or Actuator Codes (XXX) for factory available assemblies. For applications that factory assemblies are not available, select actuator, linkage, valve body and field assemble.

Input Signal	Voltage Vac 50/60 Hz	VA	Aux. Switch	Actuator Part No.	Actuator Code (XXX)
Two-Position SPST	24	18	No	MA-5213	201
	120			MA-5210	211
	240			MA-5211	221
2 to 15 Vdc. TAC System 8000, stroke occurs 6 to 9 Vdc approx., non-positive positioning	24			MP-5213	201
	120			MP-5210	211
	240			MP-5211	221
2 to 15 Vdc, TAC System 8000, start 6 Vdc factory set, adjustable 2 to 12 Vdc, 3 Vdc span, positive positioning	24			MP-5413	247[a]
	120			MP-5410	244 [a]
	240			MP-5411	245 [a]
4 to 20 mA	24	18		MPR-5613	267 [a]
	120			MPR-5610	264 [a]
	240			MPR-5611	265 [a]
Floating SPDT	24	21		MF-5413	221 [a]
				MF-5513	223 [a]

[a] Includes AV-601.

TABLE 3A. Pneumatic Actuators, select exact Actuator or Actuator Code (XXX)

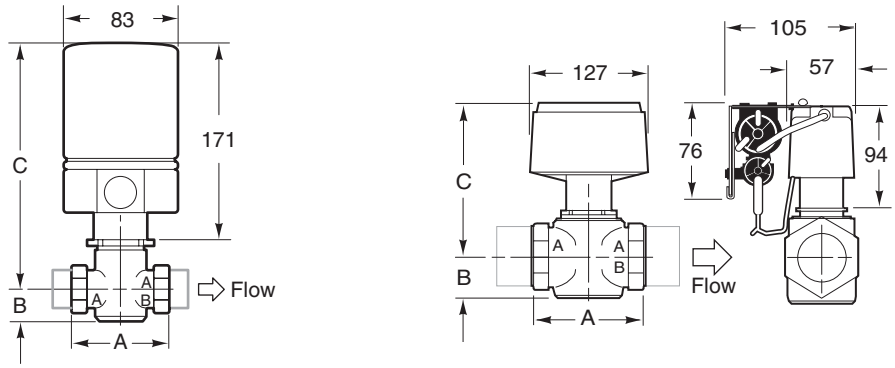
Input Signal[a]	Effective Area cm	Spring Range (kPa)	Actuator Part No.	Actuator Code (XXX)
Pneumatic	38	21 to 48	MK-2690	201
		34 to 69		202
		55 to 90		203

TABLE 4. Dimensions in Millimeters.

Valve Body				Actuator Series	
				MA/MF/MP/ MPR-5XXX[a]	MK-2690
Part Number	**Size mm**	**A**	**B**	**E**	**E**
VBS-9265-0-6-P	**15**	76	36	198	121
	20	92	40	207	129

[a] **Add 53 mm to the "E" dimension for a valve assembly using an AV-601 linkage extension.**

NOTE: Allow 76 millimeter clearance above actuator for removal. Mount MA/MF/MP/MPR-5XXX actuators above the valve body at 45° from vertical on steam applications.



[a] AV-601 linkage extension (not shown) required for hot water applications for MF-5XXX, MP-54XX, MPR-5XXX, MP-55XX.

TABLE 5. Ambient Temperature Restrictions for Valve Actuators.

Temperatures °C					
Actuator Code (XXX)		**20X, 21X, 22X**		**24X, 26X**	**2XX**
Actuator Series		**MA-521X-XXX[a] MP-521X-XXX**	**MA-521X-XXX MP-521X-XXX w/AV-601 Linkage Extension**	**MPR-561X, MPR-571X, MP-541X, MF-5X1X, MP-551X w/AV-601 Linkage Extension**	**MK-2690 [a]**
Maximum Ambient		60	60	60	104
Max. Allowable Fluid		83	138	60	121
VBS-9265-0-6-P	**Max. Allow. Ambient**	38	38	34	104
	Maximum Fluid	171	71	171	121

[a] Actuator condensation can be prevented by use of the "Linkage Extension."

CAUTION: Condensation can facilitate corrosion. Piping insulation must not cover any part of the actuator or mounting nut. With 4°C water, the maximum allowable dew point temperature without a linkage extension is 20°C.

3-Way Mixing and Diverting Globe Valves, Screwed End (15 to 80 mm) with Pneumatic Actuators

TABLE 1. Select Valve Body including P Code (Valve Size, k_{vs} Rating, Port Code).

NOTE: These charts are color coded as shown below to assist valve selection.

ORDERING EXAMPLES:

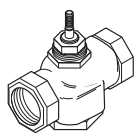
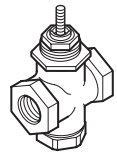
Valve Body: VB-7315-0-4-11

Actuator: MK-6611

Linkage: AV-430

Positive Positioner: AK-42309-500

- ❒ Valve Body Data less P Code (Size, k_{vs} Rating, Port Code)
- ❒ Actuator or Actuator Code (XXX) for Valve Assemblies
- ❒ P Code (Size, k_{vs} Rating, Port Code)
- ❒ Valve Linkage

		Application	
		Chilled or Hot Water 138°C Maximum	Chilled or Hot Water 138°C Maximum
		Internal Parallel Pipe Thread per ISO 7/1, BS 21, JIS B0203	Internal Parallel Pipe Thread per ISO 7/1, BS 21, JIS B0203
			
Size		**15 to 50 mm**	**65 & 80 mm**
Valve Body		VB-7315-0-4-P	VB-9315-0-4-P
Action		3-Way Mixing	3-Way Mixing
Flow Type		Mixing	Mixing
Material	**Body**	Bronze	Bronze
	Seat		
	Stem	Stainless Steel	Stainless Steel
	Plug	Brass	Brass
	Packing	Spring Loaded TFE	Spring Loaded TFE
	Disc	None	None
Pressure Class (PN)		PN16 (16 Bar)	
Allowable Control Media Temp [a]		-7 to 138°C	-7 to 138°C
Allowable Differential Pressure for Water (kPa) [b]		240 max. for normal life (Refer to page 172 for cavitation limits)	

TO SELECT A PORT CODE (P).

P Code	Valve Size in mm (R_p)[c]	k_{vs}[d]	k_{vs}[d]
-1	15 (1/2)	—	—
-2		1.9	—
-3		—	—
-4		3.8	—
-5	20 (3/4)	—	—
-6		6.5	—
-7	25 (1)	—	—
-8		12	—
-9	32 (1-1/4)	17	—
-10	40 (1-1/2)	24	—
-11	50 (2)	36	—
-12	65 (2-1/2)	—	58
-13	80 (3)	—	78

[a] CAUTION: Freeze protection required for fluid temperatures below (0°C). Avoid ice formation on stems.

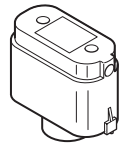
[b] Less than 140 kpa recommended for quiet service.

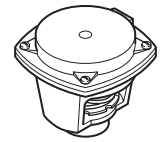
[c] R_p = internal parallel pipe thread.

[d] $k_{vs} = m^3/h$ (Δp = 100 kPa) $C_v = k_{vs} \times 1.156$

3-Way Mixing and Diverting Globe Valves, Screwed End (15 to 80 mm) with Pneumatic Actuators

TABLE 2. 15 to 50mm Valves, select Actuator having sufficient close-off for the application. Select Valve Linkage and Positive Positioner if required.





Effective Area			39 cm^2									71 cm^2								
Valve Linkage			**AV-7400**									**AV-401**								
Positive Positioner			AK-42309-500									AK-42309-500								
Actuator			**MK-2690**									**MK-4601**			**MK-4611**			**MK-4621**		
Spring Range (kPa)			21 to 48			34 to 69			55 to 90			21 to 41			34 to 69			69 to 90		
			ACTUATOR CLOSE-OFF PRESSURE RATING kPa [a] [b] [c]																	
Supply Air Pressure (kPa)			**103/138**	**103**	**138**	**103/138**	**103**	**138**	**103/138**	**103**	**138**	**103/138**	**103**	**138**	**103/138**	**103**	**138**	**103/138**	**103**	**138**
Stem Position[d]			**SU**	**SD**	**SD**	**SU**	**SD**	**SD**	**SU**	**SD**	**SD**	**SU**	**SD**	**SD**	**SU**	**SD**	**SD**	**SU**	**SD**	**SD**
Valve Body	**P Code**	**Size mm (R_p)**																		
VB-7315-0-4-P	-2, -4	**15 (1/2)**	—	—	—	340	410	1380	680	—	620	200	1720	1720	680	1030	1720	1720	240	1370
	-6	**20 (3/4)**	—	—	—	200	270	680	410	—	410	130	1240	1580	480	550	1240	1100	100	820
	-8	**25 (1)**	—	—	—	60	100	340	200	—	170	34	620	1060	200	270	680	410	34	440
	-9	**32 (1-1/4)**	—	—	—	—	50	200	100	—	100	—	410	680	100	170	410	270	—	270
	-10	**40 (1-1/2)**	—	—	—	—	—	130	68	—	62	—	—	—	68	100	270	240	—	170
	-11	**50 (2)**	—	—	—	—	—	68	—	—	—	—	—	—	—	34	130	100	—	68
VB-7325-0-4-P	-4	**15 (1/2)**	—	1720	1720	1720	1720	1720	1720	1720	1720	1720	1720	1720	1720	1720	1720	1720	1720	1720
	-6	**20 (3/4)**	—																	
	-8	**25 (1)**	—																	
	-9	**32 (1-1/4)**	—																	
	-10	**40 (1-1/2)**	—																	
	-11	**50 (2)**	—																	

[a] Close-off ratings for mixing valves: (SU = "A", SD = "B" port). "A" port (SU) ratings equal pressure at port "A" minus pressure at port "B". "B" port (SD) ratings equal pressure at port "B" minus pressure at port "A". Close-off ratings in the table are true only when the indicated supply air pressure is applied to the actuator. A change in air pressure at the actuator alters the actual close-off pressure.

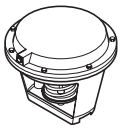
[b] Close-off pressure ratings describe only the differential pressure which the actuator can close-off to standards with adequate seating force. Consult valve body specifications for the limitations.

[c] Mixing valves are not to be used in diverting applications. Diverting valves may be used in mixing application with minor affects on flow.

[d] SU — stem up; SD — stem down. Refer to Table 5 for flow pattern, port designations, and normal position.

3-Way Mixing and Diverting Globe Valves, Screwed End (15 to 80 mm) with Pneumatic Actuators

TABLE 2A. 15 to 80 mm Valves, select Actuator or having sufficient close-off for the application. Select Valve Linkage and Positive Positioner if required.



Effective Area			71 cm²								323 cm²								
Valve Linkage			**AV-430**								**AV-495**								
Positive Positioner			AK-42309-500								AK-42309-500								
Actuator			**MK-6601**			**MK-6611**			**MK-6621**			**MK-6801**			**MK-6811**			**MK-6821**	
Spring Range (kPa)			21 to 55			34 to 69			55 to 90			21 to 55			34 to 69			55 to 90	
			ACTUATOR CLOSE-OFF PRESSURE RATING (kPa)[a] [b]																
Supply Air Pressure (kPa)			**103/138**	**103**	**138**	**103/138**	**103**	**138**	**103/138**	**103**	**138**	**103/138**	**103**	**138**	**103/138**	**103**	**138**	**103/138**	**103**	**138**
Stem Position[c]			**SU**	**SD**	**SD**	**SU**	**SD**	**SD**	**SU**	**SD**	**SD**	**SU**	**SD**	**SD**	**SU**	**SD**	**SD**	**SU**	**SD**	**SD**
Valve Body	**P Code**	**Size mm (R_p)**																	
VB-7315-0-4-P	-2, -4	**15 (1/2)**	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	-6	**20 (3/4)**	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	-8	**25 (1)**	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	-9	**32 (1-1/4)**	1720									—	—	—	—	—	—	—	—	—
	-10	**40 (1-1/2)**	270	1170	1720	550	750	1580	1170	200	1100	—	—	—	—	—	—	—	—	—
	-11	**50 (2)**	130	620	1100	340	410	820	620	100	620	—	—	—	—	—	—	—	—	—
VB-9315-0-4-P	-12	**65 (2-1/2)**	—	—	—	—	—	—	—	—	—	60	410	750	200	270	620	410	60	410
	-13	**80 (3)**	—	—	—	—	—	—	—	—	—	34	280	510	130	180	420	275	34	280

[a] Close-off ratings for mixing valves: (SU = "A", SD = "B" port). "A" port (SU) ratings equal pressure at port "A" minus pressure at port "B". "B" port (SD) ratings equal pressure at port "B" minus pressure at port "A". Close-off ratings in the table are true only when the indicated supply air pressure is applied to the actuator. A change in air pressure at the actuator alters the actual close-off pressure.

[b] Close-off pressure ratings describe only the differential pressure which the actuator can close-off to standards with adequate seating force. Consult valve body specifications for the limitations.

[c] SU — stem up; SD — stem down. Refer to Table 5 for flow pattern, port designations, and normal position.

TABLE 2B. 65 and 80 mm Valves, select Actuator having sufficient close-off for the application. Select Valve Linkage and Positive Positioner if required.

Effective Area			645 cm²							
Valve Linkage			**AV-496**							
Positive Positioner			AK-42309-500							
Actuator Code (XXX)			—			—			—	
Actuator			**MK-8801**			**MK-8811**			**MK-8821**	
Spring Range (kPa)			21 to 55			34 to 69			55 to 90	
			CLOSE-OFF PRESSURE RATING (kPa)[a] [b]							
Supply Air Pressure (kPa)			**103/138**	**103**	**138**	**103/138**	**103**	**138**	**103/138**	**103**	**138**
Stem Position[c]			**SU**	**SD**	**SD**	**SU**	**SD**	**SD**	**SU**	**SD**	**SD**
Valve Body	**P Code**	**Size mm (R_p)**									
VB-9315-0-4-P	-12	**65 (2-1/2)**	200	860	860	410	620	860	860	200	860
	-13	**80 (3)**	130	620		275	420		620	130	620

[a] Close-off ratings for mixing or sequencing valves: (SU = "A", SD = "B" port). "A" port (SU) ratings equal pressure at port "A" minus pressure at port "B". "B" port (SD) ratings equal pressure at port "B" minus pressure at port "A". Close-off ratings in the table are true only when the indicated supply air pressure is applied to the actuator. A change in air pressure at the actuator alters the actual close-off pressure.

[b] Close-off pressure ratings describe only the differential pressure which the actuator can close-off to standards with adequate seating force. Consult valve body specifications for the limitations.

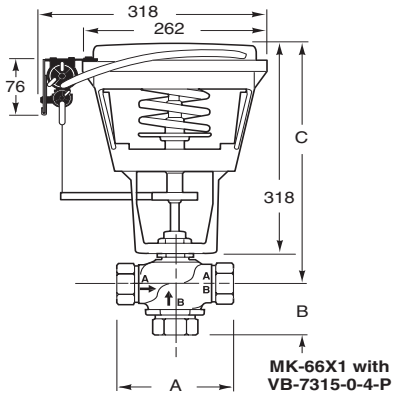
[c] SU — stem up; SD — stem down. Refer to Table 5 for flow pattern, port designations, and normal position.

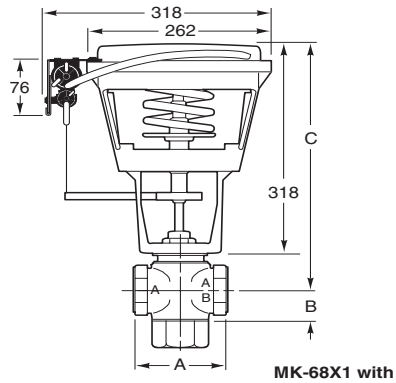
TABLE 3. Optional Input Signal Interface to Pneumatic.

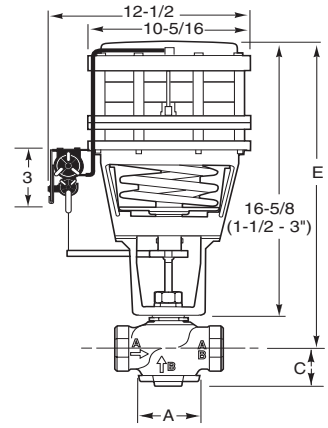
Input Signal Type	Interface Module Required
Two-Position, SPST (Electric)	AL-1XX
Two-Position, SPDT Snap Acting (Electric)	AL-1XX
Voltage 2 to 15 Vdc TAC System 8000	CP-8511-XXX
Current Input 4 to 20 mA etc.	CP-8511-XXX, CP-8551

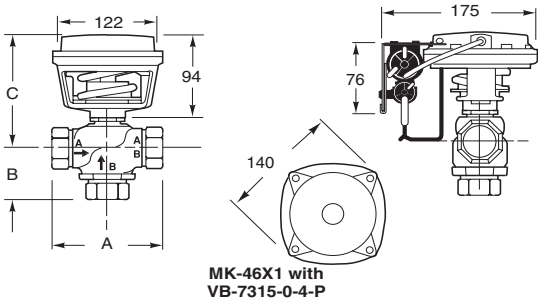
TABLE 4. Dimensions (mm).

Valve Body				Actuator			
				MK-2690	MK-46X1	MK-6XX1	MK-8XX1
Part Number	Size mm	A	B	C	C	C	C
VB-7315-0-4-P	**15**	76	35	122	124	346	—
	20	92	43	122	124	346	—
	25	117	40	124	125	348	—
	32		41	130	130	354	—
	40	137	41	133	133	357	—
	50	156	48	135	136	359	—
VB-9315-0-4-P	**65**	216	117	—	—	427	532
	80	241	127	—	—	437	541









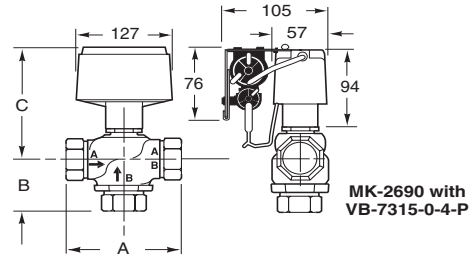


TABLE 5. Flow Pattern.

Body Part Number	Flow Type	Stem Up (SU) (Normal Position)		Stem Down (SD)	
		Flow	Closed Port	Flow	Closed Port
VB-9315-0-4-P	Mixing	B to AB	A	A to AB	B

TABLE 6. Restrictions on Maximum Ambient Temperature for Valve Actuators.

TEMPERATURES °C		
Actuators		All
Maximum Ambient		104
Max. Allowable Fluid		121
VB-7315-0-4-P VB-9315-0-4-P	**Maximum Fluid**	138
	Max. Allowable Ambient	71

3-Way Globe Valves, Screwed End (15 to 50 mm) with Hydraulic Actuators

TABLE 1. Select Valve Body including P Code (Valve Size, k_{VS} Rating, Port Code).

NOTE: These charts are color coded as shown below to assist valve selection.

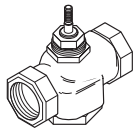
ORDERING EXAMPLES:

Valve Body: VB-7315-0-4-9

Actuator: MA-5213

Linkage: AV-7600-1

- ❒ Valve Body Data less P Code (Size, k_{VS} Rating, Port Code)
- ❒ Actuator
- ❒ P Code (Size, k_{VS} Rating, Port Code)
- ❒ Valve Linkage

		Application
		Chilled or Hot Water 138°C
		Internal Parallel Pipe Thread per ISO 7/1, BS 21, JIS B0203
		
Size		**15 to 32 mm**
Valve Body		VB-7315-0-4-P
Action		3-Way Mixing
Flow Type		Mixing
Material	**Body**	Bronze
	Seat	
	Stem	Stainless Steel
	Plug	Brass
	Packing	Spring Loaded TFE
	Disc	None
Pressure Class (PN)		PN16 (16 Bar)
Allowable Control Media Temp [a]		-7 to 138°C
Allowable Differential Pressure for Water (kPa)		240 max. for normal life (Refer to page 172 for cavitation limits)

TO SELECT A PORT CODE (P).

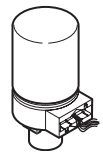
P Code	Valve Size in mm (R_p)[b]	k_{VS}[c]
-2	**15 (1/2)**	1.9
-4		3.8
-6	**20 (3/4)**	6.5
-8	**25 (1)**	12
-9	**32 (1-1/4)**	17
-10	**40 (1-1/2)**	24
-11	**50 (2)**	36

[a] CAUTION: Freeze protection required for fluid temperatures below (0°C). Avoid ice formation on stems. Do not use Hydraulic Actuators with fluid temperatures below 4°C.

[b] R_p = internal parallel pipe thread.

[c] k_{VS} = m^3/h (Δp = 100 kPa) $C_V = k_{VS} \times 1.156$

TABLE 2. Nominal Hydaulic 3-Way Valve Close Off Ratings (See Table 3 For Controller Calibration.)



			Spring Closes (Normally Closed)				Spring Opens (Normally Open)	
	VA, VF, and VS	P Code	MP-5X1X Analog Actuators: 6 to 9m 0 to 10 Volt, and 4 to 20 mA[a]		MA-521X & MF521X Digital Actuators: 2 Position and Floating		All Actuators: Analog, 2 Position and Floating	
			ACTUATOR CLOSE-OFF WITH SPRINGS SHOWN kPa					
Valve Body	**Valve Size mm.**		**Unpainted**	**Unpainted with Booster**	**Unpainted**	**Unpainted with Booster**	**Unpainted**	**Black**
VB-7315-0-4-P	15	-1,-2,-3 -4	900	1700	1300	1700	910	1700
	20	-5,-6	550	1200	910	1300	550	1300
	25	-7,-8	270	410	340	620	270	1000
	32	-9	170	270	240	410	170	620
	40	-10	100	170	140	240	100	410
	50	-11	40	95	70	140	40	340

[a] Factor shipments have unpainted large springs. For - to 10 volt and 4 to 20 mA controllers use blue and booster springs (See Table 3.)

TABLE 3. Controller Calibration and Spring Usage For VB-7XXX Valves.

			MP-512X Series[a]	
Valve	**Size mm**	**Spring(s)**	**Controller Calibration[b]**	**Nominal Conrtrol Range [b]**
VB-7315 - Mixing VB-7325 - Diverting	15 to 50	Large Unpainted	7.5 Volts	6 to 9 Volts
		PNV-145-48[c] Blue with Small Unpianted Booster[d]	7.5 Volts	6 to 9 Volts
			15 mA	14 to 16 mA

[a] MA, MF, MP-541X, and MP-55XX actuator positioning is independent of spring selected.

[b] When using TAC System 8000 controller or a 5 to 20 mA signal across a 500 ohm resistor to get the proper voltage.

[c] PNV-145-48 blue spring is not part of this kit. It is only required for controllers limited to 10 volts or 20 mA maximums.

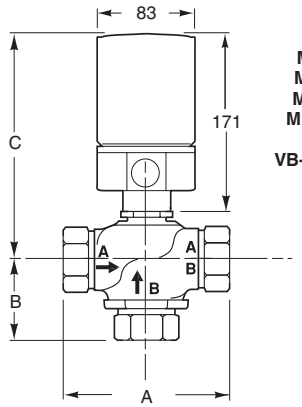
[d] Used with signals limited to 10 volts as 0 to 10 Vdc and 4 to 20 mA across a 500 ohm resistor. Note a reduced control range.

