

M9000-560 Ball Valve Linkage Kit and M9000-561 Thermal Barrier

Installation Instructions

Part No. 34-636-2227, Rev. —
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Applications

The M9000-560 Ball Valve Linkage Kit (Figure 1) is designed to mount a M9203 or M9208 Series actuator to a VG1000 Series Ball Valve. The M9000-561 Thermal Barrier (Figure 2), when used with the M9000-560 Linkage Kit, allows the valve assembly to be used for fluid temperatures up to 284°F (140°C), or 15 psi (105 kPa) saturated steam.

IMPORTANT: The VG1000 Series Ball Valves are intended to control hot water and chilled water flow under normal equipment operating conditions. Where failure or malfunction of the ball valves could lead to personal injury or property damage to the controlled equipment or other property, additional precautions must be designed into the system. Incorporate and maintain other devices, such as supervisory or alarm systems or safety or limit controls, intended to warn of or protect against failure or malfunction of the ball valves.

Installation

Parts Included

M9000-560 Ball Valve Linkage Kit

- Two thread-forming Taptite® screws, 8-32 x 0.625 in. long, T-20 TORX® slotted pan-head screws
- One machine screw, M4x0.7 x 83 mm long, T-20 TORX slotted pan-head screws
- Two screws, thread-forming (Plastite® 48), twin helix, #10-14 x 2.75 in. long, T-20 TORX slotted pan-head screws
- Adaptor bracket
- Drive shaft
- Adjustable pointer
- Fixed pointer
- Installation instructions

M9000-561 Thermal Barrier

- Drive shaft
- Barrier
- Four machine screws, M5 x 16 mm, T-25 TORX Pan-head screws
- Four flange nuts, M5 x 0.8 mm

Special Tools Needed

- T-25 TORX driver
- T-20 TORX driver
- 1/4 in. flat-blade screwdriver
- Adjustable wrench

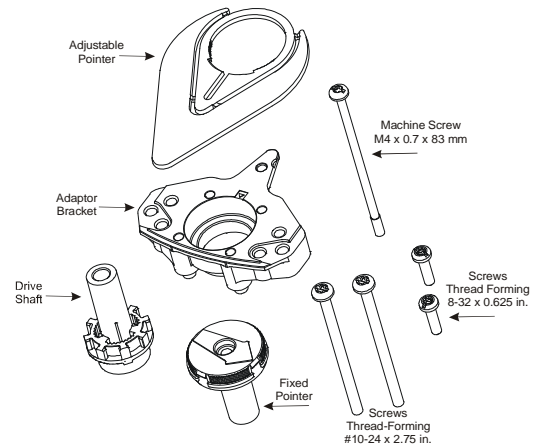


Figure 1: Parts Included with M9000-560 Ball Valve Linkage Kit

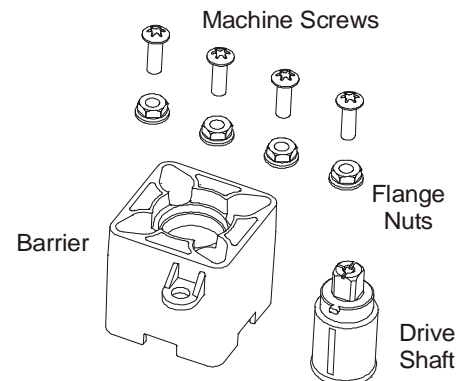


Figure 2: Parts Included with Optional M9000-561 Thermal Barrier Kit

Dimensions

See Figure 3 and Table 1 and Table 2 for dimensions of the Spring Return M9203 Series Actuated Ball Valves.

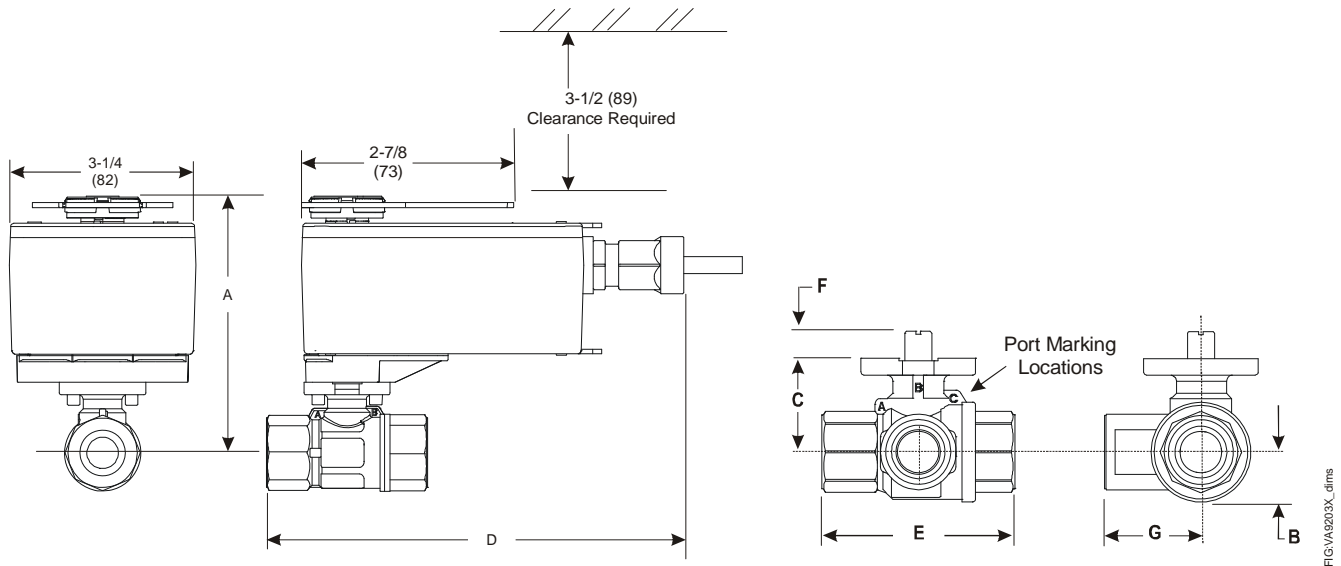


Figure 3: Field Installed M9203 Series Electric Actuator Dimensions, in. (mm)

