

Engineering Data Sheet

Document No:- 050MD3737D799 rev 3

Installation, Operation & Maintenance Instructions for
DN50-200 M737 Variable Orifice Double Regulating valve with
Elastomeric Trim

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Date 1st June 2004

CE MARKING AND THE PRESSURE EQUIPMENT DIRECTIVE 97/23/EC

This has been implemented in United Kingdom law by the Pressure Equipment Regulations 1999 (SI 1999/2001).

The regulations apply to all valves with a maximum allowable pressure greater than 0.5 bar. Valves with a maximum allowable pressure not exceeding 0.5 bar are outside the scope of the Directive. Valves are categorised in accordance with the maximum working pressure, size and ascending level of hazard, which is dependent on the fluid being transported. Fluids are classified as Group 1, dangerous fluids or Group 2, all other fluids including steam. Categories are SEP (sound engineering practice) and for ascending levels of hazard, I, II, III or IV. All valves designated as SEP do not bear the CE mark nor require a Declaration of Conformity. Categories I, II, III or IV carry the CE mark and require a Declaration of Conformity (Note- all valves up to and including 25mm (1") having a maximum allowable pressure greater than 0.5 bar are designated SEP regardless of fluid group.)

PRODUCT LIFE CYCLE

The life of the valve is dependent on its application, frequency of use and freedom from misuse. Compatibility with the system into which it is installed must be considered. The properties of the fluid being transported such as pressure, temperature and the nature of the fluid must be taken into account to minimise or avoid premature failure or non-operability. A well-designed system will take into consideration all the factors considered in the valve design, but additionally electrolytic interaction between dissimilar metals in the valve and the system must be examined. Before commissioning a system, it should be flushed to eliminate debris and chemically cleaned as appropriate to eliminate contamination, all of which will prolong the life of the valve.

LIMITS OF USE

The valves to which these installation, operation and maintenance instructions apply have been categorised in accordance with the Pressure Equipment Directive.

The fluid to be transported is limited to Group 2 liquids i.e. non-hazardous and on no account must these valves be used on any Group 2 gases, Group 1 liquids or Group 1 gases.

Fig M737 PN16 (ANSI 125) valves in sizes DN 50 to DN 200 (2" to 8") are categorised as SEP and do not require the CE mark.

Operating pressures and temperatures

PS	Non-shock pressure at temperature range	Non-shock pressure at max. temperature
16 13.8 ANSI 125	16 bar from -10°C to 120°C 13.8 bar from -10°C to 66°C	16 bar at 120 °C 12.1 bar at 120 °C

Not suitable for fatigue loading, creep conditions, fire testing, fire hazard environment, corrosive or erosive service, transporting fluids with abrasive solids.

PRESSURE/TEMPERATURE RATING

This valve is rated PN16 having a maximum temperature of 120 °C and complies with BS 7350 which must be installed in a piping system whose normal pressure and temperature do not exceed these ratings.

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If system testing will subject the valve to pressures in excess of the working pressure rating, this should be within the test pressure for the body with the valve open.

The maximum allowable pressure in valves as specified in the standards is for non-shock conditions. Water hammer and impact for example, should be avoided.

If the limits of use specified in these instructions are exceeded or if the valve is used on applications for which it was not designed, a potential hazard could result.

LAYOUT AND SITING

It should be considered at the design stage where valves will be located to give access for operation, adjustment, maintenance and repair.

Heavy valves may need independent support or anchorage.

Conventionally, valves and commissioning sets are installed in horizontal pipework. This is however not a constraint and they may be mounted in vertical or inclined pipework, inverted or rotated to clear walls, ceilings and other restrictions.

In the interests of safety, valves installed on end-of-line service in the closed position with infrequent opening should be fitted with a locking device on the operating mechanism. Alternatively, it should be fitted with a blanking flange on the downstream flange of the valve.

INSTALLATION

Prior to installation, a check of the identification plate and body marking must be made to ensure that the correct valve is being installed.

Valves are precision manufactured items and as such, should not be subjected to misuse such as careless handling, allowing dirt to enter the valve through the end ports, lack of cleaning both valve and system before operation and excessive force during bolting and handwheel operation.

All special packaging material must be removed.

Valves must be provided with adequate support. Adjoining pipework must be supported to avoid the imposition of pipeline strains on the valve body, which would impair its performance.

When large valves are provided with lifting lugs or eye nuts, these should be used to lift the valve.

Valves should not be lifted using the handwheel or stem.

Immediately prior to valve installation, the pipework to which the valve is to be fastened should be checked for cleanliness and freedom from debris.

This valve is a combined regulating and flow measurement device and must be installed with a minimum of 5 diameters of straight pipe upstream, having the same nominal diameter and not including any bore reducers or any intrusions into the bore. Three diameters are required on the valve outlet.

Care should be taken regarding the orientation of the test points to give sufficient room for manometer probe connection.

The valve must be installed with the direction arrow on the body coincident with the direction of flow in the pipeline.

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Care is needed during installation to provide free access to enable the valve to be fully operated, regulated and set in the required position.

Test Point and Extension Fitment

Test points and extensions are supplied loose and they should be fitted during installation as follows:-

Remove the blanking plugs from the valve body.