TABLE 4. Dimensions (mm).

Valve Body				Actuator Series
				MA/MF/MP/MPR-5XXX[a]
Part Number	**Size mm**	**A**	**B**	**C**
VB-7315-0-4-P	**15**	76	35	200
	20	92	43	200
	25	117	40	203
	32		41	208
	40	137	41	214
	50	156	48	214

[a] Add 53 mm to the “C” dimension for a valve assembly using an AV-601 linkage extension.

3-Way Globe Valves, Screwed End (15 to 50 mm) with Hydraulic Actuators



MA-521X
MF-5X13[a]
MP-5X1X[a]
MPR-5X1X[a]
with
VB-7315-0-4-P

a AV-601 valve linkage extension (not shown) required for MF-5X13, MP-54XX, MP-55XX, and MPR-5XXX in hot water applications. Refer to Table 3 and Table 4.

TABLE 5. Flow Pattern.

Part Number	Flow Type	Stem Up (SU) (Normal Position)		Stem Down (SD)	
		Flow	Closed Port	Flow	Closed Port
VB-7315-0-4-P	Mixing	B to AB	A	A to AB	B

TABLE 6. Ambient Temperature Restrictions For Valve Actuators.

Actuator Types		Temperatures °C.			
		MA-521X-XXX[a] MP-521X-XXX MP-551X to MP-541X MPR-5X1X	MA-521X-XXX MP-521X-XXX MP-551X to MP541X MPR-5X1X w/AV-601 Linkage Extension	MPR-561X MPR-571X MP-541X MP-551X MF-5X1X/ MPR-5X1X MPR-5X1X w/AV-601 Linkage Extension.	MP-551X to MP-541X/ MPR-5X1X
Maximum Ambient		60	60	60	60
Maximum Allowable Fluid		83	138		138
VB-7315-0-4-P	Max. Allowable Ambient	46	46	39	60
	Maximum Fluid	138	138	138	138

[a] **Actuator condensation can be prevented by use of the "Linkage Extension."**

CAUTION: Condensation can facilitate corrosion. Pipie insulation must not cover any part of the actuator or mounting nut. With 4°C water, the maximum allowable dew point temperature is 20°C.

3-Way Globe Valves, Screwed End (15 to 80 mm) with Electric Gear Train Actuators

TABLE 1. Select Valve Body including P Code (Valve Size, k_{VS} Rating, Port Code).

NOTE: These charts are color coded as shown below to assist valve selection.

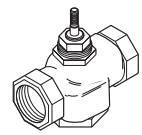
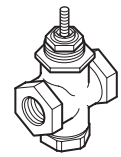
ORDERING EXAMPLES:

Valve Body: VB-9315-0-4-12

Actuator: MP-371

Linkage: AV-395

- ❒ Valve Body Data less P Code (Size, k_{VS} Rating, Port Code)
- ❒ Actuator or Actuator Code (XXX)
- ❒ P Code (Size, k_{VS} Rating, Port Code)
- ❒ Valve Linkage

		Application	
		Chilled or Hot Water 138°C Maximum 240 kPa	Chilled or Hot Water 138°C Maximum 240 kPa
		Internal Parallel Pipe Thread per ISO 7/1, BS 21, JIS B0203	Internal Parallel Pipe Thread per ISO 7/1, BS 21, JIS B0203
			
Size		**15 to 50 mm**	**65 & 80 mm**
Valve Body		**VB-7315-0-4-P**	**VB-9315-0-4-P**
Action		3-Way Mixing	3-Way Mixing
Flow Type		Mixing	Mixing
Material	**Body**	Bronze	Bronze
	Seat		
	Stem	Stainless Steel	Stainless Steel
	Plug	Brass	Brass
	Packing	Spring Loaded TFE	Spring Loaded TFE
	Disc	None	None
Pressure Class (PN)		PN16 (16 Bar)	
Allowable Control Media Temp [a]		-7 to 138°C	-7 to 138°C
Allowable Differential Pressure for Water (kPa) [b]		240 max. for normal life (Refer to page 172 for cavitation limits)	

TO SELECT A PORT CODE (P).

P Code	Valve Size in mm (R_p)[c]	k_{VS}[d]	k_{VS}[d]
-1	15 (1/2)	—	—
-2		1.9	—
-3		—	—
-4		3.8	—
-5	20 (3/4)	—	—
-6		6.5	—
-7	25 (1)	—	—
-8		12	—
-9	32 (1-1/4)	17	—
-10	40 (1-1/2)	24	—
-11	50 (2)	36	—
-12	65 (2-1/2)	—	58
-13	80 (3)	—	78

[a] CAUTION: Freeze protection required for fluid temperatures below (0°C). Avoid ice formation on stems.

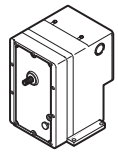
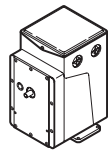
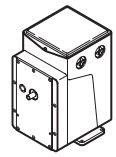
[b] Less than 140 kpa recommended for quiet service.

[c] R_p = internal parallel pipe thread.

[d] $k_{VS} = m^3/h$ (Δp = 100 kPa) $C_V = k_{VS} \times 1.156$

3-Way Globe Valves, Screwed End (15 to 80 mm) with Electric Gear Train Actuators

TABLE 2. 15 to 80 mm Valves, select the appropriate Valve Linkage for Actuator Type with correct Input Signal having sufficient close-off for the application.

	Input signal	Refer to Table 4F and Table 4G			Two-Position SPST	Refer to Table 4B and Table 4E	Refer to Table 4A, Table 4B, and Table 4E.	
Valve Linkage for VB-7315	**15 to 50 mm (R_p 1/2 to 2)**	**AV-630 or AV-630-010**			**AV-391**	**AV-391**	**AV-393**	**—**
Valve Linkage for VB-9315	**65 to 80 mm (R_p 2-1/2 to 3)**	**AV-630 or AV-630-030**			**AV-395**	**AV-395**	**AV-396**	**AV-352**
Normal Position [a]		S.U. or S.D.		None	S.U. or S.D.	S.U. or S.D.	None	None
Actuator Codes (XXX)		301	311	401	3XX	3XX	40X 41X 42X 44X	46X
Actuator Types		MM-500 MMR-500		MM-400 MMR-400	MA-318-XXX MA-418-XXX	MP-361, MP-371 MP-465, MP-475	MC-351	

Valve Body	Valve Body	P Code	Size mm (R_p)	ACTUATOR CLOSE-OFF PRESSURE RATING (kPa) [a b c]											
				SU	SD	SU	SD	SU	SD	SU	SD	SU	SD	SU	SD
VF-7315-0-4-P	VB-7315-0-4-P	-2, -4	15 (1/2)	1440	1220	1720	1720	1720	1720	1720	1720	1720	1720	—	—
		-6	20 (3/4)	740	670	1720	1720	1720	1720	1720	1720	1720	1720	—	—
		-8	25 (1)	480	440	1720	1720	1030	1030	1030	1030	1720	1720	—	—
		-9	32 (1-1/4)	270	270	1100	1089	620	620	620	620	1370	1370	—	—
		-10	40 (1-1/2)	200	200	750	750	410	410	410	410	900	900	—	—
		-11	50 (2)	110	110	410	410	240	240	240	240	550	550	—	—
VF-9315-0-4-P	VB-9315-0-4-P	-12	65 (2-1/2)	70	70	270	270	130	130	130	130	340	340	770	770
		-13	80 (3)	55	55	200	200	80	80	80	80	230	230	500	500

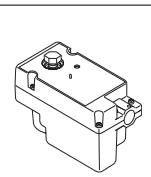
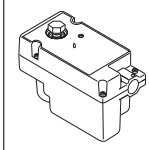
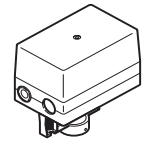
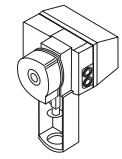
[a] SU — Stem Up; SD — Stem Down. Refer to Table 4 through Table 4G, and Table 6 for flow pattern, port designations, and normal position.

[b] Close-off ratings for mixing valves: (SU = "A" port, SD = "B" port) "A" port (SU) ratings equal pressure at port "A" minus pressure at port "B". "B" port (SD) ratings equal pressure at port "B" minus pressure at port "A".

[c] Close-off pressure ratings describe only the differential pressure which the actuator can close-off with adequate seating force. Consult valve body specifications for other limitations.

3-Way Globe Valves, Screwed End (15 to 80 mm) with Electric Gear Train Actuators

TABLE 3. 15 to 80 mm Valves, select the appropriate Valve Linkage for Actuator Type with correct Input Signal having sufficient close-off for the application.

	Input signal	Floating SPDT DC		Proportional	Floating SPDT and Multiple Input		See Table 4D	
Valve Linkage for VB-9315	15 to 32 mm (R_p 1/2 to 1-1/4)	(included)	(included)	(included)	—		—	
	40 to 50 mm (R_p 1-1/2 to 2)	—	—	—	—		AV-680	
	65 to 80 mm (R_p 2-1/2 to 3)	—	—	—	AV-672		AV-681	
Actuator Codes (XXX)		25X	262, 265, 266	256	301	303	365	366
Actuator Types		MF-22XX3[a]	MF-23X03[b] MF-23X23[b]	MS-22353	MF-63103, MF-63123		MS-7913	MS-7923

Valve Assembly	Valve Body	P Code	Size mm (R_p)	CLOSE-OFF PRESSURE RATING (kPa) [a c d]				
VF-7315-25X-4-P VS-7315-256-4-P	VB-7315-0-4-P	-2, -4	15 (1/2)	895	1720	895	1720	—
		-6	20 (3/4)	550	1170	550	1720	—
		-8	25 (1)	275	550	275	1580	—
		-9	32 (1-1/4)	170	345	170	960	—
		-10	40 (1-1/2)	100	225	100	620	413
		-11	50 (2)	40	110	40	340	241
VF-9315-0-4-P	VB-9315-0-4-P	-12	65 (2-1/2)	—	—	—	240	137
		-13	80 (3)	—	—	—	160	83

[a] MF-222X3 for hot water and steam applications only.

[b] Controller must time out drive signal in a given direction after 3 minutes or less.

[c] Close-off ratings for mixing valves: (SU = "A" port, SD = "B" port) "A" port (SU) ratings equal pressure at port "A" minus pressure at port "B". "B" port (SD) ratings equal pressure at port "B" minus pressure at port "A".

[d] Close-off pressure ratings describe only the differential pressure which the actuator can close-off with adequate seating force. Consult valve body specifications for other limitations.

TABLE 4. Two-Position SPST Input. Any MA-31X or MA-41X electric gear train actuator can be assembled to valve bodies with the close-off pressure ratings listed in Table 2. Select Actuator Type having sufficient close-off for the application. Select actuator, linkage, valve body and field assemble.

Input Signal	Normal Position	Voltage	Hz	VA	Aux. Switch	Actuator
Two-Position SPST	Normally Open	24	60	92	No	MA-318
		120		108		MA-418
Two-Position SPST	Normally Closed	24	60	92		MA-318
		120		108		MA-418

TABLE 4A. Two-Position SPDT Input. Any MC-3XX or MC-4XX electric gear train actuator can be assembled to valve bodies with the close-off pressure ratings listed in Table 2. Select Actuator Type having sufficient close-off for the application. Select actuator, linkage, valve body and field assemble.

Input Signal	Normal Position	Voltage	Hz	VA	Aux. Switch	Actuator
Two-Position SPDT	None (Non-Spring Return)	24	60	96	Yes	MC-351
		120				MC-431
						MC-431 w/AV-352
		240	50			MC5-4311

3-Way Globe Valves, Screwed End (15 to 80 mm) with Electric Gear Train Actuators

TABLE 4B. 2 to 15 Vdc TAC System 8000 input.

Input Signal	Normal Position	Voltage	Hz	VA	Aux. Switch	Actuator
2-15 Vdc, TAC System 8000, start 6 Vdc, Factory set Adj. 2-12 Vdc, 3 Vdc span, Positive Positioning	Normally Closed	120	60	50	Yes	MP-461-600
	Normally Open					MP-471-600
	None					MP-481-600
						MP-481-600 w/AV-352
2-10 Vdc or 4-20 mAdc, Fixed span and Start point		24	60	50	No	MS-22353

TABLE 4C. Factory Assemblies, Floating Actuators, select Actuator Code (XXX). Refer to Table 4G for optional inputs.

Input Signal	Normal Position	Voltage	Hz	VA	Aux. Switch	Actuator	Actuator Code (XXX) for Factory Available Assembly
SPDT Center Off Floating, Two SPST, or Two Triacs		24	50	60	No	MF-22203	252
						MF-22303	255
						MF-22323	256
SPDT Floating, Two SPST, or Triacs						MF-63103	301
						MF-63123	303

TABLE 4D. MS-79X3 Electric Gear Train Actuators.

Input Signal	Normal Position	Voltage[a]	Auxiliary Switches	Actuator	Actuator Code
Proportional	Extended	6 to 9 V	No	MS-7913	365
	Retracted			MS-7923	366
	Extended		2	MS-7913	367
	Retracted			MS-7923	368

[a] Factor setting jumper is used to select other voltages: 8 to 11V, 4 to 7 V, 0 to 10 V, 2 to 10 V, 1 to 5 V.

TABLE 4E. Multiple Input. Any MP-3XX, 4XX or 9XXX electric gear train actuator can be assembled to valve bodies with the close-off pressure ratings listed in Table 2. Select Actuator Type having sufficient close-off for the application. Select actuator, linkage, valve body and field assemble.

Normal Position	Input Signal							Voltage Vac (Hz)	Aux. Switch	Actuator Part Number
	2 to 15 Vdc TAC System 8000	4 to 20 mA etc.	Slidewire (Series 90)	SPST	SPDT Snap Acting	Pneumatic to Electric	SPDT Floating Direct Digital Control			
Normally Closed	1	9	2	Yes	Yes	11	Yes	24 (60)	Yes	MP-361
	3	4, 10				8, 12		120 (60)		MP-465
	5	4				8		240 (50)		MP5-4651
Normally Open	1	9				11		24 (60)		MP-371
	3	4, 10				8, 11		120 (60)		MP-475
	5	4				8		240 (50)		MP5-4751
None	1	9		—		11		24 (60)		MP-381
	3	4, 10				8, 12		120 (60)		MP-485
	5	4				8		240 (50)		MP5-4851
Non-Spring Return	1	9				11		24 (60)		MP-381 w/AV-352
	3	4, 10				8, 12		120 (60)		MP-485 w/AV-352

1 Requires CP-8301-024 or CP-930X ordered separately.
2 Requires AE-504 ordered separately.
3 Requires CP-8301-120 or CP-930X ordered separately.
4 Requires CP-8391-716 or CP-9302 ordered separately.
5 Requires CP-8301-240 or CP-930X ordered separately.
6 Requires CP-8391-456 or CP-930X ordered separately.
7 Requires AM-345 and AE-504 ordered separately.
8 Requires CP-8391-716 or CP-9302 and PP-8311 ordered separately.
9 Requires CP-8391-913 or CP-930X ordered separately.
10 Requires CP-8391-910 or CP-9302 ordered separately.
11 Requires CP-8391-913 or CP-930X and PP-8311 ordered separately.
12 Requires CP-8391-910 and PP-8311 ordered separately.

TABLE 4F. Modular Actuator. Refer to Table 4G for optional inputs.

Normal Position	Voltage (50/60 Hz)	Aux. Switch	Actuator Part No.
Stem Up	24	No	MM-500
Stem Down			
None Non-Spring Return			MM-400

TABLE 4G. Input Signal for Modular Actuators (MM/MMR-400 or MM/MMR-500) and MF-63123. Order these control modules separately.

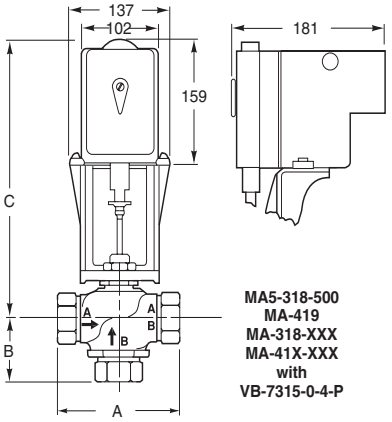
Input Signal	Control Module (order separately)	
	MM/MMR-400 or MM/MMR-500	MF-63123
Two-Position, Floating	MMC-468	None (Base Actuator)
4 to 20 mAdc	MMC-420	MFC-420[a]
135 Ω Slidewire	MMC-90	—
0 to 20 mAdc or 0 to 20 Vdc	MMC-8000	
4 to 20 mAdc with Drive-to-20 mA Position	MMC-421	—
6 to 9 Vdc	—	MFC-8000 [a]

[a] Other ranges available by Dip Switch setting on module.

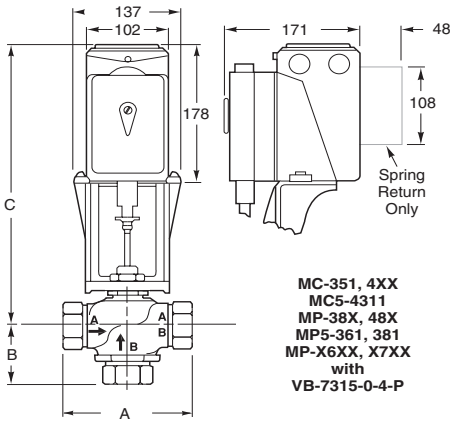
3-Way Globe Valves, Screwed End (15 to 80 mm) with Electric Gear Train Actuators

TABLE 5. Dimensions (mm).

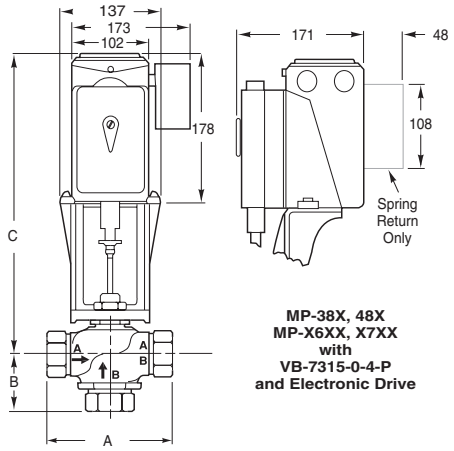
Valve Body				Actuator				
				MA-318-XXX MA-41-XXX8	MS-22353	MC-351, MP-361, 371 MP-38X, 48X MP-465, 475 MP5-46XX MP5-47XX	MC-351, MP-361, 371 MP-38X, 48X MP-465, 475 MP5-46XX MP5-47XX w/AV-352	MM-400, 500 MMR-400, 500
Part Number	**Size mm**	**A**	**B**	**C**	**C**	**C**	**C**	**C**
VB-7315-0-4-P	**15**	76	35	325	107	344	344	286
	20	92	43	325	133	344	344	286
	25	117	40	327	140	346	346	287
	32		41	333	120	352	352	294
	40	137	41	337	124	356	356	297
	50	156	48	338	124	357	357	298
VB-9315-0-4-P	**65**	216	117	405	—	424	424	365
	80	241	127	416	—	435	435	378



MA5-318-500
MA-419
MA-318-XXX
MA-41X-XXX
with
VB-7315-0-4-P

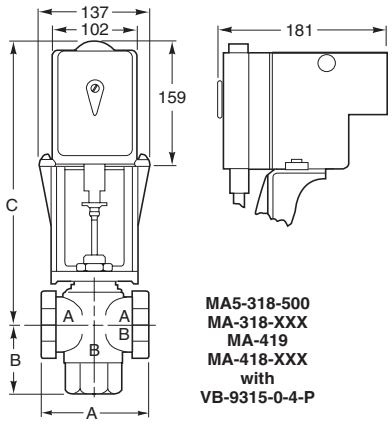


MC-351, 4XX
MC5-4311
MP-38X, 48X
MP5-361, 381
MP-X6XX, X7XX
with
VB-7315-0-4-P

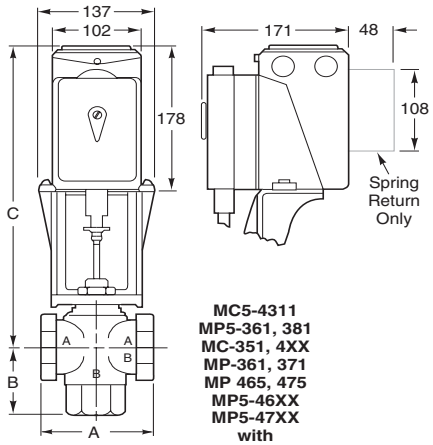


MP-38X, 48X
MP-X6XX, X7XX
with
VB-7315-0-4-P
and Electronic Drive

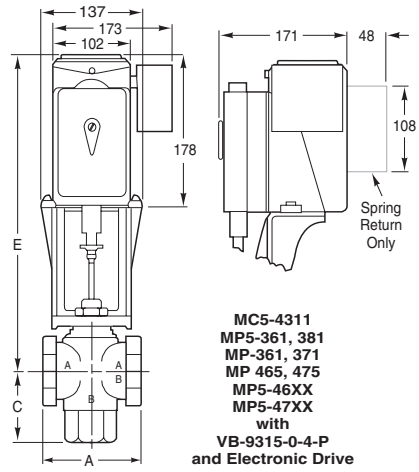
3-Way Globe Valves, Screwed End (15 to 80 mm) with Electric Gear Train Actuators



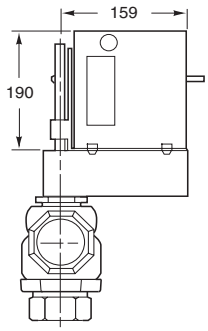
MA5-318-500
MA-318-XXX
MA-419
MA-418-XXX
with
VB-9315-0-4-P

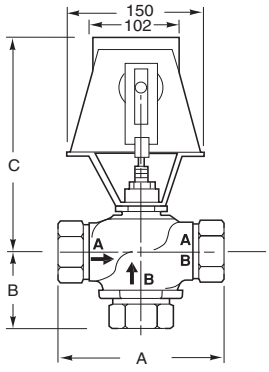


MC5-4311
MP5-361, 381
MC-351, 4XX
MP-361, 371
MP 465, 475
MP5-46XX
MP5-47XX
with
VB-9315-0-4-P

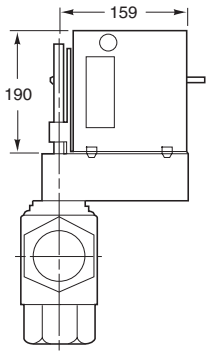


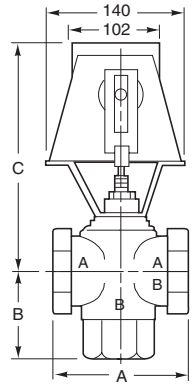
MC5-4311
MP5-361, 381
MP-361, 371
MP 465, 475
MP5-46XX
MP5-47XX
with
VB-9315-0-4-P
and Electronic Drive



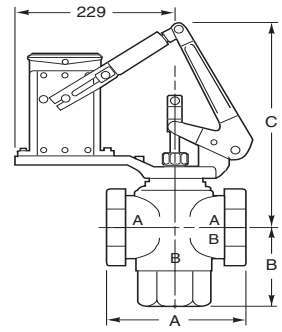


MM-400
MM-500 with
VB-7315-0-4-P





MM-400, 500
MMR-400, 500
with
VB-9315-0-4-P

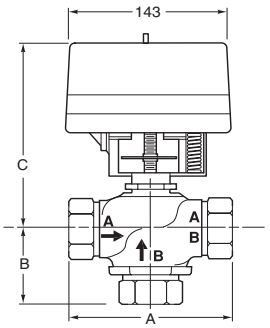


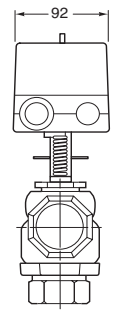
MC5-4311
MP5-361, 381
MC-351, 4XX
MP-38X, 48X
with
VB-9315-0-4-P
(65-80 mm) and
AV-352 Linkage

3-Way Globe Valves, Screwed End (15 to 80 mm) with Electric Gear Train Actuators

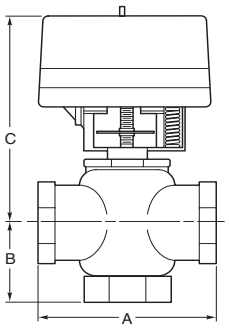
TABLE 5A. Dimensions (mm) for MF-631X3.