Table 1: M9203 Actuated VG1241, VG1245, VG1841, and VG1845 Series Ball Valve Dimensions, in. (mm)

Valve Size, in. (DN) ¹	A	B	C	D	E	F	G
1/2 (DN15)	4-5/8 (117)	21/32 (17)	1-7/32 (31)	6-31/32 (177)	2-33/64 (64)	11/32 (9)	1-1/4 (32)
3/4 (DN20)	4-5/8 (117)	21/32 (17)	1-7/32 (31)	7-1/8 (181)	2-51/64 (71)	11/32 (9)	1-13/32 (36)
1 (DN25)	4-11/16 (119)	3/4 (19)	1-19/64 (33)	7-31/64 (190)	3-13/32 (87)	11/32 (9)	1-45/64 (43)

1. Port A must always be connected to the coil (Figure 3).

Table 2: M9203 Actuated VG1271, VG1275, VG1871, and VG1875 Series Sweat Ball Valve and VA9203 Actuated VG1291, VG1295, VG1891, and VG1895 Series Press Ball Valve Dimensions, in. (mm)

Valve Size, in. (DN) ¹	A	B	C	D	E	F	G
1/2 (DN15)	4-5/8 (117)	21/32 (17)	1-7/32 (31)	7-13/64 (183)	3-25/32 (96)	11/32 (9)	1-1/4 (32)
3/4 (DN20)	4-5/8 (117)	21/32 (17)	1-7/32 (31)	7-3/4 (197)	4-3/32 (104)	11/32 (9)	1-13/32 (36)
1 (DN25)	4-11/16 (119)	3/4 (19)	1-19/64 (33)	8-3/16 (208)	4-41/64 (118)	11/32 (9)	1-45/64 (43)

1. Port A must always be connected to the coil (Figure 3).

Valve Actuator with Thermal Barrier

See Figure 4 and Table 3 for M9203 valve actuator dimensions with the optional M9000-561 Thermal Barrier installed.

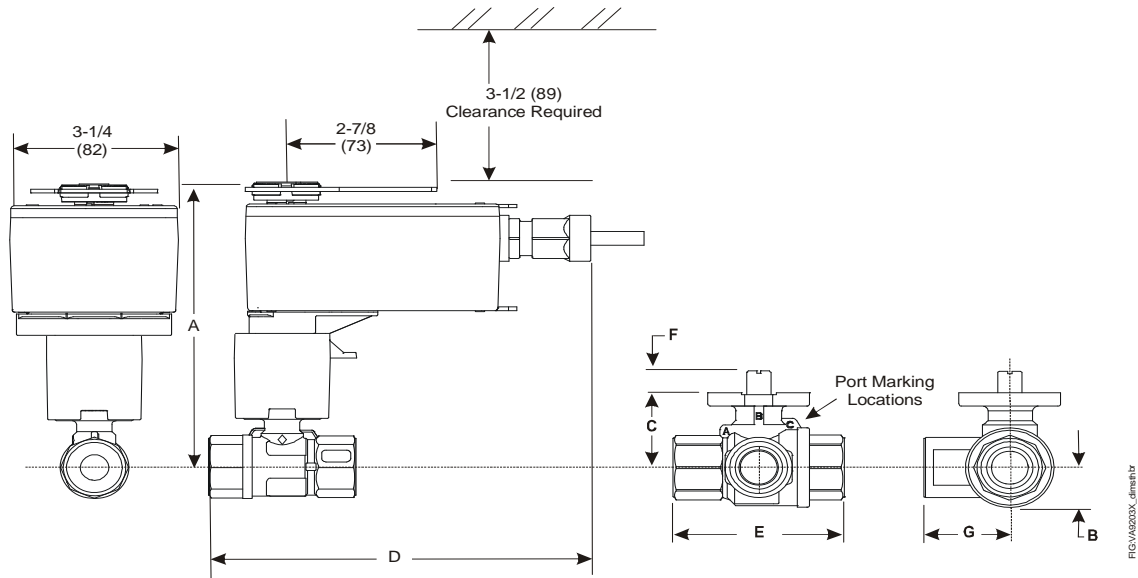


Figure 4: Spring Return M9203 Actuated VG1241, VG1245, VG1841, and VG1845 Series Ball Valve with Optional M9000-561 Thermal Barrier Installed Dimensions, in. (mm)

Table 3: M9203 Actuated VG1241, VG1245, VG1841, and VG1845 Series NPT Ball Valve with Optional Thermal Barrier Installed Dimensions, in. (mm)

Valve Size, in. (DN) ¹	A	B	C	D	E	F	G
1/2 (DN15)	6 (152)	21/32 (17)	1-7/32 (31)	6-31/32 (177)	2-33/64 (64)	11/32 (9)	1-1/4 (32)
3/4 (DN20)	6 (152)	21/32 (17)	1-7/32 (31)	7-1/8 (181)	2-51/64 (71)	11/32 (9)	1-13/32 (36)
1 (DN25)	6-1/16 (154)	3/4 (19)	1-19/64 (33)	7-31/64 (190)	3-13/32 (87)	11/32 (9)	1-45/64 (43)

1. Port A must always be connected to the coil (Figure 4).

See Figure 5 and Table 4 for Spring Return M9208 Actuated VG1241, VG1245, VG1841, and VG1845 Series NPT End Connections Ball Valves.

