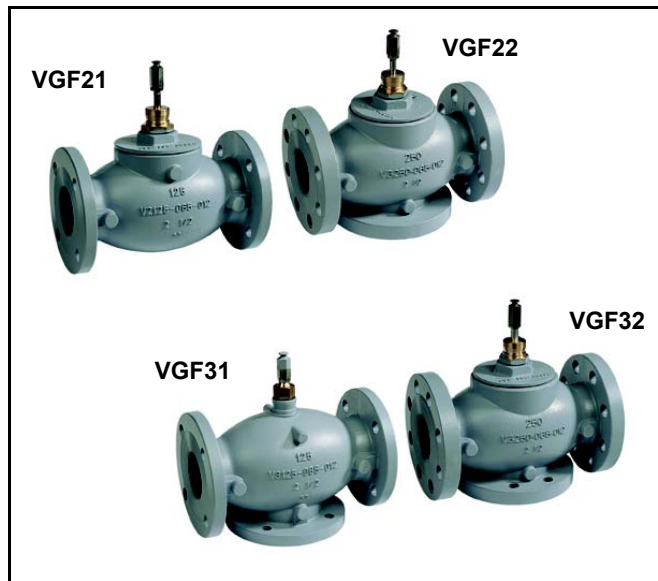


VG F Flanged Valves

PRODUCT DATA



FEATURES

- ANSI Class 125 and Class 250 cast iron bodies with flanged end connections.
- Face-to-face flange dimensions per ANSI/ISA S75.03 standard.
- Sizes from 2-1/2 to 6 inches.
- Metal-to-metal seating for long life span.
- Stainless steel trim standard.
- Differential pressure of 175 psi, ANSI Class IV on pressure-balanced models.
- Steam inlet pressure up to 100 psig.
- Self-adjusting packing.
- Accurate positioning with equal percentage and linear flow characteristics to ensure state-of-the-art temperature control.
- Universal bonnet for direct-coupled electric and pneumatic actuators for easy mounting, or linkage-coupled Modutrol® Motors and MN/MS Series direct-coupled actuators.
- Constant total flow throughout full plug travel (3-way diverting models).
- Not suitable for combustible gasses.

APPLICATION

VG F Flanged Globe Valves are used for 2-position or modulating control of steam, hot water, or chilled water-glycol solutions up to 50% concentration in heating, ventilation and air conditioning (HVAC) systems. They can be operated by ML6984/7984, ML6420/6425, ML6421/7421 Electric Linear Actuators, MP953 Pneumatic Actuators, Modutrol® Motors with Q5001 valve linkage, or MN/MS Series Direct Coupled Actuators with Q5020 valve linkage. Three-way bodies are available in mixing or diverting style with equal percentage and linear flow characteristics. Pressure-balanced models feature very high, low leakage close-off ratings.

Related Literature

- 62-0213 VG F Installation Instructions
- 63-1301 VG F Specification Data

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SPECIFICATIONS

Models: See Tables 3 and 4.

Dimensions: See Fig. 4 and 5.

Action:

Mixing valves: Stem up to close port A-AB.
All others: Stem down to close port A-AB.

Controlled Media:

Water up to 50% glycol solution.
Saturated steam (2-way models) up to 100 psig.

Valve Body Temperature-Pressure Ratings:

Water: ANSI Class 125 and 250. See Table 2.
Steam: 100 psig (6.9 bar) maximum.

Flow Capacity: See Table 6.

Stroke and Mounting:

2-1/2 and 3 inch: 3/4 in. (20mm), 1-3/8 in. bonnet.
4 to 6 inch: 1-1/2 in. (38mm), 1-7/8 in. bonnet.

Maximum Temperature Differential

(alternating hot/cold water): 108°F (60°C).

Flow Characteristic:

VGF__E_: Equal percentage, port A-AB.
VGF__L_: Linear, port A-AB.
VGF3__(all 3-way bodies): Linear, port B-AB.

Rangeability: 50:1.

Close-Off Pressure (maximum):

VGF21_P pressure-balanced: 175 psi (12 bar).
All others: Proportional to actuator force. See Table 6.

Leakage Rate (maximum):

VGF21_P pressure-balanced: 0.01% of Cv (ANSI Class IV).
VGF2__S: 0.05% of Cv (ANSI Class III).
Three-way: See Table 6.

Valve Body:

End connections:
Face-to-face flange dimensions per ANSI/ISA 75.03.
Bolt holes conform to ANSI B16.1.
Material: Cast iron, ASTM A126 Class B (GG25).

Trim:

Seat:
Mixing valve: body integrated.
All: Stainless steel.
Plug: Stainless steel, skirt guided.
Stem: Stainless steel.
Packing: Spring loaded PTFE cone rings.

Accessories:

205699A Stem and Bonnet Adapter: fits all 2-1/2 and 3 in. valves. Provides compatibility with all Honeywell electric and pneumatic actuators.
208638 Valve Body Packing Kit: O-Ring Packing for water. Kit fits all VGF Valves.
43196000-100 High Temperature Kit.
43196000-102 High Temperature Kit.
R43176754-002 Repair Kit for 2-1/2 in. and 3 in. ANSI 125 VGF valves.
R43176755-004 Repair Kit for 2-1/2 in. and 3 in. ANSI 250 and pressure-balanced VGF valves.
R43176755-005 Repair Kit for all 4 in. to 6 in. VGF valves.

NOTE: Repair kits include copper ring, spring, bearing, stem/plug, packing, and gasket.

Table 1. Service Flange Part Numbers.

Valve Size in in. (mm)	ANSI 125	ANSI 250
2 1/2 (65)	208628	208633
3 (80)	208629	208634
4 (100)	208630	208635
5 (125)	208631	208636
6 (150)	208632	208637

Table 2. Medium Temperature and Maximum Pressure.

Temperature °F (°C)	System Pressure	
	ANSI Class 125 (VGF21, VGF31)	ANSI Class 250 (VGF22, VGF32)
35 to 130 (2-66)	175 psig (1206 kPa)	400 psig (2758 kPa)
Up to 200 (< 93)	165 psig (1138 kPa)	370 psig (2251 kPa)
Up to 250 (< 121)	150 psig (1034 kPa)	340 psig (2344 kPa)
Up to 300 (< 149)	140 psig (965 kPa)	310 psig (2137 kPa)
Up to 356 (< 180)	125 psig (862 kPa)	280 psig (1931 kPa)

ORDERING INFORMATION

When purchasing replacement and modernization products from your TRADELINE® wholesaler or distributor, refer to the TRADELINE® Catalog or price sheets for complete ordering number.

If you have additional questions, need further information, or would like to comment on our products or services, please write or phone:

1. Your local Honeywell Automation and Control Products Sales Office (check white pages of your phone directory).
2. Honeywell Customer Care
1885 Douglas Drive North
Minneapolis, Minnesota 55422-4386

In Canada—Honeywell Limited/Honeywell Limitée, 35 Dynamic Drive, Scarborough, Ontario M1V 4Z9.

International Sales and Service Offices in all principal cities of the world. Manufacturing in Australia, Canada, Finland, France, Germany, Japan, Mexico, Netherlands, Spain, Taiwan, United Kingdom, U.S.A.

