AV-430

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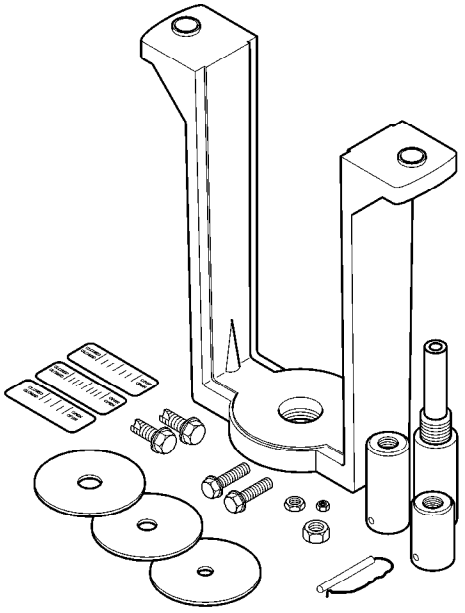
Valve Linkage for Pneumatic Actuators
General Instructions

Application

The AV-430 valve linkage is used to field assemble MK-66X1, MK-68X1, and MK-6911 actuators, as well as the obsolete MK-47X1 actuators, to applicable 1/2" to 6" two-way and three-way valve bodies.



Features

- Die cast aluminum mounting bracket
- Valve position indication is provided as a standard feature

Applicable Literature

- Siebe Environmental Controls Cross-Reference Guide, F-23638
- Siebe Environmental Controls Reference Manual, F-21683
- Siebe Environmental Controls Application Manual, F-21335
- Siebe Environmental Controls Catalog, F-25683
- Siebe Environmental Controls Valve Selection Guide, F-26094
- EN-205 Water System Guidelines, F-26080

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SPECIFICATIONS

Close-Off Pressure Rating

Refer to the current *Siebe Environmental Controls Catalog, F-25683*, to make sure the current valves and actuators are compatible with each other, and that the close-off rating is adequate for the application. Refer to Table-1 and Table-2 for listings of obsolete valves and their corresponding actuators that used the AV-430 valve linkage. Verify that the valve body differential pressure is in compliance with the limitations specified for the valves being used.

Table-1 Selection and Close-Off Ratings for Obsolete Valves.

VALVE BODY INFORMATION					CLOSE-OFF PRESSURE, psi (kPa) [a] [b]									
					Actuator MS-8XX1X-XXX MSR-8X01X Series	Actuator MK-6801			Actuator MK-6811			Actuator MK-6821		
							Stem Down			Stem Down			Stem Down	
Valve Body Part Number	Description	Normal Position (SU)	C_v	Size		Stem Up	15 [c] (104)	20 [c] (138)	Stem Up	15 [c] (104)	20 [c] (138)	Stem Up	15 [c] (104)	20 [c] (138)
VB-9213-0-4-10 VB-9214-0-4-10 VB-9215-0-4-10	2-Way, FNPT, Union Sweat, and R_p	Open	25	1-1/2"	65 (448)	—	160 (1104)	250 (1725)	—	115 (794)	230 (1587)	—	30 (207)	160 (1104)
VB-9213-0-4-11 VB-9214-0-4-11 VB-9215-0-4-11			40	2"	35 (242)	—	90 (621)	160 (1104)	—	60 (414)	125 (862)	—	15 (104)	90 (621)
VB-9223-0-4-10 VB-9224-0-4-10 VB-9225-0-4-10		Closed	25	1-1/2"	65 (448)	40 (276)	—	—	85 (586)	—	—	170 (1173)	—	—
VB-9223-0-4-11 VB-9224-0-4-11 VB-9225-0-4-11			40	2"	35 (242)	20 (138)	—	—	50 (345)	—	—	85 (586)	—	—
VB-9253-0-4-10	2-Way, FNPT Stainless Steel Trim & Teflon Disc	Open	25	1-1/2"	65 (448)	—	160 (1104)	250 (1725)	—	115 (794)	230 (1587)	—	30 (207)	160 (1104)
VB-9253-0-4-11			40	2"	35 (242)	—	90 (621)	160 (1104)	—	60 (414)	125 (862)	—	15 (104)	90 (621)
VB-9263-0-4-10		Closed	25	1-1/2"	65 (448)	40 (276)	—	—	85 (586)	—	—	170 (1173)	—	—
VB-9263-0-4-11			40	2"	35 (242)	20 (138)	—	—	50 (345)	—	—	85 (586)	—	—
VB-9273-0-4-10	2-Way, FNPT Stainless Steel Trim	Open	25	1-1/2"	65 (448)	—	160 (1104)	250 (1725)	—	115 (794)	230 (1587)	—	30 (207)	160 (1104)
VB-9273-0-4-11			40	2"	35 (242)	—	90 (621)	160 (1104)	—	60 (414)	125 (862)	—	15 (104)	90 (621)
VB-9283-0-4-10		Closed	25	1-1/2"	65 (448)	40 (276)	—	—	85 (586)	—	—	170 (1173)	—	—
VB-9283-0-4-11			40	2"	35 (242)	20 (138)	—	—	50 (345)	—	—	85 (586)	—	—
VB-9313-0-4-10 VB-9314-0-4-10 VB-9315-0-4-10	3-Way, Mixing FNPT, Union Sweat, and R_p	Flow B to AB	33	1-1/2"	35 (242) SU/ 33 (228) SD	29 (1304)	85 (586)	160 (1104)	60 (414)	60 (414)	130 (897)	105 (724)	14 (97)	85 (586)
VB-9313-0-4-11 VB-9314-0-4-11 VB-9315-0-4-11			55	2"		29 (1304)	85 (586)	160 (1104)	60 (414)	60 (414)	130 (897)	105 (724)	14 (97)	85 (586)
VB-9323-0-4-10	3-Way, Diverting FNPT		30	1-1/2"	250 (1725)	250 (1725)	250 (1725)	250 (1725)	250 (1725)	250 (1725)	250 (1725)	250 (1725)	250 (1725)	250 (1725)
VB-9323-0-4-11			42	2"	250 (1725)	250 (1725)	250 (1725)	250 (1725)	250 (1725)	250 (1725)	250 (1725)	250 (1725)	250 (1725)	250 (1725)