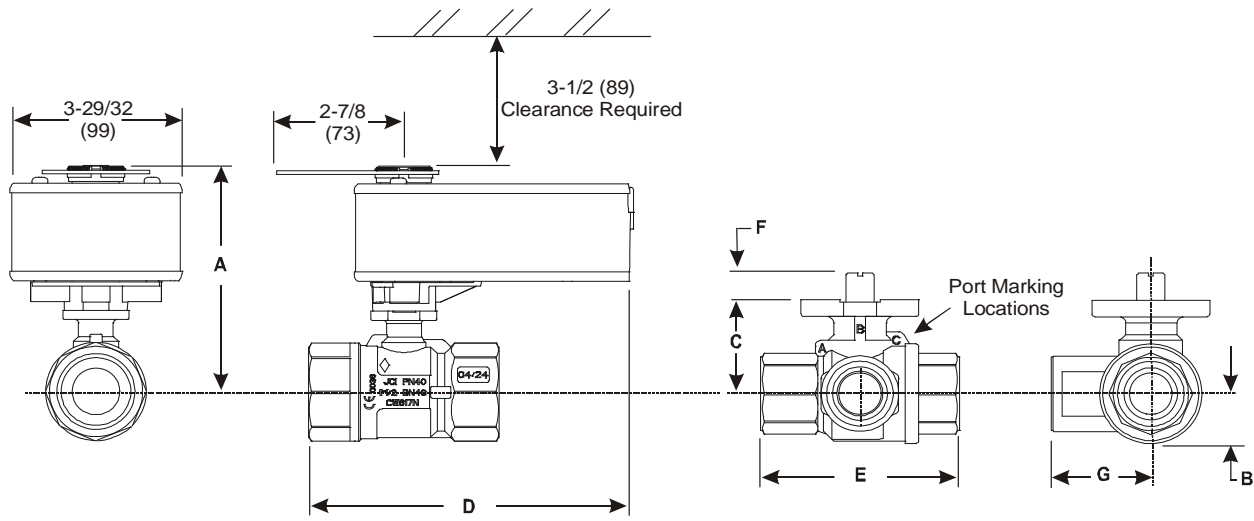


Figure 5: Field Installed M9208 Series Electric Actuator Dimensions, in. (mm)

Table 4: M9208 Actuated VG1241, VG1245, VG1841, and VG1845 Series Ball Valve Dimensions, in. (mm)

Valve Size in. (DN)	Valve Style ¹	A	B	C	D	E	F	G
1-1/4 (DN32)	All	5-5/32 (131)	1-1/32 (26)	1-23/32 (44)	7-5/32 (182)	3-15/16 (100)	11/32 (9)	1-31/32 (50)
1-1/2 (DN40)	All	5-5/16 (135)	1-9/64 (29)	1-57/64 (48)	7-3/8 (187)	4-21/64 (110)	11/32 (9)	2-11/64 (55)
2 (DN50)	2-way	5-17/32 (140)	1-15/32 (37)	2-1/8 (54)	7-19/32 (193)	4-27/32 (123)	11/32 (9)	2-27/64 (62)
	3-way				7-7/8 (200)			

1. Port A must always be connected to the coil (Figure 5).

See Figure 6 and Table 5 for valve actuator dimensions with optional M9000-561 Thermal Barrier installed.

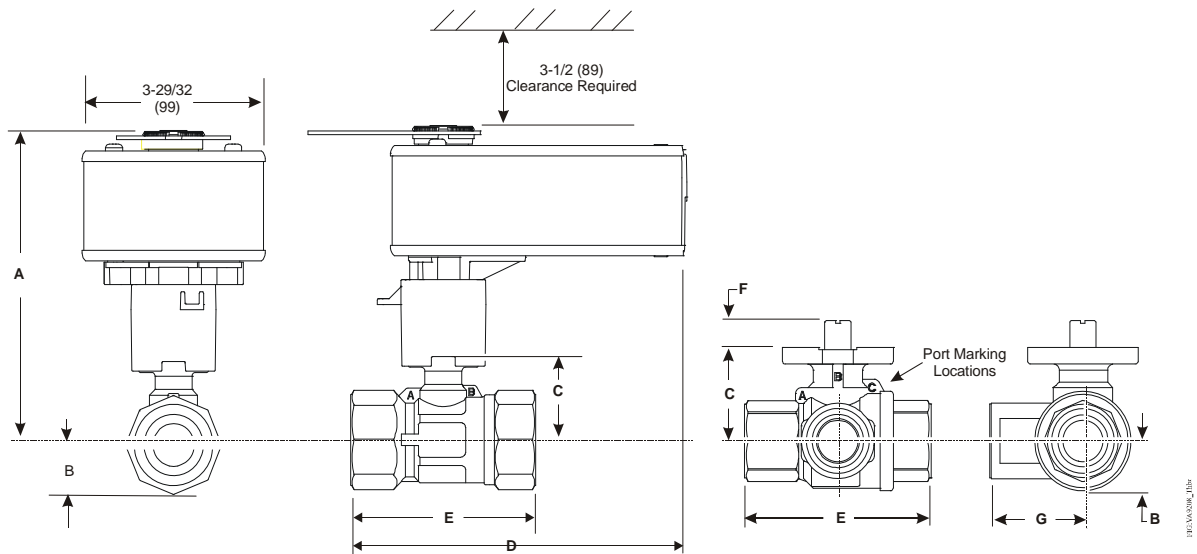


Figure 6: Spring Return M9208 Actuated VG1241, VG1245, VG1841, and VG1845 Series Ball Valve with Optional M9000-561 Thermal Barrier Installed Dimensions, in. (mm)

Table 5: M9208 Actuated VG1241, VG1245, VG1841, and VG1845 Series Ball Valve with Optional M9000-561 Thermal Barrier Installed Dimensions, in. (mm)

Valve Size in. (DN)	Valve Style ¹	A	B	C	D	E	F	G
1-1/4 (DN32)	All	9-17/64 (235)	1-1/32 (26)	1-23/32 (44)	7-1/4 (184)	3-15/16 (100)	11/32 (9)	1-31/32 (50)
1-1/2 (DN40)	All	9-15/16 (240)	1-9/64 (29)	1-57/64 (48)	7-7/16 (189)	4-21/64 (110)	11/32 (9)	2-11/64 (55)
2 (DN50)	2-way	9-31/32 (244)	1-15/32 (37)	2-1/8 (54)	7-11/16 (195)	4-27/32 (123)	11/32 (9)	N/A
	3-way				7-7/8 (200)			2-27/64 (62)

1. Port A must always be connected to the coil (Figure 6).

Mounting

Mount the VG1000 Series Ball Valves with the actuator at or above the centerline of the horizontal piping, as shown in Figure 7. This mounting position prevents water or condensation from flowing into the actuator. To minimize heat transfer, wrap the valve and piping in insulation.

