



# LOWFLOW

a division of Jordan Valve

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## I & M Mark 708HP / 708HPA

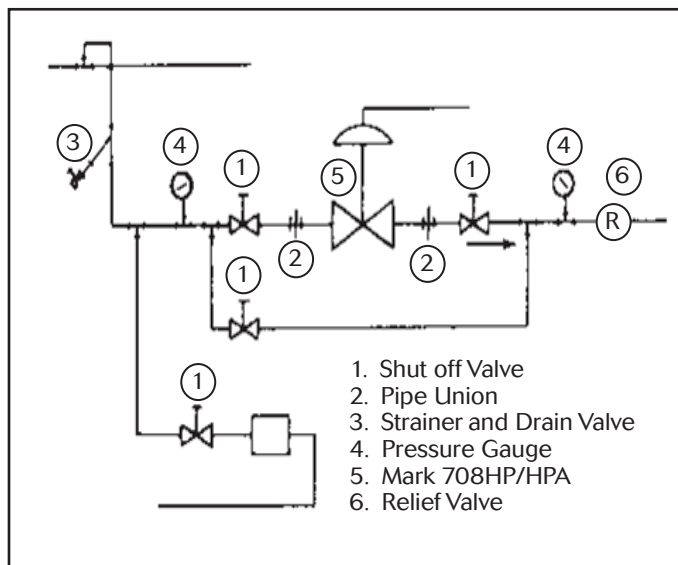
### Installation & Maintenance Instructions for Mark 708HP/708HPA 35M Actuator

**Warning:** Jordan LowFlow 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.

### Please read these instructions carefully!

Your Jordan LowFlow Valve product will provide you with long, trouble-free service if it is correctly installed and maintained. Spending a few minutes now reading these instructions can save hours of trouble and downtime later. When making repairs, use only genuine Jordan Valve parts, available for immediate shipment from the factory.

### Ideal Installation



1. To control very low flow rates, Mark 708HP/HPA control valves are often provided with trims having very small clearances. To keep this trim functioning properly, it is essential that the fluid flowing through the valve be clean.
2. To protect the valve from grit, scale, thread chips and other foreign matter, ALL pipelines and piping components should be blown out and thoroughly cleaned before the installation process begins.
3. Shutoff valves, pressure gauges, and by-pass piping should be installed as indicated in the Ideal Installation Schematic to provide easier adjustment, operation and testing.
4. A line strainer should be installed on the inlet side of the valve to protect it from grit, scale, and other foreign matter. A 0.033 perforated screen is usu-

- ally suitable for this purpose. Line strainers are available from Jordan Valve.
5. For best control, 3' 0" straight sections of pipe should be installed on either side of the valve.
6. In preparing threaded pipe connections, care should be exercised to prevent pipe-sealing compound from getting into pipelines. Pipe sealing compound should be used sparingly, leaving the two end threads clean. Jordan uses, and recommends, thread sealer Teflon ribbon.
7. The flow arrow on the valve body must be pointed in the direction of the flow. Ideally the valve should be installed in the highest horizontal line of piping to provide drainage for inlet and outlet piping, to prevent water hammer, and to obtain faster response.
8. If possible, install a relief valve downstream from the valve. Set at 15 psi above the control point of the valve.
9. In hot vapor lines, upstream and downstream piping near the valve should be insulated to minimize condensation.
10. Evaluate inlet and outlet pipe friction losses and velocities to decide when smaller outlet piping might cause, excessive back pressure. When required, a standard tapered expander connected to the outlet of the valve is recommended.
11. Where surges are severe, a piping accumulator is recommended.

### Start-Up Procedure

1. Be sure that the action of the control valve and of the controller are such that you achieve the desired results. The action can be changed if needed using the instructions shown in "Reversing Action".

Increase in temperature or pressure must:	And the action of the valve is:	Then the action of the controller must be:
Close Valve	Air to Close (direct)	Direct
Close Valve	Air to Open (reverse)	Reverse
Open Valve	Air to Close (direct)	Reverse
Open Valve	Air to Open (reverse)	Direct

2. The control valve has been pre-set by Jordan Valve, however, finer adjustment may be required to compensate for the system conditions of your application.
3. With inlet, outlet and bypass shutoff valves closed, and no pressure in the down stream line, fully open the outlet valve. Slowly open the inlet valve just enough to start flow through the control valve. Increase the flow gradually by slowly opening the inlet shutoff valve. Do not fully open the inlet valve until you are sure that the controller and control valve have control of the system. Usually, the handwheel on the inlet valve will turn freely when this point is reached.
4. To shut off the line fluid, close the inlet shutoff valve first, and then close the outlet shutoff valve.