[a] Close-Off Pressures for 3-Way Valves are Determined as Follows:
The value for SU is the "A" port close-off pressure, and is based on the pressure at "A" port minus the pressure at "B" port.
The value for SD is the "B" port close-off pressure, and is based on the pressure at "B" port minus the pressure at "A" port.

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

[c] Supply Air Pressure, psig (kPa) to the actuator.

Table-2 Obsolete Valves and Corresponding Actuators Using Valve Linkage AV-430.

Valve Data		Actuator Series		
Part Number Series	Sizes	MK-47X1 (Obsolete)	MK-68X1	MK-6911
VB-202	1/2" to 2"	Yes	Yes	No
VB-202	2-1/2" to 4"	No	Yes	No
VB-212	1/2" to 2"	Yes	Yes	No
VB-252	1/2" to 2"	Yes	Yes	No
VB-252	2-1/2" to 4"	No	Yes	No
VB-304	1/2" to 2"	Yes	Yes	No
VB-304	2-1/2" to 4"	No	Yes	No
VB-804	1/2" to 2"	Yes	Yes	No
VB-804	2-1/2" to 4"	No	Yes	No
VB-807	1/2" to 2"	Yes	Yes	No
VB-817	1/2" to 2"	No	Yes	No
VB-817	2-1/2" to 3"	No	Yes	No
VB-817	4" to 6"	No	No	Yes

Temperature Restrictions

Verify that the temperature of the media in the valve and the ambient temperature at the actuator do not exceed the values shown in the current *Siebe Environmental Controls Catalog, F-25683*.

INSTALLATION

Inspection

Inspect the package for damage. If damaged, notify the appropriate carrier immediately. If undamaged, open the package and inspect the device for any obvious damage. Return damaged products.

Requirements

- Parts:
  - See Table-3 for parts selection for the AV-430 valve linkage.
- Tools (not provided):
  - Appropriate wrenches for stem extensions, locknuts, packing nuts, and bracket nuts.
  - Appropriate screw driver for actuator mounting screws.
  - TOOL-37, 1-5/8" open-ended wrench with a maximum thickness of 3/16"
- Training:
  - Installer must be a qualified, experienced technician.

Caution:

- Avoid locations where excessive moisture, corrosive fumes, or vibration are present. Do not insulate above actuator mounting nut trapping moisture.
- Install all two-way valves so that they close against the flow. An arrow on the valve body or a tag indicates the proper flow direction.
- Always install three-way mixing valves with two inlets and one outlet.
- Always install three-way diverting valves with one inlet and two outlets.
- Do not install the actuator below the center line of the valve. For steam applications only, mount the actuator above the valve body at 45° from vertical.
- When selecting a location, allow sufficient room for accessories and for servicing the actuator.

Mounting

1. Actuators can be mounted in any upright position above the center line of a valve body.
2. When selecting a location, allow sufficient room for accessories and for service of the product.
3. Maintain proper flow direction when installing all globe and radiator-type valves. Flow direction is indicated by an arrow on the valve body or by information on the attached tag.

Table-3 Parts Selection for the AV-430 Valve Linkage.

Valve Body Description	Required Locknut	Required Stem Extension	Required Indicator Plate	Required Scale Length
Current Valves				
1/2" to 2" (VB-7XXX)	1/4" and 1/2"	Long for 1/4" Stem	With 1/2" Diameter Hole	1/2"
Obsolete Valves				
1/2" to 1-1/4" (obsolete VB-9XXX)	1/4" and 1/2"	Long for 1/4" Stem	With 1/2" Diameter Hole	1/2"
1-1/2" to 2" (VB-202, -212, -252, -304, -804, obsolete VB-9XXX)	1/4"	Medium for 1/4" Stem	With 1/4" Diameter Hole	1"
2-1/2" to 4" (VB-202, -252, -304, -804)	3/8"	Short for 3/8" Stem	With 3/8" Diameter Hole	1"
1/2" to 3" (VB-817)	3/8"	Short for 3/8" Stem *	With 3/8" Diameter Hole	1"
2-1/2" and 3" (VB-9323)	3/8"	Short for 3/8" Stem [a]	With 3/8" Diameter Hole	1"
4" to 6" (VB-817, VB-9323)	3/8"	Short for 3/8" Stem	With 3/8" Diameter Hole	1-1/2"

