Product Bulletin M9000-53x Series
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M9000-53x Series Cast Iron Flanged Valve Linkage Kit for M9000 Series Electric Actuators



Figure 1: VG2x31 Valves with M9000 Series Electric Valve Actuators

The M9000-53x Series Cast Iron Flanged Valve Linkage Kits are designed specifically for field mounting Johnson Controls® M9116 and M9124 Series Non-Spring Return (NSR) and M9220 Series Spring Return (SR) Electric Actuators to Johnson Controls VG2000 Series Cast Iron Flanged Valves in sizes 2-1/2 in. through 6 in. Kits are available to fit older Johnson Controls valves for easy conversion from pneumatic or older electric actuator installations.

Features and Benefits

❑ **Dedicated Models**	Facilitate quick and easy installation regardless of the valve stroke and electric actuator chosen
❑ **Single Anti-Rotation Bracket**	Allows one linkage to accommodate spring return and non-spring return electric actuators
❑ **Two-Bolt Coupler Clamp**	Provides quick and easy coupling of the linkage to the valve stem
❑ **Easy to Convert from Single to Tandem Actuators**	Accommodates changing shutoff requirements

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Linkage Kit Selection

A dedicated linkage kit for each stroke length and number of actuators simplifies installation and reduces setup time.

See Table 1 for a list of valid iron valve, electric actuator, and linkage kit combinations for assembly in the field.

Table 1: Valid Iron Valve, Electric Actuator, and Linkage Kit Combinations (for Assembly in the Field)

Valve Size, in.	Active Valve Code Number	Discontinued Valve Code Numbers That Are Compatible with Linkage Kit	Nominal Valve Stroke, in.	Valve Stem Dia., in.	Actuator Series*	Number of Actuators Required	Linkage Kit Code Number
2-1/2	VG2231TM VG2431TM VG2831TM	V-5252-4, -5, -6, -7, -8, -32, -33 V-5462-6, -7, -34 V-5842-7, -8, -31 VB-3752-19 VB-3970-11 VB-4322-9	3/4	3/8	M9116 M9124 M9220	One	M9000-530**
3	Not Applicable	V-5252-9, -10, -11, -34	3/4	3/8	M9124 M9220	One	M9000-530
3	VG2231UM VG2431UM VG2831UM	V-5252-12, -13, -34, -35 V-5462-8, -9, -35 V-5842-9, -10, -32 VB-3752-22 VB-3970-14 VB-4322-11	1-1/8	3/8	M9116 M9124 M9220	One	M9000-531***
			1-1/8	3/8	M9124 M9220	Two	M9000-532
3	VG2231UN VG2431UN VG2831UN	V-5462-10, -36 V-5842-17, -18, -33	1-1/8	1/2	M9124 M9220	Two	M9000-537
4	VG2231VM VG2431VM VG2831VM	V-5252-14, -36 V-5462-11, -12, -37 VB-3752-25 VB-3970-17 VB-4322-13	1-1/8	3/8	M9124 M9220	One	M9000-531***
			1-1/8	3/8	M9124 M9220	Two	M9000-532
4	VG2231VN VG2431VN VG2831VN	V-5252-15, -16, -37 V-5462-13, -14, -38 V-5842-11, -12, -34	1-1/8	1/2	M9124 M9220	Two	M9000-537
5	VG2231WN VG2431WN VG2831WN	V-5252-17, -18, -38 V-5462-15, -16, -39 V-5842-13, -14,-35 VB-3752-28 VB-3970-20 VB-4322-19	1-3/8	1/2	M9124 M9220	One	M9000-533***
			1-3/8	1/2	M9124 M9220	Two	M9000-534
6	VG2231YN VG2431YN VG2831YN	V-5252-19, -39 V-5462-17, -18, -40 V-5842-15, -16, -36 VB-3752-31 VB-3970-23 VB-4322-18	1-1/2	1/2	M9124 M9220	One	M9000-535***
			1-1/2	1/2	M9124 M9220	Two	M9000-536

* M9116 and M9124 Series Electric Actuators are non-spring return. M9220 Series Electric Actuators are spring return.

