



# JORDAN VALVE

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## I & M 667M Series

### Installation & Maintenance Instructions for the 667M Series Diaphragm Actuator

**Warning:** Jordan Valve Control Valves must only be used, installed and repaired in accordance with these Installation & Maintenance Instructions. Observe all applicable public and company codes and regulations. In the event of leakage or other malfunction, call a qualified service person; continued operation may cause system failure or a general hazard. Before servicing any valve, disconnect, shut off, or bypass all pressurized fluid. Before disassembling a valve, be sure to release all spring tension.

## INTRODUCTION

All Jordan Valve actuators are to be installed and maintained in accordance with instructions supplied by Jordan Valve.

This manual includes information on installing, maintaining and adjusting the 667M Actuator, sizes 30 to 70. Part numbers for the entire assembly is also included. For information on other equipment used with these actuators, consult the appropriate manuals.

## INSTALLATION

The 667M Diaphragm Actuator is usually delivered mounted on a Jordan Valve valve body. When installing the valve body into the pipeline, consult the instructions for that particular valve body.

Should you have any questions during the installation procedure, consult your Jordan Valve Representative.

### Actuator Mounting

1. Install the stem locknuts onto the valve stem and place the travel indicator disc onto the locknuts.
2. If the valve is direct-acting, push the valve stem down to close the valve. If the valve is reverse-acting, push the valve stem down to open the valve.
3. Place the actuator onto the valve bonnet. If necessary, use a hoist or lift the actuator in order to slip the yoke locknut over the valve stem.
4. Screw the yoke locknut onto the bonnet securing the actuator to the bonnet.
5. Apply required supply pressure to actuator. If using a 6-30 signal, apply 35 psi. If using a 3-15 signal, apply 20 psi to move the actuator stem to the top of the travel.

6. Align the indicator disc with the travel side on the actuator by adjusting the locknuts.
7. Raise the valve plug until the travel disc aligns with the top of the scale (full travel).
8. Clamp the actuator and valve body stems between the two stem connector halves. Insert and tighten both stem connector cap screws.

**Note: Avoid clamping the tip of either the valve stem or the actuator stem in the stem connector. Failure to completely clamp the stems may strip the threads and affect proper operation. The length of each stem clamped in the stem connector should be equal to or greater than the diameter of that stem.**

9. Lift the travel indicator disc to the stem connector and thread the stem locknuts against the stem connector.
10. Realign the travel indicator scale to show the valve position.

### Loading Connection

1. The loading pressure is connected to the 1/4-inch NPT connection in the side of the yoke.
2. For the 667M Series Actuator Size 70, remove the 1/4-inch bushing in the 1/2-inch NPT female connection to increase the connection size if desired. Piping or tubing can be used, but should be kept as short as possible to avoid transmission lag in the control signal. If an accessory is attached to the actuator ensure that it has been properly secured.
3. If the valve positioner is provided as part of the original equipment, the loading pressure connection will be made at the Jordan Valve manufacturing facility.
4. Check the valve stem travel by cycling the actuator several times. Ensure that the proper travel occurs when the correct pressure range is applied to the diaphragm.

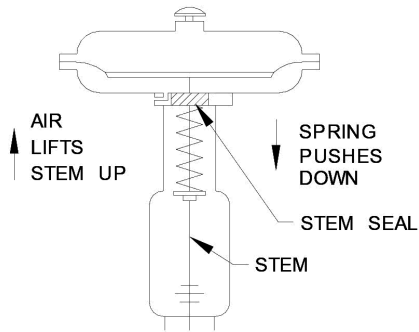


Figure 1: Schematic of 667M Actuator

**Loading Connection cont'd**

5. If the valve stem travel or pressure range is in correct, refer to the "Adjustments" section of this manual.

Do not place the valve in service if it is not responding properly to diaphragm loading pressure changes.

For ease of service, ensure that the control valve is located for easy access and serviceability with room above for accessibility. Ensure that sufficient room is provided below should removal of the actuator and valve plug be necessary.

**ADJUSTMENTS**

**Travel**

Refer to the nameplate on the yoke of the actuator for details on the specific construction and operating range of the control valve assembly.

The requirements of your specific application will dictate the spring and diaphragm used in your 667M Actuator, and when in service, the actuator should create full travel of the valve plug when diaphragm pressure is applied according to the range indicated on the nameplate. Generally, the diaphragm pressure range is 3 to 15 PSI or 6 to 30 PSI, but other ranges may be used.

If the motion during the actuator travel differs from the travel stamped on the actuator nameplate, adjust according to the following directions. In order to adjust the travel of a direct-acting valve, slightly pressure the actuator to move the valve plug off of the seat. This reduces the chance of damaging the valve plug or seat during adjustments.