## Maintenance

**Caution: Make certain that there is no pressure in the valve before loosening any fittings or joints. The following steps are recommended:**

1. Close the inlet shutoff valve.
2. Allow pressure to bleed off through the downstream piping. Do not attempt to reverse the flow through the valve by bleeding pressure from the upstream side of the valve.
3. When the pressure gauges indicate that all pressure has been removed from the system, close the outlet shutoff valve, and the valve may be serviced.

**Note: refer to the drawing at the end of this document for description and proper orientation of parts.**

To reduce maintenance time, refer to proper figure and follow steps indicated below for applicable maintenance operation.

Proposed Maintenance Procedure	Follow Steps...
Renewing stem packing	Packing Replacement
Valve Disassembly, Inspecting Parts, Replacing Plug or Seat Ring	Valve Disassembly
Valve Reassembly	Valve Reassembly
Actuator Spring Preload Adjustment	Actuator Spring Load Adjustment
Actuator Maintenance	Actuator Maintenance
Changing Valve Action	Reversing Action
Motor Valve Seat Spring Preload	Motor Valve Seat Spring Preload

### Packing Replacement

Renew valve plug stem packing if control valve has been in service beyond normal maintenance, and packing shows signs of wear. Wear will be indicated by leakage, which cannot be corrected by minor tightening of the packing flange. An additional packing ring can be installed to overcome minor leakage without dismantling the control valve or breaking valve plug connection.

1. Remove the actuator from the bonnet. (See Removing Actuator from Valve.)

2. Remove all of the packing and discard. Clean valve stem and packing box thoroughly. The valve stem may be dressed with a very fine crocus cloth, but generally it is best not to as the stem has a fine machined finish. Use approved non-residue-forming solvent for cleaning. Wipe dry with clean cloth.
3. Insert a new set of packing in packing box. Press each ring down in place with a tube as it is installed.
4. After packing is installed, assemble packing adapter, gland, and gland nuts. Tighten the nuts hand tight.
5. The final packing adjustment should be made with the valve pressurized and the packing tightened just enough to stop any leakage, while stroking the valve. Excessive tightening could cause the stem to stick and result in improper valve operation due to high friction forces.

### Removing Actuator from Valve

1. **Direct Acting Actuator (ATC):** Shut off pressure to the actuator and remove supply tubing from the actuator case. **Reverse Acting Actuator (ATO):** Apply approximately 12 psig air pressure to the actuator to lift the plug off of the seat.
2. Remove the actuator from the valve as follows: loosen the two stem nuts and move them down the stem. Lock these nuts together. Remove the packing nut and yoke lock nut. Using a wrench on the nuts and on the flats of the actuator stem, turn the valve stem (while holding the actuator stem in place) until the stems disengage. The actuator will be free of the valve.

## Body & Bonnet Disassembly

1. For actuator removal, refer to section on "Removing Actuator".
2. Remove the bonnet ring nut (4).
3. Remove stem nuts (32) and indicator (19). Pull the bonnet (3) straight up and out of the body (1). Withdraw the plug/stem(5) downward to remove from the bonnet (3).
4. Using a hook tool, carefully remove the flex seal (34) from the groove in the bonnet bore and discard. Using a deep socket wrench, remove the seat (2) from the body (1).
5. Clean all parts with a non-residue forming solvent. Remove encrusted material with a very fine crocus or aluminum oxide cloth. DO NOT attempt to polish the seating surface or trim surface (the portion of the plug that enters the seat bore.) The machining tolerances on these parts are closely controlled and flow values could change as a result.
6. Inspect all parts and replace those that are worn or damaged. The flex seal (34) cannot be re-used and must be replaced every time the bonnet is removed, and replacement of the packing set (33) is generally advisable.