Table 3. VGf2 2-way.

VGf2	Valve, Globe, Flanged, 2-way	
1	ANSI 125	
2	ANSI 250	
EP	Equal percent flow, pressure-balanced ^a	
ES	Equal percent flow, standard	
LP	Linear flow, pressure-balanced ^a	
LS	Linear flow, standard ^a	
25	2-1/2 in. ports	
30	3 in. ports	
40	4 in. ports	
50	5 in. ports	
60	6 in. ports	

^a ANSI 125 only

e.g.: 3 in. flanged, equal percent, pressure-balanced, ANSI 125

VGf2	1	EP	30
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Table 4. VGf3 3-way.

VGf3	Valve, Globe, Flanged, 3-way	
1	ANSI 125	
2	ANSI 250	
EM	Equal percent flow, mixing	
LD	Linear flow, diverting	
25	2-1/2 in. ports	
30	3 in. ports	
40	4 in. ports	
50	5 in. ports	
60	6 in. ports	

e.g.: 4 in. flanged mixing valve, ANSI 250

VGf3	2	EM	40
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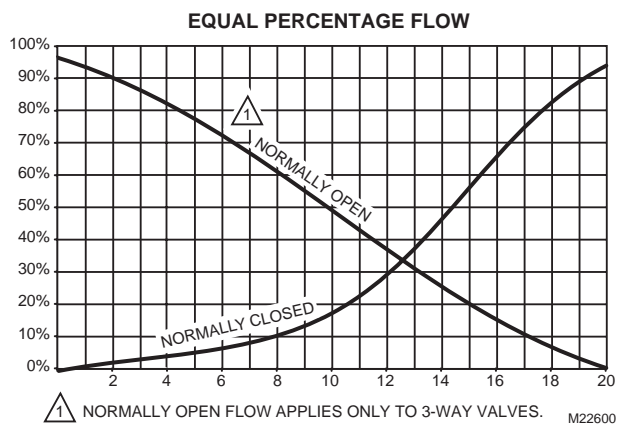


Fig. 1. Equal percentage flow diagram.

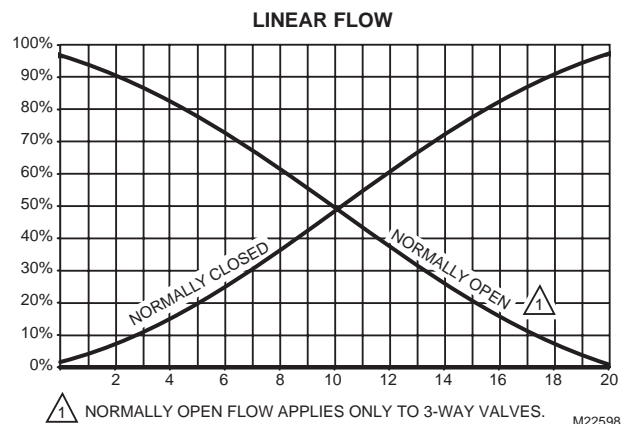


Fig. 2. Linear flow diagram.

Table 5. Honeywell Electric Actuator-operated VGf Close-off Ratings, psi (kPa).

Valve Size in. (DN)	Direct Coupled Linear Valve Actuators			Modutrol IV Motor with Q5001 Linkage			MN Series Actuator with Q5020 Linkage		MS Series 20 Nm Actuator with Q5020 Linkage	
	ML642X/ML742X		ML6984/ML7984	320 lbf (1424 N)	160 lbf (712 N)	80 lbf (356 N)	300 lb-in. (34 Nm)	175 lb-in. (20 Nm)	Full Stroke	Spring Return
	404 lbf (1800 N)	135 lbf (600 N)	160 lbf (710 N)							
2-way Non-Pressure-Balanced and Diverting Valve Close-off Ratings, psi (kPa)										
2 1/2 (65)	69 (476)	23 (158)	27 (188)	55 (379)	27 (186)	14 (96)	77 (531)	52 (358)	71 (485)	41 (282)
3 (80)	34 (234)	11 (76)	13 (89)	27 (185)	13 (89)	7 (48)	38 (262)	26 (179)	35 (241)	20 (138)
4 (100)	34 (234)	—	—	27 (185)	13 (89)	7 (48)	—	—	—	—
5 (125)	13 (89)	—	—	10 (69)	5 (37)	3 (18)	—	—	—	—
6 (150)	13 (89)	—	—	10 (69)	5 (37)	3 (18)	—	—	—	—
Mixing Valve Close-off Ratings, psi (kPa)										
2 1/2 (65)	87 (600)	29 (201)	34 (234)	69 (476)	34 (234)	17 (117)	97 (669)	66 (455)	89 (614)	52 (358)
3 (80)	58 (400)	19 (131)	23 (158)	46 (317)	23 (158)	11 (76)	65 (448)	44 (303)	59 (407)	35 (241)
4 (100)	34 (234)	—	—	27 (185)	13 (89)	7 (48)	—	—	—	—
5 (125)	13 (89)	—	—	10 (69)	5 (37)	3 (18)	—	—	—	—
6 (150)	13 (89)	—	—	10 (69)	5 (37)	3 (18)	—	—	—	—

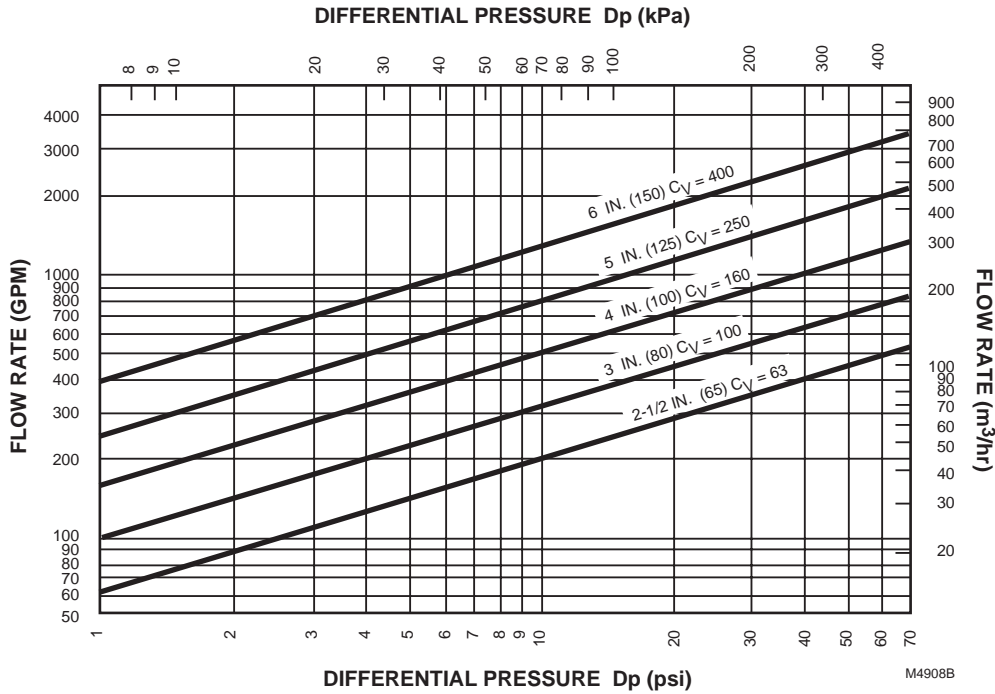


Fig. 3. Water capacity graph.

