

1

Suzhou Alpine Flow Control Co., Ltd.

IOM

Pump Control Valve – Mechanical Type A7MD

Installation

Operation

Maintenance



Pump Control Valve – Mechanical Type A7MD INSTALLATION OPERATION& MAINTENANCE INSTRUCTION MANUAL

Please carefully read below guides:

This mark indicates important information & safety guides.



Potential risks might occur if

- safety guides are ignored
- Improper use
- Insufficient qualified operators

Only suitably qualified field technicians should be allowed to work on these ACV Keep routine inspection up to date at all times

1. Storage & Transportation

1.1 Protection

Delivery of valve should be strictly under "engineering instruction" protection requirements, to ensure that the flange sealing surface are protected from harm.

1.2 Storage

If the valves needs to be stored before installation for some time, they should be kept in the wooden (wicker) boxes in which they were delivered, and kept off the ground in a dry and clean indoor area until ready for installation.

1.3 Transportation

1.3.1 Packed Valves

If the crated valve cannot be carried by one person (over 25Kgs), the use of specialized lifting equipment must be used (Crane, forklift, hoist, trolley etc.)

It is NOT recommended that crated valves be placed on top of other crated valves

Appropriate safety equipment must be used at all times when moving or repositioning crated valves. (This includes PPE)

All Alpine packaging materials comply with local safety regulations and requirements to ensure safe transportation.

1.3.2 Unpacked Valves

Use the appropriate equipment to lift and transport the unpacked valves and remain within the carrying limit. Always protect the machined surface (flanges etc.) from damage.

When making use of the "lifting Eyes" (fitted to all Alpine control valves) ensure that the

rope/chain , does not damage or chafe any part of the valve. When lifting large diameter valves(generally above DN100MM) , use proper tools to load and lift them (like tray, hook, fastener, etc), and with loading balance tools, to avoid sliding or moving during the lifting and carrying.

If lifting using an excavator, use extreme caution to avoid damage to yourself or the valve

2.Installation to the Pipeline

Warning!



- The installation and setting up operator should use appropriate equipment and the required personal protective equipment.(PPE)
- Ensure that the pipeline is not pressurized/Isolated before installation.
- Only qualified, trained staff are to install the valves.
- Verify the pipe pressure and temperature limits are within the application standard of the valves.

Verify the medium through the pipeline is compatible with the valve specification.

2.1 Witness Viewing

2.1.1 Carefully remove the valve from its packaging and check for any sign of visible damage, including the body, cover, screen, etc...

2.1.2 Check the materials shown on the rating label are suitable, including the temperature and pressure rating,

2.1.3 The use of 3rd party components is not advised and can adversely affect the service life of the valve.

2.2 Compatibility of Valve flange and Pipeline Flanges

Before installation, check the sealing method and flange drilling between valves and pipeline.

2.3 Additional equipment for ACV Installation recommendation

- Installation of air release valves on the pipeline.
- Ensure that there are air valve isolation valves fitted to the air release valve upright pipe for ease of easy maintenance.
- The pipeline must be scoured before ACV installation.(New lines)
- One Y strainer must be installed just upstream of the ACV and an isolation valve just upstream and downstream for the ACV for ease of maintenance on the ACV

Remark: the lifting and moving of the valve should be accordance with section 1.3. above

2.3.1 Installation



Important Notice

To check if the matching flange surface in good status, no trash in the wedge, no damage during the delivery, and pipeline is already cleared up.

- 2.3.1.1 Check the flange bolts etc are to specification before installation.
- 2.3.1.2 Install the isolation shut-off valves both upstream & downstream of the A7MD..
- 2.3.1.3 Ensure fhe flow direction shown by the "ARROW" on the valve body.
- 2.3.1.4 Install the control valve c/w gaskets and fasten tightly and flog.
- 2.3.1.5 Use proper torque to fasten the valve to avoid potential damage.
- 2.3.1.6 Make sure there is enough space for valve commissioning.

3.Operation

3.1 Open all the small ball valves on A7MD to ensure all control system is on.

3.2 The needle valve 3-1 is for adjusting the valve closing speed. Clockwise (closing) is to decrease the ACV closing speed and anti-clockwise (opening) increases ACV closing speed 3.3 The needle valve 3-2 is for adjusting the valve opening speed. Clockwise closing is to decrease the opening velocity, vice versa.

3.4 After installation, the valve will open slowly on pump start and close slowly on pump shut down



- 1. Main Valve
- 2. Tube
- 3. Needle Valve
- 4. Ball Valve
- T. Strainer

Notice:

When the valve close and there may still be intermittent pressurized air coming out, through the small orifice, it is normal.(it is air venting)

Possible Fault & Solution

SYMPTOM	NO.	PROBABLE CAUSE	SOLUTION
Main valve fails to open	1	Orifice plate assembly and/or orifice sense line clogged	Remove sense line and clean orifice port. Clean or replace line
	2	Ball valve in pilot system closed	Open it
	3	Main valve stuck closed Mineral buildup on stem	Disassemble,clean or replace
	4	Needle valve closed	Open it properly
Main valve fails to close	1	Foreign matter between disc and seat, scale on stem or worn disc,	Disassemble,clean or replace
	2	Needle valve closed	Open it properly
	2	Worn disc	Disassemble and replace

4. Maintenance

This valve requires minimal maintenance

Warning!



