

SAM SUNG CONTROL VALVE Phone : 02-2634-9066 Fax : 02-2634-9067 http://www.samsungvalve.co.kr	Mark 708 installation & Maintenance Instructions	
	7M & 14M Actuator * Motor Valve Quick Change Trim * Double Packed Bonnet	
	WARNING : samsung control valves must only be used. Installed, and repaired in accordance with these instructions. Observe all applicable public and company codes and regulations. In case 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.	

Please read these instructions carefully! For best results, install and maintain the Mark 708 only as instructed. When making repairs, use only genuine Jordan Valve LOWFLOW parts, available for quick shipment from the factory.



Part A: installation

- 1.To control very low flow rates, Mark 708 corner 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.Protect the valve from grit, scale, thread chips and all foreign matter by thoroughly cleaning the piping and fittings prior to installation.
- 3.In preparing threaded connections, be careful to prevent pipe sealants from getting into the lines—Pipe sealing compound should be used carefully and sparingly, leaving the two lead threads clean—Jordan uses and recommends LOCTITE PST sealant for service to 400 ° F or Graf oil tape for higher temperatures—
- 4.A strainer should be installed on the inlet side of the valve, sized to provide the proper protection to the valve trim.
- 5.Steam valves should be installed in the highest run of piping to provide drainage and prevent water hammer.
- 6.The flow arrow on the body must be pointed in the direction of the flow—The valve may be installed in any position
- 7.Kistlate piping in hot vapor lines to minimize condensation.
- 8.Install a relief valve downstream of the Mark 708, set slightly above the control pressure of the valve to protect downstream equipment from full inlet pressure—
- 9.Evaluate inlet and outlet pipe friction losses and velocities to decide when the smaller outlet piping might cause excessive back pressure—When required, a standard tapered expander connected to the outlet of the valve is recommended.

- 10.If surges are severe in liquid service, a piping accumulator may be required to reduce water hammer.

Part B: Start-Up

- 1.The action of the control valve and controller must be such as to give the desired results. The action can be changed if needed using the instructions shown Part D.

Controller Action		
If an increase in Pressure or Temperature must	...and the action of the valve is:	...then the action of the controller must be:
Close Valve	Air-to-Close	Direct
Close Valve	Air-to-Open	Reverse
Open Valve	Air-to-Close	Reverse
Open Valve	Air-to-Open	Direct

- 2.The control valve has been pre-set at the factory. Finer Adjustments may be required to compensate for pressure Drop conditions of the application.
- 3.With the inlet, outlet, and bypass shutoff valves closed, and no pressure in the downstream line, full open the shutoff valve. Slowly open the inlet valve just enough to start flow through The Mark 708.Increase 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, generally when the inlet valve hand wheel will turn freely.
- 4.To shut off the line fluid. Close the inlet shutoff valve first, followed by the outlet shutoff valve.

Part C: Maintenance

Warning : be sure that there is no pressure in the valve before loosening any fittings or joints. The following is recommended :

1. Close the inlet shutoff and bypass valves.
2. Allow pressure to bleed off downstream.
3. When inlet pressure gauge shows that there is no pressure in the valve, close the outlet shutoff valve.

Maintenance Procedure	Follow Steps
Renewing valve stem packing	Part C, Section 1
Valve disassembly. Inspecting parts, Replacing plug or seat ring	Part C, Section 2
Valve reassembly	Part C, Section 3
Actuator spring pre-load adjustment	Part C, Section 4
Actuator maintenance	Part C, Section 5
Changing valve action	Part D
Motor valve seat spring pre-load	Part E

◆ Part C, Section 1: Packing Replacement

Renew the stem packing whenever there is leakage that cannot be stopped by a light adjustment to the packing flange. Additional rings can be added to the packing set to overcome minor packing leakage and to provide additional adjustment space. This can be done without dismantling the valve.