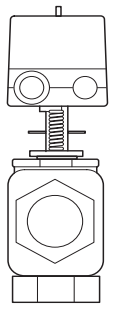
Part Number	Size mm	Actuator		
		A	B	C
VB-7315-0-4-P	15	76	35	181
	20	92	43	181
	25	117	40	183
	32		41	189
	40	137	41	191
	50	156	48	194
VB-9315-0-4-P	65	216	117	264
	80	241	127	276



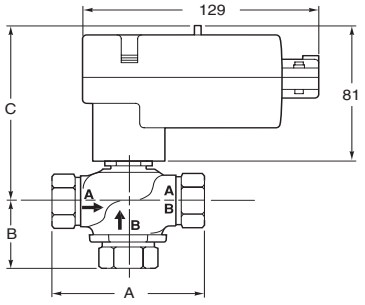


MF-631X3 with VB-7315-000-4-P





MF-631X3 with VB-9315-0-4-P



MF-22XX3 with VB-7315-0-4-P

TABLE 6. Flow Pattern.

Body Part Number	Flow Type	Stem Up (SU)		Stem Down (SD)	
		Flow	Closed Port	Flow	Closed Port
VB-7315-0-4-P VB-9315-0-X-P	Mixing	B to AB	A	A to AB	B

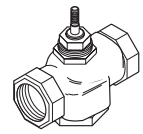
TABLE 7. Restrictions on Maximum Ambient Temperature for Valve Actuators.

Actuator Series		TEMPERATURES °C			
		MA-318-XXX MA5-318-500 MA-41X-XXX MA-419 MM-500, MMR-500	MC-351, MP-361, 371 MP-38X, 48X MP-465, 475 MP5-361, 381, 46XX, 47XX, MM-400, MMR-400	MC-351, MP-361, 371 MP-38X, 48X MP-465, 475 MP5-361, 381, 46XX, 47XX w/AV-352	MF-22XX3[a] MS-22353 MF-631X3
Maximum Ambient		57	57	57	60
Max. Allowable Fluid		127	127	127	126
VB-7315-0-4-P VB-9315-0-4-P	**Max. Allowable Ambient**	52	52	52	38
	Maximum Fluid	138	138	138	138

[a] MF-22203 for hot water and steam applications only.

3-Way Globe Valves, Screwed End (15 to 80 mm) with TAC DuraDrive™ Actuators

TABLE 1. Select Valve Body including P Code (Size, Cv Rating, Port Code). (Refer to Pages 172 to 175 for Valve Sizing.)

Application	
Chilled or Hot Water	
Internal Parallel Pipe Thread per ISO 7/1, BS 21, JIS B0203	
	
Size	15 to 50 mm
Valve Body, Actuator Provides Normal Position	VB-7315-0-4-P
Actuator Types / Input Signal	Factory Available Valve Assemblies
MA40-704X, MA40-707X, MA40-715X, MA40-717X / SPST	VA-7315-XXX-4-P VA-7325-XXX-4-P
MS40-6043, MS40-6083, MS40-6153, MS40-7043, MS40-7073, MS40-7153, MS40-7170 / 2 to 15 Vdc	VS-7315-XXX-4-P VS-7325-XXX-4-P
MF40-6043, MF40-6083, MF40-6153, MF40-7043, MF40-7073, MF40-7153, MF40-7173 / Floating SPDT	VF-7315-XXX-4-P VF-7325-XXX-4-P
Flow Type	Mixing
Material — Body	Bronze
Material — Seat	Bronze
Material — Stem	Stainless Steel
Material — Plug	Brass
Material — Packing	Spring Loaded TFE
Material — Disc	None
ANSI Pressure Class[a] (psig) Refer to page 169	250 (1724 kPa), up to 400 psig (2758 kPa) below 150°F (66°C[b])
Allowable Control Media Temp [c]	20 to 300°F (-7 to 149°C)
Allowable Differential Pressure for Water psig (kPa)[d]	35 psi (241)Max. for normal life (Refer to page 172 for cavitation limits)

NOTE: These charts are color coded as shown below to assist valve selection. Note it is possible to select either a valve assembly or component parts (actuator, valve linkage, valve body).

ORDERING EXAMPLES:

1. **Valve Assembly:** VP-7315-301-4-10
2. **Valve Body:** VB-7315-0-4-10
   Actuator: MF40-6043
   Linkage: AV-391

- ❒ Valve Body Data less P Code (Size, Cv Rating, Port Code) or Valve Assembly less Actuator Code (XXX) and less P Code (Size, Cv Rating, Port Code)
- ❒ P Code (Size, Cv Rating, Port Code)
- ❒ Actuator or Actuator Code (XXX) for Valve Assemblies
- ❒ Valve Linkage

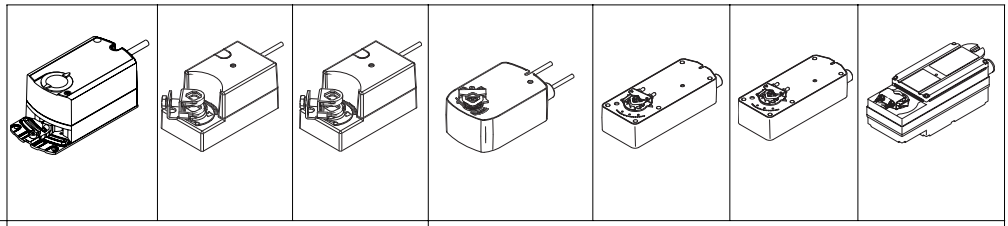
TO SELECT A PORT CODE (P).

P Code	Valve Size[c] in.	Kvs
-2[e]	15	1.64
-4		3.28
-6	20	5.62
-8	25	10.38
-9	32	14.70
-10	40	20.76
-11	50	31.14

[a] CAUTION: Solder, tubing and/or pipe schedules must meet or exceed working static pressure requirements.
[b] Do not apply the above pressure rating to the piping system.
[c] CAUTION: Freeze protection required for fluid temperatures below 32°F (0°C).
[d] Less than 20 psi recommended for quiet service.
[e] Factory assemblies are not available for two-position application using reduced port valve bodies.

3-Way Globe Valves, Screwed End (15 to 80 mm) with TAC DuraDrive™ Actuators

TABLE 2. 15 to 80 mm Valves, select the appropriate Valve Linkage for Actuator Type with correct Input Signal having sufficient close-off for the application.



	Input Signal			Floating and Proportional			SPDT, Floating and Proportional		
	Valve Linkage			AV-603	AV-605	AV-602	AV-605	AV-602	
	Actuator/Linkage Assembly			MF40-6043-200 MS40-6043-200	MF40-6083-200 MS40-6083-200	MF40-6153-200 MS40-6153-200	MA40-704X-200 MA40-704X-201 MF40-7043-200 MF40-7043-201 MS40-7043-200 MS40-7043-201	MA40-707X-200 MA40-707X-202 MF40-7073-200 MF40-7073-202 MS40-7073-200 MS40-7073-202	MA40-715X-200 MA40-715X-202 MF40-7153-200 MF40-7153-202 MS40-7153-200 MS40-7153-202	MA40-717X-200 MF40-7173-200 MS40-7173-200
	Normal Position			N.O. or N.C.						
	Valve Assembly Type			VF or VA			VA, VF or VS			
	Actuator Code (XXX)			505	506	508	532. 533. 534. 535, 536, 537	542, 543, 544, 545, 546, 547	552, 553, 554, 555, 556, 557	572, 574, 576
	Actuator Types			MF40-6043 MS40-6043	MF40-6083 MS40-6083	MF40-6153 MS40-6153	MA40-704X MF40-7043 MS40-7043	MA40-707X MF40-7073 MS40-7073	MA40-715X MF40-7153 MS40-7152	MA40-717X MF40-7173 MS40-7173
Factory Available Valve Assemblies[a]	Valve Body	P Code	Size mm.	ACTUATOR CLOSE-OFF PRESSURE RATING (kPa)[b c]						
VF-7315-XXX-4-P	VB-7315-0-4-P	2-4	15	1551	—	—	1724	—	—	—
		6	20	1551	—	—	1724	—	—	—
		8	25	690	1241	—	862	1241	—	—
		9	32	414	827	—	517	828	—	—
		10	40	276	517	965	344	517	965	1103
		11	50	138	276	552	172	276	552	827

[a] Consult price guide for factory available valve assemblies.

[b] Seat leakage rating of ANSI class IV (.01%).

[c] Close-off pressure ratings describe only the differential pressure which the actuator can close-off with adequate seating force. Consult valve body specifications for other limitations.

TABLE 3. Factory Assemblies, Two Position, Floating, Proportional Actuators, Select Actuator Code (XXX).

Input Signal	Voltage	Running VA		Auxillary Switch	Actuator	Actuator Code for Factory Assembly
		50 Hz	60 Hz			
Two Position SPST	24 Vac ± 20%	4.4	4.2	No	MA40-7043	536
				One	MA40-7043-501	537
	120 Vac ± 10%	6.4	4.3	No	MA40-7040	532
				One	MA40-7040-501	533
	230 Vac ± 10%	5.8	4.6	No	MA40-7041	534
				One	MA40-7041-501	535
	24 Vac ± 20%	9.6	9.6	No	MA40-7173	576
	120 Vac ± 10%	11.4	11.4	No	MA40-7170	572
	240 Vac ± 10%	11.8	11.8	No	MA40-7171	574
	24 Vac ± 20%	11.6	11.2	No	MA40-7153	556
				Two	MA40-7153-502	557
	120 Vac ± 10%	12.5	10.6	No	MA40-7150	552
				Two	MA40-7150-502	553
	230 Vac ± 10%	16.1	11.1	No	MA40-7151	554
				Two	MA40-7151-502	555
	24 Vac ± 20%	4.8	4.6	No	MA40-7073	546
				Two	MA40-7073-502	547
	120 Vac ± 10%	10.7	5.6	No	MA40-7070	542
				Two	MA40-7070-502	543
	230 Vac ± 10%	17.0	8.0	No	MA40-7071	544
				Two	MA40-7071-502	545
Proportional	24 Vac +20/-15%	3	3	No	MS40-6043	505
	24 Vac ± 20%	5.6	5.6	No	MS40-6083	506
		5.8	5.8	No	MS40-6153	508
		4.1	4.3	No	MS40-7043	536
				One	MS40-7043-501	537
		4.2	4.5	No	MS40-7073	546
				Two	MS40-7073-502	547
		15.7	14.9	No	MS40-7153	556
				Two	MS40-7153-502	557
		9.4	9.4	No	MS40-7173	576
	120 Vac ± 10%	11.1	11.1	No	MS40-7170	572
	240 Vac ± 10%	11.8	11.8	No	MS40-7171	574
Floating	24 Vac +20/-15%	2	2	No	MF40-6043	505
	24 Vac ± 20%	5.6	5.6	No	MF40-6083	506
		5.8	5.8	No	MF40-6153	508
		8.3	7.8	No	MF40-7043	536
				One	MF40-7043-501	537
		4.2	4.5	No	MF40-7073	546
				Two	MF40-7073-502	547
		15.9	14.9	No	MF40-7153	556
				Two	MF40-7153-502	557
		10.0	10.0	No	MF40-7173	576

3-Way Globe Valves, Screwed End (15 to 80 mm) with TAC DuraDrive™ Actuators

TABLE 4. MF40-6043 and MS40-6043 Dimensions in Millimeters. Refer to illustration below.

Valve Assembly Part Number	Valve Size mm	Valve Dimensions in millimeters		
		Three-Way (Refer to illustration below)		
		A	C	E
VX-7315-505-4-P VX-7325-505-4-P	15	76	35	162
	20	92	43	162
	25	117	44	164
	32	117	41	170
	40	136	40	173
	50	156	52	175

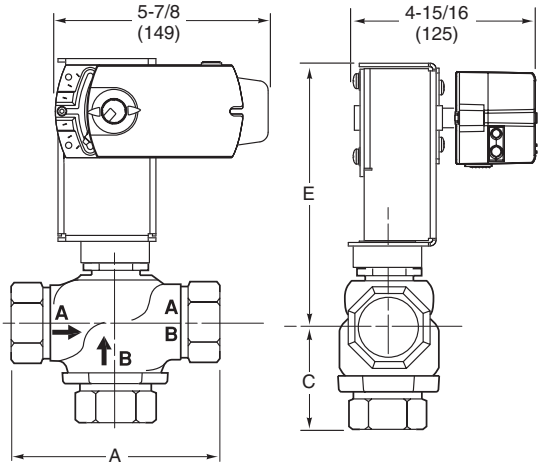


TABLE 5. MX40-6083 and MX40-6153-2XX Dimensions in Millimeters. Refer to illustration below.

Valve Assembly Part Number	Valve Size mm.	Valve Dimensions in millimeters		
		Three-Way (Refer to illustration below)		
		A	C	E
VX-73X5-XXX-4-P	25	117	44	203
	32	117	41	195
	40	137	41	198
	50	156	48	198

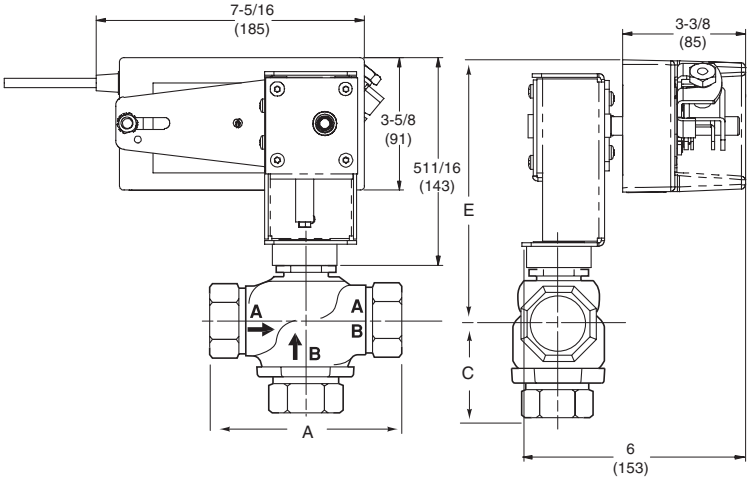


TABLE 6. MX40-704X-2XX Dimensions in Millimeters. Refer to illustration below.

Valve Assembly Part Number	Valve Size mm.	Valve Dimensions in millimeters		
		Three-Way (Refer to illustration)		
		A	C	E
VX-73X5-XXX-4-P	15	76	35	175
	20	92	43	175
	25	117	40	176
	32	117	41	182
	40	137	40	186
	50	156	48	187

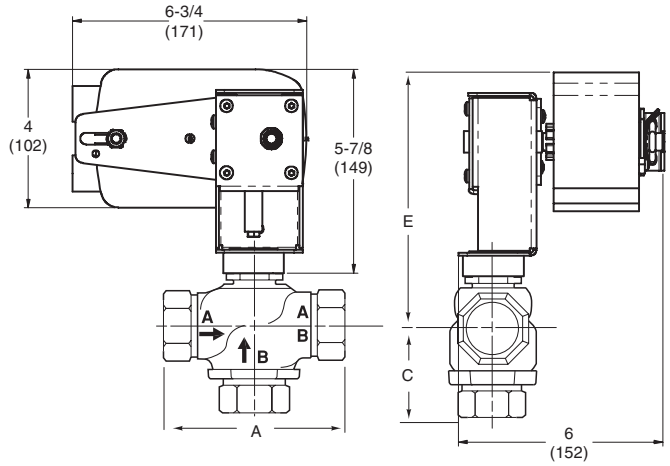
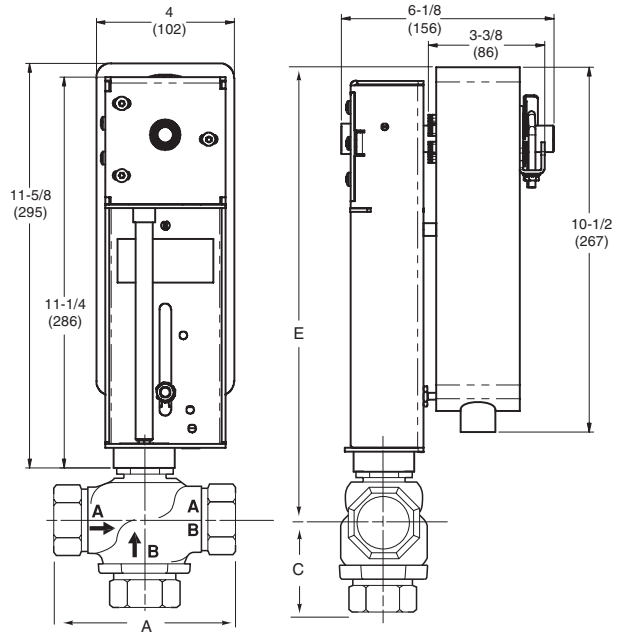


TABLE 7. MX40-715X-2XX and MX40-707X-2XX Dimensions in Millimeters. Refer to illustration below.

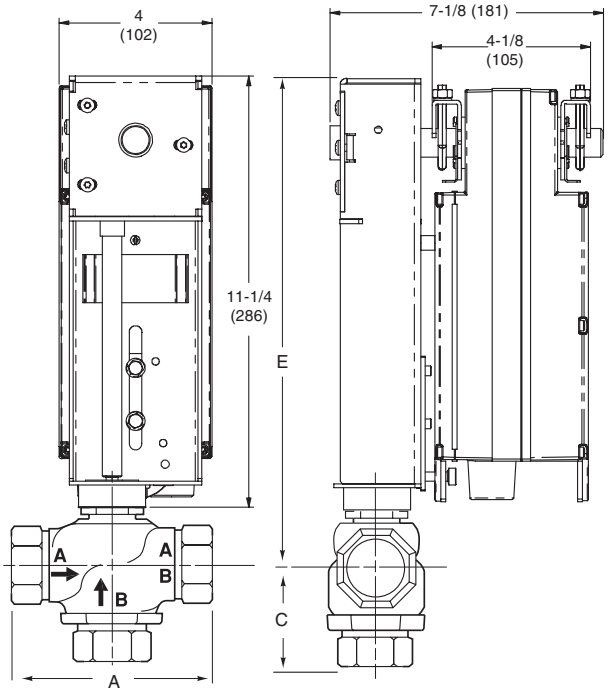
Valve Assembly Part Number	Valve Size mm.	Valve Dimensions in (millimeters		
		Three-Way (Refer to illustration below)		
		A	C	E
VX-73X5-XXX-4-P	25	117	44	356
	32	117	41	337
	40	137	41	338
	50	156	48	338



3-Way Globe Valves, Screwed End (15 to 80 mm) with TAC DuraDrive™ Actuators

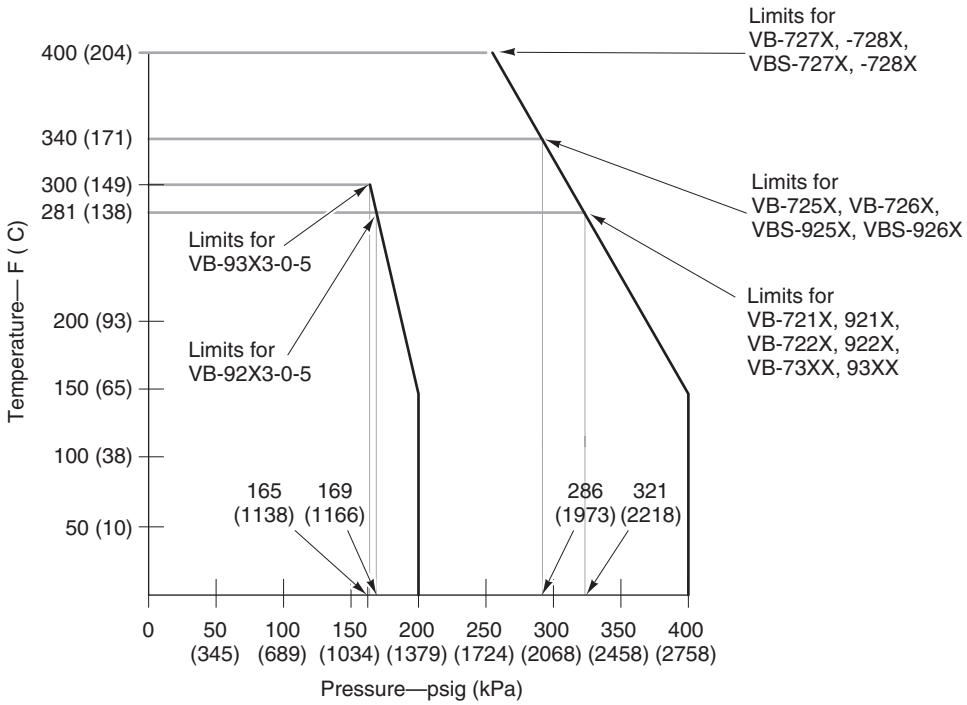
TABLE 8. MX40-717X Dimensions in Inches (Millimeters). Refer to illustration below.

Valve Assembly Part Number	Valve Size in.	Valve Dimensions in inches (millimetres)		
		Three-Way (Refer to illustration below)		
		A	C	E
VX-73X5-XXX-4-P	40	137	41	327
	50	156	48	327



VALVE
GENERAL INFORMATION

Maximum Temperature and Pressure Ratings for Globe Valve Bodies



Ratings conform with published values and disclaimer.