1. Loosen and back off the stem locknuts and indicator disc from the stem connector.
2. Loosen the stem connector cap screws.

**Note: Do not use wrenches or other tools directly on the valve stem as this could cause damage to the stem surface and valve packing.**

3. Tighten the locknuts (Keys 14 and 20) and complete the adjustment by either screwing the valve stem into the stem connector to lengthen travel or out of the stem connector to shorten travel.
4. Cycle the actuator to ensure that the correct travel has been achieved and repeat the adjustment if necessary.
5. When the correct travel has been reached tighten the stem connector cap screws.
6. Raise the travel indicator disc by threading the stem locknuts against the stem connector.
7. Adjust the travel scale to match the disc.

**Spring**

If the loading pressure range applied to reach the desired travel differs from that specified on the nameplate, a spring adjustment is required.

Check the "Bench Set" pressure range on the nameplate when the valve contains no pressure and the packing is loosely inserted in the bonnet. Refer to the "Diaphragm Pressure" range on the nameplate when the valve is controlling the specified pressure drop and the packing is tightened to stop leaks around the stem.

1. Monitor the loading pressure while making adjustments. Be sure not to exceed the pressure specifications of either the loading regulator or the actuator casings.
2. Each actuator spring has a fixed pressure span. Changing the spring compression shifts the span up or down to make the valve travel coincide with the loading pressure range.

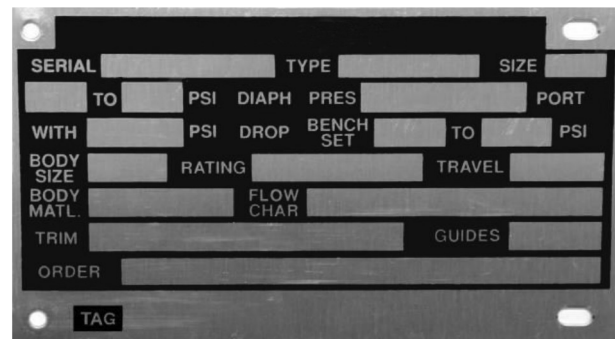


Figure 2: Nameplate on the 667M Actuator

## Spring Adjustments cont'd

- To shift the span up, turn the spring adjustor (Key 11) into the yoke. To shift the span down, turn the spring adjustor out of the yoke.

For operation of the 667M Diaphragm Actuator the actuator stem and valve plug stem must move freely in response to the loading pressure change on the diaphragm.

## MAINTENANCE

Actuator parts are subject to normal wear and tear and should be inspected regularly. The frequency of inspection and replacement of parts is dependent on the severity of operating conditions.

### WARNING:

**A sudden release of pressure or any uncontrolled process fluid can cause personal injury or damage to property. Prior to any disassembly, be sure to:**

- **Isolate the valve from the process,**
- **Release all process pressure**
- **Vent the actuator loading pressure, and**
- **Relieve all spring compression.**

### Disassembly

Although the following instructions describe how the 667M Diaphragm Actuator can be completely disassembled, when inspection or repairs are required, only disassemble those parts required to accomplish the job. Key numbers refer to Figures 3 and 4.

- Bypass the control valve and reduce the loading pressure to atmospheric.
- Remove the tubing or piping from the connection in the top of the yoke (Key 9). For top-loaded construction also remove the piping or tubing from the connection in the upper diaphragm casing (Key 7).
- Thread the spring adjustor (Key 2) off the stem (Key 3) to remove all spring compression.
- If necessary remove the actuator from the valve body by separating the stem connector (Key 21) and removing the yoke locknut.
- Remove the spring adjustor (Key 2) from the actuator stem (Key 3) and lift the spring seat and spring (Keys 4 and 1) out of the yoke.
- Remove the diaphragm casing cap screws and nuts (Keys 10 and 14) and lift off the upper diaphragm casing (Key 7).
- Remove the following parts: diaphragm (Key 6), diaphragm plate (Key 5), spacer (Key 32),

cap screw (Key 11) and actuator stem (Key 3). Be careful not to damage the O-rings (Key 25) when pulling the threads of the actuator stem through the seal bushing (Key 24). Remove the stem through the housing of the yoke so as not to pull the threads through the seal bushing.

- Separate the parts of this assembly by removing the cap screw (Key 11).
- To remove the seal bushing, remove the snap-ring (Key 30) and lift out the bushing.
- Remove the cap screws (Key 19), the lower diaphragm casing (Key 8) and the gasket (sizes 30 through 60) or O-ring (size 70) (Key 28).
- If necessary, the down travel stops can be removed (Key 33).