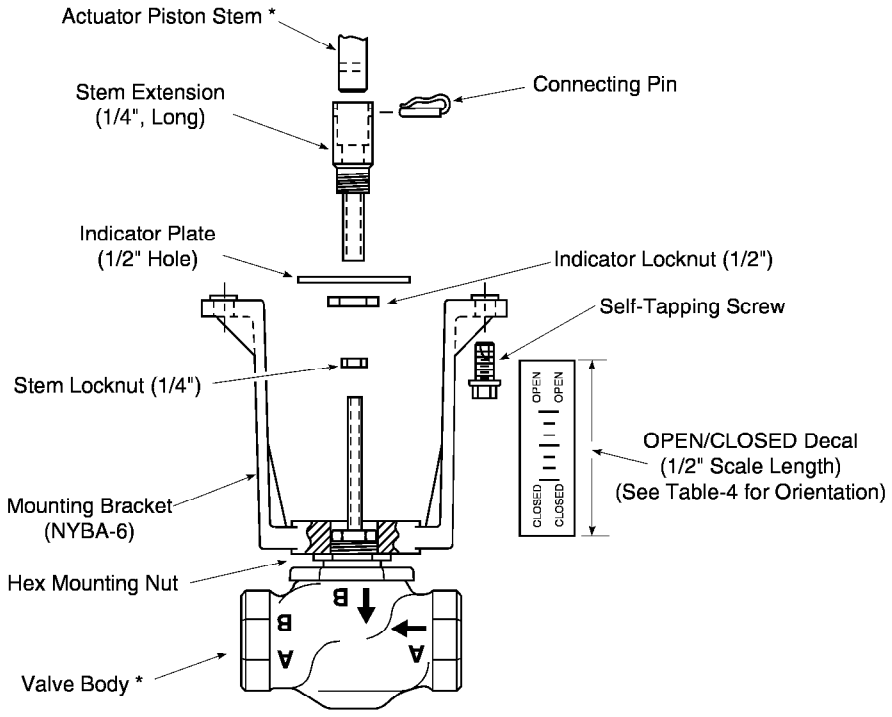
[a] Included with the valve body.

ASSEMBLY PROCEDURE

For installation on 1-1/2" and 2" VB-7XXX Valve Bodies

1. Thread the mounting bracket onto the hex head mounting nut on the valve body. See Figure-1.
2. Position the mounting bracket, then tighten the mounting nut against it, using a 1-5/8" open-ended wrench with a maximum thickness of 3/16" (TOOL-37).

Note: Install the mounting bracket in such a position as to make the wiring or piping of the actuator convenient.



* Not included with AV-430 Linkage Kit

Figure-1 Assembly of MK-66X1 Series Actuators onto 1-1/2" and 2" VB-7XXX Series Valve Bodies.

3. Select the required stem extension, stem locknut, and indicator plate from Table-3.
4. Thread the stem locknut onto the valve stem. Continue threading the locknut until it is positioned near the bottom of the exposed valve stem.
5. Position the indicator plate onto the valve stem.
6. Thread the stem extension well down onto the valve stem.
7. Position the actuator onto the mounting bracket.
8. Secure the actuator, using the two bolts provided. For a view of the completed assembly, see Figure-2.
9. Apply the OPEN/CLOSED decal (which features a 1/2" scale length) onto the mounting bracket. See Table-4 for the orientation of the decal.
10. Adjust the stem height according to the instructions in the Adjustments section.
11. Tighten the stem locknut against the stem extension to secure the stem extension in position on the valve stem.

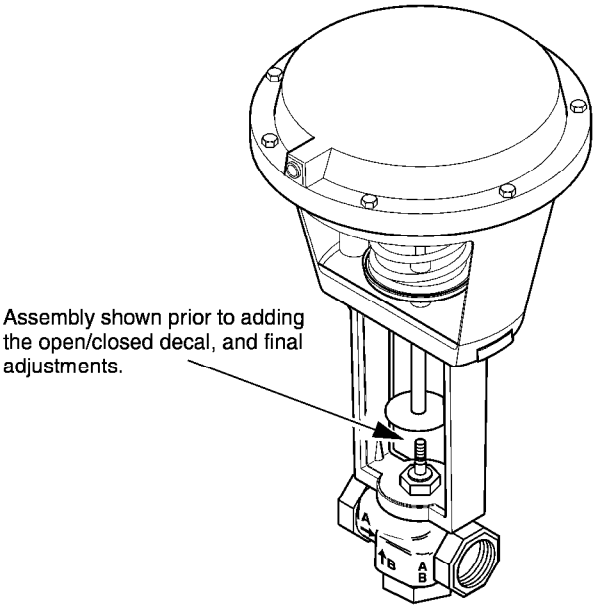


Figure-2 Typical MK-66X1 Series Actuator Using the AV-430 Valve Linkage.

Table-4 Orientation of OPEN/CLOSED Decal on Mounting Bracket.

Valve Body	Label Orientation
2-Way, Stem-Up, Open VB-721X VB-921X, VB-202, VB-212	"OPEN" End Towards Actuator
2-Way, Stem-Up, Closed VB-722X VB-922X, VB-252	"CLOSED" End Towards Actuator
3-Way, Mixing VB-731X VB-931X, VB-304, VB-804	Orientation Depends on Application: "OPEN" at Top Indicates Inlet Port "B" Is Open "OPEN" at Bottom Indicates Inlet Port "A" Is Open
3-Way, Diverting VB-7323 VB-9323, VB-817	Orientation Depends on Application: "OPEN" at Top Indicates Outlet Port "L" Is Open "OPEN" at Bottom Indicates Outlet Port "U" Is Open

For installation on Obsolete 1/2" to 1-1/4" VB-9XX3 and VB-9XX4 Valve Bodies with Obsolete MK-47X1 Actuators

1. Thread the mounting bracket onto the hex mounting nut on the valve body. See Figure-3.

Note: Install the mounting bracket in such a position as to make the piping of the actuator convenient.