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## Valve Reassembly

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1. Lubricate the seat (2) threads with a suitable lubricant such as NO-LOK and thread the seat into the body (1) (Note: Mk708HPA body is an angle pattern with the inlet at the bottom, however all instructions still apply). Tighten to 20 ft-lbs (240 in-lbs).
2. Install the metal seat ring (34) into its groove in the body.
3. Coat the guide portion of the plug/stem (5) with DOW CORNING G-n Metal Assembly Spray (750° F) according to manufacturer's instructions. Insert the plug/stem into the bonnet (3).
4. Coat the coarse exterior bonnet threads on the body (1) with a suitable anti-seize compound intended for use on stainless steel. Install the bonnet (3) onto the body, and then thread the bonnet ring nut (4) over the bonnet and onto the threads on the body. Carefully push down on the stem to be sure that the plug has fully engaged the seat. Tighten the bonnet lock nut until a positive stop is felt.
5. Bring the yoke (6) into full contact with the bonnet (3) centering it on the hub. Install the yoke lock nut (7) and hand tighten.
6. Lubricate the packing set (33) with Dow Corning #6 and install the packing set into the bonnet bore. Thread the Packing nut (8) onto the bonnet (3) and tighten loosely. Assemble the two stem nuts (32) and indicator (19) all the way on to the stem threads.

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## Actuator Preload Adjustment

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### Direct Acting Valves (Air To Close)

1. Insert the valve stem (5) into the actuator stem (11). Hold the actuator stem with a wrench to prevent it from turning. Spring preload is adjusted by threading the valve stem (5) into the actuator stem (11). Hold the actuator stem from turning with a wrench and using the stem nuts (32) turn the valve stem. Threading the valve stem into the actuator stem increases preload and threading out decreases preload.
2. Load an air supply into the upper case. Slowly increase the air pressure up to 18.5 psig while observing the stem for movement. When the plug hits the seat, tighten the yoke lock nut (7) and also tighten the packing nut until it stops.
3. Correct spring preload is when the valve plug contacts the seat at the time the actuator pressure reaches 18.5 psig.
4. If seating occurs before 18.5 psig then increase the preload. If seating occurs at a pressure higher than 18.5 psig then decrease the preload.
5. After the preload is set, lock the stem nuts (32) against the actuator stem (11).
6. Reduce pressure to 11 psig and the valve should stroke approximately full open (0.500").

### Reverse Acting Valves (Air To Open)

1. Insert the valve stem (5) into the actuator stem (11). Hold the actuator stem with a wrench to prevent it from turning. Spring preload is adjusted by threading the valve stem (5) into the actuator stem (11). Hold the actuator stem from turning with a wrench and using the stem nuts (32) turn the valve stem. Threading the valve stem into the actuator stem decreases preload and threading out increases preload.
2. Slowly decrease the air pressure down to 11 psig while observing the stem for movement. When the plug hits the seat tighten the yoke lock nut (7) and the packing nut until it stops.
3. Correct spring preload is when the valve stem starts to move when the actuator pressure reaches 11 psig.
4. If movement occurs before 11 psig then increase the preload. If movement occurs at a pressure higher than 11 psig then decrease the preload.
5. After the preload is set, lock the stem nuts (32) against the actuator stem (11).
6. Increase pressure to 20 psig and the valve should stroke approximately full open (0.500").

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## Actuator Maintenance

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1. Remove the actuator as described in "Removing Actuator."
2. Remove the nuts (24) and bolts (25) which hold the upper actuator case (23) to the lower actuator case (9) and remove the upper actuator case.

### Direct Acting Actuator (ATC):

1. Remove the actuator stem bolt (22) and lift the seal washer (17), diaphragm (16), diaphragm plate (15), and spacer (27). Remove the actuator stem (24).
2. To check the stem o-ring (35), unscrew the gland nut (13) from the gland (12) and remove the stem o-ring from the end of the gland.

### Reverse Acting Actuator:

1. Remove springs (38)& (39) from diaphragm plate (15). Remove the actuator stem bolt (22) and lift spacer (27), diaphragm plate (15), diaphragm (16), seal washer (17) and seal ring (18) from the actuator stem (11).
2. Remove the actuator stem (11). To check the stem o-ring (35), unscrew the gland nut (13) from the gland (12) and remove the stem o-ring from the end of the gland.
3. Clean all parts with an approved, non-residue-forming solvent. Remove encrusted material with crocus cloth or very mild aluminum oxide cloth. Inspect all parts for excessive wear and/or damage. Replace any worn or damaged parts.