- Cast Bronze: Screwed & Union End Fittings (VB-9XXX-0-4-P, VB-72XX-0-X-P).
- Bronze:
  - ASTM B584.
  - Pressure to ANSI B16.15 Class 250 with 400 psi up to 150°F decreasing to 346 psi at 281°F.
  - 316 stainless trim metal/metal or EPDM rubber disc with TFE packing parts/silicone packing grease.
- 316 Stainless Bodies (VBS-XXXX)
  - Casting alloy CF8M.
  - Pressure to ANSI B16.15 Class 250 with 400 psi up to 150°F decreasing to 346 psi at 281°F.
- Cast Iron:
  - Flanged End Fittings (VB-9XXX-0-5-P).
  - Materials: ASTM A126 Class B.
  - ANSI B16.1 Class 125 with 200 psi up to 150°F decreasing to 169 psi at 281°F.

Caution: Do not use valves beyond rating of piping system and components. Consult ANSI B16.22 for ratings of solder joint pressure fittings.

VB-7XXX, VB-9XXX Globe Valve Flow Curves, Rangeability, and Close-off

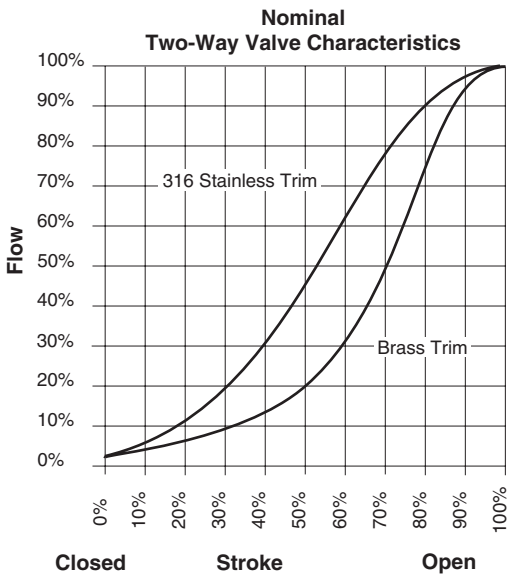
Flow Curves

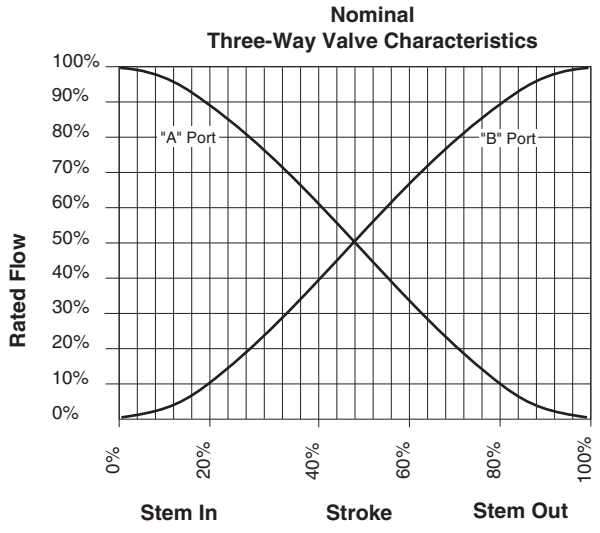
Flow curves shown below are representative of all sizes.

All valve plugs have lower gain when nearly closed to enhance control at low demand. Mixing and diverting valves are nominally linear. Separate curves shown for “A” or “B” ports are not directly additive. Total flow with both ports contributing is rated C_V.

Two-way valves with brass trim are nominally equal percentage in the composition disc types and normally used for water and low pressure steam.

Two-way valves with stainless trim are nominally linear in the TFE and metal-to-metal disc types, and normally used for higher temperature water and steam.





Rangeability

Rangeability is defined as the ratio of rated to minimum controllable flow.

For mixing and diverting valves, control begins as soon as plug displacement allows flow. Thus, Three-way valve rangeability normally exceeds 500:1 which is the reciprocal of 0.2% nominal leakage.

For Two-way valves, modulation occurs when plug displacement allows flow through the area between the plug and the port. The rangeability value is achieved by accurately machining the plug and port diameters for appropriate clearance. The following are nominal values.

TABLE 9. Two-way Valve Rangeability.

Nominal Size		Port Code (P)	Nominal Ratio
Standard	Metric		
1/2”	15 mm	1	5:1
		2	15:1
		3	25:1
		4	40:1
3/4”	20 mm	5	50:1
		6	60:1
1”	25 mm	7	60:1
		8	75:1
1-1/4”	32 mm	9	75:1
1-1/2”	40 mm	10	75:1
2”	50 mm	11	75:1
2-1/2”	65 mm	12	75:1
3”	80 mm	13	75:1
4”	—	14	75:1
5”	—	15	75:1
6”	—	16	75:1

Close-off Ratings (Unless Otherwise Specified)

Nominal actuator close-off ratings are based on ANSI IV (0.01% leakage) with EPDM discs and PTFE discs in steam applications. Metal-to-metal trim such as brass three-way and high temperature stainless are designed for ANSI III (0.1% leakage). Seat leakage for reduced port versions of metal-to-metal seats may match the full port versions allowing up to 1% on the 0.4 C_V plugs.

Consult factory for actuator requirements for ANSI VI, virtually bubble tight for EPDM and PTFE applications.

Valve Packing Life

Valve packings are designed to provide many years of useful life before they must be replaced.

The actual life, under the standard specified conditions, will vary — depending on the frequency of valve cycle and the condition of the fluid controlled. The more frequently the valve is cycled and the more contaminated the fluid is with dirt and harsh chemicals, the shorter the life of the packing.

Water and Steam System Guidelines for Valves

All heating and cooling systems are susceptible to valve and system problems caused by improper water treatment and system storage procedures.

These guidelines are to help you avoid valve and water system problems resulting from improperly treated water or storage procedures in your cooling and hot water systems, and to obtain maximum life from your TAC valves.

Durability of valve stems and packings is dependent on maintaining non-damaging water conditions. Inadequate water treatment or filtration, not in accordance with chemical supplier/ASHRAE handbook recommendations, can result in corrosion, scale, and abrasive particle formation. Scale and particulates can result in stem and packing scratches; and can adversely affect packing life and other parts of the hydronic system.

To maintain non-damaging conditions, clean the system prior to start up. Use a nitrite or molybdate based treatment program. Use filtration equipment where needed. Properly store off-line systems and monitor water treatment results using corrosion test coupons.

Follow the advice of a water treatment professional. Consult **EN-205 Water and Steam System Guidelines, Engineering Information, F-26080**, for further details.

TABLE 1. Flow Conversion Factors.

U.S.	Metric	U.K.
Cv	Kvs	Cvs
US Gal/min	m3/hr	UK gal/min
1.0	0.865	0.833
1.156	1.0	0.962
1.201	1.039	1.0

TABLE 2. Pressure Conversion.

1.0 psi	=	6.894 kPa		
1.0 kPa	=	0.145 psi		
100 kPa	=	14.5 psi	=	1.0 Bar

Valve Sizing Information for Water

GENERAL INFORMATION REQUIRED

1. Fluid controlled:
   - Chilled water, hot water, or steam.
2. Temperature limitations:
   - Fluid, maximum, and minimum.
   - Ambient for actuator.
3. Pressure:
   - Static.
   - Close-off — Fully closed.
   - Differential — Pressure drop across the valve in the fully open position.
4. End fitting:
   - Union end.
   - Globe screwed.
   - Flared.
   - Flanged.
   - Flangeless.
5. For return to a known position (i.e., normally open or normally closed): Specify 200 or 300 Series spring return actuator.
6. Dimensional data.
7. C_v (flow coefficient) requirement is calculated from flow rate and differential pressure. Refer to formulas and tables.

For additional sizing and selection background information, refer to:

- CA-28 Control Valve Sizing, F-13755.
- CA-27 Three-Way Valves, F-12348.
- CA-15 Control of High Temperature Water Systems, F-7638.
- CA-13 Fundamentals of Hot Water Pump Installation, F-7767.

RECOMMENDED PRESSURE DROPS FOR WATER

Refer to specific valve data in this catalog for maximum allowable pressure drops and close-off ratings.

A. Two-Position Valves

Two-position valves are normally selected “line size” to keep pressure drop at a minimum. If desirable to reduce valve below line size, then 10% of “available pressure” normally used to select valve.

B. Proportional Two-Way Valves

Usually selected to take a pressure drop equal to at least 50% of the “available pressure” (i.e., the pump pressure differential available between supply and return mains with design flow at the valve location). As “available pressure” is often difficult to calculate, the normal procedure is to select the valve using a pressure drop at least equal to the drop in the coil or other load being controlled (except where small booster pumps are used), but never less than 5 psi (34 kPa).

When design temperature drop is less than 60°F (33°C) for conventional systems, higher pressure drops across the valve are needed for good control results. Refer to the following table.

The calculated C_v usually falls between two valve sizes. If the pressure drop of the smaller is acceptable for the application, select the smaller valve for better control.

Conventional Heating Systems

Coil Temp. Drop °F (°C)	Recom. Valve Pressure Drop[a] (% of Available Pressure)	Valve Pressure Drop
60 (33) or more	50%	1 x load drop
40 (22)	66%	2 x load drop
20 (11)	75%	3 x load drop

[a] Recommended minimum pressure drop — 5 psi (34 kPa).

Secondary Circuits with Small Booster Pumps

50% of Available Pressure Difference (Equal to drop through load, or 50% of booster pump head)

C. Proportional Three-Way Valves

Recommended Pressure Drop — Bypass Application: 50% of “available pressure”, or equal to pressure drop through the load at full flow.

Three-way valves in the return used to control output by throttling water flow to the load (bypass applications) are controlling output in the same manner as throttling two-way valves, and must be selected using the same high pressure drops if good control results are to be obtained.

Recommended Pressure Drop — Constant Flow Applications: 20% of “available pressure”, or equal to 1/4 of the pressure drop through the load at full flow.

Three-way valves used with individual pumps to control output by varying water temperature to the load (constant flow applications) are controlling output by mixing two water sources at different temperatures, and do not require high pressure drops for good control results.

CAVITATION LIMITATIONS ON VALVE PRESSURE DROP

A valve selected with too high a pressure drop can cause erosion of discs and/or wire drawing of the seat. In addition, cavitation can cause noise, damage to the valve trim (and possibly the body) and choke the flow through the valve.

Do not exceed the maximum differential pressure (pressure drop) for the valve selected.

The following formula can be used on higher temperature water systems, where cavitation could be a problem, to estimate the maximum allowable pressure drop across the valve:

$Pm = 0.5 (P_1 - Pv)$

Pm = Maximum allowable pressure drop

P_1 = Absolute inlet pressure (psia)

Pv = Absolute vapor pressure (refer to Vapor Pressure of Water Table or Steam Table)

Note: Add 14.7 psi to gauge supply pressure to obtain absolute pressure value.

For example, if a valve is controlling 200°F water at an inlet pressure of 18 psig, the maximum pressure drop allowable would be:

Pm = 0.5 [(18 + 14.7) - 11.53] = 10.6 psi

(Vapor pressure of 200°F water is 11.53 psi)

If the pressure drop for this valve is less than 10.6 psi, cavitation should not be a problem.

Systems where cavitation is shown to be a problem can sometimes be redesigned to provide lower inlet velocities. Valves having harder seat materials should be furnished if inlet velocities cannot be lowered.

C_v (FLOW COEFFICIENT) DETERMINATION

The Water Valve Sizing Table or Slide Rule (refer to the following page) is based on the following formula:

$$Cv = \frac{GPM}{\sqrt{\Delta P}} \text{ or } Cv = GPM\sqrt{\frac{\text{Specific Gravity}}{\Delta P}}$$

Where: C_v = Coefficient of flow

C_v is defined as the flow in GPM with ýP = 1 psi

GPM = U.S. gallons per minute (60°F, 15.6°C)

ΔP = Differential pressure in psi (pressure drop)

Other forms of this formula are:

$$\Delta P = \left(\frac{GPM}{Cv}\right)^2$$

and

$$GPM = Cv\sqrt{\Delta P}$$

These formulas can be used to calculate one of the three quantities if the other two are known.

Flow coefficients (C_v's) for valve bodies are given on valve specification pages of this catalog.

Metric (SI) Units

Kvs is defined as the flow in m^3/h with ΔP = 100 kPa (1.0 Bar) with the valve completely open.

Flow is calculated using the following formula:

$$m^3/h = kvs\sqrt{\Delta P}$$

Where:

ΔP = Differential pressure (pressure drop) in Bar (1 Bar = 100 kPa)

m^3/h = Cubic metres/hour (15.6 °C)

Pressure drop is calculated using the following form of the above formula:

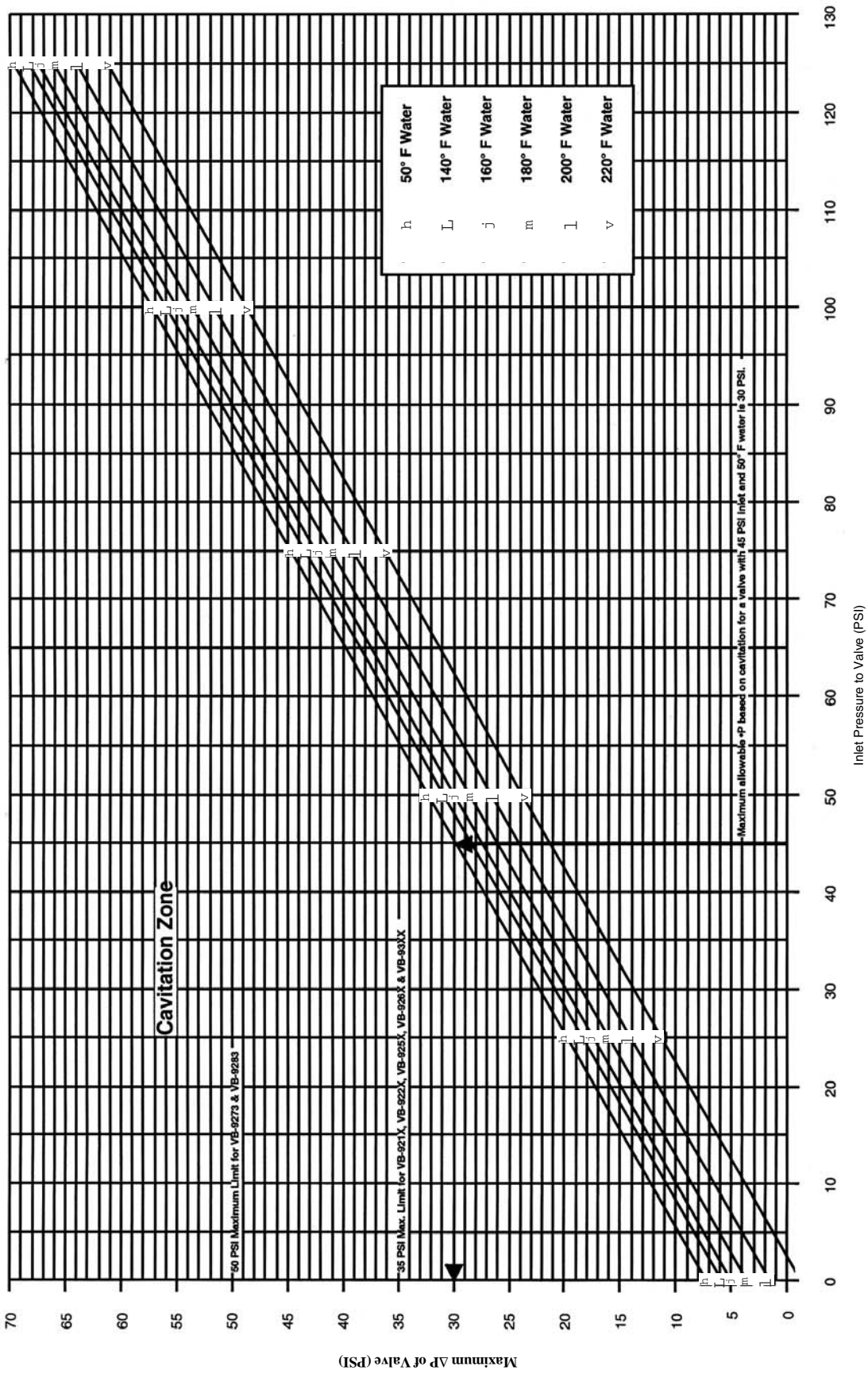
$$\Delta P = \left(\frac{m^3/h}{kvs}\right)^2$$

These formulas can be used to calculate one of the three quantities if the other two are known.

TABLE 1. Vapor Pressure of Water Table.

Water Temperature °F	Vapor Pressure psig	Water Temperature °F	Vapor Pressure psig
40	0.12	140	2.89
50	0.18	150	3.72
60	0.26	160	4.74
70	0.36	170	5.99
80	0.51	180	7.51
90	0.70	190	9.34
100	0.95	200	11.53
110	1.28	210	14.12
120	1.69	220	17.19
130	2.22	230	20.78

Maximum Allowable ΔP for Water Valve



WATER VALVE SIZING TABLES

WATER CAPACITY IN GALLONS PER MINUTE										
	Differential Pressure (psi) ΔP									
Cv	2	3	4	5	10	15	20	25	30	35
0.10	0.14	0.17	0.20	0.22	0.32	0.39	0.45	0.5	0.5	0.6
0.22	0.31	0.38	0.44	0.49	0.70	0.85	0.98	1.1	1.2	1.3
0.30	0.42	0.52	0.60	0.67	0.95	1.16	1.34	1.5	1.6	1.8
0.4	0.57	0.69	0.80	0.89	1.26	1.55	1.79	2.0	2.2	2.4
0.75	1.06	1.30	1.50	1.68	2.37	2.90	3.35	3.8	4.1	4.4
0.9	1.27	1.56	1.80	2.01	2.85	3.49	4.02	4.5	4.9	5.3
0.95	1.34	1.65	1.9	2.1	3.0	3.7	4.2	4.8	5.2	5.6
1.0	1.41	1.73	2.0	2.2	3.2	3.9	4.5	5.0	5.5	5.9
1.3	1.84	2.3	2.6	2.9	4.1	5.0	5.8	6.5	7.1	7.7
1.4	1.98	2.4	2.8	3.1	4.4	5.4	6.3	7.0	7.7	8.3
1.5	2.12	2.6	3.0	3.4	4.7	5.8	6.7	7.5	8.2	8.9
1.75	2.47	3.0	3.5	3.9	5.5	6.8	7.8	8.8	9.6	10.4
1.9	2.69	3.3	3.8	4.2	6.0	7.4	8.5	9.5	10.4	11.2
2.0	2.8	3.5	4.0	4.5	6.3	7.7	8.9	10	11	12
2.2	3.1	3.8	4.4	4.9	7.0	8.5	9.8	11	12	13
2.8	4.0	4.8	5.6	6.3	8.9	10.8	12.5	14	15	17
3.25	4.6	5.6	6.5	7.3	10.3	12.6	14.5	16	18	19
3.6	5.1	6.2	7.2	8.0	11	14	16	18	20	21
4.0	5.7	6.9	8.0	8.9	13	15	18	20	22	24
4.3	6.1	7.4	8.6	9.6	14	17	19	22	24	25
4.4	6.2	7.6	8.8	9.8	14	17	20	22	24	26
5.0	7.1	8.7	10	11	16	19	22	25	27	30
5.4	7.6	9.4	11	12	17	21	24	27	30	32
5.5	7.8	9.5	11	12	17	21	25	28	30	33
6.2	8.8	11	12	14	20	24	28	31	34	37
7.5	11	13	15	17	24	29	34	38	41	44
8.5	12	15	17	19	27	33	38	43	47	50
10	14	17	20	22	32	39	45	50	55	59
12	17	21	24	27	38	46	54	60	66	71
14	20	24	28	31	44	54	63	70	77	83
15	21	26	30	34	47	58	67	75	82	89
16	23	28	32	36	51	62	72	80	88	95
20	28	35	40	45	63	77	89	100	110	118
21	30	36	42	47	66	81	94	105	115	124
22	31	38	44	49	70	85	98	110	120	130
28	40	48	56	63	89	108	125	140	153	166
30	42	52	60	67	95	116	134	150	164	177
34	48	59	68	76	108	132	152	170	186	201
40	57	69	80	89	126	155	179	200	219	237
41	58	71	82	92	130	159	183	205	225	243
43	61	74	86	96	136	167	192	215	236	254
47	66	81	94	105	149	182	210	235	257	278
48	68	83	96	107	152	186	215	240	263	284
49	69	85	—	—	—	—	—	—	—	—
51	72	88	102	114	161	198	228	255	279	302
56	79	97	112	125	177	217	250	280	307	331

WATER CAPACITY IN GALLONS PER MINUTE										
	Differential Pressure (psi) ΔP									
Cv	2	3	4	5	10	15	20	25	30	35
63	89	109	126	141	199	244	282	315	345	373
65	92	113	130	145	206	252	291	325	356	385
67	95	116	134	150	212	259	300	335	367	396
68	96	118	136	152	215	263	304	340	372	402
78	110	135	—	—	—	—	—	—	—	—
84	119	145	168	188	266	325	376	420	460	497
95	120	147	170	190	269	329	380	425	466	503
91	129	158	182	203	288	352	407	455	498	538
100	141	173	200	224	316	387	447	500	548	592
101	143	175	202	226	319	391	452	505	553	598
108	153	187	216	241	342	418	483	540	592	639
132	187	—	—	—	—	—	—	—	—	—
133	188	—	—	—	—	—	—	—	—	—
145	205	251	290	324	459	562	648	725	794	858
170	240	294	340	380	538	658	760	850	931	1006
177	250	307	354	396	560	686	792	885	969	1047
235	332	407	470	525	743	910	1051	1175	1287	1390
250	354	433	500	559	791	968	1118	1250	1369	1479
257	363	—	—	—	—	—	—	—	—	—
270	382	—	—	—	—	—	—	—	—	—
290	410	502	580	648	917	1123	1297	1450	1588	1716
350	495	606	700	783	1107	1356	1565	1750	1917	2071
389	550	674	778	870	1230	1507	1740	1945	2131	2301
390	552	675	780	872	1233	1510	1744	1950	2136	2307
429	607	—	—	—	—	—	—	—	—	—
525	742	—	—	—	—	—	—	—	—	—
632	894	—	—	—	—	—	—	—	—	—
820	1160	—	—	—	—	—	—	—	—	—
1125	1591	—	—	—	—	—	—	—	—	—
1320	1867	—	—	—	—	—	—	—	—	—
1758	2486	—	—	—	—	—	—	—	—	—
1900	2687	—	—	—	—	—	—	—	—	—
2533	3582	—	—	—	—	—	—	—	—	—
2850	4031	—	—	—	—	—	—	—	—	—
3035	4292	—	—	—	—	—	—	—	—	—
4118	5824	—	—	—	—	—	—	—	—	—
5279	7466	—	—	—	—	—	—	—	—	—
6584	9311	—	—	—	—	—	—	—	—	—
9626	13613	—	—	—	—	—	—	—	—	—

Note: Consult valve body and assembly specifications for pressure, pressure drop, temperature, and other limitations. When using pipe reducers, use effective Cv and formula to calculate flow rather than nominal Cv shown in this table.

RECOMMENDED PRESSURE DROPS FOR STEAM

Refer to specific valve data in this catalog for maximum allowable drops and close-off ratings.

A. Two Position Zone Valves and Direct Radiator Valves

Use a minimum of 10% of inlet pressure (psig).