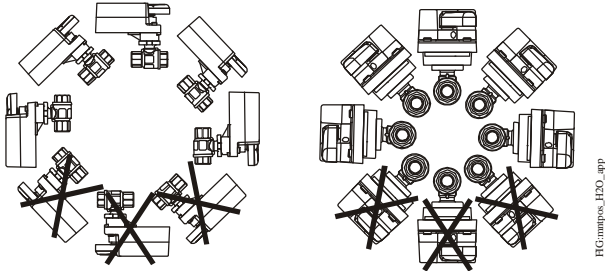


Figure 7: Mounting Positions for Chilled Water and Condensing Atmosphere Applications

IMPORTANT: In steam applications, install the valve with the stem horizontal to the piping. Failure to follow this precaution may shorten the life of the actuator.

Mounting M9000-560 Linkage to M9203 Actuator

To mount the actuator to a ball valve, rotate the valve stem manually several times using an adjustable wrench to break the torque that may have built up during long-term storage.

Mounting the M9203 Actuator to Spring Return Port A (Coil) Open

To mount the actuator to Spring Return Port A (Coil) Open:

1. Turn the valve stem to the position outlined in Figure 8.

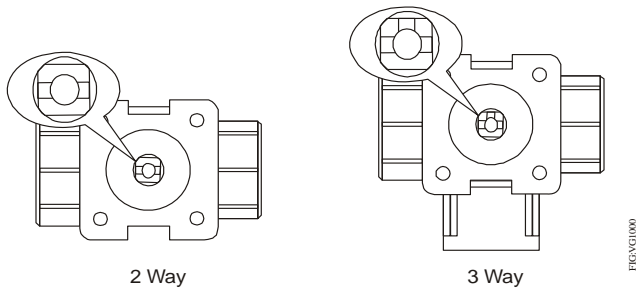


Figure 8: Positioning the Valve Stem

2. Mount optional M9000-561 Thermal Barrier to the valve if fluid temperature exceeds 212°F (100°C). See the *Mounting the Thermal Barrier* section for more information.
3. Insert the drive shaft into Side B (Figure 9). The drive shaft is keyed for one-way assembly. With gentle pressure applied, rotate the drive shaft until the key aligns and the drive shaft falls into place.

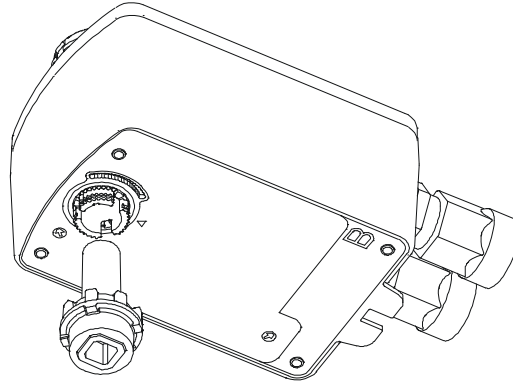


Figure 9: Inserting the Drive Shaft

4. Install linkage base on Side B using the two #8-32 x 0.625 in. long screws (Figure 10). The recommended torque is 29 to 33 lb-in. (3.3 to 3.7 N·m).

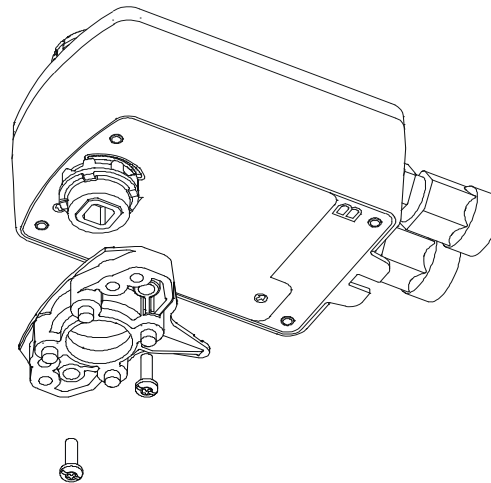


Figure 10: Installing the Linkage

5. Insert fixed pointer and M4x0.7x83 mm long screw into the Side A actuator hub (Figure 11). Direct the arrow on the pointer to 100%.

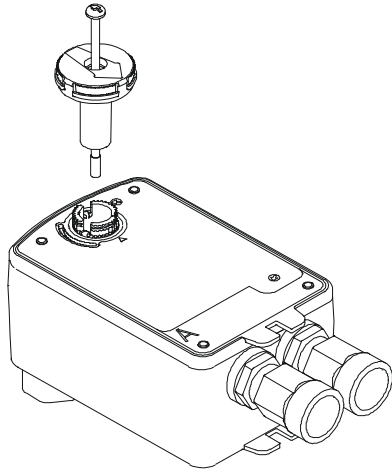


Figure 11: Installing the Fixed Pointer

6. Install the actuator on the ball valve (Figure 12). Tighten the actuator mounting screw to a torque of 10 to 12 lb-in. (1.1 to 1.4 N·m) and snap the large adjustable pointer into place.