IMPORTANT

Valve sizing is important for correct system operation. Undersized valves do not have sufficient capacity at maximum load. Oversized valves do not have sufficient authority over the load in modulating applications.

Oversized valves can initiate cycling and the seat and throttling plug can be damaged because of the restricted opening. Some variables that must be determined are:

- Medium (steam, water, glycol solution 50 percent maximum) to be controlled.
- Maximum temperature and pressure of the medium at the valve.
- Pressure differential that exists across the valve under maximum load conditions.
- Maximum capacity the valve must deliver.
- Maximum line pressure differential against which the valve actuator must close.

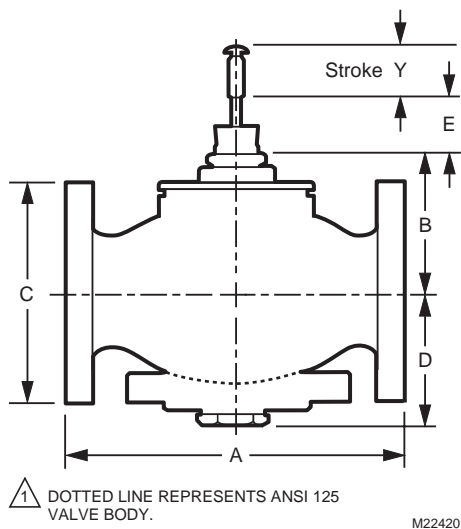


Fig. 4. Dimensions for two-way models in inches (mm) (See Table 6).

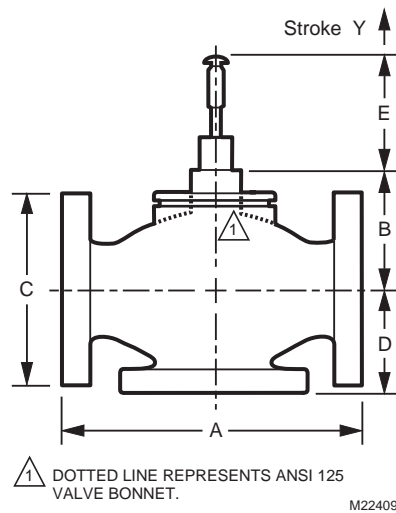


Fig. 5. Dimensions for three-way models in inches (mm) (See Table 6).

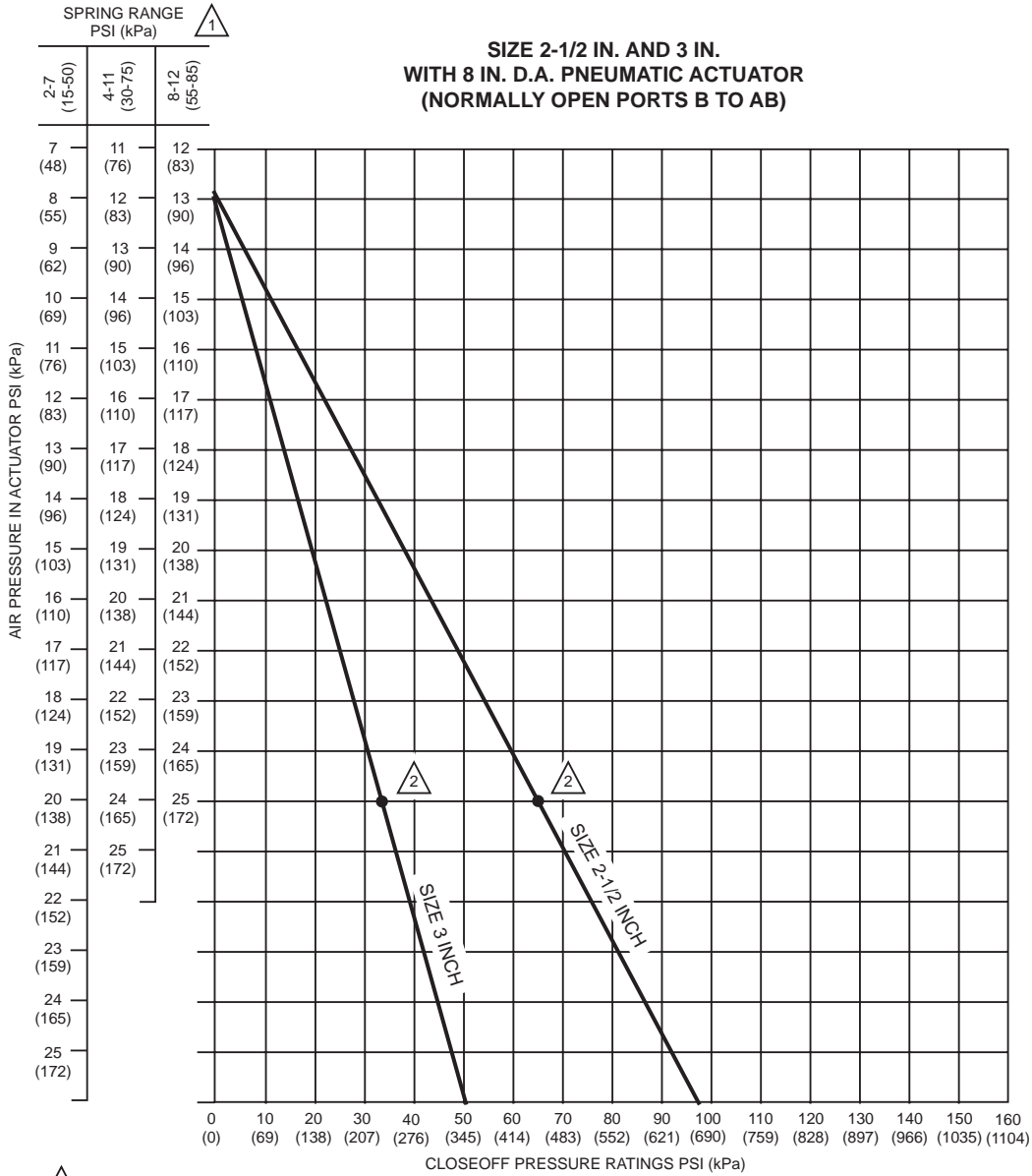
Table 6. Valve Sizes, Flow Capacities, Close-off Pressure Ratings, and Dimensions.