B. Proportional Control Valves

Low pressure (15 psig or less): ΔP of 80% of gauge inlet pressure.

When Cv required is between two valve sizes and closer to the smaller valve size, re-size for Cv using 42% of the absolute inlet pressure as pressure drop. Use the valve that is larger than the calculated Cv.

For steam pressures greater than 15 psig: 42% of the absolute inlet pressure.

When Cv required is between two valve sizes, select the larger size.

Note: Do not size steam valves on higher system pressures using a pressure drop greater than 42% of the absolute inlet pressure.

Cv (FLOW COEFFICIENT) DETERMINATION

The Steam Capacity Tables or Slide Rule (refer to this and the following two pages) is based on the following formula:

$$Cv = \frac{QK}{3\sqrt{\Delta P \times P_2}}$$

Where: Cv = Coefficient of flow

Q = Lbs per hour of steam

ΔP = Differential pressure in psi (pressure drop)

P_2 = Outlet pressure in psia (absolute)
psig + 14.7 = psia (absolute)

K = 1 + (0.0007 x °F super-heat)

Note: K normally is 1 (K = 1 for saturated steam).

Other forms of the formula are:

$$Q = \frac{3Cv\sqrt{\Delta P \times P_2}}{K}$$

Note: K normally is 1.

$$\Delta P = \left(\frac{QK}{3\,Cv}\right)^2 \times \frac{1}{\Delta P_2}$$

Note: K normally is 1.

$$P_2 = \left(\frac{QK}{3\,Cv}\right)^2 \times \frac{1}{\Delta P}$$

Note: K normally is 1 (K = 1 for saturated steam).

These formulas can be used to calculate one of the quantities if the others are know.

Flow coefficients (Cv's) for specific valve bodies are given on specification pages of this catalog.

STEAM CAPACITY IN POUNDS PER HOUR

Note: Table is based on saturated steam.

Inlet Pressure psig ΔP	2#		5#		10#		15#		20#		25#		40#		50#		75#		100#	
Cv	**0.2[a]**	**1.6**	**0.5[a]**	**4**	**1[a]**	**8**	**1.5[a]**	**12**	**2[a]**	**14**	**2.5[a]**	**16**	**4[a]**	**23**	**5[a]**	**27**	**7.5[a]**	**37**	**10[a]**	**48**
0.10	0.5	1.5	0.9	2.4	1.5	3	2.0	4	2.4	5	2.9	6	4.3	8	5.2	10	7.4	13	9.7	17
0.22	1.2	3.2	2.0	5.2	3.2	8	4.3	10	5.3	11	6.4	13	9.4	18	11.4	21	16.4	29	21.4	37
0.30	1.6	4.4	2.8	7.1	4.4	10	5.9	13	7.3	15	8.7	18	12.8	24	15.5	29	22.3	40	29.1	51
0.4	2.2	5.9	3.7	9.5	5.8	14	7.8	17	9.7	20	11.6	23	17.1	32	20.7	38	29.8	53	38.8	68
0.75	4.1	11.1	7.0	17.8	11.0	26	14.6	33	18.2	38	21.7	44	32.0	61	38.9	72	55.9	99	72.8	127
0.9	4.9	13	8.4	21	13	31	18	39	22	46	26	53	38	73	47	86	67	119	87	153
0.95	5.2	14	8.8	23	14	33	19	42	23	49	27	55	41	77	49	91	71	126	92	161
1.0	5.4	15	9.3	24	15	35	20	44	24	51	29	58	43	81	52	96	74	132	97	170
1.3	7.1	19	12	31	19	45	25	57	32	66	38	76	56	105	67	124	97	172	126	221
1.4	7.6	21	13	33	20	49	27	61	34	71	41	82	60	113	73	134	104	185	136	238
1.5	8.2	22	14	36	22	52	29	66	36	77	43	88	64	122	78	144	112	199	146	255
1.75	9.5	26	16	42	26	61	34	77	42	89	51	102	75	142	91	167	130	232	170	297
1.9	10	28	18	45	28	66	37	83	46	97	55	111	81	154	98	182	142	252	184	323
2.0	11	29	19	48	29	69	39	87	49	102	58	117	85	162	104	191	149	265	194	339
2.2	12	32	20	52	32	76	43	96	53	112	64	129	94	178	114	211	164	291	214	373
2.5	14	37	23	59	37	87	49	109	61	128	72	146	107	203	130	239	186	331	243	424
2.8	15	41	26	67	41	97	55	122	68	143	81	164	120	227	145	268	209	371	272	475
3.25	18	48	30	77	47	113	63	142	79	166	94	190	139	263	168	311	242	431	315	552
3.5	19	52	33	83	51	121	68	153	85	179	101	204	150	284	181	335	261	464	340	594
3.6	20	53	33	86	53	125	70	157	87	184	104	210	154	292	187	345	268	477	349	611
4.0	22	59	37	95	58	139	78	175	97	204	116	234	171	324	207	383	298	530	388	679
4.3	23	63	40	102	63	149	84	188	104	220	124	251	184	348	223	412	320	570	417	730
4.4	24	65	41	105	64	153	86	192	107	225	127	257	188	356	228	421	328	583	427	747
5.0	27	74	46	119	73	173	98	219	121	255	145	292	214	405	259	479	372	662	485	849
5.4	29	80	50	128	79	187	105	236	131	276	156	315	231	437	280	517	402	715	524	917
5.5	30	81	51	131	80	191	107	240	133	281	159	321	235	446	285	526	410	729	534	934
6.2	34	91	58	147	91	215	121	271	150	317	179	362	265	502	321	593	462	821	602	1052
7.0	38	103	65	166	102	243	137	306	170	357	203	409	299	567	363	670	521	927	680	1188
7.5	41	111	70	178	110	260	146	328	182	383	217	438	320	608	389	718	559	994	728	1273
8.5	46	125	79	202	124	295	166	372	206	434	246	497	363	689	441	814	633	1126	825	1443

[a] For two-position control.

STEAM CAPACITY IN POUNDS PER HOUR

Note: Table is based on saturated steam.

Inlet Pressure psig ΔP	2#		5#		10#		15#		20#		25#		40#		50#		75#		100#	
Cv	**0.2[a]**	**1.6**	**0.5[a]**	**4**	**1[a]**	**8**	**1.5[a]**	**12**	**2[a]**	**14**	**2.5[a]**	**16**	**4[a]**	**23**	**5[a]**	**27**	**7.5[a]**	**37**	**10[a]**	**48**
10	54	147	93	238	146	347	195	437	243	511	289	584	427	810	518	957	745	1325	971	1697
12	65	177	112	285	175	416	234	525	291	613	347	701	513	972	622	1149	894	1590	1165	2037
14	76	206	130	333	204	485	273	612	340	715	405	818	598	1134	726	1340	1043	1855	1359	2376
15	82	221	139	357	219	520	293	656	364	766	434	876	641	1215	777	1436	1117	1987	1456	2546
16	87	236	149	380	234	555	312	700	388	817	463	935	684	1296	829	1531	1192	2120	1553	2716
20	109	295	186	475	292	694	390	874	485	1021	579	1168	854	1620	1037	1914	1490	2649	1941	3395
21	114	310	195	499	307	728	410	918	509	1072	608	1227	897	1701	1088	2010	1564	2782	2039	3565
22	120	324	204	523	321	763	429	962	534	1124	636	1285	940	1782	1140	2106	1639	2914	2136	3734
28	153	413	260	666	409	971	546	1224	679	1430	810	1636	1196	2268	1451	2680	2086	3709	2718	4753
30	163	442	279	713	438	1040	585	1312	728	1532	868	1753	1282	2430	1555	2871	2235	3974	2912	5092
34	185	501	316	808	497	1179	663	1487	825	1736	984	1986	1453	2754	1762	3254	2533	4504	3300	5771
40	218	590	372	951	584	1387	780	1749	970	2043	1157	2337	1709	3240	2073	3829	2980	5299	3883	6790
41	223	605	381	975	599	1422	800	1793	995	2094	1186	2395	1752	3321	2125	3924	3054	5431	3980	6960
43	234	634	400	1022	628	1491	839	1880	1043	2196	1244	2512	1837	3483	2229	4116	3203	5696	4174	7299
47	256	693	437	1117	686	1630	917	2055	1140	2400	1360	2746	2008	3807	2436	4499	3501	6226	4562	7978
48	262	708	446	1141	701	1664	937	2099	1165	2451	1389	2804	2051	3888	2488	4594	3575	6359	4659	8148
49	267	723	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
51	278	752	474	1212	745	1768	995	2230	1237	2605	1475	2979	2179	4131	2643	4881	3799	6756	4951	8657
56	305	826	521	1331	818	1942	1093	2448	1359	2860	1620	3271	2392	4536	2903	5360	4171	7418	5436	9506
63	343	929	586	1498	920	2185	1229	2754	1528	3217	1823	3680	2692	5103	3265	6030	4693	8346	6116	10694
65	354	958	604	1545	949	2254	1268	2842	1577	3320	1881	3797	2777	5265	3369	6221	4842	8611	6310	11034
67	365	988	623	1593	979	2323	1307	2929	1625	3422	1938	3914	2862	5427	3473	6413	4991	8876	6504	11373
68	371	1003	632	1617	993	2358	1327	2973	1650	3473	1967	3973	2905	5508	3225	6509	5065	9008	6601	11543
78	425	1150	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
84	458	1239	781	1997	1227	2913	1639	3673	2038	4290	2430	4907	3589	6804	4354	8040	6257	11128	8154	14259
85	463	1253	790	2021	1241	2947	1658	3716	2062	4341	2459	4966	3631	6885	4406	8136	6332	11260	8251	14429
91	496	1342	846	2163	1329	3155	1776	3979	2208	4647	2633	5316	3888	7372	4717	8710	6778	12055	8834	15447
100	545	1475	930	2377	1460	3468	1951	4372	2426	5107	2893	5842	4272	8101	5183	9571	7449	13247	9707	16975
101	550	1489	939	2401	1475	3502	1971	4416	2450	5158	2922	5900	4315	8182	5235	9667	7523	13380	9804	17145
108	589	1593	1004	2568	1577	3745	2107	4722	2620	5516	3125	6309	4614	8749	5598	10337	8045	14307	10484	18333
132	719	1949	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
133	725	1961	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
145	790	2138	1348	3447	2118	5028	2829	6340	3518	7405	4195	8471	6195	11746	7516	13878	10801	19209	14075	24613

Inlet Pressure psig ΔP	2#		5#		10#		15#		20#		25#		40#		50#		75#		100#	
Cv	**0.2[a]**	**1.6**	**0.5[a]**	**4**	**1[a]**	**8**	**1.5[a]**	**12**	**2[a]**	**14**	**2.5[a]**	**16**	**4[a]**	**23**	**5[a]**	**27**	**7.5[a]**	**37**	**10[a]**	**48**
170	926	2507	1580	4042	2483	5895	3317	7433	4128	8682	4918	9931	7263	13771	8811	16271	12663	22520	16502	28857
177	965	2610	1645	4208	2585	6138	3454	7739	4294	9039	5121	10340	7562	14338	9174	16941	13184	23448	17182	30045
235	1281	3465	2184	5587	3432	8149	4585	10275	5701	12002	6799	13729	10040	19036	12180	22493	17505	31131	22812	39819
250	1362	3686	2324	5943	3651	8669	4878	10930	6065	12768	7233	14605	10681	20251	12958	23928	18622	33118	24268	42437
257	1401	3790	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
270	1471	3981	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
290	1580	4276	2696	6894	4235	10056	5658	12679	7036	14810	8390	16942	12389	23492	15031	27757	21602	38417	28151	49227
350	1907	5161	3253	8321	5112	12136	6829	15303	8491	17875	10126	20447	14953	28352	18141	33500	26071	46366	33975	59412
389	2120	5736	3616	9248	5681	13489	7590	17008	9438	19866	11254	22725	16619	31511	20162	37233	28976	51532	37761	66032
390	2125	5751	3625	9272	5696	13523	7609	17052	9462	19918	11283	22783	16662	31592	20214	37328	29050	51664	37858	66202
429	2338	6326	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
525	2861	7742	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
632	3444	9319	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
820	4469	12092	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1125	6131	16589	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1320	7194	19465	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1758	9581	25923	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1900	10355	28017	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2533	13804	37351	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2850	15532	42026	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3035	16540	44754	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4118	22442	60723	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5279	28769	77843	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6584	35881	97087	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
9626	52459	141944	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

[a] For two-position control.

VALVE LINKAGES

Valve Body

To select the required valve linkage proceed with the following steps:

1. Match the part number below with the part number on the valve.
2. Use the part number in parenthesis and the appropriate actuator part number to select the required valve linkage from the valve linkage selection guide on the following pages.

CYBC-372 (VB-202)
CYBC-374 (VB-202)
CYBC-375 (VB-202)
CYBC-406 (VB-202)
CYBC-408 (VB-202)
CYBC-409 (VB-202)
DYBB-121 (VB-804)
DYBB-123 (VB-804)
DYBB-140 (VB-804)
DYBB-142 (VB-804)
DYBB-208 (VB-131)
DYBB-209 (VB-131)
DYBB-268 (VB-131)
DYBB-275 (VB-252)
DYBB-282 (VB-131)
DYBB-293 (VB-334)
DYBB-294 (VB-324)
DYBB-295 (VB-324)
DYBB-296 (VB-334)
DYBB-297 (VB-324)
DYBB-298 (VB-324)
DYBB-299 (VB-324)
DYBB-300 (VB-324)
DYBB-301 (VB-324)
DYBB-302 (VB-314)
DYBB-303 (VB-314)
DYBB-304 (VB-354)
DYBB-305 (VB-354)
DYBB-306 (VB-131)
DYBB-307 (VB-131)
DYBB-308 (VB-131)
DYBB-309 (VB-131)
DYBB-310 (VB-131)
DYBB-311 (VB-131)
DYBB-313 (VB-354)
DYBB-314 (VB-354)
DYBB-315 (VB-354)
DYBB-316 (VB-314)
DYBB-317 (VB-314)
DYBB-318 (VB-314)
OYBB-109 (VB-202)
OYBB-110 (VB-202)
OYBB-113 (VB-212)
OYBB-114 (VB-212)
OYBB-115 (VB-202)
OYBB-116 (VB-202)
OYBB-119 (VB-212)
OYBB-120 (VB-212)
OYBB-242 (OYBB-233)
OYBB-257 (OYBB-233)
OYBB-258 (OYBB-233)
OYBB-259 (OYBB-233)
OYBB-276 (VB-260)
OYBB-309 (VB-262)
VA-11 (VB-111)
VA-12 (VB-121)
VA-20 (VB-202)
VA-100 (VB-804)
VA-101 (VB-314)
VA-102 (VB-324)
VA-1100 (VB-111)
VA-1102 (VB-111)
VA-1112 (VB-111)
VA-1210 (VB-121)
VA-1212 (VB-121)
VA-1300 (VB-131)
VA-1302 (VB-131)
VA-1312 (VB-131)
VA-1512 (VB-151)
VA-2001 (VB-202)
VA-2021 (VB-202)
VA-2101 (VB-212)
VA-2121 (VB-212)
VA-2402 (0YBB-223)
VA-3041 (VB-804)
VA-3140 (VB-314)
VA-3142 (VB-314)
VA-3240 (VB-324)
VA-3242 (VB-324)
VA-3500 (VB-354)
VA-3502 (VB-354)
VA-3542 (VB-354)
VA-8041 (VB-804)
VA-8171 (VB-817)
VA-9211 (VB-9211)
VA-9212 (VB-9212)
VA-9213 (VB-9213)
VA-9214 (VB-9214)
VA-9221 (VB-9221)
VA-9222 (VB-9222)
VA-9223 (VB-9223)
VA-9224 (VB-9224)
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VA-9283 (VB-9283)
VA-9312 (VB-9312)
VA-9313 (VB-9313)
VA-9314 (VB-9314)
VA-9332 (VB-9332)
VC-20 (VB-202)
VC-21 (VB-212)
VC-100 (VB-804)
VC-2004 (VB-202)
VC-2005 (VB-202)
VC-2006 (VB-202)
VC-2007 (VB-202)
VC-2024 (VB-202)
VC-2104 (VB-212)
VC-2106 (VB-212)
VC-2107 (VB-212)
VC-2124 (VB-212)
VC-2304 (VB-260)
VC-2307 (VB-260)
VC-2604 (VB-260)
VC-3044 (VB-804)
VC-3047 (VB-804)
VC-8044 (VB-804)
VC-8174 (VB-817)
VC-9213 (VB-9213)
VC-9214 (VB-9214)
VC-9223 (VB-9223)
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VK-2027 (VB-202)
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VK-2127 (VB-212)
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VK-2455 (OYBB-233)
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VK-2527 (VB-252)
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VK-3047 (VB-804)
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VK-3245 (VB-324)
VK-3342 (VB-344)
VK-3344 (VB-334)
VK-3345 (VB-334)
VK-3544 (VB-354)
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VK-8047 (VB-804)
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VK-9314 (VB-9314)
VK-9323 (VB-9323)
VK-9332 (VB-9332)
VP-82 (VB-202)
VP-83 (VB-212)
VP-100 (VB-804)
VP-1112 (VB-111)
VP-1212 (VB-121)
VP-1312 (VB-131)
VP-1512 (VB-151)
VP-2024 (VB-202)
VP-2025 (VB-202)
VP-2026 (VB-202)
VP-2124 (VB-212)
VP-2452 (OYBB-233)
VP-2624 (VB-262)
VP-3044 (VB-804)
VP-3045 (VB-804)
VP-3046 (VB-804)
VP-3142 (VB-314)
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VP-3542 (VB-354)
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VP-8045 (VB-804)
VP-8174 (VB-817)
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YBA-610 (VB-131)

Valve Body Part Number	Valve Sizes	ACTUATOR PART NUMBER										
		Electric/Electronic										
		MA-3X8-XXX MA-416-XXX MA-4X8-XXX MA-4X9-XXX	MA-521X-XXX	MC-31X MC-32X MC-41X MC-41X1	All MC-3XX, 4XX, 4XXX Except Those in Preceding Column	MF-631X3	MP-32X, 33X, 36X, 37X, 42XX, 43XX, 46XX, 47XX, 21XX (180× Models Only)	MP-34X, 35X, 38X, 44XX, 45XX, 48XX (180× Models Only)	MP-503 MP-513 MU-503 MU-504 MU-506	MF-5X1X, MP-54XX, MP-55XX	MU-4610X MU-4710X	MM/MMR-400 MM/MMR-500
VB-111-0-X-X	1/2 to 1-1/4 in.	—	AV-600	—	—	—	—	—	AV-308	AV-600[a]	—	—
VB-121-0-X-X	1/2 in. O.D.	—	AV-600	—	—	—	—	—	AV-308	AV-600 [a]	—	—
VB-131-X-X-X	5/8 or 7/8 in. O.D.	—	AV-600	—	—	—	—	—	AV-308	AV-600 [a]	—	—
VB-151-0-1-X	1/2 to 1-1/4 in.	—	AV-600	—	—	—	—	—	AV-308	AV-600 [a]	—	—
VB-202-0-1-X	1/2 to 2 in.	AV-300 & AV-21	—	AV-300 & AV-21	AV-300 & AV-30	—	AV-300 & AV-21	AV-300 & AV-30[b]	—	—	AV-300 & AV-21	—
VB-202-0-2-X	2-1/2 to 4 in.	AV-300 & AV-29	—	AV-300 & AV-29	AV-300 & AV-30	—	AV-300 & AV-29	AV-300 & AV-30	—	—	AV-300 & AV-29	—
VB-202-0-2-X	5 & 6 in.	—	—	—	AV-352	—	—	AV-352	—	—	—	—
VB-212-0-1-X	1/2 to 2 in.	AV-300 & AV-21	—	AV-300 & AV-21	AV-300 & AV-30	—	AV-300 & AV-21	AV-300 & AV-30 [b]	—	—	AV-300 & AV-21	—
VB-252-0-1-X	1/2 to 2 in.	—	—	—	—	—	—	—	—	—	—	—
VB-252-0-2-X	2-1/2 to 4 in.	—	—	—	—	—	—	—	—	—	—	—
VB-260-0-1-X	1/2 & 3/4 in.	—	—	—	AV-333	—	—	—	—	—	—	—
VB-260-0-1-X	1 to 1-1/2 in.	—	—	—	AV-300 & AV-30	—	—	—	—	—	—	—
VB-262-0-1-X	1/2 to 1-1/2 in.	—	—	—	AV-300 & AV-30	—	—	AV-300 & AV-30	—	—	—	—
VB-314-0-1-X	1/2 to 1 in.	—	AV-600	—	—	—	—	—	AV-308	AV-600 [a]	—	—
VB-324-0-5-4	1/2 in. O.D.	—	AV-600	—	—	—	—	—	AV-308	AV-600 [a]	—	—
VB-334-0-5-4	1/2 in. O.D.	—	AV-600	—	—	—	—	—	AV-308	AV-600 [a]	—	—
VB-354-0-5-X	5/8 or 7/8 in. O.D.	—	AV-600	—	—	—	—	—	AV-308	AV-600 [a]	—	—
VB-804-0-1-X	1/2 to 2 in.	AV-300 & AV-21	—	AV-300 & AV-21	AV-300 & AV-30	—	AV-300 & AV-21	AV-300 & AV-30 [b]	—	—	AV-300 & AV-21	—
VB-804-0-2-X	2-1/2 to 4 in.	AV-300 & AV-29	—	AV-300 & AV-29	AV-300 & AV-30	—	AV-300 & AV-29	AV-300 & AV-30	—	—	AV-300 & AV-29	—
VB-804-0-2-X	5 & 6 in.	—	—	—	AV-352	—	—	AV-352	—	—	—	—
VB-807-0-1-X	1/2 to 2 in.	AV-300 & AV-21	—	AV-300 & AV-21	AV-300 & AV-30	—	AV-300 & AV-21	AV-300 & AV-30	—	—	AV-300 & AV-21	—
VB-817-0-X-X	1/2 to 3 in.	AV-300 & AV-29	—	AV-300 & AV-29	AV-300 & AV-30	—	AV-300 & AV-29	AV-300 & AV-30	—	—	AV-300 & AV-29	—
VB-817-0-X-X	4 to 6 in.	—	—	—	AV-352	—	AV-352	AV-352	—	—	—	—
VB-7211-0-4-X	1/2 to 1-1/4 in.	—	AV-7600-1	—	—	AV-671	—	—	AV-308-0-0-1	AV-7600-1 [a]	—	—
VB-7212-0-4-X	5/8 in. O.D.	—	AV-7600-1	—	—	—	—	—	AV-308-0-0-1	AV-7600-1 [a]	—	—
VB-7213-0-4-X	1/2 to 2 in.	AV-391	AV-7600-1	AV-391	AV-393	—	AV-391	AV-393	AV-308-0-0-1	AV-7600-1 [a]	AV-391	AV-630, AV-630-010
VB-7214-0-4-X	1/2 to 2 in.	AV-391	AV-7600-1	AV-391	AV-393	—	AV-391	AV-393	AV-308-0-0-1	AV-7600-1 [a]	AV-391	AV-630, AV-630-010
VB-7215-0-4-X	15 to 50 mm	AV-391	AV-7600-1	AV-391	AV-393	—	AV-391	AV-393	AV-308-0-0-1	AV-7600-1 [a]	AV-391	AV-630, AV-630-010
VB-7221-0-4-X	1/2 to 1-1/4 in.	—	AV-7600-1	—	—	—	—	—	AV-308-0-0-1	AV-7600-1 [a]	—	—
VB-7222-0-4-X	5/8 in. O.D.	—	AV-7600-1	—	—	—	—	—	AV-308-0-0-1	AV-7600-1 [a]	—	—
VB-7223-0-4-X	1/2 to 2 in.	—	AV-7600-1	—	—	—	—	—	AV-308-0-0-1	AV-7600-1 [a]	—	—
VB-7224-0-4-X	1/2 to 2 in.	—	AV-7600-1	—	—	—	—	—	AV-308-0-0-1	AV-7600-1 [a]	—	—
VB-7225-0-4-X	1/2 to 2 in.	—	—	—	—	—	—	—	—	—	—	—
VB-7253-0-4-X	1/2 to 2 in.	AV-391	AV-7600-1	AV-391	AV-393	AV-671	AV-391	AV-393	AV-308-0-0-1	AV-7600-1 [a]	AV-391	AV-630, AV-630-010
VB-7263-0-4-X	1/2 to 2 in.	—	AV-7600-1	—	—	—	—	—	AV-308-0-0-1	AV-7600-1 [a]	—	—