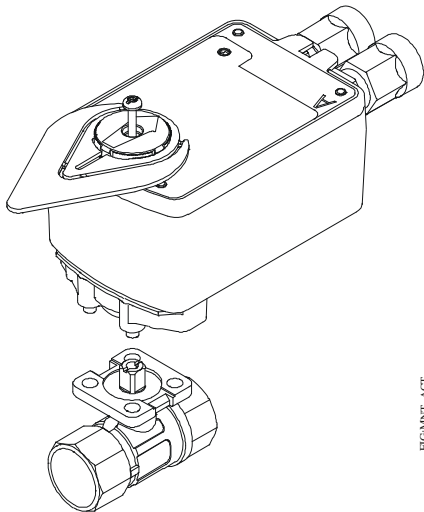


Figure 12: Mounting the Actuator

Mounting the M9203 Actuator to Spring Return Port A (Coil) Closed

To mount the actuator to Spring Return Port A (coil) closed:

1. Turn the valve stem to the position outlined in Figure 13.

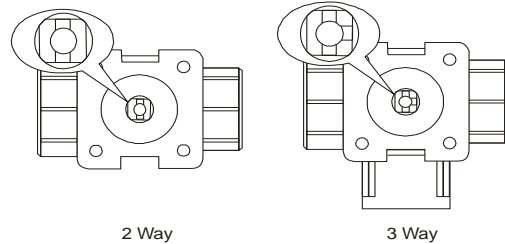


Figure 13: Positioning the Valve Stem

2. Mount optional M9000-561 Thermal Barrier to the valve if fluid temperature exceeds 212°F (100°C). See the *Mounting the Thermal Barrier* section for more information.
3. Insert the drive shaft into Side A (Figure 14). The drive shaft is keyed for one-way assembly. With gentle pressure applied, rotate the drive shaft until the key aligns and the drive shaft falls into place.

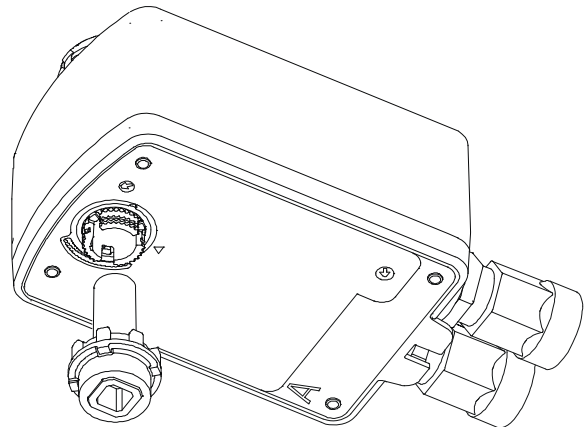


Figure 14: Inserting the Drive Shaft

4. Install linkage base on Side A using the two #8-32 x 0.625 in. long screws (Figure 15). The recommended torque is 29 to 33 lb-in. (3.3 to 3.7 N-m).

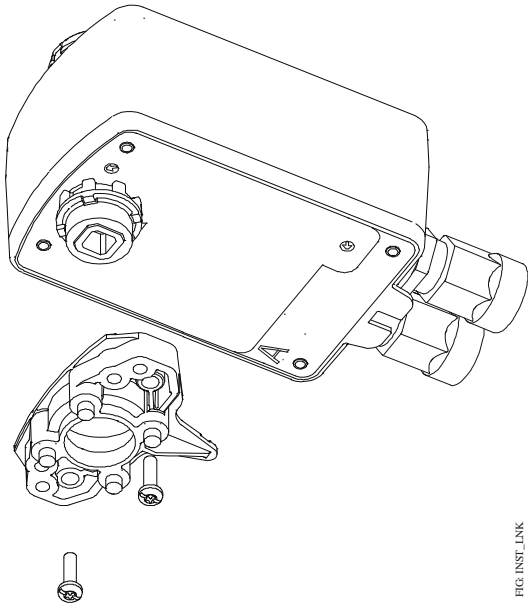


Figure 15: Installing the Linkage

FIG. INST_LINK

5. Insert fixed pointer and M4x0.7x83 mm long screw into the Side B actuator hub (Figure 16). Direct the arrow on the pointer to 0%.

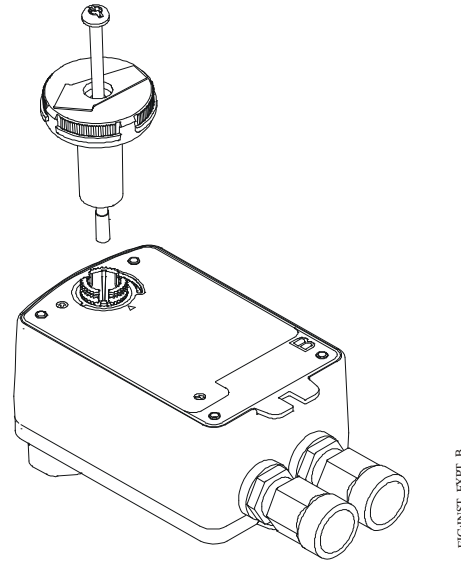


Figure 16: Installing the Fixed Pointer

FIG. INST_FPPT_B

6. Install the actuator on the ball valve (Figure 17). Tighten the actuator mounting screw to a torque of 10 to 12 lb-in (1.1 to 1.4 N-m) and snap the large adjustable pointer into place.