1. Remove the actuator from the bonnet. (See Valve Disassembly in Part C, Section 2.)
2. Completely remove all of the old packing and discard. Clean the valve stem and packing box thoroughly. If necessary, 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 an approved non-residue forming solvent for cleaning. Wipe dry with a clean cloth.
3. Insert a new packing set into the packing box. Press each ring down firmly into place with a tube.
4. After the packing is installed, assemble the 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.**

◆ Part C, Section 2: Removing Actuator from Valve

- 1a. **Direct Acting** Actuator ATC (Air-to-Close): Shut off pressure to the actuator and remove the supply tubing from the actuator case.
- 1b. **Reverse Acting** Actuator ATO (Air-to-Open): Apply approximately 6 psig air pressure to the actuator to lift the plug off of the seat.
- 1c. **Motor Valve** (Mark 708MV): Position the valve to full open and disconnect all electrical connections.
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 two nuts that secure the support legs to the bonnet. 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 and Bonnet Disassembly

1. For packing replacement, refer to Part C, Section 1.
2. Remove body/bonnet bolts and **carefully separate the body from the bonnet so as not to damage delicate trim components.**
3. Remove stem nuts and indicator. Loosen the packing gland nuts and withdraw stem and plug out of bonnet. (The smaller trims have a one-piece stem and plug which can be withdrawn through packing).
4. With a socket wrench, remove the seat from the body. Remove and discard the body/bonnet gasket.
5. Soft seats are disassembled by removing the seat cap from the seat and then the soft seat can be removed.
6. Clean all parts with an approved no residue-forming solvent. Remove encrusted material with a very fine Crocus or Aluminum oxide cloth. However, do not use these abrasives on the seating surface or the trim surface (the portion of the Plug that enters the seat bore.) The machining tolerances on these surfaces are so closely controlled that you might change the valve's flow characteristic.
7. Inspect all parts and replace any badly worn or damaged parts. It is always advisable to replace seals and gaskets. Do not attempt to resurface seating surfaces of the plug or seat. Seats and plugs are only sold in factory-matched sets.

◆ Part C, Section 3: Valve Reassembly

1. Soft seated valves : insert soft seat into the seat cavity, install the seat cap and tighten.
2. Lubricate the seat threads with a lubricant such as NO-LOK and thread the seat into the body. Torque to values shown.

Valve Size	Seat Torque	
	Ft-lbs	In-lbs
3/4"	26	310
1/2"	30	240
1/4"	13	150

* for 1/4" motor valves, use 1/2" torque values.

3. Guided trim: coat the guide portion of the plug with MOLYKOTE G-Rapid Spray lubricant or an equivalent light. Lubricant suitable for your service. Assemble plug to the stem.
4. Insert the stem into the bonnet. Set the gasket around the boss on the bonnet. Carefully assemble the bonnet to the body and allow the plug to center into the seat. Push down on the stem to be sure that the plug has fully engaged the seat. Hand-tighten the body bolts.

Valve Size	Gasket Material	Quantity Required
All	Teflon	1
1/2" & 3/4"	Graf oil	2
1/4"	Graf oil	1

* for 1/4" motor valves with Graf oil gasket, use quantity of 2.

5. Install the packing as described in Part C, Section 1.
6. While holding the plug firmly in position in the seat, secure the body to the bonnet with the bolts. Torque bolts evenly to values shown:

Torque Values (in-lbs)				
Material	Bolt Diameter			Limitation
	5/16"	1/4"	3/8"	
Gr. 80"	125	90	200	650 °F (also SAE Gr. 8)
Gr. B7	125	90	200	1000 °F
Gr. B6	125	90	200	900 °F (410 SST)

* Standard bolting

7. Reassemble the two stem nuts and indicator all the way onto the stem threads. Lock the two nuts together.
8. If the actuator is reverse acting (ATO), Apply approximately 6 psig air pressure to the actuator.
- 8a. **If motor valve**, position to full open
9. Insert support legs into the bonnet flange and thread the stem into the actuator stem. Hold the actuator stem with a wrench to prevent it from turning. When the stems are engaged enough to bring the support legs into full contact with the bonnet flange, install the nuts onto support legs and tighten. (You can press down on the actuator to compress the springs. And bring the legs into contact with the bonnet flange.) The Actuator spring pre-load must be adjusted; refer to Part C, Section 4. For motor valve seat spring pre-load, refer to Part E.

◆ Part C, Section 4: Actuator Spring Pre-Load Adjustment (Bench Setting)

1. The two stem nuts should be loosened and threaded down the stem and then locked together.
2. A regulated air supply must be provided to the actuator. Connect the air to the lower case for reverse action or to the upper case for direct action actuators.
3. Standard actuators have ranges of either 3-15 psig or 6-30 Psig. The range is stamped on the valve nameplate. These

Instructions will assume that the range is 3-15. If yours differs, substitute the appropriate pressure where these instructions. Refer to 3 psig.