Valve Body Part Number	Valve Sizes	ACTUATOR PART NUMBER										
		Electric/Electronic										
		MA-3X8-XXX MA-416-XXX MA-4X8-XXX MA-4X9-XXX	MA-521X-XXX	MC-31X MC-32X MC-41X MC-41X1	All MC-3XX, 4XX, 4XXX Except Those in Preceding Column	MF-631X3	MP-32X, 33X, 36X, 37X, 42XX, 43XX, 46XX, 47XX, 21XX (180× Models Only)	MP-34X, 35X, 38X, 44XX, 45XX, 48XX (180× Models Only)	MP-503 MP-513 MU-503 MU-504 MU-506	MF-5X1X, MP-54XX, MP-55XX	MU-4610X MU-4710X	MM/MMR-400 MM/MMR-500
VB-7273-0-4-X	1/2 to 2 in.	AV-391	AV-7600-1	AV-391	AV-393	AV-671	AV-391	AV-393	AV-308-0-0-1	AV-7600-1 [a]	AV-391	AV-630, AV-630-010
VB-7283-0-4-X	1/2 to 2 in.	—	AV-7600-1	—	—	—	—	—	AV-308-0-0-1	AV-7600-1 [a]	—	—
VB-7312-0-4-X	5/8 in. O.D.	—	AV-7600-1	—	—	—	—	—	AV-308-0-0-1	AV-7600-1 [a]	—	—
VB-7313-0-4-X	1/2 to 2 in.	AV-391	AV-7600-1	AV-391	AV-393	AV-671	AV-391	AV-393	AV-308-0-0-1	AV-7600-1 [a]	AV-391	AV-630, AV-630-010
VB-7314-0-4-X	1/2 to 2 in.	AV-391	AV-7600-1	AV-391	AV-393	—	AV-391	AV-393	AV-308-0-0-1	AV-7600-1 [a]	AV-391	AV-630, AV-630-010
VB-7315-0-4-X	15 to 50 mm	AV-391	AV-7600-1	AV-391	AV-393	AV-671	AV-391	AV-393	AV-308-0-0-1	AV-7600-1 [a]	AV-391	AV-630, AV-630-010
VB-7323-0-4-X	1/2 to 2 in.	AV-391	AV-7600-1	AV-391	AV-393	—	AV-391	AV-393	AV-308-0-0-1	AV-7600-1 [a]	AV-391	AV-630, AV-630-010
VB-7332-0-4-X	5/8 in. O.D.	—	—	—	—	—	—	—	AV-308-0-0-1	AV-7600-1 [a]	—	—
VB-9211-0-4-X	1/2 to 1-1/4 in.	—	AV-600-0-0-1	—	—	AV-671	—	—	AV-308-0-0-1	AV-600-0-0-1 [a]	—	—
VB-9212-0-4-X	5/8 in. O.D.	—	AV-600-0-0-1	—	—	—	—	—	AV-308-0-0-1	AV-600-0-0-1 [a]	—	—
VB-9213-0-4-X	1/2 to 1-1/4 in.	AV-391	AV-600-0-0-1	AV-391	AV-393	—	AV-391	AV-393	AV-308-0-0-1	AV-600-0-0-1 [a]	AV-391	AV-630, AV-630-010
VB-9213-0-4-X	1-1/2 & 2 in.	AV-392	—	AV-392	AV-394	[c]	AV-392	AV-394	—	—	AV-392	AV-630, AV-630-020
VB-9213-0-4-X	2-1/2 & 3 in.	AV-395	—	AV-395	AV-396, AV-352	AV-672	AV-395	AV-396 & AV-352	—	—	AV-395	AV-630, AV-630-030
VB-9213-0-5-X	2-1/2 to 4 in.	AV-395	—	AV-395	AV-396, AV-352	AV-672	AV-395	AV-396, AV-352	—	—	AV-395	AV-630, AV-630-030
VB-9213-0-5-X	5 & 6 in.	—	—	—	AV-352	—	—	AV-352	—	—	—	—
VB-9214-0-4-X	1/2 to 1-1/4 in.	AV-391	AV-600-0-0-1	AV-391	AV-393	—	AV-391	AV-393	AV-308-0-0-1	AV-600-0-0-1 [a]	AV-391	AV-630, AV-630-010
VB-9214-0-4-X	1-1/2 & 2 in.	AV-392	—	AV-392	AV-394	—	AV-392	AV-394	—	—	AV-392	AV-630, AV-630-020
VB-9215-0-4-X	15 to 32 mm	AV-391	AV-600-0-0-1	AV-391	AV-393	—	AV-391	AV-393	AV-308-0-0-1	AV-600-0-0-1 [a]	AV-391	AV-630, AV-630-010
VB-9215-0-4-X	40 to 50 mm	AV-392	—	AV-392	AV-394	[c]	AV-392	AV-394	—	—	AV-392	AV-630, AV-630-020
VB-9215-0-4-X	65 to 80 mm	AV-395	—	AV-395	AV-396, AV-352	AV-672	AV-395	AV-396 & AV-352	—	—	AV-395	AV-630, AV-630-030
VB-9221-0-4-X	1/2 to 1-1/4 in.	—	AV-600-0-0-1	—	—	—	—	—	AV-308-0-0-1	AV-600-0-0-1 [a]	—	—
VB-9222-0-4-X	5/8 in. O.D.	—	AV-600-0-0-1	—	—	—	—	—	AV-308-0-0-1	AV-600-0-0-1 [a]	—	—
VB-9223-0-4-X	1/2 to 1-1/4 in.	—	AV-600-0-0-1	—	—	—	—	—	AV-308-0-0-1	AV-600-0-0-1 [a]	—	—
VB-9223-0-4-X	1-1/2 to 2 in.	—	—	—	—	—	—	—	—	—	—	—
VB-9223-0-4-X	2-1/2 & 3 in.	—	—	—	—	—	—	—	—	—	—	—
VB-9223-0-5-X	2-1/2 to 4 in.	—	—	—	—	—	—	—	—	—	—	—
VB-9223-0-5-4	5 to 6 in.	—	—	—	AV-352	—	—	AV-352	—	—	—	—
VB-9224-0-4-X	1/2 to 1-1/4 in.	—	AV-600-0-0-1	—	—	—	—	—	AV-308-0-0-1	AV-600-0-0-1 [a]	—	—
VB-9224-0-4-X	1-1/2 & 2 in.	—	—	—	—	—	—	—	—	—	—	—
VB-9225-0-4-X	15 to 32 mm.	—	—	—	—	—	—	—	—	—	—	—
VB-9253-0-4-X	1/2 to 1-1/4 in.	AV-391	AV-600-0-0-1	AV-391	AV-393	AV-671	AV-391	AV-393	AV-308-0-0-1	AV-600-0-0-1 [a]	AV-391	AV-630, AV-630-010
VB-9253-0-4-X	1-1/2 & 2 in.	AV-392	—	AV-392	AV-394	[c]	AV-392	AV-394	—	—	AV-392	AV-630, AV-630-020
VB-9263-0-4-X	1/2 to 1-1/4 in.	—	AV-600-0-0-1	—	—	—	—	—	AV-308-0-0-1	AV-600-0-0-1 [a]	—	—
VB-9263-0-4-X	1-1/2 & 2 in.	—	—	—	—	—	—	—	—	—	—	—
VB-9273-0-4-X	1/2 to 1-1/4 in.	AV-391	AV-600-0-0-1	AV-391	AV-393	AV-671	AV-391	AV-393	AV-308-0-0-1	AV-600-0-0-1 [a]	AV-391	AV-630, AV-630-010
VB-9273-0-4-X	1-1/2 & 2 in.	AV-392	—	AV-392	AV-394	[c]	AV-392	AV-394	—	—	AV-392	AV-630, AV-630-010

Valve Body Part Number	Valve Sizes	ACTUATOR PART NUMBER										
		Electric/Electronic										
		MA-3X8-XXX MA-416-XXX MA-4X8-XXX MA-4X9-XXX	MA-521X-XXX	MC-31X MC-32X MC-41X MC-41X1	All MC-3XX, 4XX, 4XXX Except Those in Preceding Column	MF-631X3	MP-32X, 33X, 36X, 37X, 42XX, 43XX, 46XX, 47XX, 21XX (180× Models Only)	MP-34X, 35X, 38X, 44XX, 45XX, 48XX (180× Models Only)	MP-503 MP-513 MU-503 MU-504 MU-506	MF-5X1X, MP-54XX, MP-55XX	MU-4610X MU-4710X	MM/MMR-400 MM/MMR-500
VB-9283-0-4-X	1/2 to 1-1/4 in.	—	AV-600-0-0-1	—	—	—	—	—	AV-308-0-0-1	AV-600-0-0-1 [a]	—	—
VB-9283-0-4-X	1-1/2 & 2 in.	—	—	—	—	—	—	—	—	—	—	—
VB-9312-0-4-X	5/8 in. O.D.	—	AV-600-0-0-1	—	—	—	—	—	AV-308-0-0-1	AV-600-0-0-1 [a]	—	—
VB-9313-0-4-X	1/2 to 1-1/4 in.	AV-391	AV-600-0-0-1	AV-391	AV-393	AV-671	AV-391	AV-393	AV-308-0-0-1	AV-600-0-0-1 [a]	AV-391	AV-630, AV-630-010
VB-9313-0-4-X	1-1/2 & 2 in.	AV-392	—	AV-392	AV-394	[c]	AV-392	AV-394	—	—	AV-392	AV-630, AV-630-020
VB-9313-0-4-X	2-1/2 & 3 in.	AV-395	—	AV-395	AV-396, AV-352	AV-672	AV-395	AV-396, AV-352	—	—	AV-395	AV-630, AV-630-030
VB-9313-0-5-X	2-1/2 to 4 in.	AV-395	—	AV-395	AV-396, AV-352	AV-672	AV-395	AV-396, AV-352	—	—	AV-395	AV-630, AV-630-030
VB-9313-0-5-X	5 to 6 in.	—	—	—	AV-352	—	—	AV-352	—	—	—	—
VB-9314-0-4-X	1/2 to 1-1/4 in.	AV-391	AV-600-0-0-1	AV-391	AV-393	—	AV-391	AV-393	AV-308-0-0-1	AV-600-0-0-1 [a]	AV-391	AV-630, AV-630-010
VB-9314-0-4-X	1-1/2 & 2 in.	AV-392	—	AV-392	AV-394	—	AV-392	AV-394	—	—	AV-392	AV-630, AV-630-020
VB-9315-0-4-X	15 to 32 mm	AV-391	AV-600-0-0-1	AV-391	AV-393	AV-671	AV-391	AV-393	AV-308-0-0-1	AV-600-0-0-1 [a]	AV-391	AV-630, AV-630-010
VB-9315-0-4-X	40 to 50 mm	AV-392	—	AV-392	AV-394	[c]	AV-392	AV-394	—	—	AV-392	AV-630, AV-630-020
VB-9315-0-4-X	65 to 80 mm	AV-395	—	AV-395	AV-396, AV-352	AV-672	AV-395	AV-396, AV-352	—	—	AV-395	AV-630, AV-630-030
VB-9323-0-4-X	1/2 to 1-1/4 in.	AV-391	AV-600-0-0-1	AV-391	AV-393	—	AV-391	AV-393	AV-308-0-0-1	AV-600-0-0-1 [a]	AV-391	AV-630, AV-630-010
VB-9323-0-4-X	1-1/2 & 2 in.	AV-392	—	AV-392	AV-394	—	AV-392	AV-394	—	—	AV-392	AV-630, AV-630-020
VB-9323-0-5-X	2-1/2 & 3 in.	AV-300 & AV-29	—	AV-300 & AV-29	AV-300 & AV-30	—	AV-300 & AV-29	AV-300 & AV-30	—	—	AV-300 & AV-29	AV-630, AV-630-040
VB-9323-0-5-X	4 to 6 in.	—	—	—	AV-352	—	AV-352	AV-352	—	—	—	—
VB-9332-0-4-X	5/8 in. O.D.	—	—	—	—	—	—	—	AV-308-0-0-1	AV-600-0-0-1 [a]	—	—
OYBB-233	1/2 & 3/4 in.	—	AV-600	—	—	—	—	—	AV-308	AV-600 [a]	—	—

[a] Use AV-601 for high fluid temperature applications; see specific valve for temperature limitations.

[b] Some valves used AV-327 neutral band linkages and will require AV-327. These linkages can be identified by the cam being marked with the number “49”. AV-327 were used on heating valves when the auxiliary switch(es) were controlling D.X. compressor.

[c] Direct mount; no separate linkage.

NOTE:

AV-600-0-0-1 can replace AV-600.
AV-430-0-0-1 can replace AV-430.
AV-308-0-0-1 can replace AV-308.

Valve Body Part Number	Valve Sizes	ACTUATOR PART NUMBER							
		Electric/Electronic							
		MX40-6043	MX40-6083	MX40-6153	MX40-634X	MX40-704X	MX40-707X	MX40-715X	MX40-717X
VB-111-0-X-X	1/2 to 1-1/4 in.	—	—	—	—	—	—	—	—
VB-121-0-X-X	1/2 in. O.D.	—	—	—	—	—	—	—	—
VB-131-X-X-X	5/8 or 7/8 in. O.D.	—	—	—	—	—	—	—	—
VB-151-0-1-X	1/2 to 1-1/4 in.	—	—	—	—	—	—	—	—
VB-202-0-1-X	1/2 to 2 in.	—	—	—	—	—	—	—	—
VB-202-0-2-X	2-1/2 to 4 in.	—	—	—	—	—	—	—	—
VB-202-0-2-X	5 & 6 in.	—	—	—	—	—	—	—	—
VB-212-0-1-X	1/2 to 2 in.	—	—	—	—	—	—	—	—
VB-252-0-1-X	1/2 to 2 in.	—	—	—	—	—	—	—	—
VB-252-0-2-X	2-1/2 to 4 in.	—	—	—	—	—	—	—	—
VB-260-0-1-X	1/2 & 3/4 in.	—	—	—	—	—	—	—	—
VB-260-0-1-X	1 to 1-1/2 in.	—	—	—	—	—	—	—	—
VB-262-0-1-X	1/2 to 1-1/2 in.	—	—	—	—	—	—	—	—
VB-314-0-1-X	1/2 to 1 in.	—	—	—	—	—	—	—	—
VB-324-0-5-4	1/2 in. O.D.	—	—	—	—	—	—	—	—
VB-334-0-5-4	1/2 in. O.D.	—	—	—	—	—	—	—	—
VB-354-0-5-X	5/8 or 7/8 in. O.D.	—	—	—	—	—	—	—	—
VB-804-0-1-X	1/2 to 2 in.	—	—	—	—	—	—	—	—
VB-804-0-2-X	2-1/2 to 4 in.	—	—	—	—	—	—	—	—
VB-804-0-2-X	5 & 6 in.	—	—	—	—	—	—	—	—
VB-807-0-1-X	1/2 to 2 in.	—	—	—	—	—	—	—	—
VB-817-0-X-X	1/2 to 3 in.	—	—	—	—	—	—	—	—
VB-817-0-X-X	4 to 6 in.	—	—	—	—	—	—	—	—
VB-2253-0-8-X	1/2 to 2 in.	AV-505	AV-506	AV-506	AV-510	AV-506	AV-550	AV-550	AV-510
VB-2253-0-8-X	1/2 to 2 in.	AV-505	AV-506	AV-506	AV-510	AV-506	AV-550	AV-550	AV-510
VB-7211-0-4-X	1/2 to 1-1/4 in.	AV-603	AV-603	AV-602	—	AV-605	AV-602	AV-602	AV-602
VB-7212-0-4-X	1/2 to 2 in.	—	—	—	—	—	—	—	—
VB-7213-0-4-X	1/2 to 2 in.	AV-603	AV-605	AV-602	—	AV-605	AV-602	AV-602	AV-602
VB-7214-0-4-X	1/2 to 2 in.	AV-603	AV-605	AV-602	—	AV-605	AV-602	AV-602	AV-602
VB-7215-0-4-X	15 to 50 mm	—	—	—	—	—	—	—	—
VB-7221-0-4-X	1/2 to 1-1/4 in.	AV-603	AV-605	AV-602	—	AV-605	AV-602	AV-602	AV-602
VB-7222-0-4-X	5/8 in. O.D.	—	—	—	—	—	—	—	—
VB-7223-0-4-X	1/2 to 2 in.	AV-603	AV-605	AV-602	—	AV-605	AV-602	AV-602	AV-602
VB-7224-0-4-X	1/2 to 2 in.	—	—	—	—	—	—	—	—
VB-7225-0-4-X	15 to 50 mm.	AV-603	AV-605	AV-602	—	AV-605	AV-602	AV-602	AV-602
VB-7253-0-4-X	1/2 to 2 in.	AV-603	AV-605	AV-602	—	AV-605	AV-602	AV-602	AV-602
VB-7263-0-4-X	1/2 to 2 in.	—	—	—	—	—	—	—	—
VB-7273-0-4-X	1/2 to 2 in.	AV-603	AV-605	AV-602	—	AV-605	AV-602	AV-602	AV-602
VB-7283-0-4-X	1/2 to 2 in.	—	—	—	—	—	—	—	—
VB-7312-0-4-X	5/8 in. O.D.	—	—	—	—	—	—	—	—

Valve Body Part Number	Valve Sizes	ACTUATOR PART NUMBER							
		Electric/Electronic							
		MX40-6043	MX40-6083	MX40-6153	MX40-634X	MX40-704X	MX40-707X	MX40-715X	MX40-717X
VB-7313-0-4-X	1/2 to 2 in.	AV-603	AV-605	AV-602	—	AV-605	AV-602	AV-602	AV-602
VB-7314-0-4-X	1/2 to 2 in.	—	—	—	—	—	—	—	—
VB-7315-0-4-X	15 to 50 mm	AV-603	AV-605	AV-602	—	AV-605	AV-602	AV-602	AV-602
VB-7323-0-4-X	1/2 to 2 in.	AV-603	AV-605	AV-602	—	AV-605	AV-602	AV-602	AV-602
VB-7332-0-4-X	5/8 in. O.D.	—	—	—	—	—	—	—	—
VB-9211-0-4-X	1/2 to 1-1/4 in.	—	—	—	—	—	—	—	—
VB-9212-0-4-X	5/8 in. O.D.	AV-603	AV-605	AV-602	—	AV-605	AV-602	AV-602	AV-602
VB-9213-0-4-X	1/2 to 1-1/4 in.	AV-603	AV-605	AV-602	—	AV-605	AV-602	AV-602	AV-602
VB-9213-0-5-X	2-1/2 to 4 in.	AV-603	AV-605	AV-602	—	AV-605	AV-602	AV-602	AV-602
VB-9214-0-4-X	1/2 to 1-1/4 in.	AV-603	AV-605	AV-602	—	AV-605	AV-602	AV-602	AV-602
VB-9214-0-4-X	1-1/2 & 2 in.	—	—	—	—	—	—	—	—
VB-9215-0-4-X	15 to 32 mm	AV-603	AV-605	AV-602	—	AV-605	AV-602	AV-602	AV-602
VB-9215-0-4-X	40 to 50 mm	—	—	—	—	—	—	—	—
VB-9215-0-4-X	65 to 80 mm	—	—	—	—	—	—	—	—
VB-9221-0-4-X	1/2 to 1-1/4 in.	AV-603	—	—	—	AV-605	—	—	—
VB-9222-0-4-X	5/8 in. O.D.	AV-603	—	—	—	AV-605	—	—	—
VB-9223-0-4-X	1/2 to 1-1/4 in.	AV-603	—	—	—	AV-605	—	—	—
VB-9223-0-4-X	1-1/2 to 2 in.	—	—	—	—	—	—	—	—
VB-9223-0-4-X	2-1/2 & 3 in.	—	—	—	—	—	—	—	—
VB-9223-0-5-X	2-1/2 to 4 in.	—	—	—	—	—	—	—	—
VB-9223-0-5-4	5 to 6 in.	—	—	—	—	—	—	—	—
VB-9224-0-4-X	1/2 to 1-1/4 in.	AV-603	—	—	—	AV-605	—	—	—
VB-9224-0-4-X	1-1/2 & 2 in.	—	—	—	—	—	—	—	—
VB-9225-0-4-X	15 to 32 mm.	—	—	—	—	—	—	—	—
VB-9253-0-4-X	1/2 to 1-1/4 in.	AV-603	—	—	—	AV-605	—	—	—
VB-9253-0-4-X	1-1/2 & 2 in.	—	—	—	—	—	—	—	—
VB-9263-0-4-X	1/2 to 1-1/4 in.	AV-603	—	—	—	AV-605	—	—	—
VB-9263-0-4-X	1-1/2 & 2 in.	—	—	—	—	—	—	—	—
VB-9273-0-4-X	1/2 to 1-1/4 in.	AV-603	—	—	—	AV-605	—	—	—
VB-9273-0-4-X	1-1/2 & 2 in.	AV-603	—	—	—	AV-605	—	—	—
VB-9283-0-4-X	1/2 to 1-1/4 in.	AV-603	—	—	—	AV-605	—	—	—
VB-9283-0-4-X	1-1/2 & 2 in.	—	—	—	—	—	—	—	—
VB-9312-0-4-X	5/8 in. O.D.	AV-603	—	—	—	AV-605	—	—	—
VB-9313-0-4-X	1/2 to 1-1/4 in.	AV-603	—	—	—	AV-605	—	—	—
VB-9313-0-4-X	1-1/2 & 2 in.	—	—	—	—	—	—	—	—
VB-9313-0-4-X	2-1/2 & 3 in.	—	—	—	—	—	—	—	—
VB-9313-0-5-X	2-1/2 to 4 in.	—	—	—	—	—	—	—	—
VB-9313-0-5-X	5 to 6 in.	—	—	—	—	—	—	—	—
VB-9314-0-4-X	1/2 to 1-1/4 in.	AV-603	—	—	—	AV-605	—	—	—
VB-9314-0-4-X	1-1/2 & 2 in.	—	—	—	—	—	—	—	—

