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I & M Mark 978-LF JD Series

Installation & Maintenance Instructions for Mark 978-LF JD Low Flow Sanitary Control Valve

Please read these instructions carefully!

Your Steriflow 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 Steriflow Valve parts, available for immediate shipment from the factory.

Valve Installation

1. The valve valve is designed for sanitary service and should be installed in a clean system. As such, strainers at the valve inlet to protect the valve should not be necessary.
2. For **angle body valves**, the valve is normally installed with inlet vertical on the bottom, and outlet horizontal to provide the best drainage inside the valve. This is recommended only for drainage considerations: the valve will function in any position.
3. Steam control valves are best located at a high point in the piping system with the take-off out of the top of the steam header. This minimizes the possibility of water in the valve.
4. For best control, 3'0" straight sections of pipe should be installed on either side of the valve.
5. Use caution in tightening commercial sanitary fittings. Over-tightening can cause the gasket to extrude into the flow passage.
6. If possible, install a relief valve downstream from the MK978-LF JD. Set at about 15% above the control pressure.
7. If you are in gas or vapor service, and your control setpoint is 25% or less than the inlet pressure, you should expand your outlet piping by one pipe diameter for optimal performance.
8. Operate the MK978-LF JD within pressure/temperature ratings on the nameplate. Refer to catalog for additional details.
9. Provide proper air pressure to actuator. Valves with positioners: 20 psig supply for 3-15 range, 40 psig supply for 6-30 range; valves without positioners: 40 psig supply to controller.

Start-Up

1. Make sure actions of control valve and controller are such as to give desired results as shown in the following table. To change the action, see instructions under **Actuator Subassembly**.

Controller Action		
If 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
	Air-to-Open	Reverse
Open Valve	Air-to-Close	Reverse
	Air-to-Open	Direct

The Mark 978-LF JD has been pre-set at the factory. However, finer adjustments may be required to compensate for pressure drop conditions of the application.

2. With the inlet, outlet, and bypass shutoff valves closed, and no pressure in the downstream line, fully open the outlet shutoff valve. Slowly open the inlet valve just enough to start flow through the MK978-LF JD. 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. Usually, the handwheel on the inlet valve will turn freely once this point is reached.
3. To shutoff the line fluid, close the inlet shutoff valve first, followed by the outlet shutoff valve.

Preparing for Maintenance

Warning: be sure that there is not pressure in the valve before loosening any fitting or joint.

1. Close inlet shutoff valve and bypass valve.
2. Open the MK978-LF JD.
3. Allow pressure to bleed off downstream.
4. When pressure gauge shows there is no pressure in the valve, close outlet shutoff valve.
5. When lubricant is needed, use one that is compatible with both your process and the valve's seal material (see nameplate). Consult factory if unsure what lubricant to use..

Seal Replacement

The MK978-LF JD repair kit can be ordered with diaphragm seals and an o-ring backup.

Body / Bonnet Gasket Replacement

1. The Mark 978-LF JD must be in open position, plug (34) off seat. Reverse acting valves need pressure applied to actuator to lift plug off seat.
2. Remove bonnet bolts (3) and separate body (1) from bonnet (2).
3. Remove air pressure from actuator.
4. Hold the stem connector (6) with a wrench or pliers. Loosen jam nuts (7) underneath the stem connector and unscrew the valve stem (27) from the stem connector (6).
5. Insert the new Stem/Plug/Diaphragm assembly into the bonnet (2) from below. Transfer the two jam nuts to the new Stem/Plug/Diaphragm assembly and thread them all the way down on the stem threads.
6. Reverse - add pressure to lift plug.
7. Replace bonnet on valve body (see step 1 above if valve is reverse acting).
8. Secure bonnet to body with bonnet bolts loosely tighten. Cycle the valve by stroking the plug up and down several times to align the trim to the body. With the plug on the seat, cross tighten bonnet bolts 150 in. - lbs in two stages.
9. Screw valve stem (27) into stem connector (6) until it bottoms out. Secure with jam nuts (7).

Actuator

Actuator Disassembly – Reverse Acting

1. Apply sufficient air pressure to lift plug (34) off seat. Separate body and bonnet as described above.
2. Loosen and remove lock ring (4).
3. Loosen the two actuator stem jam nuts (7). Unscrew the stem connector (6) from the actuator stem (20).
4. Remove air pressure from actuator.
5. Remove bolts (10) then separate upper and lower housings (11/9).
6. Remove springs (19).
7. Hold actuator stem (20) with a wrench on the flats on its lower end and remove the cap screw (12).
8. Remove in order: lockwasher (18), diaphragm plate (17), diaphragm (16), diaphragm washer (15), threadseal (14), and spacer (13).
9. Remove the HHCS (10) and seal washers (21) and lift the lower case off of the yoke.
10. Remove o-ring (22) and two back up rings (23) from the lower case (9).