- 4a. **Direct Acting Actuator (A-T-C Air-to-Close):** The spring pre-load adjustment may be made with or without pressure in the body. Spring pre-load is adjusted by threading the valve stem into the actuator stem. Keep the actuator stem from turning with a wrench and turn the valve stem using the stem nuts. Threading the valve stem into the actuator stem increases pre-load while threading out decreases pre-load. Slowly increase the air pressure up to 3 psig while observing the stem for movement. Correct spring pre-load is when the valve stem starts to move when the actuator pressure reaches 3 psig. If movement starts before 3 psig, increase the pre-load; if movement starts at pressure higher than 3 psig decrease the pre-load. After the pre-load is set, lock the stem nuts against the actuator stem. The valve position indicator may require readjustment relative to the indicator.
- 4b. **Reverse Acting Actuator (A-T-O Air-to-Open):** In an A-T-O actuator, the valve plug is closed by the actuator spring force which operates against the stem thrust created by the inlet pressure pushing up on the plug and stem. If the spring pre-load adjustment is made without pressure in the valve body, additional pre-load may be needed to overcome the effects of this thrust when the control valve is placed in service. The amount of additional pre-load will be dependent on the size of the seat orifice and the inlet pressure. For the smallest trims and low pressures, it will be negligible. For the largest trim, it could be significant. The catalog lists the maximum pressure that the valve is capable of shutting off against with a 3 psig pre-load. If higher pressures are needed, then a position should be used. Spring pre-load is adjusted by threading the valve stem into the actuator stem. Keep the actuator stem from turning with a wrench and turn the valve stem using the stem nuts. Threading the valve stem into the actuator stem decreases pre-load, while threading out increases pre-load. Slowly increase air pressure up to 3 psig while observing the stem for movement. Correct spring pre-load is when the valve stem starts to open when the actuator pressure reaches 3 psig. If movement starts before 3 psig increase the pre-load; if movement starts at a pressure higher than 3 psig, decrease the pre-load. After the pre-load is set, lock the stem nuts against the actuator stem. The valve position indicator may require adjustment relative to the indicator.

◆ Part C, Section 5: Actuator Maintenance (Pneumatic)

* Disassembly and inspection of Actuator

Note: the actuator stem has two retaining rings. The purpose of these rings is to maintain compression on the springs (to keep them in place) should the actuator be removed from the valve bonnet. The upper ring functions with reverse action and the lower ring functions with direct action actuators.

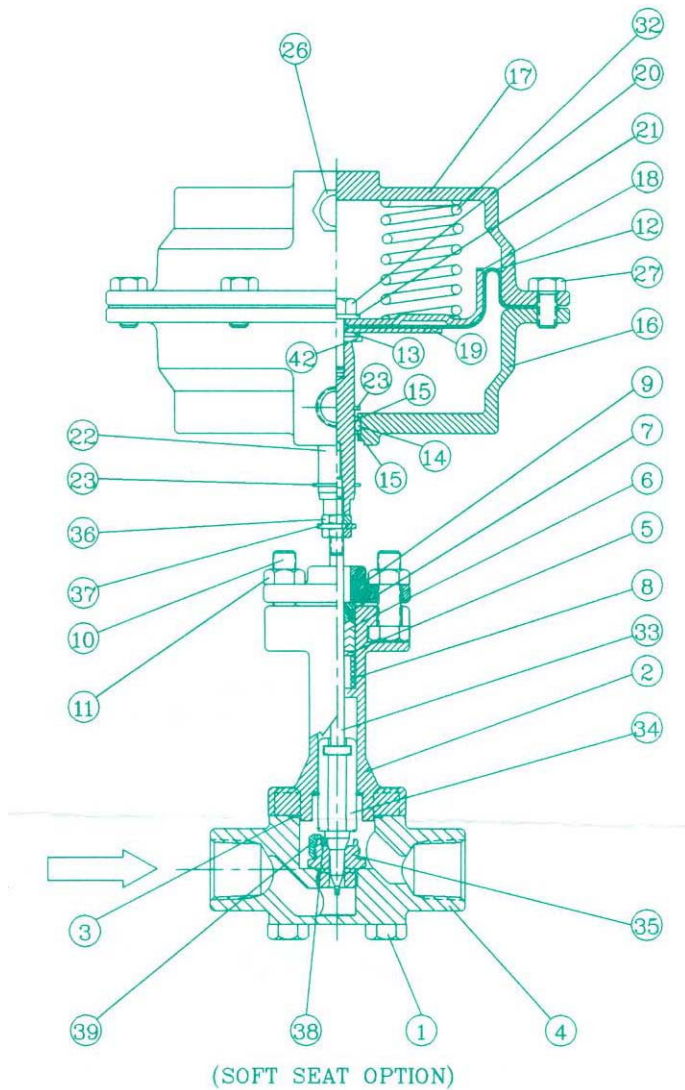
- 1a. **Direct Acting Actuator (A-T-C Air-to-Close):** Shut off air pressure to the actuator and remove the supply tubing from the actuator case.
- 1b. **Reverse Acting Actuator (A-T-O Air-to-Open):** Apply approximately 6 psig air pressure to the actuator. Lift the plug off of the seat.