Valve Body Part Number	Valve Sizes	ACTUATOR PART NUMBER							
		Electric/Electronic							
		MX40-6043	MX40-6083	MX40-6153	MX40-634X	MX40-704X	MX40-707X	MX40-715X	MX40-717X
VB-9315-0-4-X	15 to 32 mm	AV-603	—	—	—	AV-605	—	—	—
VB-9315-0-4-X	40 to 50 mm	—	—	—	—	—	—	—	—
VB-9315-0-4-X	65 to 80 mm	—	—	—	—	—	—	—	—
VB-9323-0-4-X	1/2 to 1-1/4 in.	AV-603	—	—	—	AV-605	—	—	—
VB-9323-0-4-X	1-1/2 & 2 in.	—	—	—	—	—	—	—	—
VB-9323-0-5-X	2-1/2 & 3 in.	—	—	—	—	—	—	—	—
VB-9323-0-5-X	4 to 6 in.	—	—	—	—	—	—	—	—
VB-9332-0-4-X	5/8 in. O.D.	AV-603	—	—	—	AV-605	—	—	—
OYBB-233	1/2 & 3/4 in.	AV-603	—	—	—	AV-605	—	—	—

Valve Body Part Number	Valve Sizes	ACTUATOR PART NUMBER										
		Electric/Electronic			Pneumatic							
		MU-4810X	MUP-4610X MUP-4710X	MUP-4820X	MK-2690	MK-46X1	MK-47X1 (Obsolete)	MK-48X1 (VB-9XXX only)	MK-66XX (1/2 in. stroke)	MK-68X1 (MK-69X1 is only used on VB-817 & VB-9323, 4 to 6 in.)	MK-88XX (2-1/2 to 4 in.)	MK-89XX (5 & 6 in.)
VB-111-0-X-X	1/2 to 1-1/4 in.	—	—	—	AV-400	AV-404	—	—	—	—	—	—
VB-121-0-X-X	1/2 in. O.D.	—	—	—	AV-400	AV-401	—	—	—	—	—	—
VB-131-X-X-X	5/8 or 7/8 in. O.D.	—	—	—	AV-400	AV-401	—	—	—	—	—	—
VB-151-0-1-X	1/2 to 1-1/4 in.	—	—	—	AV-400	AV-401	—	—	—	—	—	—
VB-202-0-1-X	1/2 to 2 in.	AV-300 & AV-30[a]	AV-300 & AV-21	AV-300 & AV-30 [a]	—	—	AV-430	—	—	AV-430	—	—
VB-202-0-2-X	2-1/2 to 4 in.	AV-300 & AV-30	AV-300 & AV-29	AV-300 & AV-30	—	—	—	—	—	AV-430	AV-496[b]	—
VB-202-0-2-X	5 & 6 in.	AV-352	—	AV-352	—	—	—	—	—	—	—	AV-496
VB-212-0-1-X	1/2 to 2 in.	AV-300 & AV-30 [a]	AV-300 & AV-21	AV-300 & AV-30 [a]	—	—	AV-430	—	—	AV-430	—	—
VB-252-0-1-X	1/2 to 2 in.	—	—	—	—	—	AV-430	—	—	AV-430	—	—
VB-252-0-2-X	2-1/2 to 4 in.	—	—	—	—	—	—	—	—	AV-430	AV-496 [b]	—
VB-260-0-1-X	1/2 & 3/4 in.	—	—	—	—	—	—	—	—	—	—	—
VB-260-0-1-X	1 to 1-1/2 in.	—	—	—	—	—	—	—	—	—	—	—
VB-262-0-1-X	1/2 to 1-1/2 in.	AV-300 & AV-30	—	AV-300 & AV-30	—	—	—	—	—	—	—	—
VB-314-0-1-X	1/2 to 1 in.	—	—	—	AV-400	AV-401	—	—	—	—	—	—
VB-324-0-5-4	1/2 in. O.D.	—	—	—	AV-400	AV-401	—	—	—	—	—	—
VB-334-0-5-4	1/2 in. O.D.	—	—	—	AV-400	AV-401	—	—	—	—	—	—
VB-354-0-5-X	5/8 or 7/8 in. O.D.	—	—	—	AV-400	AV-401	—	—	—	—	—	—
VB-804-0-1-X	1/2 to 2 in.	AV-300 & AV-30 [a]	AV-300 & AV-21	AV-300 & AV-30 [a]	—	—	AV-430	—	—	AV-430	—	—
VB-804-0-2-X	2-1/2 to 4 in.	AV-300 & AV-30	AV-300 & AV-29	AV-300 & AV-30	—	—	—	—	—	AV-430	AV-496 [b]	—
VB-804-0-2-X	5 & 6 in.	AV-352	—	AV-352	—	—	—	—	—	—	—	AV-496
VB-807-0-1-X	1/2 to 2 in.	AV-300 & AV-30	AV-300 & AV-21	AV-300 & AV-30	—	—	AV-430	—	—	AV-430	—	—
VB-817-0-X-X	1/2 to 3 in.	AV-300 & AV-30	AV-300 & AV-29	AV-300 & AV-30	—	—	—	—	—	AV-430	—	—
VB-817-0-X-X	4 to 6 in.	AV-352	—	AV-352	—	—	—	—	—	AV-430	—	—

Valve Body Part Number	Valve Sizes	ACTUATOR PART NUMBER										
		Electric/Electronic			Pneumatic							
		MU-4810X	MUP-4610X MUP-4710X	MUP-4820X	MK-2690	MK-46X1	MK-47X1 (Obsolete)	MK-48X1 (VB-9XXX only)	MK-66XX (1/2 in. stroke)	MK-68X1 (MK-69X1 is only used on VB-817 & VB-9323, 4 to 6 in.)	MK-88XX (2-1/2 to 4 in.)	MK-89XX (5 & 6 in.)
VB-7211-0-4-X	1/2 to 1-1/4 in.	—	—	—	AV-7400	AV-401	—	—	—	—	—	—
VB-7212-0-4-X	5/8 in. O.D.	—	—	—	AV-7400	AV-401	—	—	—	—	—	—
VB-7213-0-4-X	1/2 to 2 in.	AV-393	AV-391	AV-393	AV-7400	AV-401	—	—	AV-430-0-0-1	—	—	—
VB-7214-0-4-X	1/2 to 2 in.	AV-393	AV-391	AV-393	AV-7400	AV-401	—	—	AV-430-0-0-1	—	—	—
VB-7215-0-4-X	15 to 50 mm	AV-393	AV-391	AV-393	AV-7400	AV-401	—	—	AV-430-0-0-1	—	—	—
VB-7221-0-4-X	1/2 to 1-1/4 in.	—	—	—	AV-7400	AV-401	—	—	—	—	—	—
VB-7222-0-4-X	5/8 in. O.D.	—	—	—	AV-7400	AV-401	—	—	—	—	—	—
VB-7223-0-4-X	1/2 to 2 in.	AV-393	AV-391	AV-393	AV-7400	AV-401	—	—	AV-430-0-0-1	—	—	—
VB-7224-0-4-X	1/2 to 2 in.	AV-393	AV-391	AV-393	AV-7400	AV-401	—	—	AV-430-0-0-1	—	—	—
VB-7253-0-4-X	1/2 to 2 in.	AV-393	AV-391	AV-393	AV-7400	AV-401	—	—	AV-430-0-0-1	—	—	—
VB-7263-0-4-X	1/2 to 2 in.	AV-393	AV-391	AV-393	AV-7400	AV-401	—	—	AV-430-0-0-1	—	—	—
VB-7273-0-4-X	1/2 to 2 in.	AV-393	AV-391	AV-393	AV-7400	AV-401	—	—	AV-430-0-0-1	—	—	—
VB-7283-0-4-X	1/2 to 2 in.	AV-393	AV-391	AV-393	AV-7400	AV-401	—	—	AV-430-0-0-1	—	—	—
VB-7312-0-4-X	5/8 in. O.D.	—	—	—	AV-7400	AV-401	—	—	—	—	—	—
VB-7313-0-4-X	1/2 to 2 in.	AV-393	AV-391	AV-393	AV-7400	AV-401	AV-430-0-0-1	—	—	—	—	—
VB-7314-0-4-X	1/2 to 2 in.	AV-393	AV-391	AV-393	AV-7400	AV-401	AV-430-0-0-1	—	—	—	—	—
VB-7315-0-4-X	15 to 50 mm	AV-393	AV-391	AV-393	AV-7400	AV-401	AV-430-0-0-1	—	—	—	—	—
VB-7323-0-4-X	1/2 to 2 in.	AV-393	AV-391	AV-393	AV-7400	AV-401	AV-430-0-0-1	—	—	—	—	—
VB-7332-0-4-X	5/8 in. O.D.	—	—	—	AV-7400	AV-401	—	—	—	—	—	—
VB-9211-0-4-X	1/2 to 1-1/4 in.	—	—	—	AV-430	AV-401	—	—	—	—	—	—
VB-9212-0-4-X	5/8 in. O.D.	—	—	—	AV-400	AV-401	—	—	—	—	—	—
VB-9213-0-4-X	1/2 to 1-1/4 in.	AV-393	AV-391	AV-393	AV-400	AV-401	—	—	AV-430-0-0-1	—	—	—
VB-9213-0-4-X	1-1/2 & 2 in.	AV-394	AV-392	AV-394	—	—	AV-430-0-0-1	AV-420	—	AV-430-0-0-1	—	—
VB-9213-0-4-X	2-1/2 & 3 in.	AV-396, AV-352	AV-395	AV-396, AV-352	—	—	—	—	—	AV-495	AV-496	—
VB-9213-0-5-X	2-1/2 to 4 in.	AV-396, AV-352	AV-395	AV-396, AV-352	—	—	—	—	—	AV-495	AV-496	—
VB-9213-0-5-X	5 & 6 in.	AV-352	—	AV-352	—	—	—	—	—	—	—	AV-496
VB-9214-0-4-X	1/2 to 1-1/4 in.	AV-393	AV-391	AV-393	AV-400	AV-401	—	—	AV-430-0-0-1	—	—	—
VB-9214-0-4-X	1-1/2 & 2 in.	AV-394	AV-392	AV-394	—	—	AV-430-0-0-1	AV-420	—	AV-430-0-0-1	—	—
VB-9215-0-4-X	15 to 32 mm	AV-393	AV-391	AV-393	AV-400	AV-401	—	—	AV-430-0-0-1	—	—	—
VB-9215-0-4-X	40 and 50 mm	AV-394	AV-392	AV-394	—	—	AV-430-0-0-1	AV-420	—	AV-430-0-0-1	—	—
VB-9215-0-4-X	65 and 80 mm	AV-396, AV-352	AV-395	AV-396, AV-352	—	—	—	—	—	AV-495	AV-496	—
VB-9221-0-4-X	1/2 to 1-1/4 in.	—	—	—	AV-400	AV-401	—	—	—	—	—	—
VB-9222-0-4-X	5/8 in. O.D.	—	—	—	AV-400	AV-401	—	—	—	—	—	—
VB-9223-0-4-X	1/2 to 1-1/4 in.	AV-393	AV-391	AV-393	AV-400	AV-401	—	—	AV-430-0-0-1	—	—	—
VB-9223-0-4-X	1-1/2 to 2 in.	AV-394	AV-392	AV-394	—	—	AV-430-0-0-1	AV-420	—	AV-430-0-0-1	—	—
VB-9223-0-4-X	2-1/2 & 3 in.	AV-396	AV-395	AV-396	—	—	—	—	—	AV-495	AV-496	—
VB-9223-0-5-X	2-1/2 to 4 in.	AV-396	AV-395	AV-396	—	—	—	—	—	AV-495	AV-496	—
VB-9223-0-5-4	5 to 6 in.	AV-352	—	AV-352	—	—	—	—	—	—	—	AV-496
VB-9224-0-4-X	1/2 to 1-1/4 in.	AV-393	AV-391	AV-393	AV-400	AV-401	—	—	AV-430-0-0-1	—	—	—

Valve Body Part Number	Valve Sizes	ACTUATOR PART NUMBER										
		Electric/Electronic			Pneumatic							
		MU-4810X	MUP-4610X MUP-4710X	MUP-4820X	MK-2690	MK-46X1	MK-47X1 (Obsolete)	MK-48X1 (VB-9XXX only)	MK-66XX (1/2 in. stroke)	MK-68X1 (MK-69X1 is only used on VB-817 & VB-9323, 4 to 6 in.)	MK-88XX (2-1/2 to 4 in.)	MK-89XX (5 & 6 in.)
VB-9224-0-4-X	1-1/2 & 2 in.	AV-394	AV-392	AV-394	—	—	AV-430-0-0-1	AV-420	—	AV-430-0-0-1	—	—
VB-9225-0-4-X	15 to 80 mm.	—	—	—	AV-400	AV-401	—	—	AV-430-0-0-1	AV-495	—	—
VB-9253-0-4-X	1/2 to 1-1/4 in.	AV-393	AV-391	AV-393	AV-400	AV-401	—	—	AV-430-0-0-1	—	—	—
VB-9253-0-4-X	1-1/2 & 2 in.	AV-394	AV-392	AV-394	—	—	AV-430-0-0-1	AV-420	—	AV-430-0-0-1	—	—
VB-9263-0-4-X	1/2 to 1-1/4 in.	AV-393	AV-391	AV-393	AV-400	AV-401	—	—	AV-430-0-0-1	—	—	—
VB-9263-0-4-X	1-1/2 & 2 in.	AV-394	AV-392	AV-394	—	—	AV-430-0-0-1	AV-420	—	AV-430-0-0-1	—	—
VB-9273-0-4-X	1/2 to 1-1/4 in.	AV-393	AV-391	AV-393	AV-400	AV-401	—	—	AV-430-0-0-1	—	—	—
VB-9273-0-4-X	1-1/2 & 2 in.	AV-394	AV-392	AV-394	—	—	AV-430-0-0-1	AV-420	—	AV-430-0-0-1	—	—
VB-9283-0-4-X	1/2 to 1-1/4 in.	AV-393	AV-391	AV-393	AV-400	AV-401	—	—	AV-430-0-0-1	—	—	—
VB-9283-0-4-X	1-1/2 & 2 in.	AV-394	AV-392	AV-394	—	—	AV-430-0-0-1	AV-420	—	AV-430-0-0-1	—	—
VB-9312-0-4-X	5/8 in. O.D.	—	—	—	AV-400	AV-401	—	—	—	—	—	—
VB-9313-0-4-X	1/2 to 1-1/4 in.	AV-393	AV-391	AV-393	AV-400	AV-401	—	—	AV-430-0-0-1	—	—	—
VB-9313-0-4-X	1-1/2 & 2 in.	AV-394	AV-392	AV-394	—	—	AV-430-0-0-1	AV-420	—	AV-430-0-0-1	—	—
VB-9313-0-4-X	2-1/2 & 3 in.	AV-396, AV-352	AV-395	AV-396, AV-352	—	—	—	—	—	AV-495	AV-496	—
VB-9313-0-5-X	2-1/2 to 4 in.	AV-396, AV-352	AV-395	AV-396, AV-352	—	—	—	—	—	AV-495	AV-496	—
VB-9313-0-5-X	5 to 6 in.	AV-352	—	AV-352	—	—	—	—	—	—	—	AV-496
VB-9314-0-4-X	1/2 to 1-1/4 in.	AV-393	AV-391	AV-393	AV-400	AV-401	—	—	AV-430-0-0-1	—	—	—
VB-9314-0-4-X	1-1/2 & 2 in.	AV-394	AV-392	AV-394	—	—	AV-430-0-0-1	AV-420	—	AV-430-0-0-1	—	—
VB-9315-0-4-X	15 to 32 mm	AV-393	AV-391	AV-393	AV-400	AV-401	—	—	AV-430-0-0-1	—	—	—
VB-9315-0-4-X	40 and 50 mm	AV-394	AV-392	AV-394	—	—	AV-430-0-0-1	AV-420	—	AV-430-0-0-1	—	—
VB-9315-0-4-X	65 and 80 mm	AV-396, AV-352	AV-395	AV-396, AV-352	—	—	—	—	—	AV-495	AV-496	—
VB-9323-0-4-X	1/2 to 1-1/4 in.	AV-393	AV-391	AV-393	AV-400	AV-401	AV-430-0-0-1	—	—	—	—	—
VB-9323-0-4-X	1-1/2 & 2 in.	AV-394	AV-392	AV-394	—	—	AV-430-0-0-1	AV-420	—	AV-430-0-0-1	—	—
VB-9323-0-5-X	2-1/2 & 3 in.	AV-300 & AV-30	AV-300 & AV-29	AV-300 & AV-30	—	—	—	—	—	AV-430-0-0-1	—	—
VB-9323-0-5-X	4 to 6 in.	AV-352	—	AV-352	—	—	—	—	—	AV-430-0-0-1	—	—
VB-9332-0-4-X	5/8 in. O.D.	—	—	—	AV-400	AV-401	—	—	—	—	—	—
OYBB-233	1/2 & 3/4 in.	—	—	—	AV-400	AV-401	—	—	—	—	—	—

[a] Some valves used AV-327 neutral band linkages and will require AV-327. These linkages can be identified by the cam being marked with the number “49”. AV-327 were used on heating valves when the auxiliary switch(es) were controlling D.X. compressor.

[b] Requires XYBB-252 and NYBA-59.

AV-600-0-0-1 can replace AV-600.
AV-430-0-0-1 can replace AV-430.
AV-308-0-0-1 can replace AV-308.

Application

For assembling electric gear train actuators to valve bodies.

The AV-390 through AV-396 linkages are used to field assemble TAC gear train actuators and VB-9XXX and VB-7XXX series of valve bodies.

Features:

- Die case aluminum mounting bracket.
- Valve position indication provided as standard.

Specifications

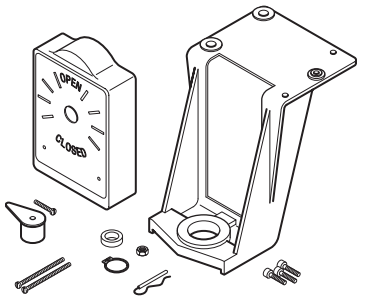
- Actuator mounting: In any upright position with actuator above the center line of the valve body.

Model No.	Description	Minimum Actuator Torque Required (Actuator must be 180° Stroke) (lb-in.)	Stem Force (lb)
AV-29	Cam, Plunger and Connection Pin Kit	50	150
AV-30		100	300
AV-91	Cam, Plunger and Stem Extension Kit	40	150
AV-92[a]		50	150
AV-93		70	300
AV-94[b]		100	300
AV-300	Common Parts Kits Req. AV-29, 30	—	—
AV-347	Complete Linkage	50	150
AV-347-10		100	300
AV-347-20		50	150
AV-347-30		100	300
AV-390	Common Parts Kits Req. AV-91, 92, 93, 94	—	—
AV-391	Complete Linkages	40	150
AV-392[a]		50	150
AV-393		70	300
AV-394[b]		100	300
AV-395		50	150
AV-396		100	300

[a] Used on obsolete 1-1/2 & 2" VB-9XXX valves with spring return actuators only.
[b] Used on obsolete 1-1/2 & 2" VB-9XXX valves with non-spring return actuators only.

AV-29, AV-30, AV-9X Series , AV-300, AV-347, AV-39X Series

Electric/Electronic Valve Linkage Kits



AV-352

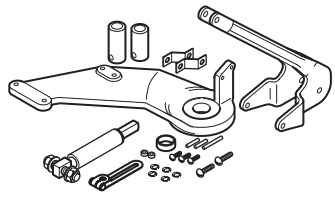
Gear Train Actuator Valve Linkage

Application

The AV-352 valve linkage is used to field-install gear train actuators on specified 2-1/2 to 6 in. valve bodies.

Features:

- Compatible with TAC (Barber-Colman) 2-1/2 to 6 in. valves.
- Provides increased close-off pressure on 2-1/2 to 4 in. valves.
- Required for rated close-off pressure on 5 and 6 in. valves.



Specifications

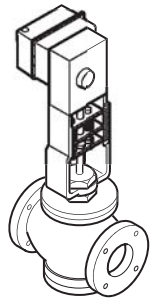
- Actuator mounting: In any upright position with actuator above the center line of the valve body.
- Minimum actuator torque required: 220 lb-in.
- Actuator travel required: 180°.

AV-357, AV-358

Electric/Electronic Valve Linkage Kits

Application

For assembling MP-9000 Series gear train actuators to 4 to 6 in. VB-9213 and VB-9313 valve bodies.



Specifications

- Actuator mounting: In any upright position with actuator above the center line of the valve body.

AV-400

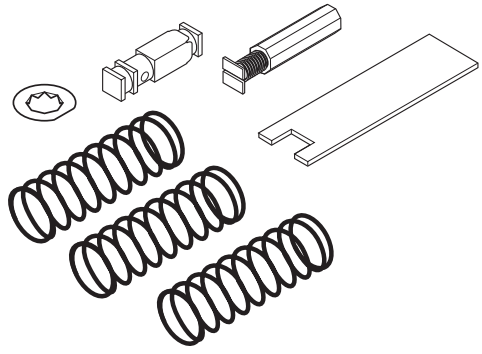
Pneumatic Actuator Valve Linkage Kit

Application

The AV-400 valve linkage kit is used to field-install MK-2690 pneumatic actuators to a variety of 1/2 through 2 in. valve bodies.

Features:

- Springs are provided for all control signal applications, including 3 to 7, 5 to 10, and 8 to 13 psig.
- Kit fits both current and obsolete TAC (Barber-Colman) valve bodies.
- Contains parts for either VB-9XXX or VB-7XXX valve bodies.



Specifications

- Actuator mounting: In any upright position with actuator above the center line of the valve body.

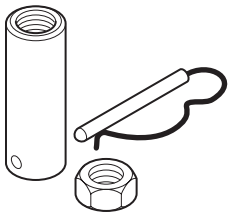
Spring Range psig (kPa)	Spring Color
3 to 7 (21 to 46)	Yellow
5 to 10 (34 to 69)	Black
8 to 13 (55 to 90)	Blue

AV-401

Pneumatic Actuator Valve Linkage Kit

Application

For assembling MK-46XX Series pneumatic actuators to specific 1/2 to 2 in. VB-7XXX valve bodies.



Specifications

- Actuator mounting: In any upright position with actuator above the center line of the valve body.

Actuator Effective Area 11 sq. in. (21 cm^2)	Spring Range psig (kPa)
MK-4601	3 to 6 (21 to 41)
MK-4611	5 to 10 (34 to 69)
MK-4621	10 to 13 (69 to 90)

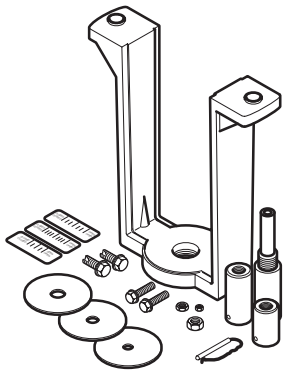
AV-430

Electric/Electronic and Pneumatic Valve Linkage Kit

Application

For assembling MK-6800 Series 50 sq. in. pneumatic actuators to 2-1/2 to 6 in. VB-9XXX valve bodies.