Model Number (see Table 1)	Size		Cv (kvs)	Close-off Pressure, psi (kPa), with 400 lbf (1800N) actuator ^a	Leakage Rate	Dimensions, in. (mm) See Fig. 4 (Two-way Valves) or Fig. 5 (Three-way Valves)					
	in.	DN				A	B	C	D	E	Y ^b
2-way valves, ANSI Class 125 Stem down to close. Equal percentage or Linear flow characteristic.											
VGf21_S25	2-1/2	65	63 (54)	69 (475)	<0.05% of Cv (ANSI Class III)	10-7/8 (276)	4-3/8 (112)	7 (178)	—	3-1/2 (89)	13/16 (20)
VGf21_S30	3	80	100 (86)	34 (234)		11-3/4 (298)	6-3/8 (161)	7-1/2 (191)	—		
VGf21_S40	4	100	160 (137)	34 (234)		13-7/8 (352)	5-7/8 (150)	9 (229)	—	5-1/4 (133)	1-1/2 (38)
VGf21_S50	5	125	250 (214)	13 (90)		15-3/4 (400)	6-3/16 (157)	10 (254)	—		
VGf21_S60	6	150	400 (343)	13 (90)		17-3/4 (451)	6-3/16 (157)	11 (279)	—		
2-way valves, ANSI Class 250. Stem down to close. Equal percentage flow characteristic.											
VGf22ES25	2-1/2	65	63 (54)	69 (475)	<0.05% of Cv (ANSI Class III)	11-1/2 (292)	4-3/8 (112)	7-1/2 (191)	—	3-1/2 (89)	13/16 (20)
VGf22ES30	3	80	100 (86)	34 (234)		12-1/2 (318)	6-3/8 (161)	8-1/4 (210)	—		
VGf22ES40	4	100	160 (137)	34 (234)		14-1/2 (368)	5-7/8 (150)	10 (254)	—	5-1/4 (133)	1-1/2 (38)
VGf22ES50	5	125	250 (214)	13 (90)		16-5/8 (422)	6-3/16 (157)	11 (279)	—		
VGf22ES60	6	150	400 (343)	13 (90)		18-5/8 (473)	6-3/16 (157)	12-1/2 (318)	—		
2-way valves, Pressure-balanced, ANSI Class 125. Stem down to close. Equal percentage or Linear flow characteristic.											
VGf21_P25	2-1/2	65	75 (64)	175 (1206) ^c	<0.01% of Cv (ANSI Class IV)	10-7/8 (276)	4-3/16 (107)	7 (178)	—	3-1/2 (89)	13/16 (20)
VGf21_P30	3	80	116 (99)			11-3/4 (298)	5-7/8 (150)	7-1/2 (191)	—		
VGf21_P40	4	100	178 (153)			13-7/8 (352)	5-7/8 (150)	9 (229)	—	5-1/4 (133)	1-1/2 (38)
VGf21_P50	5	125	318 (273)			15-3/4 (400)	6-1/8 (156)	10 (254)	—		
VGf21_P60	6	150	390 (334)			17-3/4 (451)	6-1/8 (156)	11 (279)	—		
3-way Mixing valves, ANSI Class 125. Stem up to close A-AB.											
VGf31EM25	2-1/2	65	63 (54)	87 (599)	<0.5% of Cv, A-AB; <1% of Cv, B-AB.	10-7/8 (276)	3 (76)	7 (178)	3-3/4 (95)	4-3/16 (107)	13/16 (20)
VGf31EM30	3	80	100 (86)	58 (400)		11-3/4 (298)	4-3/16 (107)	7-1/2 (191)	4-3/8 (111)		
VGf31EM40	4	100	160 (137)	34 (234)		13-7/8 (352)	5-8/16 (140)	9 (229)	5-1/8 (130)	6-11/16 (170)	1-1/2 (38)
VGf31EM50	5	125	250 (214)	13 (90)		15-3/4 (400)	5-3/8 (137)	10 (254)	5-3/4 (146)		
VGf31EM60	6	150	400 (343)	13 (90)		17-3/4 (451)	5-11/16 (145)	11 (279)	6-5/8 (168)		
3-way Mixing valves, ANSI Class 250. Stem up to close A-AB.											
VGf32EM25	2-1/2	65	63 (54)	87 (599)	<0.5% of Cv, A-AB; <1% of Cv, B-AB.	11-1/2 (292)	4-3/8 (112)	7-1/2 (191)	3-3/4 (95)	4-3/16 (107)	13/16 (20)
VGf32EM30	3	80	100 (86)	58 (400)		12-1/2 (318)	6-3/8 (161)	8-1/4 (210)	4-3/8 (111)		
VGf32EM40	4	100	160 (137)	34 (234)		14-1/2 (368)	5-7/8 (150)	10 (254)	5-1/8 (130)	6-11/16 (170)	1-1/2 (38)
VGf32EM50	5	125	250 (214)	13 (90)		16-5/8 (422)	6-3/16 (157)	11 (279)	5-3/4 (146)		
VGf32EM60	6	150	400 (343)	13 (90)		18-5/8 (473)	6-3/16 (157)	12-1/2 (318)	6-5/8 (168)		
3-way Diverting valves, ANSI Class 125. Stem down to close AB-A.											
VGf31LD25	2-1/2	65	63 (54)	69 (475)	<0.05% of Cv, AB-A; <0.1% of Cv, AB-B.	10-7/8 (276)	3 (76)	7 (178)	3-3/4 (95)	4-3/16 (107)	13/16 (20)
VGf31LD30	3	80	100 (86)	34 (234)		11-3/4 (298)	4-3/16 (107)	7-1/2 (191)	4-3/8 (111)		
VGf31LD40	4	100	160 (137)	34 (234)		13-7/8 (352)	5-8/16 (140)	9 (229)	5-1/8 (130)	6-11/16 (170)	1-1/2 (38)
VGf31LD50	5	125	250 (214)	13 (90)		15-3/4 (400)	5-3/8 (137)	10 (254)	5-3/4 (146)		
VGf31LD60	6	150	360 (309)	13 (90)		17-3/4 (451)	5-11/16 (145)	11 (279)	6-5/8 (168)		
3-way Diverting valves, ANSI Class 250. Stem down to close AB-A.											
VGf32LD25	2-1/2	65	63 (54)	69 (475)	<0.05% of Cv, AB-A; <0.1% of Cv, AB-B.	11-1/2 (292)	4-3/8 (112)	7-1/2 (191)	3-3/4 (95)	4-3/16 (107)	13/16 (20)
VGf32LD30	3	80	100 (86)	34 (234)		12-1/2 (318)	6-3/8 (161)	8-1/4 (210)	4-3/8 (111)		
VGf32LD40	4	100	160 (137)	34 (234)		14-1/2 (368)	5-7/8 (150)	10 (254)	5-1/8 (130)	6-11/16 (170)	1-1/2 (38)
VGf32LD50	5	125	250 (214)	13 (90)		16-5/8 (422)	6-3/16 (157)	11 (279)	5-3/4 (146)		
VGf32LD60	6	150	360 (309)	13 (90)		18-5/8 (473)	6-3/16 (157)	12-1/2 (318)	6-5/8 (168)		

^a See Table 5 for close-off ratings with other Honeywell actuators.

^b Adjustment dimension. Valve in closed position.

^c Pressure-balanced model close-off rating is Cv independent and requires 400 lb (1800N) actuator force to operate the valve.