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 two nuts that secure the support legs to the bonnet. Turn the valve stem using a wrench on the nuts and on the flats of the actuator stem (while holding the actuator stem in place) until the stems disengage. The actuator will be free of the valve.
- 3a. **Direct Acting Actuator:** separate the cases by removing the bolts. Use a wrench on the flats to prevent the actuator stem from turning and remove the bolt and lock washer. Lift off the diaphragm washer, diaphragm, diaphragm plate, and Thread Seal. Remove the springs. If the actuator stem is to be removed, remove one retaining ring and push the actuator stem out. Remove and discard the O-ring and two back-up rings.
- 3b. **Reverse Acting Actuator:** separate the cases by removing the bolts. Remove the springs. Use a wrench on the flats to prevent the actuator stem from turning and remove the bolt and lock washer. Lift off the diaphragm plate, diaphragm, diaphragm washer, and Thread Seal. If the actuator stem is to be removed, remove one retaining ring and push the actuator stem out. Remove and discard the O-ring and two back-up rings.
4. If there is a need to clean the parts, use a solvent that will not harm Buna-N elastomers, such as Stoddard solvent.

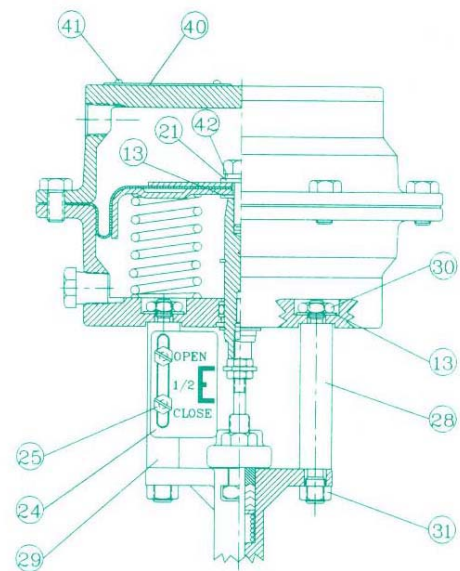
◆ Reassembly of Actuator - 7M & 14M

1. Replacement of the actuator stem seal is recommended. The O-ring and back-up rings are standard Buna-N, size-112. Lubricate and install the two back-up rings and the O-ring into the cavity in the lower case. The back-up rings are installed on either side of the O-ring/
2. The retaining ring closest to the top end (bolted) of the actuator stem must be in place. The retaining ring nearest the other end (with wrench flats) must be removed.
- 3a. **Direct Acting Actuator:** attach the following parts to the top of the actuator stem in the order indicated: Thread Seal, diaphragm plate, diaphragm, diaphragm washer, and lock washer. Secure them with the bolt. Hold the actuator stem on the wrench flats and tighten the bolt.
- 3b. **Reverse Acting Actuator:** attach the following parts to the top of the actuator stem in the order indicated: Thread Seal, diaphragm washer, diaphragm, diaphragm plate, and lock washer. Secure them with the bolt. Hold the actuator stem on the wrench flats and tighten the bolts.
- 4a. **Direct Acting:** hold this assembly by the bolt head in a vise, stem pointing upward. Install the springs over the dimples in the diaphragm plate. Take the lower case and carefully install it onto the actuator stem by firmly pressing in place. Install the retaining ring into the groove in the actuator stem. This will keep the springs compressed and prevent them from coming out of place.
- 4b. **Reverse Acting:** install this assembly into the lower actuator case by pressing the actuator stem firmly through the stem O-ring seal. Then install the lower retaining ring onto the actuator plate. Next, install the springs over the dimples in the diaphragm plate.
5. Position the flange of the diaphragm on the flange of the lower actuator case and attach the upper actuator case with the bolts.
6. Reassemble the actuator to the valve as described in Part C: Section 3, points 8 and 9.