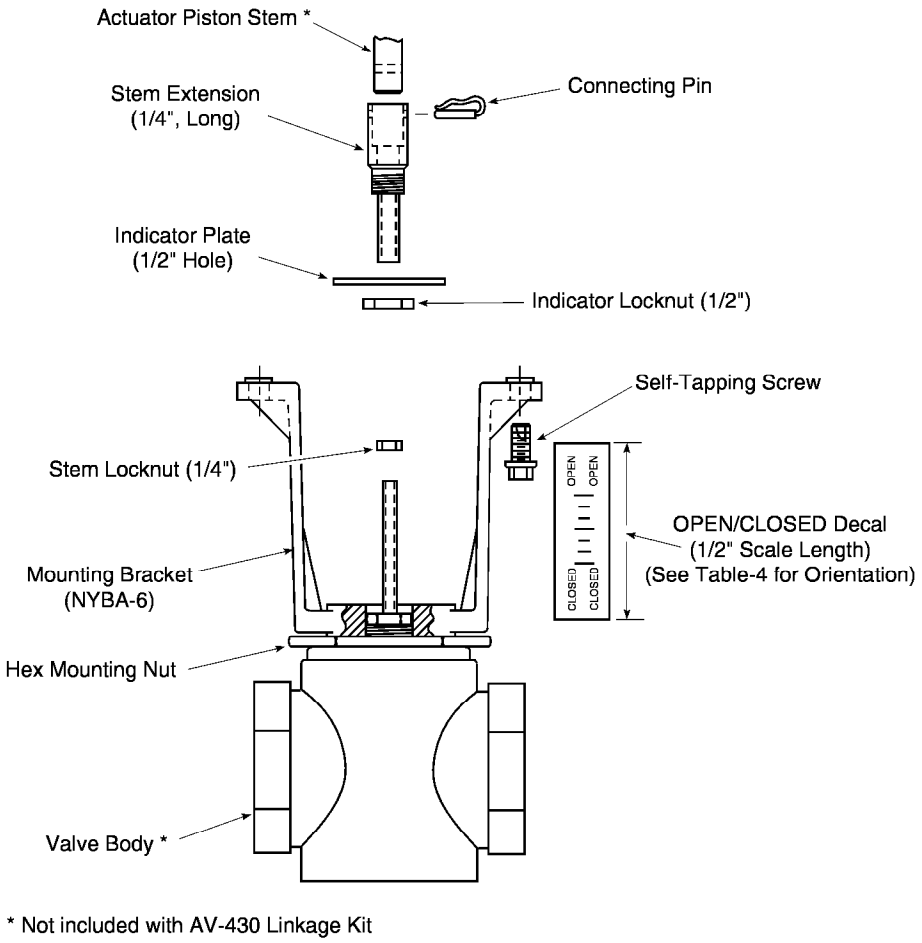


Figure-3 Assembly of MK-47X1 Series with 1/2" through 1-1/4" VB-9XX3 Series Valve bodies.

2. Position the mounting bracket, then tighten the hex mounting nut against it, using a 1-5/8" open-ended wrench with a maximum thickness of 3/16" (TOOL-37).
3. Select the required stem extension, two locknuts (1/4" and 1/2"), and indicator plate, according to Table-3.
4. Thread the 1/4" locknut onto the valve stem. Continue threading the locknut until it is positioned near the bottom of the exposed valve stem.
5. Position the indicator plate onto the stem extension. Thread the 1/2" locknut onto the stem extension to secure the indicator plate.
6. Thread the assembled stem extension onto the valve stem.
7. Install the MK-47X1 actuator onto the mounting bracket, using the two self-tapping screws provided. See Figure-4 for a view of the completed assembly.

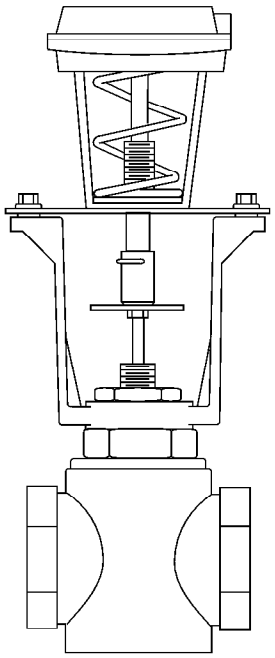


Figure-4 Typical MK-47X1 Series Actuator Using the AV-430 Valve Linkage.

8. Apply the OPEN/CLOSED decal (which features a 1/2" scale length) onto the mounting bracket. See Table-4 for the orientation of the decal.
9. Adjust the stem height according to the instructions in the Adjustments section.
10. Tighten the 1/4" locknut to secure the stem extension in position on the valve stem.

For installation on Obsolete 1-1/2" and 2" VB-9XX3 and VB-9XX4 Valve Bodies

1. Install the mounting bracket on a valve body as follows:

   Style "A" Valve Body

   a. Thread the mounting bracket onto the hex head mounting nut. See Figure-5.

   b. Position the mounting bracket, then tighten the mounting nut against it, using a 1-5/8" open-ended wrench with a maximum thickness of 3/16" (TOOL-37).

   c. Proceed to step 2.

Note: Install the mounting bracket in such a position as to make the wiring or piping of the actuator convenient.