** The M9000-530 cannot be retrofitted with the M9000-610 Tandem Adapter Kit.

*** Linkages can be retrofitted with a tandem actuator using an M9000-610 Tandem Adapter Kit.

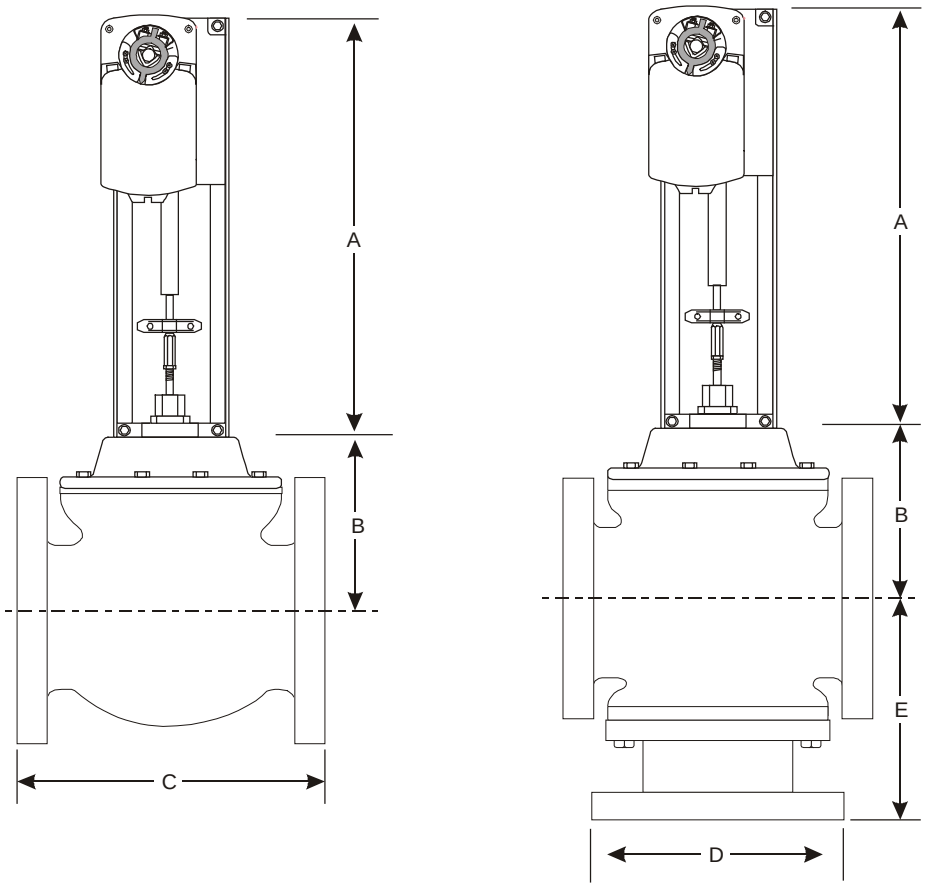
Table 2: Maximum Closeoff Pressure, psig (kPa) for VG2000 Valves with Non-Spring Return Actuators