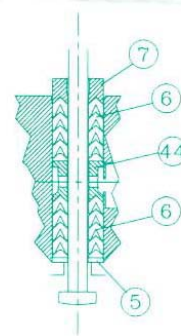
Reverse Acting



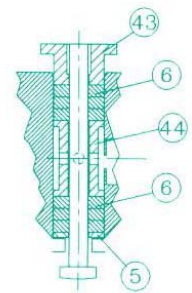
Direct Acting



Double Packing



**TFE CHEVRON
PACKING**



BRAIDED PACKING

Nb	Description	Qty.	Nb	Description	Qty.	Nb	Description	Qty.
1	Body/Bonnet Bolt	4	18	Diaphragm Plate	1	35	Seat	1
2	Bonnet	1	19	Diaphragm Washer	1	36	Stem Nut	2
3	Body/Bonnet Gasket	1	20	Hex Bolt	1	37	Indicator Washer	1
4	Body	1	21	Lock washer	1	38	Soft Seat (optional)	1
5	Retaining Washer	1	22	Actuator Stem	1	39	Seat Cap	1
6	Packing Set	1	23	Retaining Ring	2	40	Name Plate	1
7	Packing Adapter	1	24	Travel Scale	1	41	Drive Screw	2
8	Packing Spring	1	25	Self-Tapping Screw	2	42	Spacer (3-15 range only)	1
9	Packing Gland	1	26	Vent	1	43	Packing Follower	1
10	Hex Bolt	2	27	Actuator Bolt	6	44	Lantern Ring	1
11	Gland Nut	2	28	Support Leg	1	45	Mounting Bracket for Mark 708MV Motor Valve	1
12	Diaphragm	1	29	Support Leg/Travel Scale	1	46	Motor for Mark 708MV	1
13	Thread Seal	3	30	Jam Nut	2	47	Stem Connector for MV	1
14	O-ring	1	31	Nut	2	48	Mounting Plate for Mark 708MV Motor Valve	1
15	Back-Up Ring	2	32	Spring	3	49	Nut for Mark 708MV	1
16	Lower Actuator Case	1	33	Valve Stem	1			
17	Upper Actuator Case	1	34	Plug	1			

Part D: Reversing Action

Follow these instructions for changing the valve action from Direct to reverse or from reverse to direct. The same parts are

1. Disassemble the actuator. Refer to Part C: Section 5.
2. Reassemble the actuator to the desired action as is described in Part C, Section 5.

To change the action of a motor valve, refer to Motor Manual IM-0577 and Electrical Connection drawing 95/C/032783 Which are provided with all Mark 708MW motor valves.

Part E: Motor Valve Seat Spring Pre-load

1. Position motor to be full open.
2. The two stem nuts should be loosened and threaded down the stem and then locked together.
3. Slowly stroke motor to closed position, while rotating valve stem and stem nuts back and forth (approximately 1/4 turn). Caution: valve stem should rotate freely. When it no longer Rotates freely, the plug is in contact with the seat and the Motor must be stopped or damage may occur. If required, the Valve stem may be threaded into the actuator stem to allow Motor to complete stroke.
4. With motor in full closed position and stopped by limit switch, rotate the stem down until the plug is in contact with the seat, and turn an additional 1/4-1/2 turn to pre-load seat.
5. Position motor to open position, and confirm that the motor is stopped by the limit switch prior to plug reaching upper stop. Without rotating the stem, thread the stem nuts up and lock Against the actuator stem.

Note : limit switches and high/low set points are factory-set. If Command signal range will not fully stroke the valve refer to Electrical connection drawing 95/C/032783 for set point Adjustment procedure. With seat spring pre-load set, if plug Hits upper stop prior to limit switch ,the limit switch will require Adjustment; consult factory for procedure.