### Assembly

- Place a new gasket or O-ring (Key 28) on the yoke (Key 9) and apply lubricant to the O-ring.
- Position the lower diaphragm casing (Key 8) on the yoke, align the holes and insert and tighten the cap screws (Key 19).
- If the down travel stops (Key 33) were removed, insert and tighten them.
- Coat the O-rings (Keys 28 and 29) with lubricant and place them in the seal bushing (24).
- Fill the seal bushing with lubricant, slide the bushing into the yoke (Key 9) and install the snap ring (Key 30).
- Insert the actuator stem (Key 3) through the spring housing of the yoke, then add the lower diaphragm plate (Key 29), diaphragm (Key 6), diaphragm plate (Key 5), and the travel stop cap screw and spacer (Keys 11 and 32).
- Place this assembly in the actuator, being careful when pushing the actuator stem through the seal bushing that the threads do not damage the O-rings.

**Note: Over tightening the diaphragm cap screws and nuts can damage the diaphragm. Do not exceed 20 foot-pounds (27 Newton meters) torque.**

- Install the upper diaphragm casing (Key 7) and secure with cap screws and nuts (Keys 10 and 14). Tighten evenly using a crisscross pattern to ensure a proper seal.
- Install the actuator spring (Key 1) and spring seat (Key 4). Apply lubricant to the threads of the actuator stem and to the surface of the spring adjustor (Key 2) that contacts the spring seat. Thread the spring adjustor onto the actuator stem.
- Mount the actuator onto the valve, following procedures in the "Installation" section of this manual.

## 667M ACTUATOR PARTS LIST

The following parts list includes complete part numbers for components of the 667M Actuator that are generally replaceable in the field, and are most commonly used. Key numbers correspond to those in Figures 3 and 4. Include the serial number of your actuator in all correspondence regarding replacement parts.

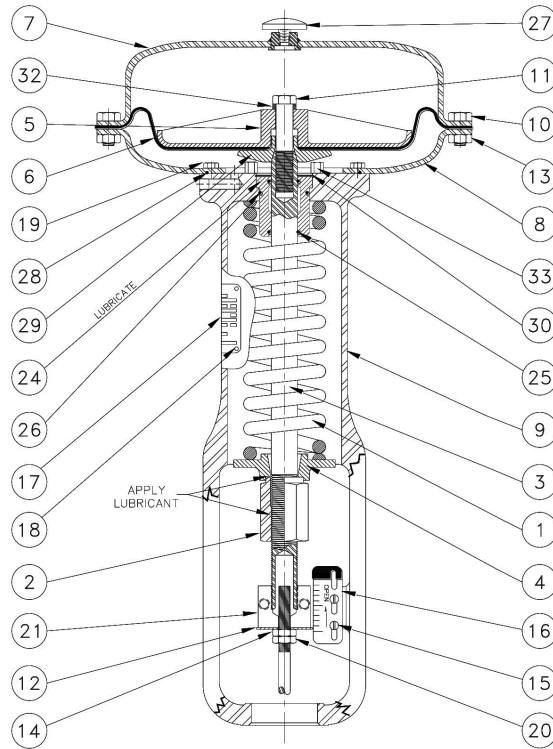


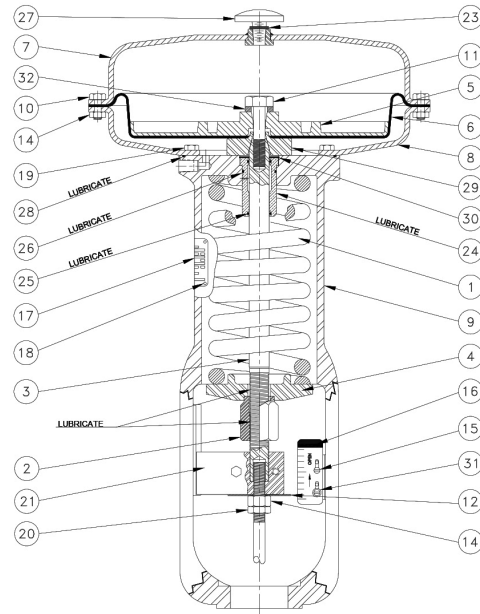
Figure 3: 667M Actuator, Sizes 30 through 60