For assembling MK-6600 Series 50 sq. in. pneumatic actuators to 1-1/2 and 2 in. VB-7XXX valve bodies.



Specifications

- Actuator mounting: In any upright position with actuator above the center line of the valve body.

Valve Body Description	Required Parts from AV-430-0-0-1			
	Lock Nut	Stem Extension	Indicator Plate	Scale Length
1-1/2 and 2 in. (VB-7XXX)	1/4 in.	For 1/4 in. Stem	With 1/4 in. Dia. Hole	1 in.
2-1/2 to 4 in. VB-252, 304, 804)	3/8 in.	For 3/8 in. Stem	With 3/8 in. Dia. Hole	1 in.
1-1/2 to 3 in. (VB-817) 2-1/2 & 3 in. (VB-9323)	3/8 in.	For 3/8 in. Stem[a]	With 3/8 Dia. Hole	1 in.
4 in. (VB-817, 9323)	3/8 in.	For 3/8 in. Stem	With 1/2 in. Dia. Hole	1 in.
5 and 6 in. (VB-817, 9323)	3/8 in.	For 3/8 in. Stem	With 3/8 in. Dia. Hole	1-1/2 in.

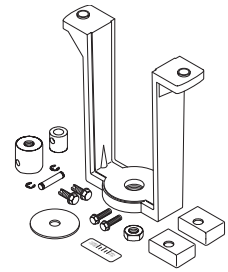
[a] Required stem extension may be shipped with valve body.

AV-496

Pneumatic Valve Linkage Kit

Application

For assembling pneumatic actuators to 2-1/2 to 6 in. valve bodies.



Specifications

- Actuator mounting: In any upright position with actuator above the center line of the valve body.

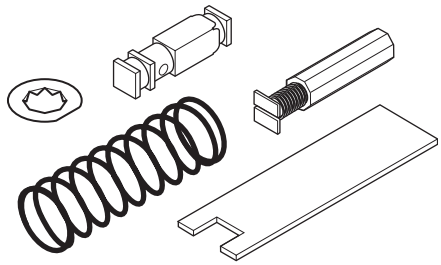
Linkage Number	Valve Body Sizes Except VB-9323	Actuator
AV-496	2-1/2 to 6 in.	MK-88XX MK-89XX

AV-600

Electric/Electronic Valve Linkage Kit

Application

For assembling MA-521X, MF-5X13, MP-521X, MP-541X, MP-551X, MPR-561X, MPR-571X, and MPR-581X Series hydraulic actuators to (1/2 to 2 in.) VB-7XXX and obsolete VB-9XXX valve bodies. Device consists of spring retainer, spring and combination stem extension and lock nut. TOOL-19 spring compression tool is recommended for assembly.



Specifications

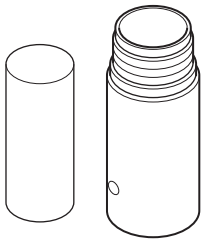
- Actuator mounting: In any upright position above the center line of the valve body. For steam applications only, mount the actuator above the valve body at 45° from vertical.
- Contains parts for either VB-9XXX or VB-7XXX valve bodies.

AV-601

Electric/Electronic Valve Linkage Extension Kit

Application

The AV-601 valve extension kit is used to increase the allowable ambient temperature range of MA, MF, MP-5X1X-XXX, MPR-5X1X and MP-541X Series actuators. The MF-5X1X, MP-541X, and MPR-5X1X Series of actuators require the AV-601 extension. This kit provides thermal insulation between the valve and the actuator. It does not insulate the actuator from radiant or convective heat transfer.



Specifications

- Kit consists of an extension coupling and a spacer.
- Dimensions: Add 2-1/32 in. (52 mm) to the “E” dimension for the valve assembly using an AV-601 linkage extension. Refer to complete dimensions:
  - Two-Way Valves, Union End and Flared.
  - Two-Way Valves, Screwed and Flanged.
  - Three-Way Mixing and Sequencing Valves, Flared.
  - Three-Way Mixing and Diverting Valves, Screwed.

Restrictions on Maximum Ambient Temperature for Valve Actuators

Maximum Temperature of Media in Valve Body °F (°C) (Check Rating of Valve)	Maximum Ambient Temperature of MF-5X13, MP-541X, or MPR-5X1X)		Maximum Ambient Temperature of MA-521X, MP-551X or MP-521X	
	AV-600[a] or AV-7600-1[b] Only for Chilled Water Applications Only °F (°C)	AV-600 or AV-7600-1 and AV-601 °F (°C)	AV-600 or AV-7600-1 Only °F (°C)	AV-600 or AV-7600-1 and AV-601 °F (°C)
366 (180)	Do Not Use	88 (31)	90 (32)	90 (32)
340 (171)	Do Not Use	93 (34)	100 (38)	100 (38)
281 (138)	Do Not Use	103 (39)	115 (46)	140 (60) [c]
181 (83)	Do Not Use	120 (48)	140 (60) [c]	140 (60) [c]
80 (26))	140 (60)[c]	140 (60) [c]	140 (60) [c]	140 (60) [c]

[a] For detailed valve linkage installation instructs, refer to AV-600 Hydraulic Actuator Valve Linkage Kit General Instructions, F-26279.

[b] For detailed valve linkage installation instructs, refer to AV-7600-1 Hydraulic Actuator Valve Linkage Kit General Instructions, F-26235.

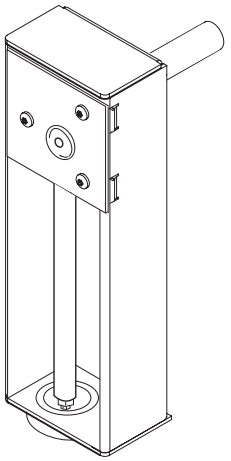
[c] Maximum allowable ambient temperature of the actuator.

AV-602

Globe Valve Linkage Kit

Application

The linkages are designed to link the TAC actuators to VB-7XXX globe valves.



Specifications

- Motor mounting: In any upright position with motor above center line of the valve body.

Actuator	Globe Valve	SR or NSR
MX40-717X	1-1/2 in. thru 2 in.	SR
MX40-6153	1-1/4 in. thru 2 in.	NSR
MX40-707X	1 in. thru 2 in.	SR
MX40-715X	1-1/4 in. thru 2 in.	

AV-603

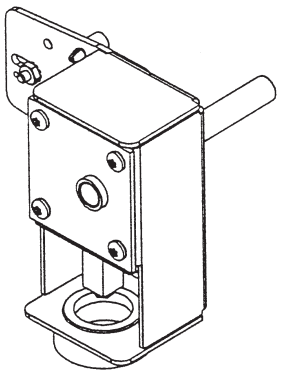
Globe Valve Linkage Kit

Application

The AV-603 linkage is designed to link the TAC MF40-6043 and MS40-6043 actuators to 1/2” through 2”, 2-way or 3-way globe valves.

Specifications

- Motor mounting: In any upright position with motor above center line of the valve body.



AV-605

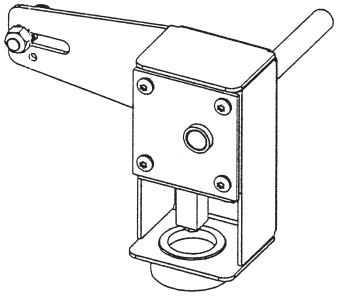
Globe Valve Linkage Kit

Application

The AV-605 linkage is designed to link the TAC MX40-6083 to 1/2” through 2”, 2-way or 3-way globe valves and the MA40-704X, MF40-7043, and MS40-7043 actuators to 1/2” through 2”, 2-way or 3-way globe valves.

Specifications

- Motor mounting: In any upright position with motor above center line of the valve body.



AV-630

Electric/Electronic Valve Linkage Kit

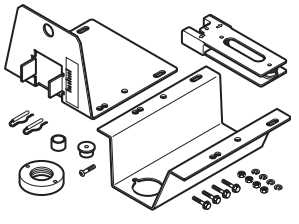
Application

For assembling MM/ MMR-400 or MM/ MMR-500 Series actuators to 1/2 to 2 in. VB-7XXX, 2-1/2 to 4 in. VB-9XXX, and 2-1/2 to 3 in. VB-9323 valve bodies. Refer to table below.

Specifications

- Motor mounting: In any upright position with motor above center line of the valve body.

Valve Size	Linkage
1/2 to 1-1/4 in.	AV-630-010
2-1/2 to 4 in. except VB-9323	AV-630-030
2-1/2 and 3 in. VB-9323	AV-630-040
All the above valves	AV-630

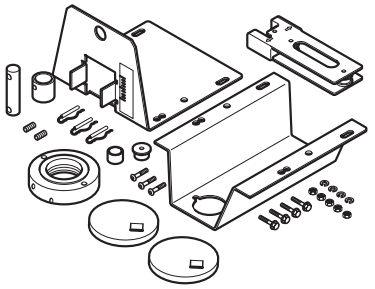


Application

For assembling MM/ MMR-400 or MM/ MMR-500 Series to specific Honeywell valve bodies.

AV-631

Electric/Electronic Valve Linkage Kit



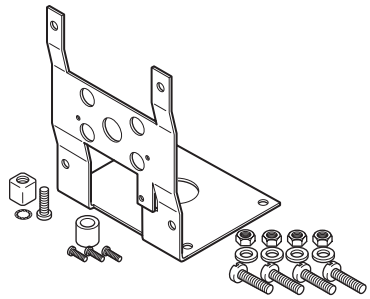
Valve Size	Honeywell Valve Body Part Number
2-Way Valves	
1/2”	V5011A1015
	V5011A1049
	V5011A1072
	V5011A1106
	V5011C1045
	V5011C1060
	V5011C1086
	V5011C1524
	V5011C1532
	V5011C1540
	V5011C1557
	V5011C1565
3/4”	V5011A1163
	V5011C1144
	V5011C1151
	V5011C1599
1”	V5011A1221
	V5011C1201
	V5011C1219
	V5011C1623
1-1/4”	V5011A1288
	V5011C1268
	V5011C1656
1-1/2”	V5011A1346
	V5011C1326
	V5011C1334
	V5011C1680
2”	V5011A1395
	V5011A1403
	V5011C1383
	V5011C1391
2-1/2”	V5011A1460
	V5011A1734
	V5011C1441
	V5011C1458
3”	V5011A1528
	V5011A1767
	V5011C1516
3-Way Valves - Mixing	
1/2”	V5013A1005
	V5013A1013
3/4”	V5013A1021
1”	V5013A1039
1-1/4”	V5013A1047
1-1/2”	V5013A1054
2”	V5013A1062
2-1/2”	V5013B1003
3”	V5013B1011
3-Way Valves - Diverting	
2-1/2”	V90CA-7
3”	V90CA-8

AV-632
Adaptor Kit

Application

For mounting MM-400/500 modular actuator to Honeywell Q618A and Johnson Y20EBD valve linkages.

The kit is also used to mount Honeywell Q607 auxiliary switch and Q181A auxiliary potentiometer kits to MM-400/500 modular actuators.



AV-641
Valve Linkage Kit

Application

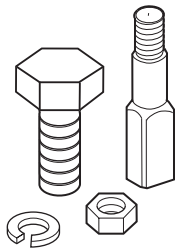
The AV-641 Valve Linkage is designed for mounting MF-22XX3 series Floating Electric and MS-22353 Proportional actuators onto TAC series valve bodies.

Features:

- Provides direct couple interface between actuators and valve bodies.

Specifications

- Actuator mounting: In any upright position with actuator above the center line of the valve body.
- Also see AV-644 Valve Linkage Kit for hex (center section) stem extension.



AV-642
Valve Linkage Kit

Application

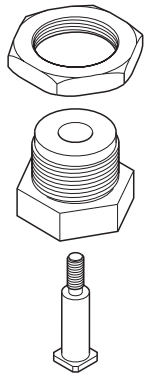
The AV-642 Valve Linkage is designed for mounting MF-22XX3 series Floating Electric and MS-22353 Proportional actuators onto 15 mm and 20 mm GBX and VT Controlli series valve bodies.

Features:

- Provides direct couple interface between actuators and Controlli valve bodies.

Specifications

- Actuator mounting: In any upright position with actuator above the center line of the valve body.



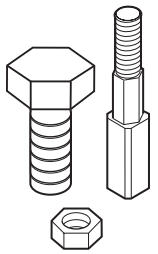
AV-644 and AV-644-10
Valve Linkage Kit

Application

The AV-644 Valve Linkage is designed for mounting MF-22XX3 series Floating Electric and MS-22353 Proportional actuators onto TAC series valve bodies.

Features:

- Provides direct couple interface between actuators and valve bodies.



Specifications

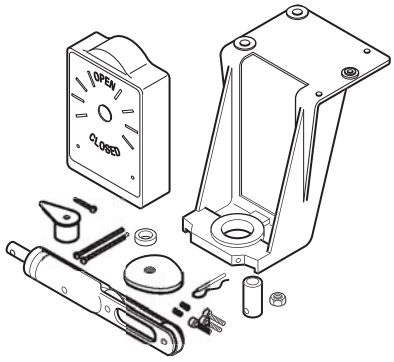
- Actuator mounting: In any upright position with actuator above the center line of the valve body.
- Replaces AV-643 Valve Linkage (plastic).

Note: AV-644-10 includes the drive screw.

AV-650
Electric/Electronic Valve Linkage Kit

Application

Provides the interface between electric gear train actuators and Honeywell V-5011 two-way and V-5013 three-way (1/2 to 3 in.) valve bodies with 1-3/8 in. bonnets.



Specifications

- Actuator mounting: In any upright position with actuator above center line of the valve body.
- Minimum actuator torque required: 50 lb-in. (5.6 N-m). Actuator must have 180° stroke.
- Stem force: 150 lb (667 N).
- Typical actuators:
  - MA-318, 318-500, 416, 416-500, 418, 418-500, 419, 419-500.
  - MC-351, 421, 431, 4311 and MC5-4311.
  - MP-361, 371, 381, 382, 421, 422, 451, 452, 461-600, 465, 471-600, 475, 481-600, 485, 486, 4851.
  - MP5-4651, 4751, 4851.

Close-Off Pressure Ratings

Valve Body		Close-Off Pressure Ratings psi (kPa)[a]	Valve Body		Close-Off Pressure Ratings psi (kPa)[a]
V-5011	1/2 in.	150 (1034)	V-5013	1/2 in.	150 (1034)
	3/4 in.			3/4 in.	
	1 in.			1 in.	
	1-1/4 in.	132 (910)		1-1/4 in.	137 (945)
	1-1/2 in.	85 (586)		1-1/2 in.	92 (634)
	2 in.	52 (359)		2 in.	63 (434)
	2-1/2 in.	30 (207)		2-1/2 in.	30 (207)
	3 in.	19 (131)		3 in.	21 (145)

[a] Based on 1050 lb (668 N) stem force.

AV-671

Electric/Electronic Valve Linkage Kit

Application

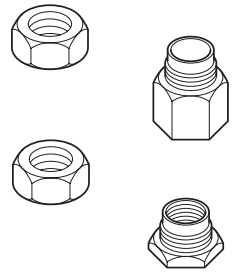
For mounting MF-60000 Series actuators on 1/2- 2 in VB-7000 and VB-9000 valves.

Features:

- Provides direct couple interface between actuator valve.

Specifications

- Actuator mounting: In any upright position with actuator above the center line of the valve body.



AV-672

Electric/Electronic Valve Linkage Kit

Application

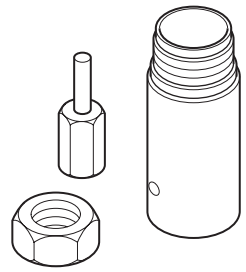
For mounting MF-60000 Series actuators on 2-1/2, 3, or 4 in. VB-921X and VB-931X valves.

Features:

- Provides direct couple interface between MF-60000 actuator and 2-1/2 to 4 in. valve.

Specifications

- Actuator mounting: In any upright position with actuator above the center line of the valve body.



AV-673

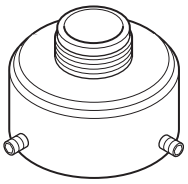
Electric/Electronic Valve Linkage Kit

Application

For mounting selected TAC actuators on Johnson Controls 1/2 through 2 in. VB-3754, VB-3924, and VB-4324 valves.

Features:

- Provides direct couple interface between MF-631X3 actuator and 1/2 through 2 in. Johnson Controls VB-3754, VB-3924, and VB-4324 valves.



Specifications

- Actuator mounting: In any upright position with actuator above the center line of the valve body.

Close-Off Rating

Two-Way Valves

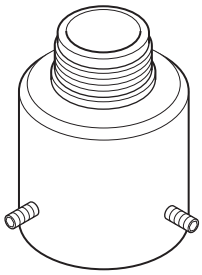
Johnson Controls Valve Body	P Code	Size in.	MF-631X3 Close-Off Pressure Ratings psig
VB-3754 (Push Down to Close)	-1	1/2	150
	-2		
	-3		
	-4	3/4	
VB-3974 (Push Down to Open)	-5	1	
	-6	1-1/2	95
	-7	2	55

Three-Way Valves

Johnson Controls Valve Body	P Code	Size in.	Close-Off Pressure Ratings
VB-4324 (Three-Way Mixing)	-1	1/2	150
	-2		
	-3		
	-4	3/4	
	-5	1	
	-6	1-1/2	95
	-7	2	55

AV-674

Electric/Electronic Valve Linkage Kit



Application

For mounting selected TAC actuators on 1/2 to 3 in. Honeywell 3/4 in. stroke valves.

Features:

- Provides direct couple interface between MF-631X3 actuator and 1/2 to 3 in. Honeywell 3/4 in. stroke valve.

Specifications

- Actuator mounting: In any upright position with actuator above the center line of the valve body.

Close-Off Rating

Two-Way Valves

Honeywell Valve Body	Size in.	Close-Off Pressure Ratings psig
V5011F (Screwed)	1/2	150
	3/4	
	1	
	1-1/4	
	1-1/2	123
	2	75
	2-1/2	44
	3	27
V5011G (Screwed, Comp. Disc)	2	75
	2-1/2	44
	3	27
V5011G (Screwed, Metal-to-Metal Seating)	1/2	150
	3/4	
	1	
	1-1/4	
	1-1/2	123

Three-Way Valves

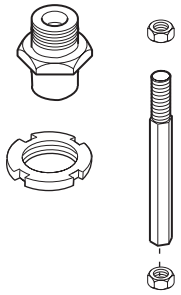
Honeywell Valve Body	Size in.	Close-Off Pressure Ratings psig
V5013F (Screwed, Mixing)	1/2	150
	3/4	
	1	
	1-1/4	
	1-1/2	137
	2	96

AV-680

Electric/Electronic Valve Linkage Kit

Application

The AV-680 linkage is used to mount the MS-7913 and MS-7923 model actuators to 1-1/2 to 2 in. VB-7XXX globe valve bodies.



Specifications

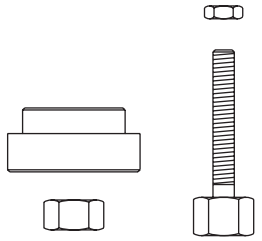
- Parts needed to mount MX-7913 and MX-7923 actuators to VB-7XXX valves.
- If fluid temperatures exceed 300°F (150°C), mount actuator above horizontal, but at least 45° from vertical.

AV-681

Electric/Electronic Valve Linkage Kit

Application

The AV-681 linkage is used to mount the MS-7913 and MS-7923 model actuators to 2-1/2 to 4 in. VB-9XXX globe valves.



Specifications

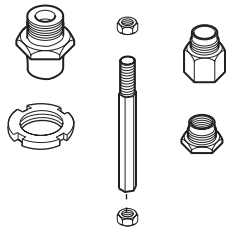
- Parts to mount MX-7913 and MX-7923 actuators to obsolete VB-9XXX valves.
- If fluid temperatures exceed 300°F (150°C), mount actuator above horizontal, but at least 45° from vertical.

AV-682

Electric/Electronic Valve Linkage Kit

Application

The AV-682 linkage is used to mount the MS-7913 and MS-7923 model actuators to style A and B (obsolete)1-1/2 and 2 in. VB-9XXX valves.



Specifications

- Parts needed to mount MX-7913 and MX-7923 actuators to obsolete VB-9XXX valves.
- If fluid temperatures exceed 300°F (150°C), mount actuator above horizontal, but at least 45° from vertical.

AV-7400

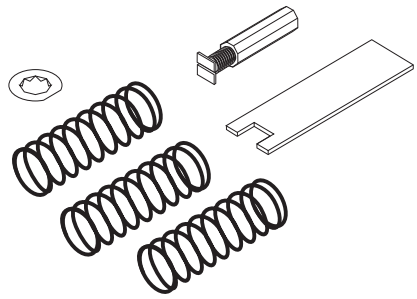
Pneumatic Actuator Valve Linkage Kit

Application

The AV-7400 valve linkage kit is used to field-install MK-2690 pneumatic actuators to a variety of VB-7XXX series 1/2 through 2 in. valve bodies.

Features:

- Springs are provided for all control signal applications, including 3 to 7, 5 to 10, and 8 to 13 psig.
- Kit fits all VB-7XXX series valve bodies.
- Blue spring used with AV-7600-1 supports hydraulic 4-20 mA and 0-10 Vdc applications.



Specifications

- Actuator mounting: In any upright position with actuator above the center line of the valve body.

Spring Range psig (kPa)	Spring Color
3 to 7 (21 to 48)	Yellow
5 to 10 (34 to 68)	Black
8 to 13 (55 to 89)	Blue

AV-7600-1

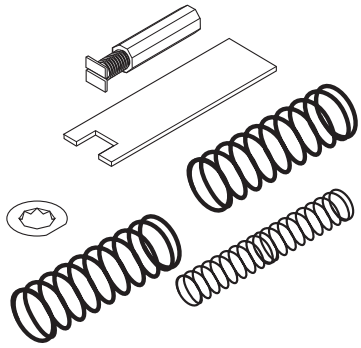
Hydraulic Actuator Valve Linkage Kit

Application

The AV-7600-1 valve linkage kit is used to field assemble MA-521X, MF-5X13, MP-521X, MP-541X, MP-551X, MPR-561X, MPR-571X, and MPR-581X round hydraulic actuators to 1/2 through 2 in. VB-7XXX series valve bodies.

Features:

- Provides direct couple interface between MA, MF, MP, and MPR-5XXX actuators and valve bodies.
- Kit fits all VB-7XXX series valve bodies.
- Includes spring choices for higher 2-way valve close off.



Specifications

- Actuator mounting: In any upright position above the center line of the valve body. For steam applications only, mount the actuator above the valve body at 45° from vertical.

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On October 1st, 2009, TAC became the Buildings Business of its parent company Schneider Electric. This document reflects the visual identity of Schneider Electric, however there remains references to TAC as a corporate brand in the body copy. As each document is updated, the body copy will be changed to reflect appropriate corporate brand changes.

F-27414-3 2008 gg