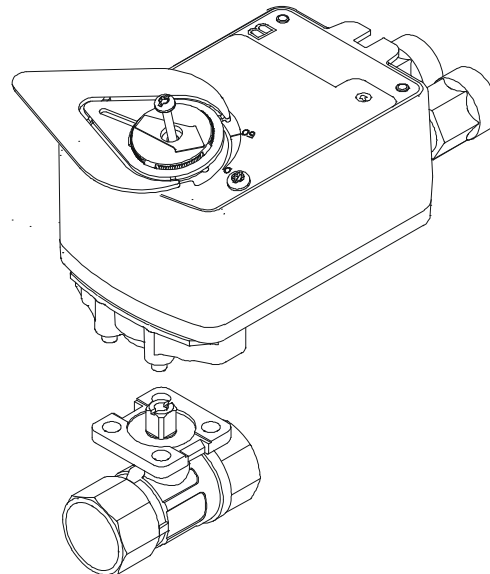


Figure 17: Mount the Actuator

FIG. MNT_ACT_B

Mounting M9000-560 Linkage to M9208 Actuator

To mount the actuator to a ball valve rotate the valve stem manually several times using an adjustable wrench to break the torque that may have built up during long-term storage.

Mounting the M9208 Actuator to Spring Return Port A (Coil) Open

To mount the actuator to Spring Return Port A (Coil) open:

1. Turn the valve stem to the position outlined in Figure 18.

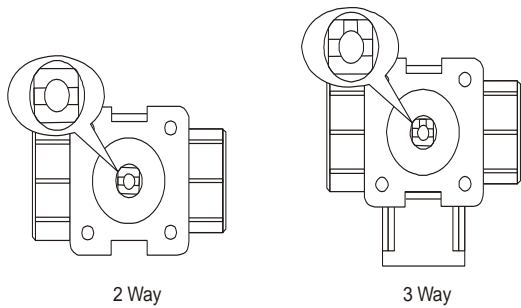


Figure 18: Positioning the Valve Stem

2. Mount optional M9000-561 Thermal Barrier to the valve if fluid temperature exceeds 212°F (100°C). See the *Mounting the Thermal Barrier* section for more information.
3. Insert the drive shaft into Side B (Figure 19).

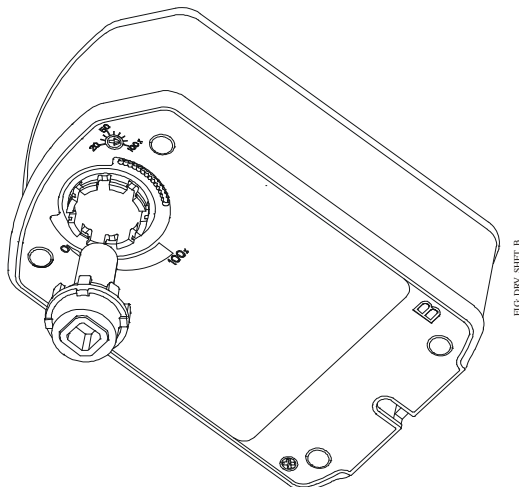


Figure 19: Inserting the Drive Shaft

4. Install linkage base on Side B using the two #10-14 x 2.75 in. long screws (Figure 20). The recommended torque is 20 to 24 lb-in. (2.3 to 2.7 N·m).

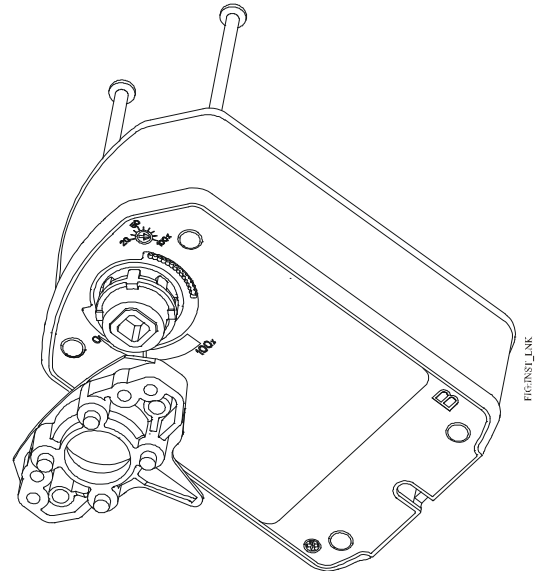


Figure 20: Installing the Linkage

5. Insert fixed pointer and M4x0.7x83 mm long screw into the Side A actuator hub. Direct the arrow on the pointer to 100%.

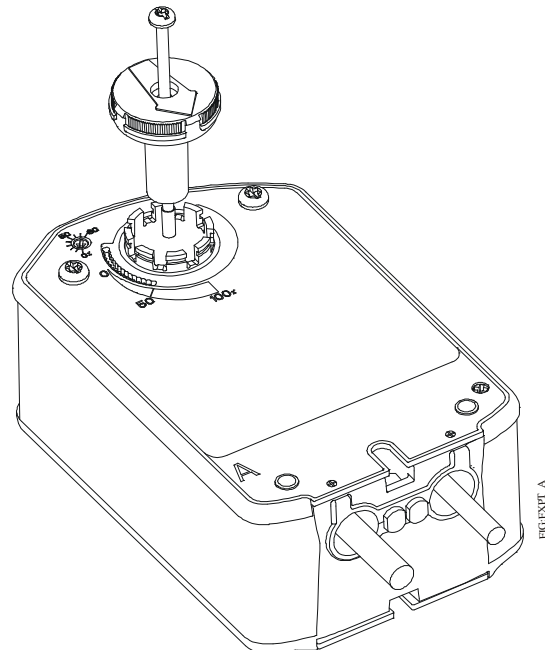


Figure 21: Installing the Fixed Pointer

6. Install the actuator on the ball valve (Figure 22). Tighten the actuator mounting screw to a torque of 10 to 12 lb-in. (1.1 to 1.4 N·m) and snap the large adjustable pointer into place.