Trouble Shooting

- * Erratic Control - over sizing can cause cycling or hunting (recalculate the size required). Under sizing can cause the control point to drop off under peak loads (increase the trim size). Inlet pressure to the valve may be varying significantly and the controller may not be following it (adjust controller). Control loop may require equal percentage trim if high range-abilities are being utilized. Steam traps may need recode-tinning, Safety relief valves may be leaking. Valve stroke may be out of adjustment or there may be foreign matter in the valve preventing full plug movement.
- * 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 recode-toning. 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 from properly stroking open.

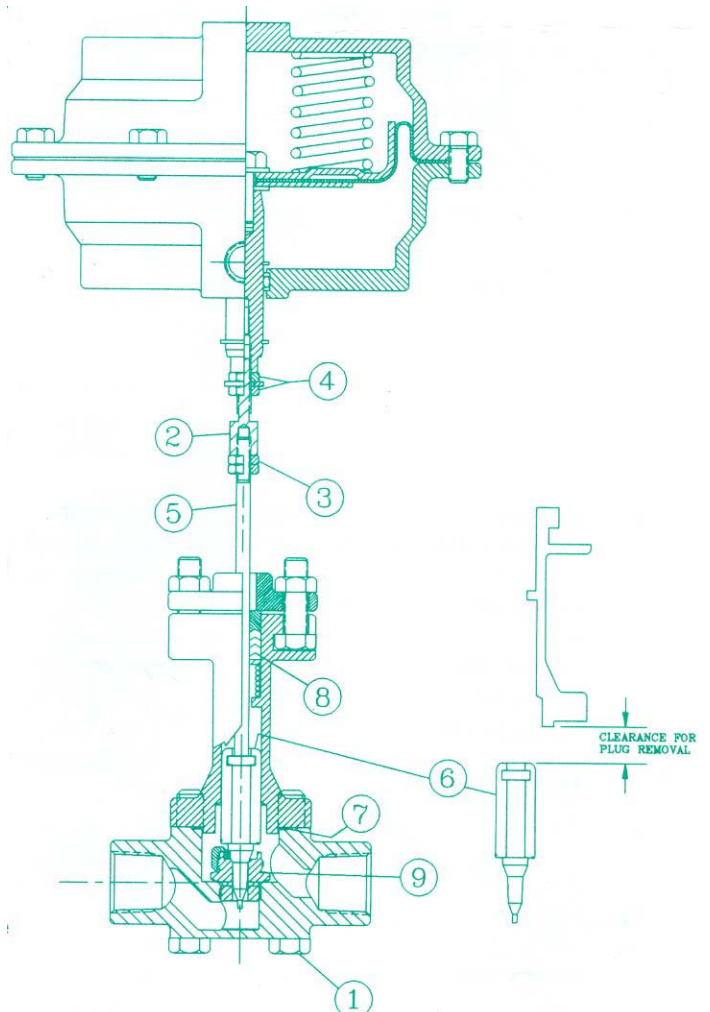
- * Overpressure (outlet) - dirt in the trim may prevent Valve from shutting off. Diaphragm failure, incorrect actuator spring adjustment, or insufficient air pressure to direct acting (air-to-close) actuators would prevent the valve from properly stroking closed.