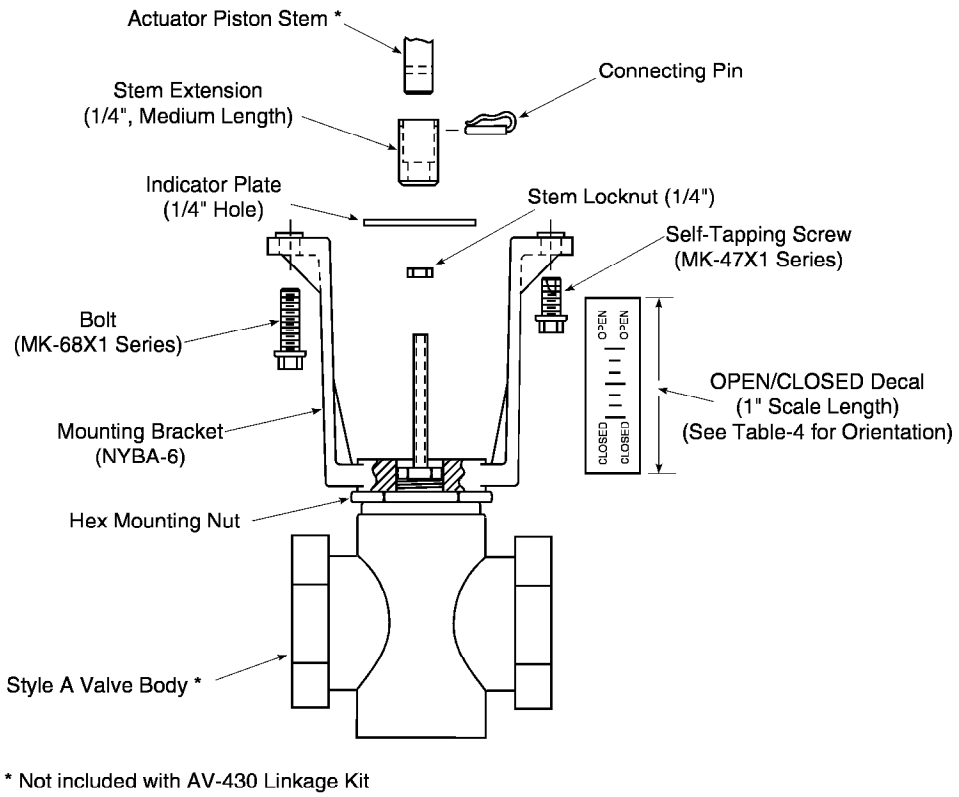


Figure-5 Assembly of MK-47X1 and MK-68X1 Series Actuators with Style "A" 1-1/2" and 2" VB-9XX3 and VB-9XX4 Series Valve Bodies.

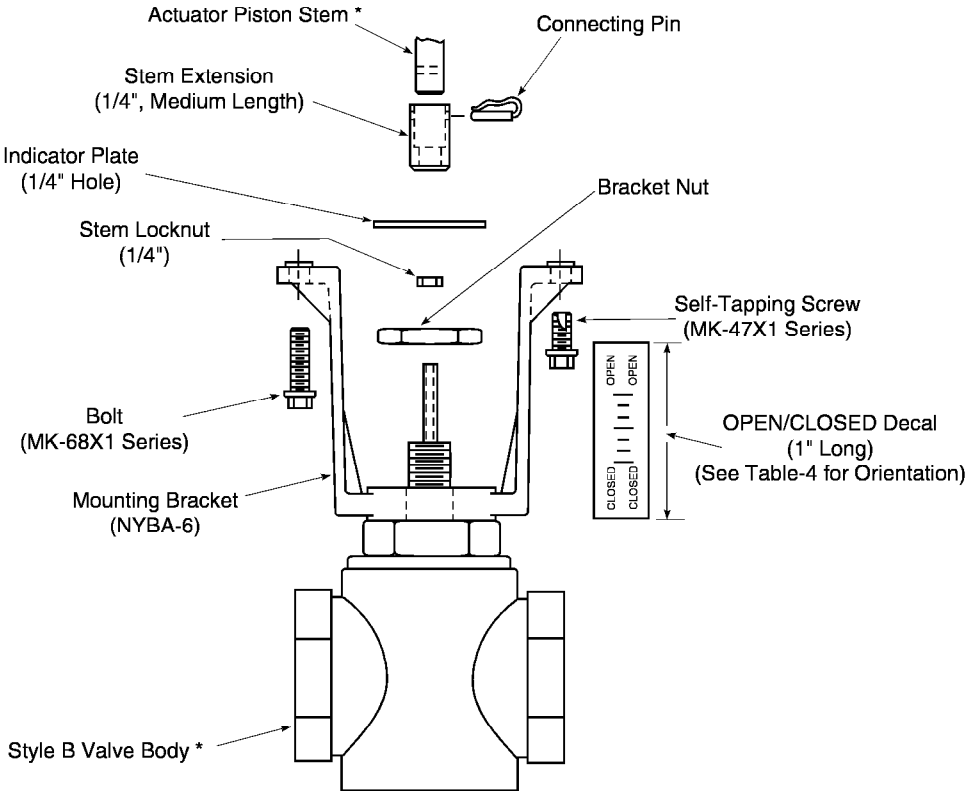
Style "B" Valve Body

a. Remove the bracket nut from the valve body.

b. Position the mounting bracket onto the valve body. See Figure-6.

c. Replace and tighten the bracket nut onto the valve body to secure the mounting bracket.

d. Proceed to step 2.