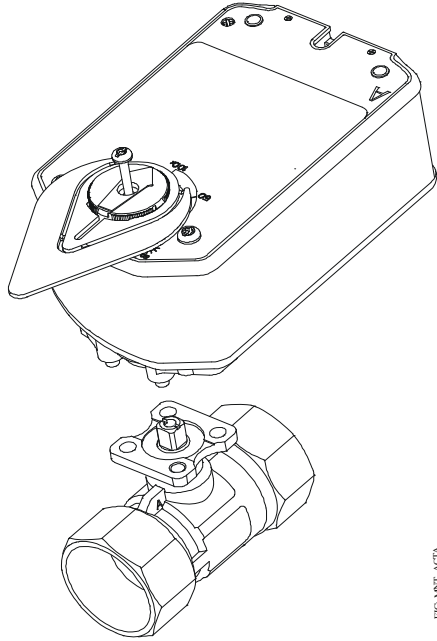


Figure 22: Mount the Actuator

Mounting the M9208 Actuator to Spring Return Port A (Coil) Closed

To mount the actuator to Spring Return Port A (coil) Closed:

1. Turn the valve stem to the position outlined in Figure.

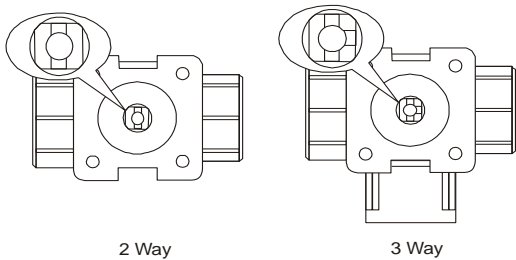


Figure 23: Positioning the Valve Stem

2. Mount optional M9000-561 Thermal Barrier to the valve if fluid temperature exceeds 212°F (100°C). See the *Mounting the Thermal Barrier* section for more information.
3. Insert the drive shaft into Side A (Figure 24).

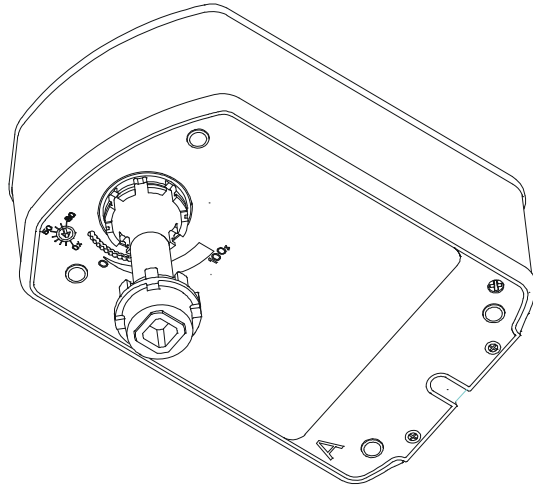


Figure 24: Inserting the Drive Shaft

4. Install linkage base on Side A using the two #10-14 x 2.75 in. long screws (Figure 25). The recommended torque is 20 to 24 lb-in. (2.3 to 2.7 N·m).

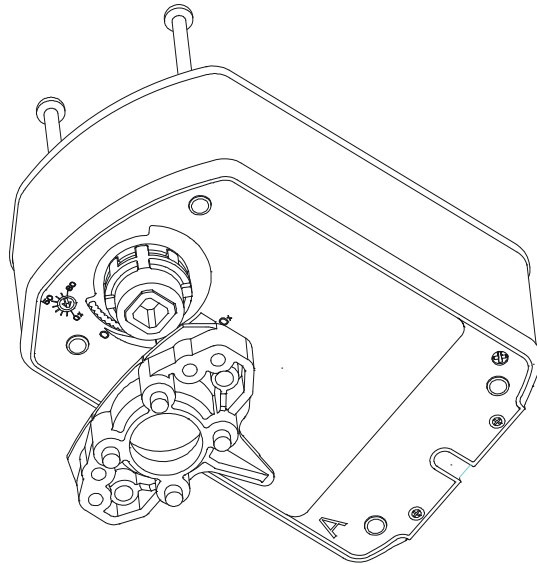


Figure 25: Installing the Linkage

5. Insert fixed pointer and M4x0.7x83 mm long screw into the Side B actuator hub. Direct the arrow on the pointer to 0%.

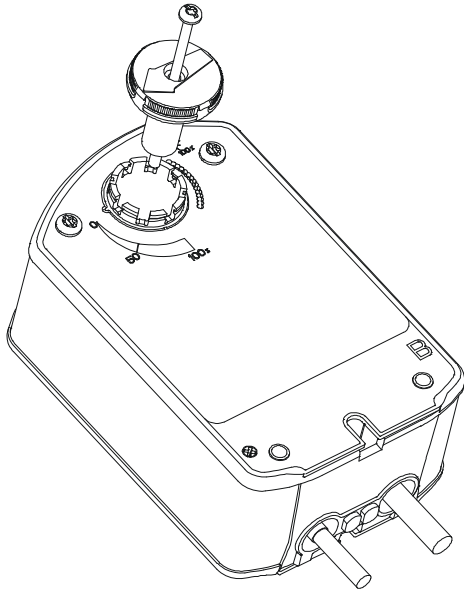


FIG. 26/PT/B

Figure 26: Installing the Fixed Pointer

6. Install the actuator on the ball valve. Tighten the actuator mounting screw to a torque of 10 to 12 lb-in. (1.1 to 1.4 N-m) and snap the large adjustable pointer into place.