Optional Quick Change Trim

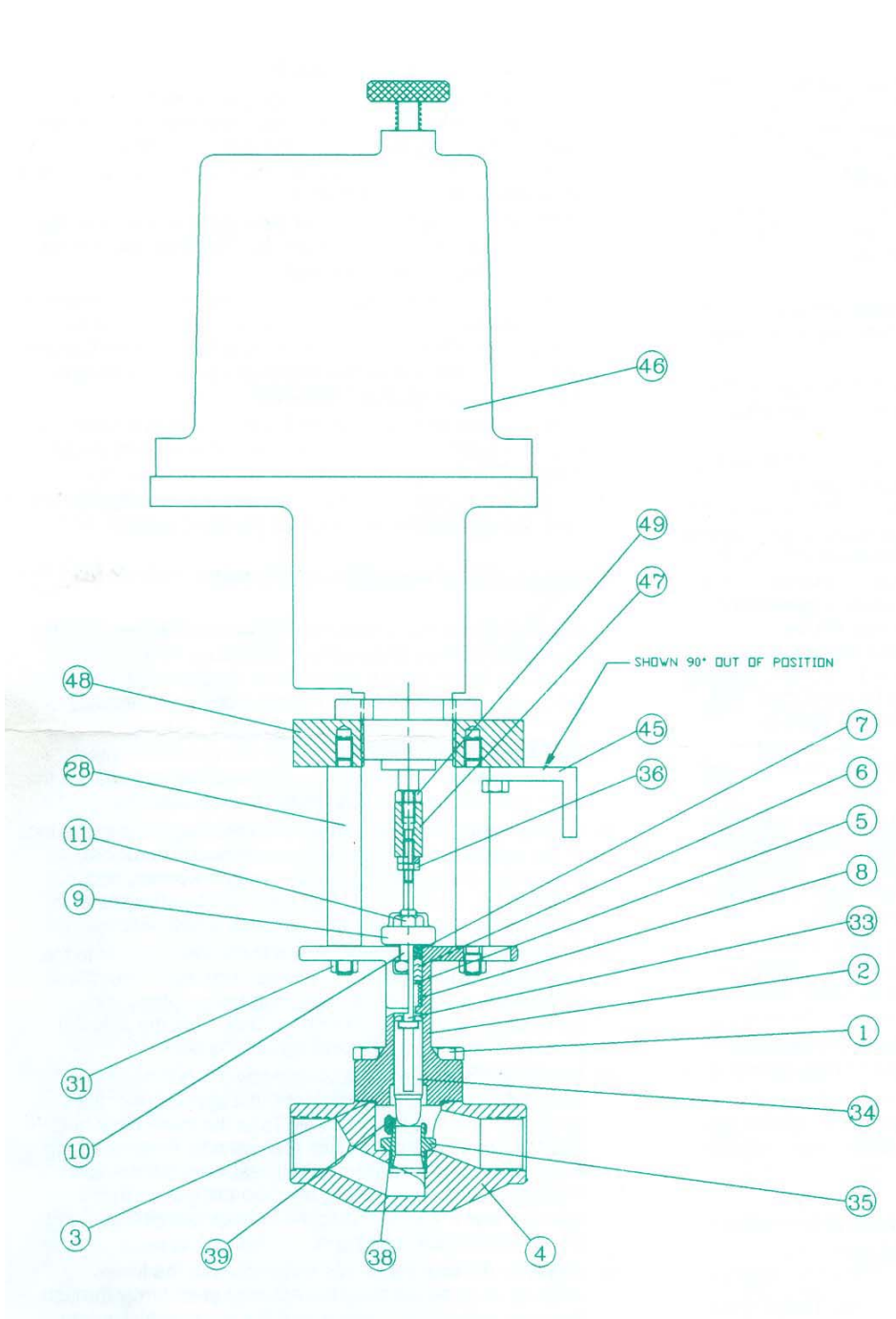
* Trim Removal Instructions

Referring to drawing below:

1. Remove four bolts (1), and remove body.
2. Loosen nut (3). Keep connector (2) from rotating.
3. Do not loosen nuts (4) as this would change actuator Spring adjustment.
4. Unthread stem (5) from connector.
5. Push stem (5) Through body. (Do not push stem threads through packing unless stem is being replaced.)
6. Slide plug (6) off stem.
7. Remove and install new seat (9) - optional.
8. Install new gasket (7). Install new packing (8) if stem is removed.
9. Assemble in reverse order. Note: stem must be threaded into connector until bottomed out to maintain stroke adjustment.



Mark 708MV Motor Valve



Nb.	Description	Qty.
1	Body/Bonnet Bolt	4
2	Bonnet	1
3	Body/Bonnet Gasket	1
4	Body	1
5	Retaining Washer	1
6	Packing Set	1
7	Packing Adapter	1
8	Packing Spring	1
9	Packing Grand	1
10	Hex Bolt	2
11	Gland Nut	2
28	Support Leg	2
31	Nut	2
33	Valve Stem	1
34	Plug	1
35	Seat	1
36	Stem Nut	2
38	Soft Seat (optional)	1
39	Seat Cap	1
45	Mounting Bracket	1
46	Motor	1
47	Stem Connector	1
48	Mounting Plate	1
49	Nut	1

Replacement parts are in stock for immediate shipment. To order , contact:
Sam sung valve

Sam sung control valve

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