Valve	Size, in.	Cv	M9116 Single Actuator*	M9124 Single Actuator	M9124 Tandem Actuator	Linkage
Two-Way						
VG2231TM	2-1/2	51	62 (427)	101 (696)		M9000-530 (Tandem mounting of actuators not recommended for this size valve.)
VG2231UM	3	83	27 (186)	43 (296)	88 (606)	M9000-531 (Single Actuator) M9000-532, M9000-537 (Tandem Actuators)
VG2231VM	4	150		24 (165)	49 (337)	M9000-531 (Single Actuator) M9000-532, M9000-537 (Tandem Actuators)
VG2231WN	5	240			26 (179)	M9000-534 (Tandem Actuators)
VG2231YN	6	350			16 (110)	M9000-536 (Tandem Actuators)
Three-Way						
VG2831TM	2-1/2	54	37 (255)	60 (413)		M9000-530 (Tandem mounting of actuators not recommended for this size valve.)
VG2831UM	3	80	16 (110)	26 (179)	53 (365)	M9000-531 (Single Actuator) M9000-532, M9000-537 (Tandem Actuators)
VG2831VM	4	157	9 (62)	14 (96)	30 (206)	M9000-531 (Single Actuator) M9000-532, M9000-537 (Tandem Actuators)
VG2831WN	5	238		7 (48)	15 (103)	M9000-533 (Single Actuator) M9000-534 (Tandem Actuators)
VG2831YN	6	347		4 (28)	9 (62)	M9000-535 (Single Actuator) M9000-536 (Tandem Actuators)

* M9116-AGx-2 Series Electric Actuators cannot be used in tandem configuration.

Table 3: Maximum Closeoff Pressure, psig (kPa) for VG2000 Valves with Spring Return Actuators

Valve	Size, in.	Cv	M9220 Single Actuator	M9220 Tandem Actuator	Linkage
Two-Way					
VG2231TM	2-1/2	51	76 (524)		M9000-530 (Tandem mounting of actuators not recommended for this size valve.)
VG2231VM	4	150		37 (255)	M9000-532, M9000-537 (Tandem Actuators)
VG2231WN	5	240		20 (135)	M9000-534 (Tandem Actuators)
Three-Way					
VG2831TM	2-1/2	54	45 (310)		M9000-530 (Tandem mounting of actuators not recommended for this size valve.)
VG2831UM	3	80	20 (138)	40 (276)	M9000-531 (Single Actuator) M9000-532, M9000-537 (Tandem Actuators)
VG2831VM	4	157	11 (76)	22 (152)	M9000-531 (Single Actuator) M9000-532, M9000-537 (Tandem Actuators)
VG2831WN	5	238		12 (83)	M9000-534 (Tandem Actuators)
VG2831YN	6	347		7 (48)	M9000-536 (Tandem Actuators)



Two-Way PDTC Assembly

Three-Way Mixing Assembly

Figure 2: M9000 Actuated VG2000 Series Cast Iron Flanged Valve Dimensions, in. (mm) (Refer to Table 4.)

Table 4: M9000 Actuated VG2000 Series Cast Iron Flanged Valve Dimensions, in. (mm)

Actuator Style	Valve Size, in.	Stem Diameter, in.	A	B	C	D	E
M9000	2-1/2	3/8	16-13/16 (427)	4-21/32 (118)	7-1/4 (184)	7 (178)	6-25/32 (172)
	3	3/8	16-13/16 (427)	5-5/16 (135)	8-5/8 (219)	7-1/2 (191)	6-13/16 (175)
		1/2	17-3/8 (441)	5-5/16 (135)	8-5/8 (219)	7-1/2 (191)	6-13/16 (175)
	4	3/8	16-13/16 (427)	6-7/16 (164)	10-1/2 (267)	9 (229)	8-1/16 (205)
		1/2	17-3/8 (441)	6-7/16 (164)	10-1/2 (267)	9 (229)	8-1/16 (205)
	5	1/2	17-3/8 (441)	6-7/8 (175)	12-1/2 (318)	10 (254)	9-5/32 (233)
	6	1/2	17-3/8 (441)	8-3/16 (208)	14-1/2 (368)	11 (279)	9-15/16 (252)

Product Guidelines

IMPORTANT: The M9000-53x Series Valve Linkage Kits are intended to control equipment under normal operating conditions. Where failure or malfunction of the M9000-53x Linkage Kit could lead to an abnormal operating condition that could cause personal injury or damage to the equipment or other property, other devices (limit or safety controls) or systems (alarm or supervisory systems) intended to warn of, or protect against, failure or malfunction of M9000-53x Linkage Kit must be incorporated into and maintained as part of the control system.