* Not included with AV-430 Linkage Kit

Figure-6 Assembly of MK-47X1 and MK-68X1 Series Actuators with Style "B" 1-1/2" and 2" VB-9XX3 and VB-9XX4 Series Valve Bodies.

2. Select the required stem extension, stem locknut, and indicator plate from Table-3.

3. Thread the stem locknut onto the valve stem. Continue threading the locknut until it is positioned near the bottom of the exposed valve stem.

4. Position the indicator plate onto the valve stem.

5. Thread the stem extension well down onto the valve stem.

6. Install the actuator on the mounting bracket as follows:

   MK-47X1Series Actuators

   a. Position the actuator onto the mounting bracket.

   b. Secure the actuator, using the two self-tapping screws provided. For a view of the completed assembly, see Figure-4 when an MK-47X1 actuator is used.

   MK-68X1 Series Actuators

   a. Position the actuator onto the mounting bracket.

   b. Secure the actuator, using the two bolts provided. For a view of the completed assembly, see Figure-7.

7. Apply the OPEN/CLOSED decal (which features a 1" scale length) onto the mounting bracket. See Table-4 for the orientation of the decal.

8. Adjust the stem height according to the instructions in the Adjustments section.

9. Tighten the stem locknut against the stem extension to secure the stem extension in position on the valve stem.

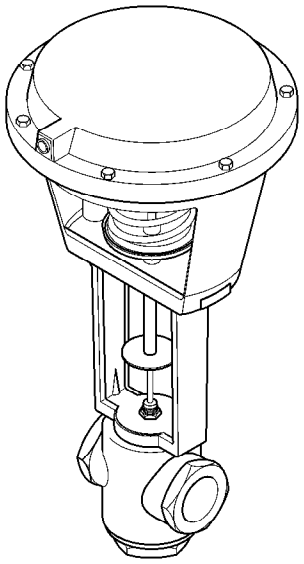


Figure-7 Typical MK-68X1 Series Actuator Using the AV-430 Valve Linkage.

For installation on VB-202, -212, -252, -304, -804, -807, and -817 (1-1/2" to 2") Valve Bodies

1. Install the mounting bracket onto the valve body as follows:
   a. Remove the packing nut and the bracket nut from the valve body.

Note: Install the mounting bracket in such a position as to make the wiring or piping of the actuator convenient.

   b. Position the mounting bracket onto the valve body. See Figure-8.
   c. Replace and tighten the bracket nut and packing nut onto the valve body to secure the mounting bracket.

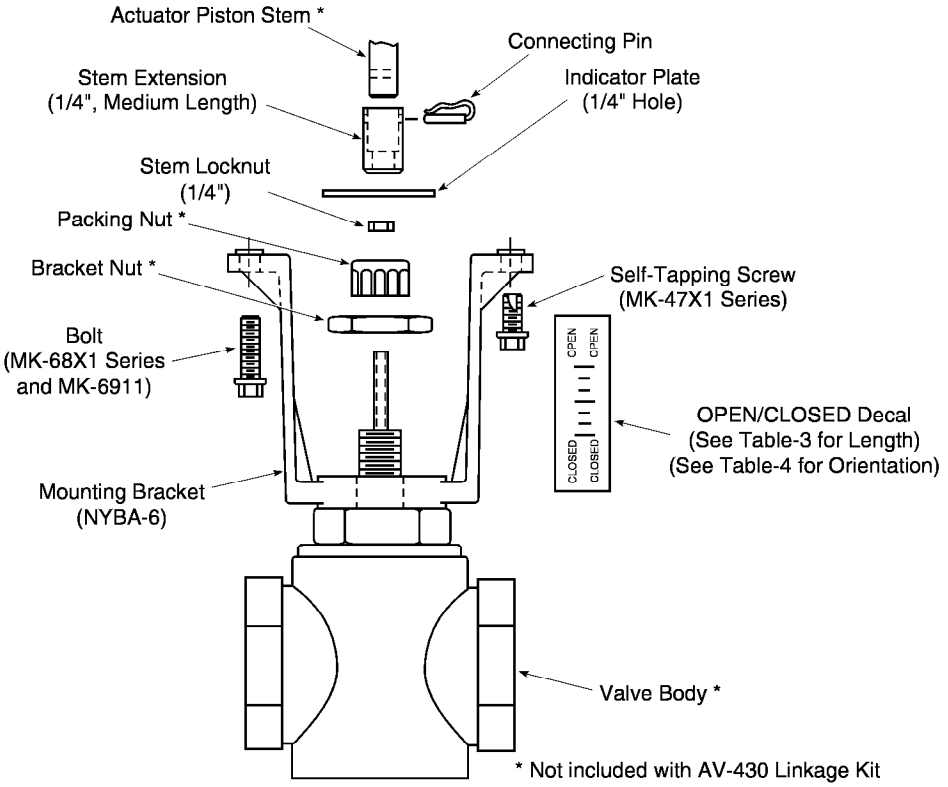


Figure-8 Assembly of MK-4700 and MK-6800 Series Actuators with VB-202, -212, -252, -304, -804, -807, -817, and VB-9323 (1-1/2" to 2") Series Valve Bodies.