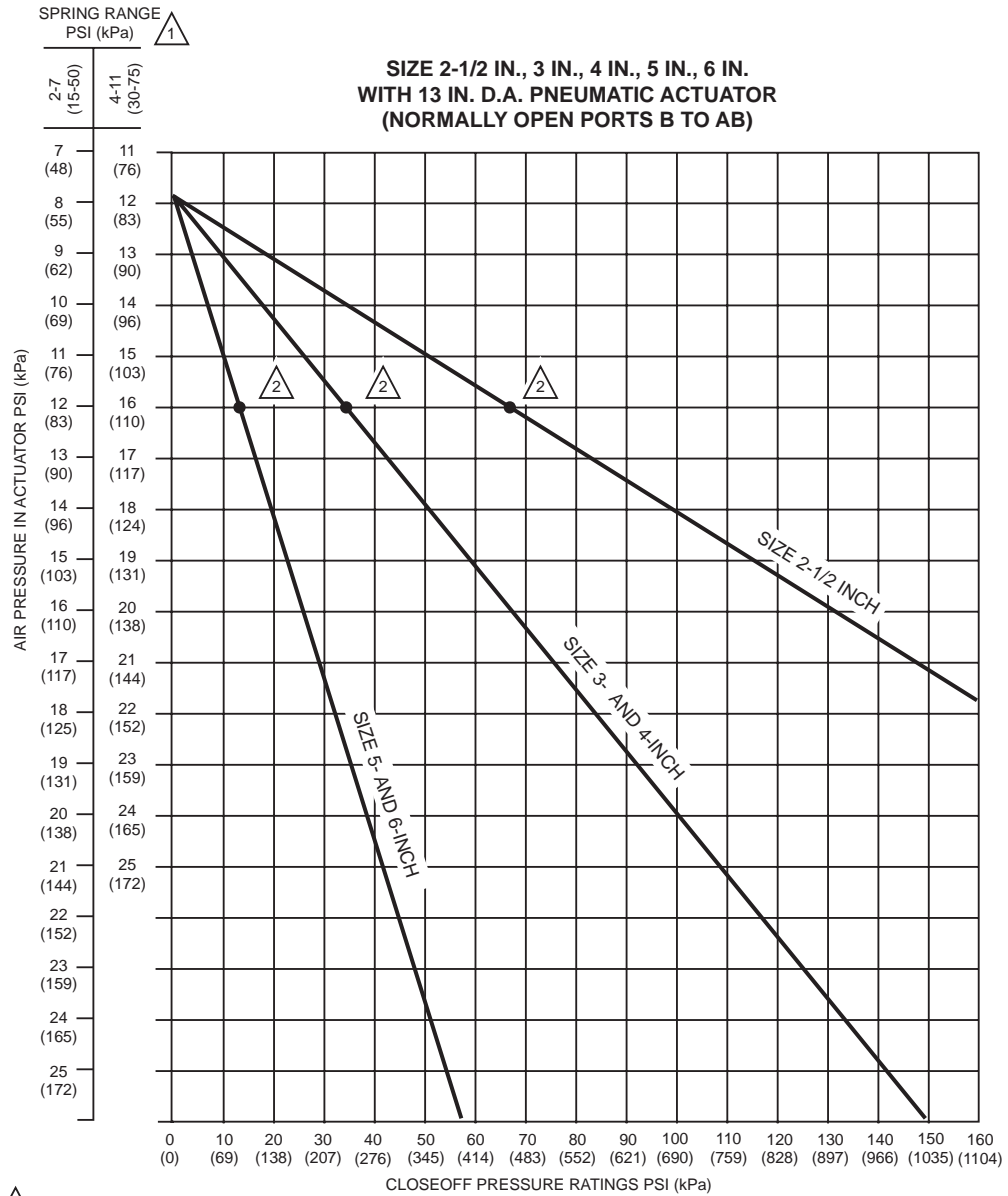


△1 CLOSEOFF PRESSURE AT VARIOUS CONTROL AIR PRESSURES FOR VGf FLANGED VALVES AND MP953 PNEUMATIC ACTUATORS.

△2 AIR PRESSURE REQUIRED TO OPERATE PRESSURE-BALANCED VGf FLANGED VALVES.

M22594

Fig. 6. Close-off pressures with pneumatic actuators.



△ 1 CLOSEOFF PRESSURE AT VARIOUS CONTROL AIR PRESSURES FOR VGf FLANGED VALVES AND MP953 PNEUMATIC ACTUATORS.

△ 2 AIR PRESSURE REQUIRED TO OPERATE PRESSURE-BALANCED VGf VALVES.

M22595

Fig. 7. Close-off pressures with pneumatic actuators.

INSTALLATION

When Installing this Product...

1. Read these instructions carefully. Failure to follow them could damage the product or cause a hazardous condition.
2. Check ratings given in instructions and on the product to ensure the product is suitable for your application.
3. Installer must be a trained, experienced service technician.
4. After installation is complete, check out product operation as provided in these instructions.

WARNING

Severe Burn Hazard.
Contact with hot liquid can lead to severe injury or cause death.

Release system pressure and isolate or drain the valve pipe section so the medium (steam, water or glycol solution) does not leak out of the valve body during installation (see Fig. 9).

CAUTION

Electrical Shock or Equipment Damage Hazard.
Can shock individuals or short equipment circuitry.

Disconnect power supply to the actuator to prevent electrical shock and equipment damage, or remove and cap the air line to the actuator.

IMPORTANT

- Before installing the valve, raise and lower the valve stem to make sure that the valve stem operates freely. Impaired stem operation can indicate that the stem was bent by rough handling. This condition can require replacing the valve.
- Protect the stem from damage due to bending or scratching.

Safety

The valves are to be installed by skilled personnel and in strict accordance with the installation instructions and local regulations. (See Fig. 8 for proper hoisting method.) Honeywell assumes no responsibility for damages or injuries resulting from non-compliance with installation instructions or standard good practice when mounting, operating, or maintaining the valves, even if not explicitly mentioned in the

installation instructions. (See Fig. 10 for basic pipe orientation.) Observe all safety practices when working with steam systems.

Proper Use

These valves are only for use in cold, warm, hot water systems and for steam applications. They are designed for a medium temperature range of from 35 to 355°F, at a maximum pressure of 125 or 250 psig, depending on their ANSI body class. They are to be operated with the appropriate Honeywell actuators only. Water should be properly filtered, treated and conditioned according to local conditions. The installation of a strainer is strongly recommended.

IMPORTANT

The presence of iron oxide (red rust) in the system voids the valve warranty.

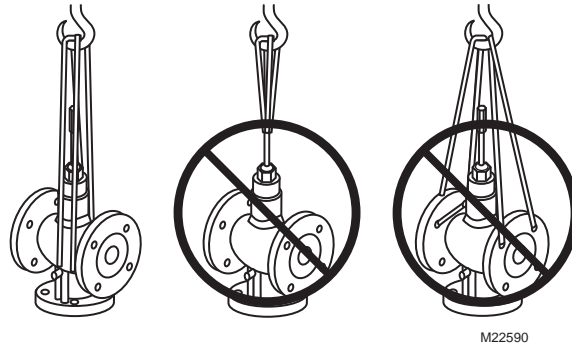


Fig. 8. Proper hoisting of VGF Valves.

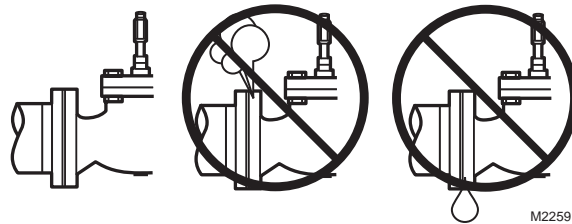


Fig. 9. Piping must prevent leakage.