Table 1: Parts Reference

Key	Part Name	Key	Part Name	Key	Part Name
1	Actuator Spring	12	Travel Indicator	23	Pipe Bushing (Size 70 only) (not shown)
2	Spring Adjuster	13	Hex Nut	24	Seal Bushing
3	Actuator Stem	14	Hex Jam Nut	25	O-Ring
4	Spring Seat	15	Self-Tapping Screw	26	O-Ring
5	Diaphragm Plate	16	Travel Indicator Scale	27	Vent assembly
6*	Diaphragm	17	Nameplate	28	Gasket/ O-Ring
7	Upper Diaphragm Case	18	Drive Screw	29	Lower Diaphragm Plate
8	Lower Diaphragm Case	19	Bolt	30	Snap Ring
9	Yoke	20	Hex Nut	31	Washer
10	Bolt	21	Stem Connector	32	Spacer
11	Cap Screw	22	Twin Speed Nut (not shown)	33	Down Stop

\* Recommended spare part

## 667M SERIES DIAPHRAGM ACTUATOR



**Figure 4: 667M Actuator, Size 70**

**Table 2: Parts List**

Key	Description	Part Number		
1	Actuator Spring	Consult Jordan Valve		
2	Spring Adjustor	Size 30	1E801724102	
		Sizes 34, 40	1E821024102	
		Sizes 45, 46, 50, 60	1E846224102	
		Size 70	1N131824102	
3	Actuator Stem Steel, CD PL	Size 30	1E801624222	
		Size 34	1E884724222	
		Size 40	1E820924222	
		Sizes 45, 46	1J332824222	
		Sizes 50, 60	1E846124222	
		Size 70	2N131724222	
4	Spring Seat	Size 30, Steel	1U425623122	
		Sizes 34,40, Steel	1R179923122	
		Sizes 45, 46, 50, 60, Steel	1R180023122	
		Size 70	Cast Iron	1N129619052
			Steel	1N757722012
5	Diaphragm Plate	Size 30, Aluminum	30A2880X012	
		Sizes 34,40, Cast Iron	3E880519042	
		Sizes 45, 50, Aluminum	30A2882X012	
		Sizes 46, 60, Cast Iron	2E847519042	
		Size 70, Cast Iron	2N127019042	
6	Diaphragm Nitrile	Size 30	2E800002202	
		Sizes 34, 40	2E669902202	
		Sizes 45, 50	2E859602202	
		Sizes 46, 60	2E859802202	
		Size 70	2N130902202	

667M SERIES DIAPHRAGM ACTUATOR

Table 2: Parts List, continued

Key	Description	Part Number	
7	Upper Diaphragm Casing Steel	Size 30	2E800728992
		Sizes 34, 30	2E681428992
		Sizes 45, 50	3E844628992
		Sizes 46, 60	3E846728992
		Size 70	2N127828992
8	Lower Diaphragm Casing Steel	Size 30	2E801125062
		Sizes 34, 40	2E682625062
		Sizes 45, 50	3E845325062
		Sizes 46, 60	3E847725062
		Size 70	2N131025062
9	Yoke Cast Iron	Size 30	3E801419042
		Size 34	2E884619042
		Size 40	3E820819042
		Sizes 45, 46	3E900819042
		Sizes 50, 60	3E845919042
		Size 70	3N130319042
10	Cap Screw Steel, CD PL	Size 30 (12 req'd)	1E760324052
		Sizes 34, 40 (16 req'd)	1E760324052
		Sizes 45, 50 (20 req'd)	1A675124052
		Size 46, 60 (24 req'd)	1A675124052
		Size 70 (28 req'd)	1A582824052
11	Cap Screw	See Following Table	
12	Travel Indicator, SST	Sizes 30, 34	1E793138992
		Sizes 40, 45, 46	1E807538992
		Sizes 50, 60	1E832838992
		Size 70	1B971838992
13	Hex Nut, SST (Refer to Key 10 for quantities)	1A346524122	
14	Hex Jam Nut, CD PL	Sizes 30, 34 (2 req'd)	1P131224142
		Size 40 (1 req'd)	1A413224122
		Size 45 (None req'd)	---
		Size 46 (1 req'd)	1A413224122
		Sizes 50, 60, 70 (1 req'd)	1A375424122
15	Self-tapping Screw, SST	Sizes 30, 34, 40, 45, 46 (2 req'd)	1E793238992
		Sizes 50, 60, 70 (2 req'd)	1E831338992
16	Travel Indicator Scale, SST	See Following Table	
17	Nameplate, SST	1K325738992	
18	Drive Screw, SST (4 req'd)	1A368228982	
19	Cap Screw CD PL	Size 30 (6 req'd)	1D529824052
		Sizes 34, 40 (6 req'd)	1A368424052
		Sizes 45, 46, 50, 60 (8 req'd)	1A368424052
		Size 70 (12 req'd)	1N129328992