2. Select the required stem extension, stem locknut, and indicator plate from Table-3.
3. Thread the stem locknut onto the valve stem. Continue threading the locknut until it is positioned near the bottom of the exposed valve stem.
4. Position the indicator plate onto the valve stem.
5. Thread the stem extension well down onto the valve stem.

6. Install the actuator onto the mounting bracket as follows:

   MK-47XX Series Actuators

   a. Position the actuator onto the mounting bracket.

   b. Secure the actuator, using the two self-tapping screws provided. For a view of the completed assembly, see Figure-4 when an MK-47XX actuator is used.

   MK-68XX and MK-6911 Series Actuators

   a. Position the actuator onto the mounting bracket.

   b. Secure the actuator, using the two bolts provided. For a view of the completed assembly, see Figure-7.

7. Adjust the stem height according to the instructions in the Adjustments section.

8. Apply the OPEN/CLOSED decal onto the mounting bracket. Refer to Table-3 for the required scale length. See Table-4 for the orientation of the decal.

9. Tighten the stem locknut against the stem extension to secure the stem extension in position on the valve stem.

For installation on VB-202, -212, -252, -304, -804, -807, -817, and VB-9323 (2-1/2" to 6") Series Valve Bodies

1. Install the mounting bracket onto the valve body as follows:
   a. Remove the packing nut and the bracket nut from the valve body.

Note: Install the mounting bracket in such a position as to make the wiring or piping of the actuator convenient.

   b. Position the mounting bracket onto the valve body. See Figure-9.
   c. Replace and tighten the bracket nut and packing nut onto the valve body to secure the mounting bracket.

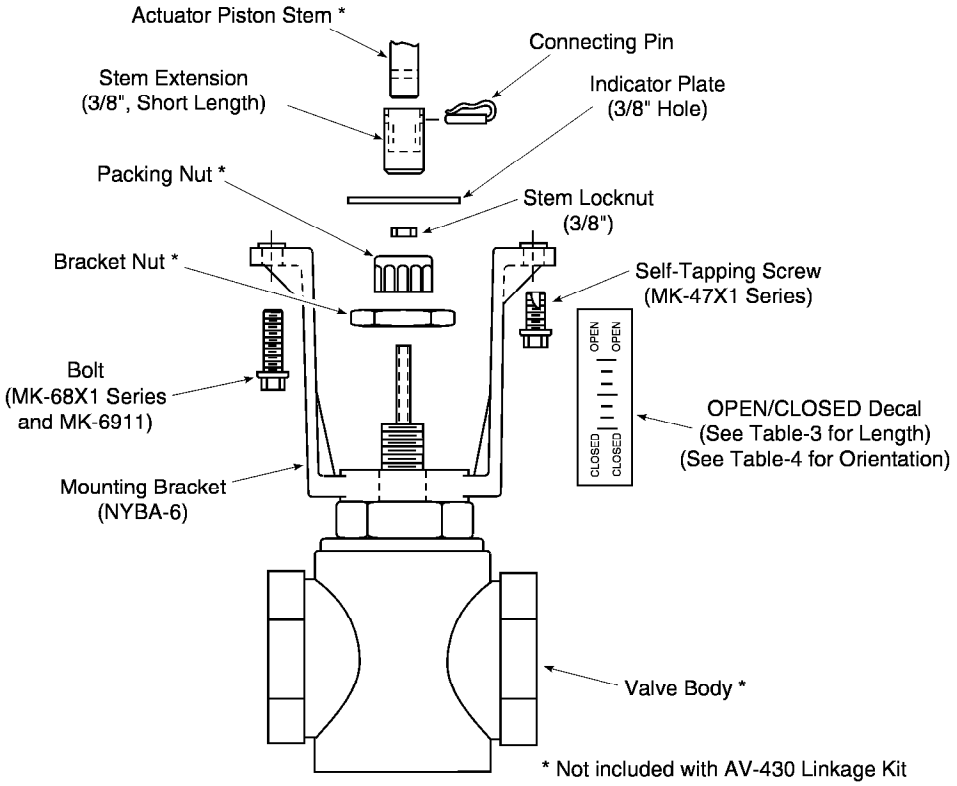


Figure-9 Assembly of MK-47X1, MK-68X1, and MK-6911Series Actuators with VB-202, -212, -252, -304, -804, -817, and VB-9323 (2-1/2" to 6") Series Valve Bodies.

2. Select the required stem extension, stem locknut, and indicator plate from Table-3.
3. Thread the stem locknut onto the valve stem. Continue threading the locknut until it is positioned near the bottom of the exposed valve stem.
4. Position the indicator plate onto the valve stem.
5. Thread the stem extension well down onto the valve stem.

6. Install the actuator onto the mounting bracket as follows:

   MK-47X1 Series Actuators

   a. Position the actuator onto the mounting bracket.

   b. Secure the actuator, using the two self-tapping screws provided. For a view of the completed assembly, see Figure-4 when an MK-47X1 actuator is used.

   MK-68X1 Series Actuators

   a. Position the actuator onto the mounting bracket.

   b. Secure the actuator, using the two bolts provided. For a view of the completed assembly, see Figure-7.

7. Adjust the stem height according to the instructions in the Adjustments section.
8. Apply the OPEN/CLOSED decal onto the mounting bracket. Refer to Table-3 for the required scale length. See Table-4 for the orientation of the decal.
9. Tighten the stem locknut against the stem extension to secure the stem extension in position on the valve stem.