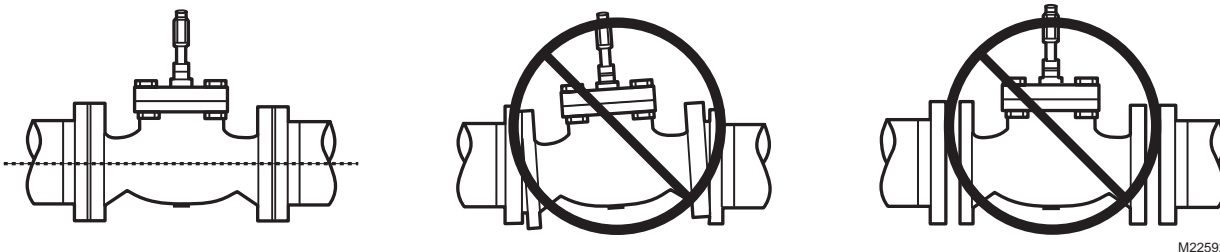


Fig. 10. Basic pipe orientation.

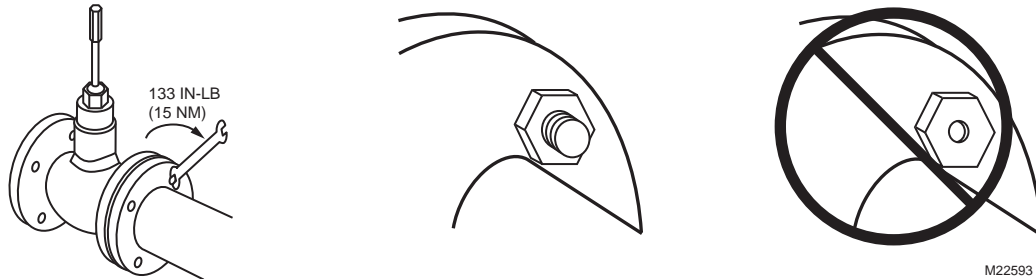


Fig. 11. Basic proper bolt length.

Location

Select a location where the valve and actuator are accessible. Allow sufficient space for servicing the valve and actuator. See Fig. 4 and 5 for valve body dimensions.

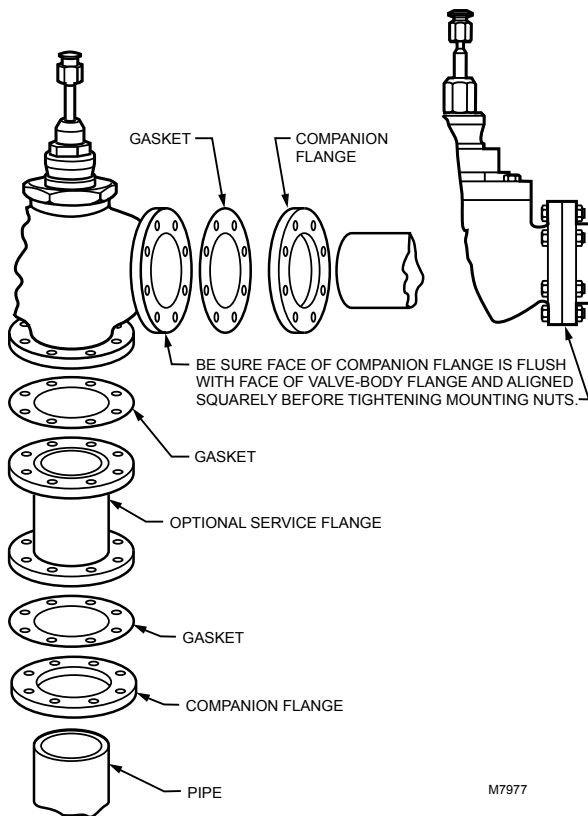


Fig. 12. Flanged valve body installation.

NOTE: See Table 1 for service flange part numbers.

Mounting the Valve

See Fig. 12 for typical installation.

1. Hoist valve by its body only. Do not lift by stem, bonnet, flanges, or flange holes. (See Fig. 8.)
2. Install the valve so the flow follows the direction of the arrow indicated on the valve body.
3. Install the valve so the actuator is above the valve body. The valve can be installed in any position between vertical and horizontal. Do not install the valve with the stem below horizontal or upside down.
4. When controlling steam, use appropriate high temperature kit 43196000 and rotate valve body so that actuator is not positioned directly above the piping.
5. Use companion flanges with the same number of bolt holes and dimensions as the valve to be installed. The optional service flange may be installed in the lower port. See Table 1 for part numbers. Use standard cast-iron flanges for the two end ports.
6. Use a gasket material recommended for the medium to be handled.
7. Use mounting bolts long enough so the nuts can use the full length of the nut threads. (See Fig. 11.) Use bolts 1/8 in. smaller than the diameter of the bolt hole to allow clearance for installing. (See Fig. 12.)

Mounting Actuator

For information on mounting, refer to the Product Data literature for the actuator. Actuator installation clearances are provided. It is important to have the correct actuator available for the installation. See Table 7 for basic clearance information.

Table 7. Installation Clearances (from Valve Bonnet, B).

Actuator	Minimum Vertical Clearance in in. (mm)
ML6420, ML7420	12-11/16 (322)
ML6421A, ML7421A	14-1/4 (360)
ML6421B, ML7421B	16-7/8 (430)
ML6425A,B; ML7425A,B	14-5/16 (364)
MN/MS Series + Q5020	12 (305)
ML6984, ML7984	
Modutrol IV + Q5001	14-1/2 (369)
MP953C (8 inch dia)	11-7/8 (302)
MP953C (13 inch dia)	17-11/16 (449)
MP953E (8 inch dia)	16-1/2 (420)
MP953E (13 inch dia)	25-13/16 (655)

CHECKOUT

For instructions for operating the valve actuator, see the Product Data sheet for the specific actuator. Operate the control system and check the valve operation to determine that the valve stem positions the valve smoothly through full stroke without binding.

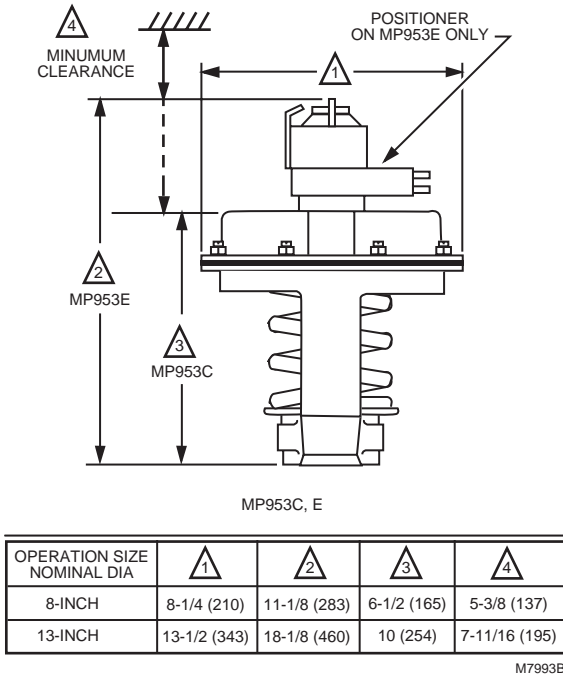


Fig. 13. MP953C-F Pneumatic Actuator dimensions in in. (mm).