667M SERIES DIAPHRAGM ACTUATOR

**Table 2: Parts List, continued**

Key	Description	Part Number	
20	Hex Nut CD PL	Sizes 30, 34 (None req'd)	---
		Size 40 (1 req'd)	1A353724122
		Size 45 (2 req'd)	1A353724122
		Size 46 (1 req'd)	1A353724122
		Sizes 50, 60, 70 (1 req'd)	1A351124122
21	Stem Connector, STL	Sizes 30, 34	1E7977000A2
		Size 40	1E8033000A2
		Sizes 45, 46	1J3330000A2
		Sizes 50, 60	1E8337000A2
		Size 70	1N1319000A2
22	Twin Speed Nut, SST	Sizes 30, 34	1E793938992
		Sizes 40, 45, 46	1E808438992
		Sizes 50, 60, 70	1E833538992
23	Pipe Bushing, CD PL	Size 70	1C379026232
24	Seal Bushing, Brass	Size 30	1E791214012
		Sizes 34, 40	1E682814012
		Sizes 45 to 60	1E845714012
		Size 70	1N131614012
25	O-Ring, Nitrile (2 req'd)	Size 30	1E591406992
		Sizes 34, 40	1D237506992
		Sizes 45 to 60	1C562206992
		Size 70	1E736906992
26	O-Ring, Nitrile	Sizes 30, 34, 40	1C415706992
		Sizes 45, 46, 50, 60, 70	1E845806992
27	Vent Assembly		Y602X1A11
28	Gasket, Garlock	Sizes 30, 34, 40	1E801204022
		Sizes 45, 46, 50, 60	1E845404022
	O-Ring, Nitrile	Size 70	1D269106992
29	Lower Diaphragm Plate	Size 30, Aluminum	1E791344022
		Sizes 34, 40, Aluminum	1E682744022
		Sizes 45, 46, 50, 60, Aluminum	1E845544022
		Size 70, Steel	1N131524092
30	Snap Ring, SST	Sizes 30, 34, 40	1E801337022
		Sizes 45 to 70	1E845638992
31	Washer (2 req'd)	Size 70, Steel	1E873028992
32	Spacer, Steel		See Following Table
33	Down Stop, Steel	Sizes 30 to 40	1H493524092
		Sizes 45 to 60	1H494324092

## 667M SERIES DIAPHRAGM ACTUATOR

**Key 11 Cap Screw  
Key 32 Spacer, Steel**

Actuator Size	Key	Travel In (mm)			
		7/16 (11)	5/8 (16)	3/4 (19)	1-1/8 (29)
30	11	1A685724052	1A685724052	1B227524052	---
	32	1R408724092	1R408624092	1R408524092	---
34	11	1R408828992	1R408928992	1R408928992	---
	32	1R409324092	1R409424092	1R409524092	---
40	11	1R408828992	1R408828992	1R408928992	1R409128992
	32	1R409324092	1R409424092	1R409524092	1R409624092
45, 46, 50, 60	11	1R409824052	1R409824052	1R409824052	1R409924052
	32	1R410324092	1R410424092	1R410524092	1R410824092
70	11	---	---	1R411024052	1R411524092
	32	---	---	1R411624092	1R411124052

Actuator Size	Key	Travel In (mm)		
		1-1/2 (38)	2 (51)	3 (76)
30	11	---	---	---
	32	---	---	---
34	11	---	---	---
	32	---	---	---
40	11	1R409228992	---	---
	32	1R409724092	---	---
45, 46, 50, 60	11	1R410124052	1R410224052	---
	32	1R410624092	1R410724092	---
70	11	1R409824052	1R409924092	1R410224052
	32	1R411424092	1R411324052	1R410724092

**Key 16 Travel Indicator Scale**

Actuator Size	Travel In (mm)			
	7/16 (11)	5/8 (16)	3/4 (19)	1-1/8 (29)
30	1E793438992	1E793538992	1E793638992	---
34	1E793438992	1E793538992	1E793638992	---
40, 45, 46	1E807638992	1E807738992	1E808138992	1E808238992
50	1E833038982	1E833038992	1E833138992	1E833238992
60	1F535238982	1E833038992	1E833138992	1E833238992
70	---	---	1H745738992	1H745838992

Actuator Size	Travel In (mm)		
	1-1/2 (38)	2 (51)	3 (76)
30	---	---	---
34	---	---	---
40, 45, 46	1E803838992	1R444538982	---
50	1E833338992	1E833438992	---
60	1E833338992	1E833438992	---
70	1H745938992	1H746038992	1H746138992



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