Adjustments

For VB-202, VB-212, VB-9213, VB-9253, and VB-9273 Valve Bodies (2-Way, Normally Open)

Adjust the stem height as follows:

1. Apply supply air pressure to the actuator so that the actuator piston shaft is fully extended.
2. Push the valve stem down completely so that the valve disc is seated against the bottom valve seat.
3. Turn the stem extension only until the hole in the stem extension aligns with the hole in the actuator piston.
4. Turn the stem extension two full rotations upward, into the actuator piston.
5. Remove air pressure (actuator in the retract position) and insert the connecting pin into the aligned holes in the stem extension and actuator piston.

For VB-252, VB-304, VB-804, VB-817, VB-7223, VB-7263, VB-7283, VB-7323, VB-9223, VB-9263, VB-9283, VB-9313, and VB-9323 Valve Bodies (2-Way, Normally Closed and 3-Way)

Adjust the stem height as follows:

1. Without applying power, make sure the actuator is in the fully retracted position.
2. Make sure the valve stem is pulled completely up, so that the valve disc is seated against the top valve seat.
3. Turn the stem extension only until the hole in the stem extension aligns with the hole in the actuator piston.
4. Turn the stem extension two full rotations downward, away from the actuator piston.
5. Apply air pressure to put the actuator in the fully extended position and insert the connecting pin into the aligned holes in the stem extension and actuator piston.

For VB-7213, VB-7253, and VB-7273 Valve Bodies (2-Way, Normally Open)

Adjust the stem height as follows:

1. Without applying air, make sure the actuator is in fully retracted position.
2. Make sure the valve stem is pulled completely up (Full Open Position).
3. Turn the stem extension until the hole in the stem extension aligns with the hole in the actuator piston.
4. Insert the connecting pin into the aligned holes in the stem extension and actuator piston.

CHECKOUT

When assembly is completed, operate the actuator full-stroke several times to verify valve close-off and the performance of the assembly.

MAINTENANCE

The actuator linkage requires no maintenance.

Regular maintenance of the total system is recommended to assure sustained, optimum performance.

FIELD REPAIR

None. Replace an inoperative actuator linkage with a functional unit.

DIMENSIONAL DATA

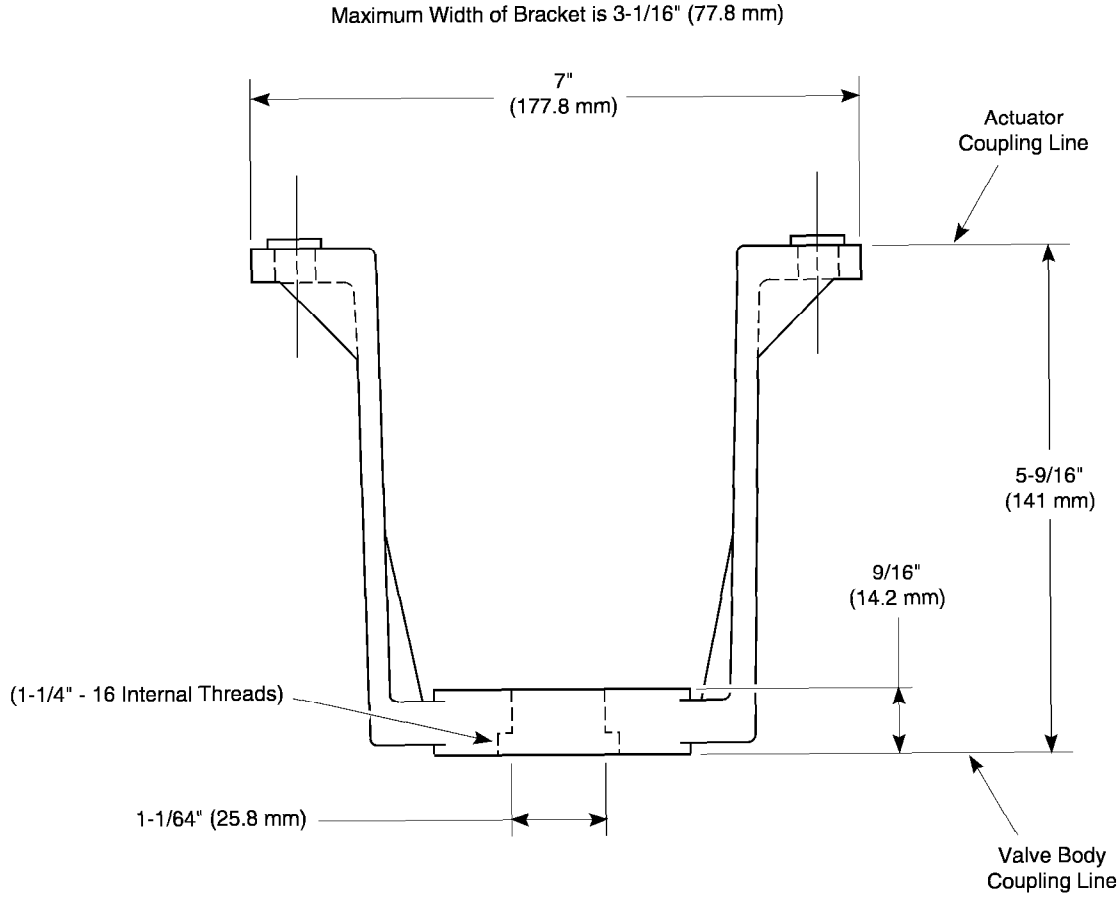


Figure-10 Dimensions of the Valve Linkage Mounting Bracket.