■ Site maintenance- Before commencing ANY maintenance ensure that the ACV is isolated from the pipeline by completely closing the upstream and downstream isolation valves. The ACV will still be pressurized. Loosen one of the pilots ¾ inch nuts and gently bleed the pressure from the valve

Only qualified staff trained in commissioning the control valve should adjust and/or repair automatic control valves.

4.1 Daily Maintenance

Except routine inspection to ensure satisfactory operation and sealing, regular maintenance and lubrication are not necessary.

4.2 Valve Removal

4.2.1 Before removing an ACV from the pipeline, ensure that it has been isolated from the line by closing the upstrean and downstream isolation valves.

4.2.2 Loosen the flange bolts and bleed off any pressure still remaining. Remove the valve.

4.2.3 Keep the flange bolts, nuts and washers in a safe place until the ACV is re-installed

4.3 Disassemble of the valve in the field while still connected to the pipeline Disassembly

1. Close upstream and downstream isolation valves.

Loosen tube fittings in the pilot system to remove pressure from valve body and cover chamber. After pressure has been released from the valve, remove the pilots and tubing. Mark position of tubing and pilots for re-assembly. (Take a photo first)
Remove Bonnet bolts and remove Bonnet. Pull Bonnet straight up to keep from damaging the integral seat bearing and stem.

4. Remove the diaphragm assembly from the valve body. With smaller valves this can be accomplished by hand by pulling straight up on top of the stem. On large valves, an eye bolt of proper size can be installed on top of the stem and the spare parts can be then lifted with the correct tools on site. Take care not to damage the stem and diaphragm. (Use extreme caution when removing the diaphragm assembly. On larger valves it is heavy and serious injury to hands can easily occur. Ideally a tripod with a block and tackle should be used. Wear industrial gloves)

5. Next remove the stem nut. Examine the stem threads above the nut for signs of

mineral deposits or corrosion. If the threads are not dirty, use a wire brush to remove as much the residue as possible. Attach a good fitting wrench (Not a shifting spanner) to the nut and give it a sharp "Tap" rather than a steady pull. Usually, several blows are sufficient to loosen the nut for further removal.

6. After the stem nut has been removed, the assembly can be broken down into its component parts. Removal of the seal from the disc holder can be a problem if the valve has been in service for a long time. Using two screwdrivers inserted along the outside edge of the disc usually will accomplish its removal.

7. The only part left in the valve body is the seat which ordinarily does not require removal. Carefully clean and polish the inside and outside surfaces with very fine emery tape.

Reassembly

1. Reassembly is the reverse of the disassembly procedure. When the nut has been tightened to a point where the diaphragm cannot be twisted, the seal should be compressed very slightly by the Seal retainer. Excessive compression should be avoided.

2. MAKE SURE THE **STEM NUT** IS VERY TIGHT. Attach a good fitting wrench to the nut and give it a sharp "Tap" rather than a steady pull. Usually, several blows are sufficient to tighten the stem nut for final tightening. Failure to do so could allow the diaphragm to pull loose and tear when subjected to pressure.

3. Carefully install the Diaphragm assembly. Take care not to damage the stem and diaphragm.

4. Put spring into place and replace the Bonnet. Make sure diaphragm is smooth under the Bonnet.

5. Tighten Bonnet bolts firmly.

Test Procedure after Valve Assembly

There are a few simple tests which can be made in the field to make sure the valve has been assembled properly. Do these before installing pilot system and returning valve to service.

1. Check the diaphragm assembly for freedom of movement. Insert a fabricated tool into the threaded hole on top of valve stem and lift the diaphragm assembly manually. Note any roughness, sticking or grabbing. The diaphragm assembly should move smoothly throughout the entire valve stroke. The tool is fabricated from threaded bar on one end to fit valve stem and has a "T" Bar handle of some kind welded on the other end for easy gripping.

Place marks on these spare parts lifting tool when the valve is closed and when

manually positioned fully opened. The distance between the two marks should be approximately the full stem travel (which is about 025 X DN + 5mm). If the stroke is different, there is a good reason to believe something is mechanically restricting the stroke of the valve. The Bonnet must be removed, the obstruction located and removed. Due to the weight of the diaphragm assembly, this procedure is not possible on valves DN200 and larger. On these valves, the same determination can be made by carefully introducing a low pressure into the valve body with the Bonnet vented. Looking in Bonnet center hole see the diaphragm assembly lift easily without hesitation, and then settle back easily when the pressure is removed.

2. To check the valve for drip-tight closure, a line should be connected from the inlet to the Bonnet, and pressure applied at the inlet of the valve. If properly assembled, the valve should hold tight with a low pressure

3. With the line connected from the inlet to the Bonnet, apply full working pressure to the inlet. Check all around the Bonnet for any leaks. Re-tighten Bonnet nuts if necessary to stop leaks past the diaphragm.

4. Remove pressure, then re-install the pilot system and tubing exactly as it was prior to removal.(check the phot you took prior to disassembly) **Bleed air from all high points.**

5. Then adjust the valve again follow operation procedure.

5. Drawing and parts