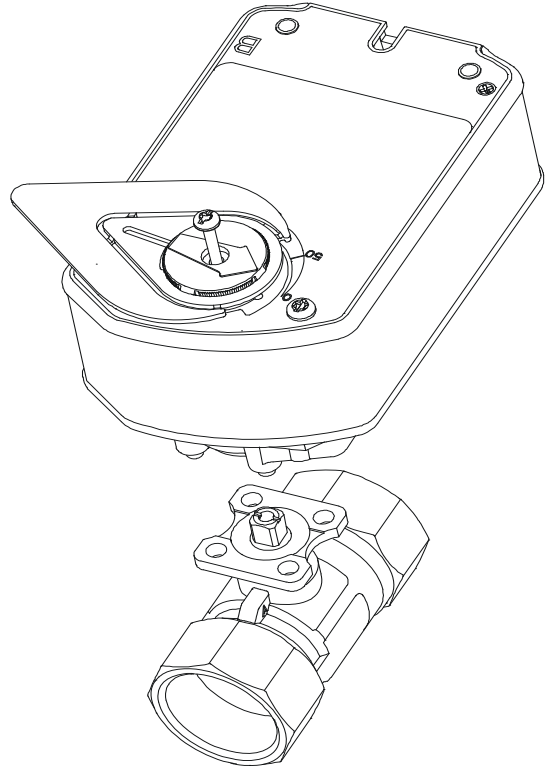


FIG.MNT

Figure 27: Mount the Actuator

Mounting the Thermal Barrier

Figure 28 shows the optional M9000-561 Thermal Barrier.

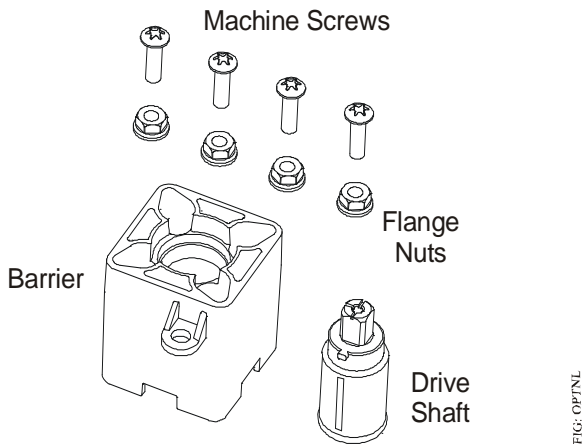


Figure 28: Optional M9000-561 Thermal Barrier

To mount the optional thermal barrier:

1. Install the thermal barrier drive shaft into the thermal barrier by aligning the tab on the drive shaft with the slot on the thermal barrier (Figure 29).

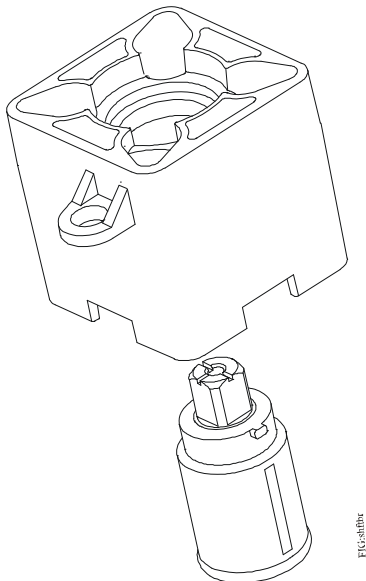


Figure 29: Installing the Drive Shaft into the Thermal Barrier

2. Rotate the drive shaft to align marks on the top of the thermal drive shaft with matching marks on the valve stem.
3. Mount the thermal barrier onto the valve using the four included M5x16 mm machine screws and four M5 flange nuts. Tighten the screws to a recommended torque of 21 to 25 lb-in (2.4 to 2.8 N·m) (Figure 30).

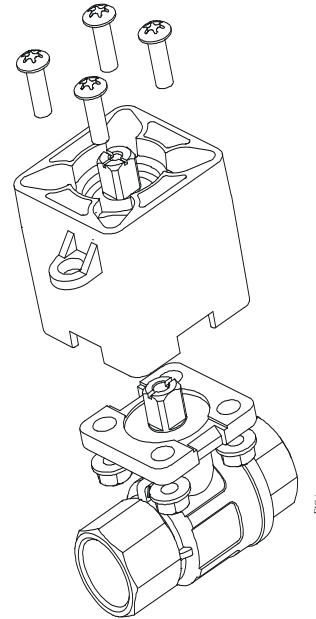


Figure 30: Installing the Barrier

4. Proceed to actuator mounting instructions. Follow the same steps as mounting directly to the valve when mounting the actuator to the thermal barrier.

Repair Information

If the M9000-560 Ball Valve Linkage Kit or M9000-561 Thermal Barrier fail to operate within the specifications, replace the unit. For a replacement kit, contact the nearest Johnson Controls® representative.

Technical Specifications

VG1000 Series Forged Brass Ball Valves

Fluid Temperature Limits	VG12x1 and VG18x1 Series	23 to 203°F (-5 to 95°C); Not Rated for Steam Service
	VG12x5 and VG18x5 Series	-22 to 212°F (-30 to 100°C); Not Rated for Steam Service
Ambient Conditions M(VA)9203	Standard Operating	-22 to 140°F (-30 to 60°C); 90% RH Maximum, Noncondensing
	Storage	-40 to 185°F (-40 to 85°C); 95% RH Maximum, Noncondensing
Ambient Conditions M(VA)9208	Standard Operating	-4 to 140°F (-20 to 60°C); 90% RH Maximum, Noncondensing
	Extended Operating	-40 to -4°F (-40 to -20°C); 90% RH Maximum, Noncondensing
	Storage	-40 to 185°F (-40 to 85°C); 95% RH Maximum, Noncondensing
Materials		Glass-Reinforced Thermoplastic Resin; Suitable for use in other environmental air space (plenums) in accordance with Section 300.22(c) of the National Electric Code.
Shipping Weight	M9000-560 Linkage Kit	1.5 lb (0.7 kg)

M9000-561 Thermal Barrier Kit

Fluid Temperature Limits	VG12x5 and VG18x5 Series with M9000-561 Thermal Barrier Installed	-22 to 284°F (-30 to 140°C) Water; 15 psig (103 kPa) at 250°F (121°C) Saturated Steam
Materials		Glass-Reinforced Thermoplastic Resin; Suitable for use in other environmental air space (plenums) in accordance with Section 300.22(c) of the National Electric Code.
Shipping Weight	M9000-561 Thermal Barrier	1.5 lb (0.7 kg)

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.



Building Efficiency

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