Actuator Disassembly – Direct Acting

1. Loosen and remove the lock ring (4).
2. Loosen the two actuator stem jam nuts (7). Unscrew the stem connector (6) from the actuator stem (20).
3. Remove bolts (10) then separate upper and lower housings (11/9).
4. Pull the diaphragm assembly out of the lower case (9) and remove springs (19).
5. Hold actuator stem (20) with a wrench on the flats on its lower end and remove the cap screw (12).
6. Remove in order: spacer (13), threadseal (14), diaphragm washer (15), diaphragm (16), diaphragm plate (17).
7. Remove the HHCS (10) and seal washers (21) and lift the lower case off of the yoke.
8. Remove o-ring (22) and two back up rings (23) from the lower case (9).

Actuator Reassembly

Actuator action can be changed by ordering a conversion kit from your Steriflow Representative. To reverse the action, follow the reassembly procedure for the desired action. **Note: Typically, new springs will be required when going from one action to the other.**

Reverse Acting

1. Lubricate back up rings (23) and o-ring (22) with a suitable o-ring lubricant and insert in the lower case (9) as shown in the schematic.
2. Install lower case (9) on yoke (5) with seal washers (21) and HHCS (10).
3. Place HHCS (12) into a vice. Place lockwasher (14) on to the HHCS (12), followed by diaphragm plate (17) with rim facing bolt head, diaphragm (16) with convolution toward bolt head, diaphragm washer (16), threadseal (18), and spacer (13). Screw the entire stack into the actuator stem (20) and tighten securely. Coat the end of the actuator stem with o-ring lubricant.
4. Insert the actuator stem and diaphragm assembly into the lower case (9).
5. Align bolt holes in the diaphragm (16) with holes in lower actuator case (9).
6. Replace springs (19) over bosses in diaphragm plate (7).
7. Place four bolts (10) 90° apart and tighten finger tight. Install remaining bolts and cross-tighten evenly to secure the upper case (11).

Direct Acting

1. Lubricate back up rings (23) and o-ring (22) with a suitable o-ring lubricant and insert in the lower case (9) as shown in the schematic.
2. Install lower case (9) on yoke (5) with seal washers (21) and HHCS (10). Install springs (19).
3. Place HHCS (12) into a vice. Place on the HHCS the sacer (13), threadseal (14), diaphragm washer (15), diaphragm (16) with convolution away from bolt head, diaphragm plate (17), and lockwasher (18).

Thread diaphragm assembly into actuator stem (20) and tighten securely.

4. Lubricate actuator stem (20) and insert into lower case (9).
5. Place the upper actuator case (11) on the diaphragm in alignment with the bolt holes.
6. Place four bolts (10) 90° apart and tighten finger tight. Install remaining bolts and cross-tighten evenly to secure the upper case (11).

Troubleshooting

If You Experience Erratic Control:

- Oversizing can cause cycling or hunting – *recalculate required Cv.*
- Undersizing can cause the control point to drop off under peak loads – *increase trim size.*
- Inlet pressure may be varying significantly and the controller may not be following it – *adjust controller*.
- Improper trim characteristic.
- 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 plug movement.

If You Experience Insufficient Flow:

- Check shutoff valves to be sure they are fully open.
- Inlet pressure to the valve may be insufficient to provide the needed flow – *check the inlet pressure with a pressure gauge.*
- Steam traps may need reconditioning; foreign material in the trim may prevent the valve from passing its full capacity.
- Diaphragm failure, insufficient air pressure, or incorrect actuator spring adjustment in reverse acting (air to open) actuators will prevent the valve from properly opening.