Install the M9000-53x Series Linkage Kit with the actuator at or above the centerline of the horizontal piping. To minimize heat transfer, it is recommended that the valve and piping in steam applications be wrapped with insulation. Be sure to allow sufficient clearance for actuator removal (as illustrated in Figure 3).

Note: Protect the electric actuator from dripping water, which could enter the housing and create an electrical short. In addition, do not cover the actuator with thermal insulating material.

For more detailed installation information, refer to the *M9000-53x Series Cast Iron Flanged Valve Linkage Kit for Mounting a Single M9000 Series Electric Actuator Installation Instructions (Part No. 14-1298-18)* or *M9000-53x Series Cast Iron Flanged Valve Linkage Kit for Tandem Mounting of M9000 Series Electric Actuators Installation Instructions (Part No. 14-1298-26)*.

Electric Actuator Selection

When used with the M9100 Series Non-Spring Return Electric Actuators or the M9220 Series Spring Return Electric Actuators, the M9000-53x Series Valve Linkage Kit offers an easy-to-install and inexpensive way to upgrade existing cast iron flanged valves.

M9100 Series Non-Spring Return Electric Actuators

The M9116 and M9124 Series is a family of non-spring return electric actuators that operate on 24 VAC or VDC power and are available for use with floating or proportional controllers. When coupled with the M9000-53x Series Valve Linkage Kits, the rotary motion of this actuator is converted to linear movement that operates 2-1/2 through 6 in. two-way and three-way VG2000 Series Cast Iron Flanged Valves. Integral auxiliary switches are available for indicating end-stop position or performing switching functions. Position feedback is available via switches or a 0 to 10 VDC or 2 to 10 VDC signal. Position feedback is also available with a potentiometer for field-mounted M9100 Series Actuators only.

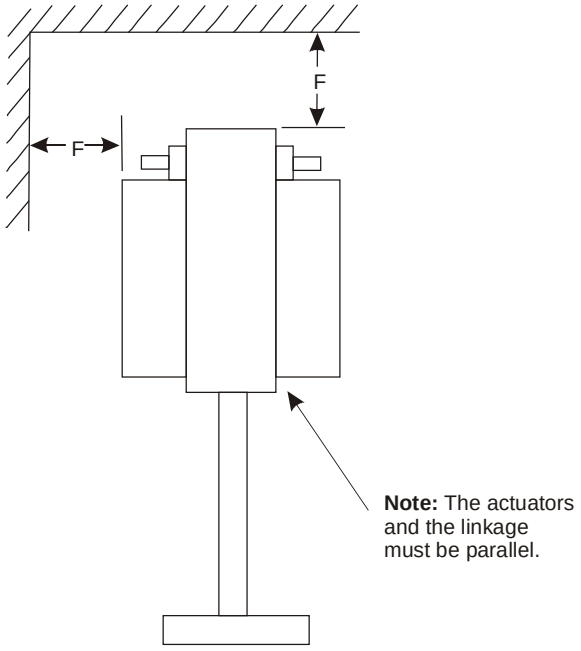
Note: The M9116-AGX-2 cannot be mounted in tandem.

For more information on M9100 Series Electric Actuators as well as details on models available, refer to the *M9108, M9116, M9124, and M9132 Series Electric Non-spring Return Actuators Product Bulletin (LIT-2681058)*.

M9220 Series Spring Return Electric Actuators

The M9220 Series is a family of spring return electric actuators that operates on 24 VAC or VDC power and is available for use with on/off, floating (for single actuator only), or proportional controllers. When coupled with an M9000-53x Series Valve Linkage Kits, the rotary motion of this actuator is converted to linear movement that operates 2-1/2 through 6 in. two-way and three-way VG2000 Series Cast Iron Flanged Valves. Integral auxiliary switches are available for indicating end-stop position or performing switching functions. Position feedback is available via switches or a 0 to 10 VDC or 2 to 10 VDC signal. Position feedback is also available with a potentiometer for field-mounted M9220 Series Actuators only.