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## Reassembly of Actuator

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After all parts have been thoroughly cleaned and inspected, reassemble the actuator:

1. Assemble actuator bolt (22), fastener seal (18), seal washer (17) (with counter bore towards actuator bolt), diaphragm (16), diaphragm plate (15), spacer (27) and thread into the actuator stem (11) and tighten.
2. Set the diaphragm assembly down on a flat surface with the actuator stem facing up. Place small amount of Parker O-Lube or comparable lubricant on the actuator stem. Then place the inner and outer springs (38 & 39) on the diaphragm plate, nested over the stamped bosses, and one set in the middle over the actuator stem (11).
3. Take the yoke/ lower case assembly and place over the springs, centering the actuator stem (11) over the gland (12). Now take this entire assembly firmly holding the diaphragm assembly and the lower actuator case (9) together and flip it over (making sure the springs do not move out of position and are not hitting on any bolt heads (24A) from the lower case).
4. Place the upper actuator case (23) on the diaphragm, lining up the bolt holes.
5. Place the 2 longer bolts (24B) and nuts (25) 180° apart and tighten evenly to draw the upper case (23) down onto the lower case (9). Install the remaining bolts and nuts and tighten evenly while alternating across the actuator case.

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### 35M Reverse Acting Actuator ATC (Air to Close)

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1. Assemble actuator bolt (22), spacer (27), diaphragm plate (15), diaphragm (16), seal washer (17) (with counter bore towards actuator stem), fastener seal (18) and thread into the actuator stem and tighten.
2. Place diaphragm assembly down into lower case/ yoke assembly made in step 2, making sure to guide the actuator stem thru the gland. Line up the holes in the diaphragm (16) with the holes in the lower diaphragm case (9).
3. Place the inner and outer springs (38 & 39) on the diaphragm plate, nested over the stamped bosses, and one set in the middle over the actuator bolt(22)
4. Place the upper actuator case (23) on the diaphragm (16), lining up the bolt holes.
5. Place the 2 longer bolts (24B) and nuts (25) 180° apart and tighten evenly to draw the upper case (23) down onto the lower case (9). Install the remaining bolts (24A) and nuts (25) and tighten evenly while alternating across the actuator case.

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## Trouble Shooting

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### If You Experience Erratic Control:

- Oversizing can cause cycling or hunting (recalculate the size required).
- Undersizing can cause the control point to drop off under peak loads (increase the trim size).
- Inlet pressure to the valve maybe varying significantly and the controller may not be following it (adjust the controller).
- Control loop may require equal percentage trim if high rangabilities are being utilized. Steam traps may need reconditioning.
- Safety relief valves may be leaking.
- Valve stroke may be out of adjustment or there may be foreign matter in the valve preventing full movement.

### If You Experience Insufficient Flow:

- Check shutoff valves to be sure they are fully open.
- Inlet pressure to valve may be insufficient to provide the needed flow (check the inlet pressure with a pressure gauge).
- Strainers should be checked for clogging and blown down if needed.
- Steam traps may need reconditioning.
- Dirt in the trim may prevent the valve from passing its full capacity.
- Diaphragm failure or insufficient air pressure to reverse acting (air-to-open) actuators would prevent the valve from properly stroking open.
- Incorrect actuator spring adjustment in reverse acting actuators would prevent the valve properly stroking open.

### If You Experience Overpressure (outlet):

- Dirt in the trim may prevent valve from shutting off.
- Diaphragm failure, incorrect actuator spring adjustment, or insufficient air pressure to direct acting (air-to-close) actuators would prevent the valve from properly stroking closed.