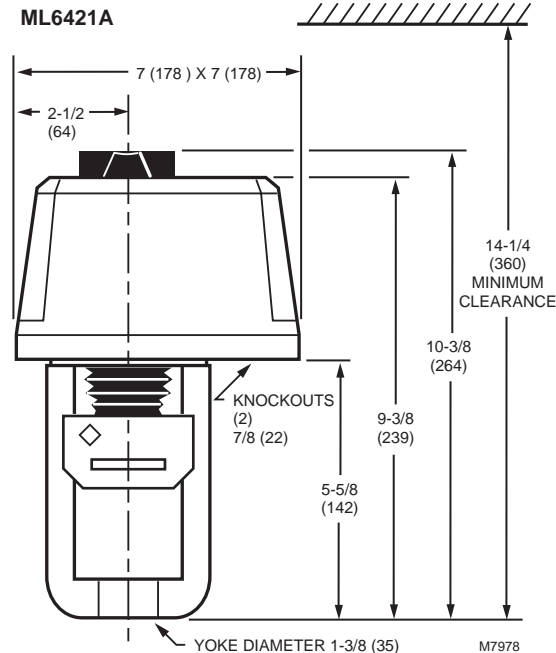


Fig. 14. ML6421A and ML7421A Actuator (use with 2-1/2 and 3 in. valves) dimensions in in. (mm).

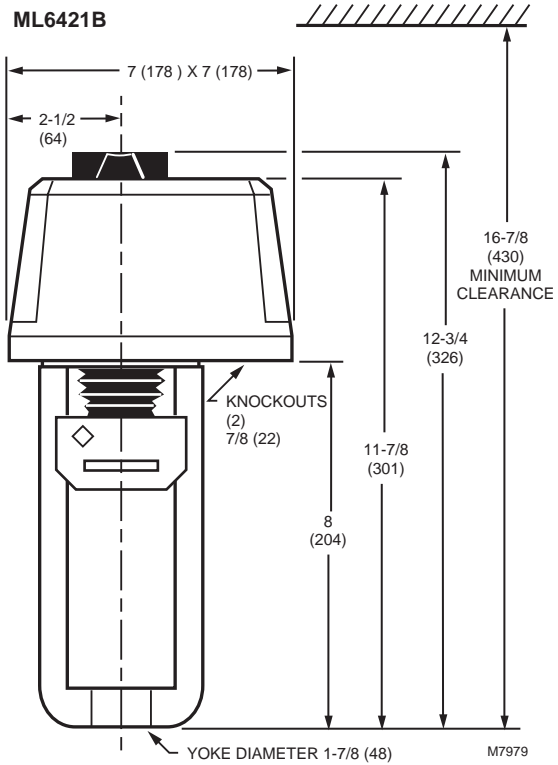


Fig. 15. ML6421B and ML7421B Actuator (use with 4, 5, and 6 in. valves) dimensions in in. (mm).

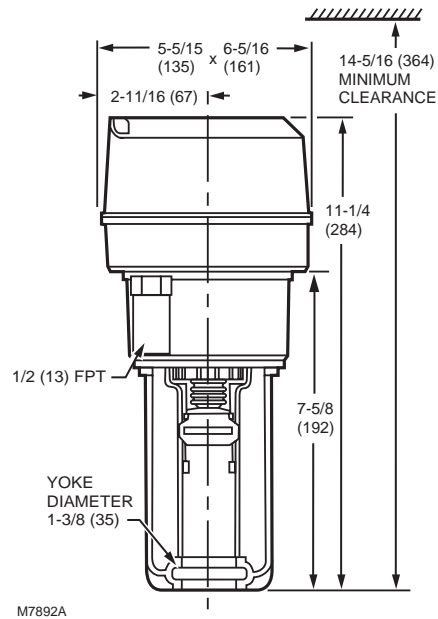


Fig. 16. ML6425A,B; ML7425A,B Actuator (use with 2-1/2 and 3 in. valves) dimensions in in. (mm).

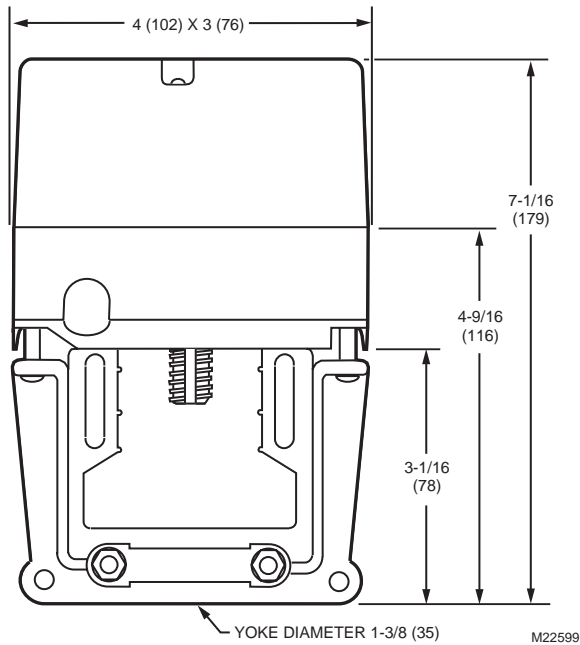


Fig. 17. ML6984, ML7984 Actuator dimensions in in. (mm).