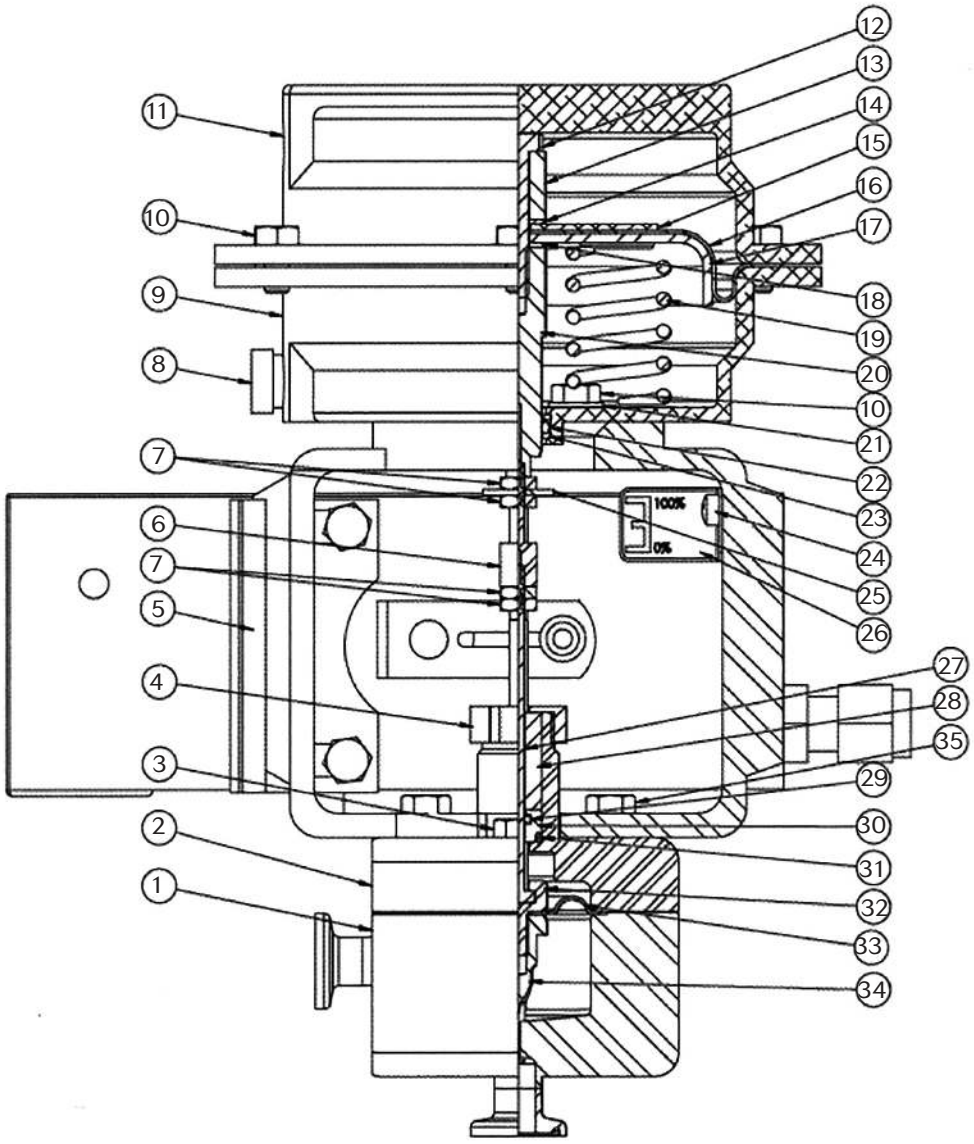
If You Experience Overpressure (Outlet):

- Foreign material in the trim can prevent the valve from shutting off.
- Diaphragm failure, insufficient air pressure, or incorrect actuator spring adjustment in direction acting (air to close) actuators will prevent the valve from properly stroking closed.
- Hard seated valves may not be capable of tight shutoff (leakage would cause downstream pressure to rise).
- Overranging the valve – use smaller Cv.

If You Experience Leakage:

- Excessive pressure drop across the valve could prevent the valve from shutting off properly – check the catalog ratings for the maximum allowable pressure drop for your trim, action and actuator.
- Hard seated valves may not be capable of tight shutoff (leakage would cause downstream pressure to rise).
- Overranging the valve – use smaller Cv.

Illustration and Parts List



Item	Description	Item	Description	Item	Description
1	Body	13	Spacer	25	Travel Indicator
2	Bonnet	14	Seal Washer	26	Travel Scale
3	HHCS	15	Washer	27	Stem
4	Lock Ring Bushing	16	Diaphragm	*28	Bushing
5	Yoke	17	Diaphragm Plate	*29	O-ring
6	Stem Connector, Upper	18	Lockwasher	30	Spacer
7	Nut	19	Spring	*31	O-ring
8	Vent	20	Actuator Stem	32	Plug Connector
9	Lower Actuator Case	21	Seal Washer	*33	Diaphragm
10	HHCS	22	O-Ring	*34	Plug
11	Upper Actuator Case	23	Back-up Ring	35	HHCS
12	HHCS	24	FMS 1-32	* Recommended Spare Parts	

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