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## Ordering Spare Parts

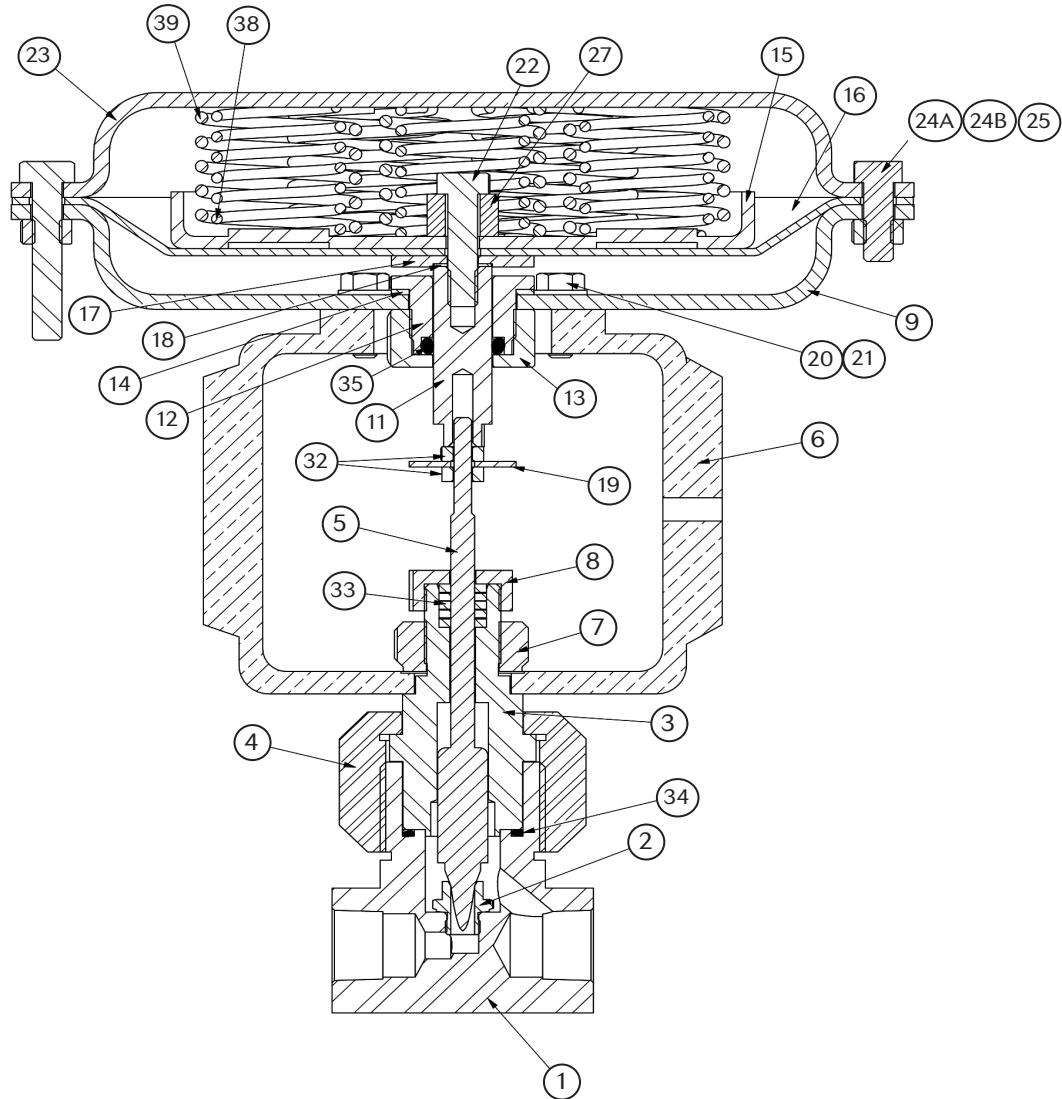
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Use only genuine Jordan Valve parts to keep your valve in good working order. So that we can supply the parts, which were designed for your valve, we must know exactly which product you are using. The only guarantee to getting the correct replacement parts is to provide your Jordan Representative with the valve serial number. This number is located on the valve identification tag. If the serial number is not available, the parts needed for your valve might be determined using the following information: Model Number, Valve Body Size, Seat Material and Cv Rating, Spring Range and Set Point, Trim Material, Part Name - Number and Quantity.

NOTE: Any parts ordered without a valve serial number that are found to be incorrect are subject to up to a minimum 25% restock charge when returned.



## Illustration and Parts List



Item	Description	Qty.	Item	Description	Qty.	Item	Description	Qty.
1	Body	1	13	Gland Nut	1	24A	HHCS, 5/16-18 X 0.875"	6
*2	Seat	1	14	Gasket	1	24B	HHCS, 5/16-18 X 1.75"	2
3	Bonnet	1	15	Diaphragm Plate	1	25	Nut, 5/16-18	8
4	Bonnet Ring Nut	1	16	Diaphragm	1	26	Travel Scale (not shown)	1
*5	Stem Plug	1	17	Seal Washer	1	27	Spacer	1
6	Yoke	1	18	Fastener Seal	1	32	Jam Nut, 1/4-28	2
7	Yoke Lock Nut	1	19	Washer	1	*33	Packing	1
8	Packing Nut	1	20	HHCS, 1/4-20 X 0.75"	6	*34	Metal Seat Ring	1
9	Lower Actuator Case	1	21	Threadseal	6	*35	O-Ring	1
11	Actuator Stem	1	22	HHCS, 5/16-18 X 1.25"	1	38	Inner Spring	7
12	Gland	1	23	Upper Actuator Case	1	39	Outer Spring	7
*	Recommended Spare Parts							