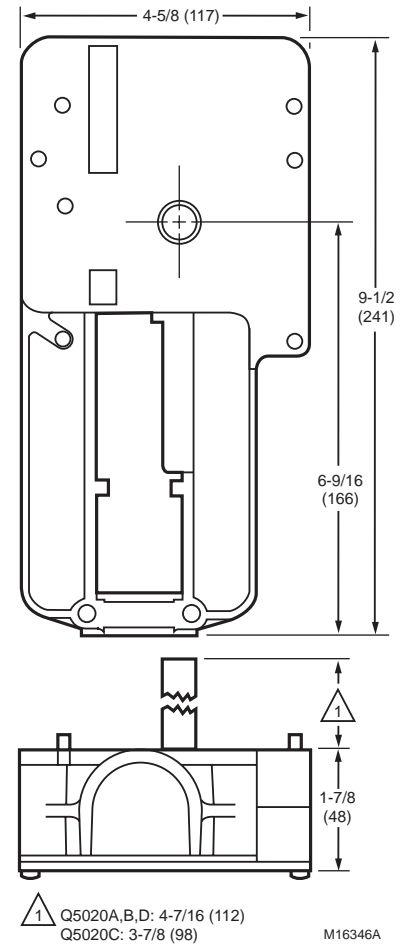
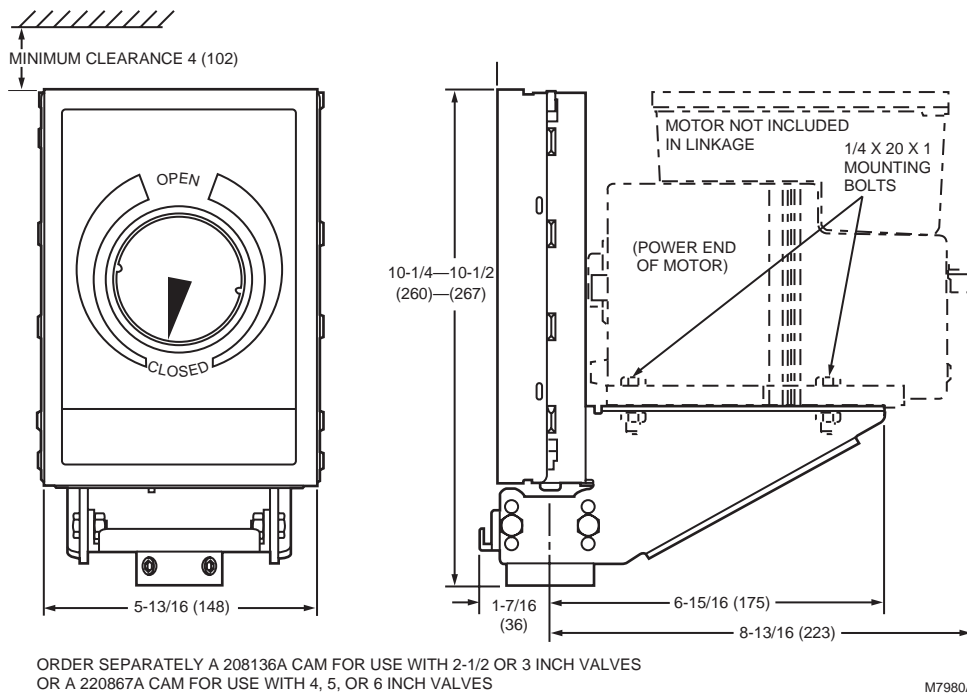


Fig. 18. Q5020 Actuator Linkage dimensions in in. (mm).



ORDER SEPARATELY A 208136A CAM FOR USE WITH 2-1/2 OR 3 INCH VALVES
OR A 220867A CAM FOR USE WITH 4, 5, OR 6 INCH VALVES

Fig. 19. Q5001 Linkage with high torque spring-return Modutrol IV™ motor dimensions in in. (mm).

SERVICE

General

Fig. 20 shows the valve in the fully open or fully flowing position from the B port to the AB port. As the valve stem moves downward, the flow from the B to AB ports decreases and the flow from the A to AB ports increases. As the valve stem moves upward, the flow from the B to AB ports increases and the flow from the A to AB ports decreases.

For electric control, a spring return actuator returns the valve to its normal position (open or closed to the A or the B port, depending on the actuator selected) in the event of a power failure. Non-spring return actuators hold the last commanded position.

For pneumatic control, the actuator returns the valve to its normal position (open or closed to the A or the B port, depending on the actuator selected) in the event of a loss of control air pressure.

For typical flow curves see Fig. 1 and 2.

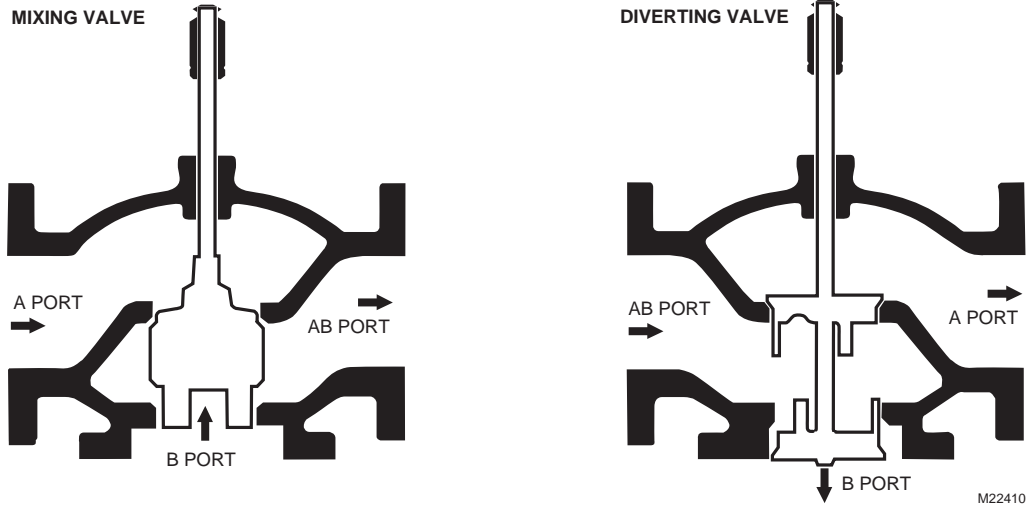


Fig. 20. Three-way valve operation.

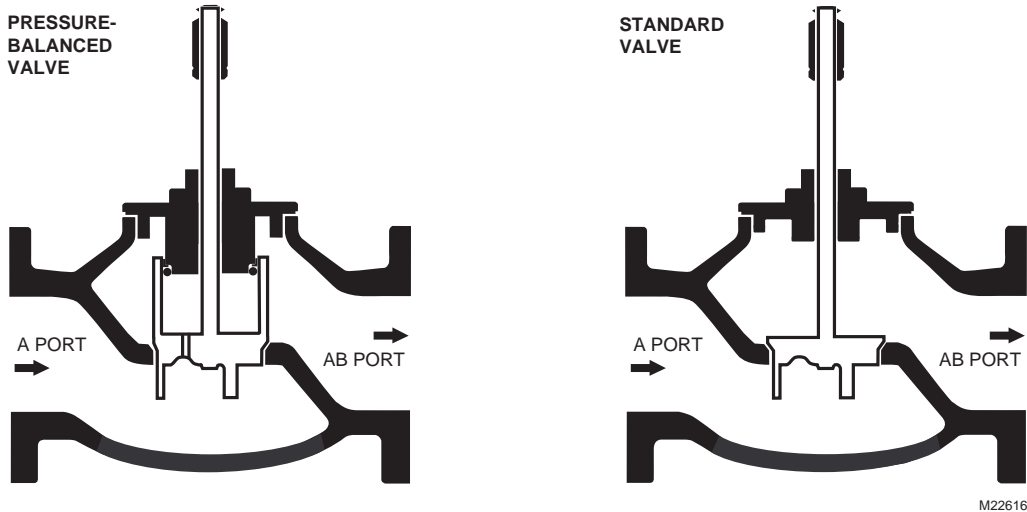


Fig. 21. Two-way valve operation.

Honeywell

Automation and Control Solutions

Honeywell International Inc.
1985 Douglas Drive North
Golden Valley, MN 55422

Honeywell Limited-Honeywell Limitée
35 Dynamic Drive
Scarborough, Ontario
M1V 4Z9

Honeywell International

Control Products
Honeywell Building
17 Changi Business Park Central 1
Singapore 486073

Honeywell Europe S.A.

3 Avenue du Bourget
1140 Brussels
Belgium

Honeywell Latin American Region

480 Sawgrass Corporate Parkway
Suite 200
Sunrise FL 33325