For more information on M9220 Series Electric Actuators as well as details on models available, refer to the *M9220-xxx-3 Electric Spring Return Actuators Product Bulletin (LIT-12011057)*.



F = 5 in. (127 mm) minimum clearance

Figure 3: Minimum Distance Required for Maintenance and/or Removal of Linkage

Table 5: Accessories

Code Number	Description
M9000-610	Tandem Adapter Kit (converts single actuator linkage kit into tandem actuator linkage kit). Includes: Shaft with spring clip, cable, strain relief, anti-rotation bracket with screws, and two plug-in terminal blocks.

Repair Information

If the M9000-53x Series Linkage Kit fails to operate correctly within its specifications, replace the unit. For a replacement kit, contact the nearest Johnson Controls representative.

Technical Specifications

Product	M9000-53x Series Cast Iron Flanged Valve Linkage Kits	
Model Numbers and Valid Valve, Electric Actuator, and Linkage Kit Combinations	Refer to Table 1.	
Service*	Hot Water, Chilled Water, 50/50 Glycol Solutions, and 15 psig (103 kPa) Saturated Steam for Heating, Ventilating, and Air Conditioning (HVAC) Systems	
Force Output	**M9000-530**	378 lb (1684 N) minimum with M9116 Series Actuator 605 lb (2691 N) minimum with M9124 Series Actuator 457 lb (2035 N) minimum with M9220 Series Actuator
	M9000-531	238 lb (1060 N) minimum with M9116 Series Actuator 380 lb (1694 N) minimum with M9124 Series Actuator 288 lb (1281 N) minimum with M9220 Series Actuator
	M9000-532	761 lb (3385 N) minimum with Tandem M9124 Series Actuators 576 lb (2562 N) minimum with Tandem M9220 Series Actuators
	M9000-533	315 lb (1405 N) minimum with M9124 Series Actuator
	M9000-534	631 lb (2806 N) minimum with Tandem M9124 Series Actuators 477 lb (2121 N) minimum with Tandem M9220 Series Actuators
	M9000-535	280 lb (1248 N) minimum with M9124 Series Actuator
	M9000-536	561 lb (2495 N) minimum with Tandem M9124 Series Actuators 424 lb (1887 N) minimum with Tandem M9220 Series Actuators
	M9000-537	761 lb (3385 N) minimum with Tandem M9124 Series Actuators 576 lb (2562 N) minimum with Tandem M9220 Series Actuators
Valve Stroke	**M9000-530**	3/4 in. (19 mm) Nominal
	M9000-531	1-1/8 in. (29 mm) Nominal
	M9000-532	1-1/8 in. (29 mm) Nominal
	M9000-533	1-3/8 in. (35 mm) Nominal
	M9000-534	1-3/8 in. (35 mm) Nominal
	M9000-535	1-1/2 in. (38 mm) Nominal
	M9000-536	1-1/2 in. (38 mm) Nominal
	M9000-537	1-1/8 in. (29 mm) Nominal
Minimum Ambient Operating Temperature (Limited by the Valve)	35°F (2°C) in Water and Steam Applications	
Maximum Ambient Operating Temperature (Limited by the Actuator)**	122°F (50°C) M91xx Series Actuators 131°F (55°C) M9220 Series Actuators	
Dimensions	Refer to Table 4.	
Shipping Weight	7-1/2 lb (3.4 kg)	

* Proper water treatment is recommended; refer to VDI 2035 Standard.

** In steam applications, install the valve with the stem horizontal to the piping, and wrap the valve with insulation.

The performance specifications are nominal and conform to acceptable industry standards. For application at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products.

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