Fit the extensions into the valve body.

Fit the test points to the extensions ensuring that the test point with the red strap is on the upstream side of the valve.

Note:- When tightening the test point and extensions excessive force is not necessary and care should be taken regarding the orientation of the test points to give sufficient room for manometer probe connection. A suitable sealing compound may be used on the test point and extension threads but excessive use should be avoided.

Valve end protectors should only be permanently removed immediately before installation. The valve interior should be inspected through the end ports to determine whether it is clean and free from foreign matter. The mating flange (both valve and pipework flanges) should be checked for correct gasket contact face, surface finish and condition. If a condition is found which might cause leakage, no attempt to assemble should be made until the condition has been corrected.

The gasket should be suitable for operation conditions or maximum pressure/temperature ratings.

The gaskets should be checked to ensure freedom from defects or damage.

Care should be taken to provide correct alignment of the flanges being assembled. Suitable lubricant on bolt threads should be used. In assembly, bolts are tightened sequentially to make the initial contact of flanges and gaskets flat and parallel followed by gradual and uniform tightening in an opposite bolting sequence to avoid bending one flange relative to the other, particularly on flanges with raised faces.

Parallel alignment of flanges is especially important in the case of the assembly of a valve into an existing system.

Flanged joints depend on compressive deformation of the gasket material between the flange surfaces.

The bolting must be checked for correct size, length, material and that all connection flange bolt holes are utilized.

OPERATING

The valve is opened by anti-clockwise rotation of the handwheel to a positive stop. Further effort is not necessary. When fully open it is advantageous to rotate the handwheel clockwise 1/2 turn.

To close the valve, the handwheel is rotated clockwise to a positive stop.

Wheelkeys or other similar devices should not be used.

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Note:- If fitted with a handwheel locking device the padlock and upper locking device necessitates removal prior to operation.

When used for the balancing of water distribution systems, valves will always be in the fully open position at the commencement of the exercise.

During the commissioning stage, all entrained air must be expelled from the system before accurate measurements of differential pressure signals can be taken from the test points.

Each test point is fitted with a cap retained by a coloured strap.

Upstream (HP) - Red.
Downstream (LP) - Blue.

Note:- For safety reasons all probe insertions during commissioning must be carried out with the system cold.

For the Fig 631/633 test points, these measurements are taken by directly inserting the test probe into the test point, a silicone oil or grease should be lightly smeared onto the test probe prior to insertion.

After disconnecting the probes, re-fit the test points captive cap for protection and additional sealing.

Regulation is accomplished by rotating the handwheel clockwise. The disk travel towards closure corresponds with the micrometer scale reading on the indicator ring and sleeve.

The indicator should read 0-0 when the valve is fully closed.

Valve Setting

When the regulated position is achieved the double regulating feature is then set as follows:-

1. Remove the red plastic handwheel cap.
2. Using the key (provided beneath the cap) or screwdriver rotate the regulation screw anti-clockwise to set the double regulation feature. A positive stop will be felt. Tightening is not necessary.

The double regulating feature is now set, which enables the valve to be fully closed for isolation and re-opened to the previously set position. This should be checked at this time.

Replace the key (if provided) and the red plastic handwheel cap.

MAINTENANCE

The valve should be at zero pressure and ambient temperature prior to any maintenance.

Maintenance Engineers & Operators are reminded to use correct fitting tools and equipment. A full risk assessment and methodology statement must be compiled prior to any maintenance. The risk assessment must take into account the possibility of the limits of use being exceeded whereby a potential hazard could result.

A maintenance programme should therefore include checks on the development of unforeseen conditions, which could lead to failure.

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In systems where corrosion could be a potential hazard, wall thickness checks on the body and bonnet should be made. This requires either the removal of the valve from the pipeline or removal of the bonnet with the system at zero pressure. If the wall thickness has reduced by 25%, the valve must be replaced.

This valve does not require any routine maintenance.

The only items which may require attention are as follows:

'O' Ring and Stuffing Box Gasket Replacement

During this maintenance exercise the stuffing box needs to be removed from the valve, necessitating a complete valve isolation and local system drain.

1. Record the set position on the micrometer scale e.g. 5.6.
2. Remove the plastic handwheel cap and the adjusting key (if provided).
3. Open the valve to the Full Open position, approximately 8 or 14 turns from closed depending upon valve size. (The regulation screw will need to be backed off in the clockwise direction to achieve the full open position).
4. Remove the handwheel retaining screw and washer.
5. Lift the complete handwheel and indicator assembly off the valve.
6. Note the position of the indicator sleeve window and lift the indicator sleeve off the valve bonnet hexagon.
7. Slacken and remove the stuffing box screws with an allen key.
8. Remove the stuffing box (a soft mallet may be used if necessary).
9. Remove the stuffing box gasket.
10. Clean both gasket-sealing faces and fit the new stuffing box gasket over the stem.
11. Remove the old 'O' ring seals from the stuffing box. (Please ensure that the stuffing box is clean and free from dirt).
12. Fit new 'O' ring seals into the stuffing box bore grooves (silicone grease maybe applied).
13. Fit the complete stuffing box over the stem onto the valve (take special care not to damage the 'O' ring seals).
14. Re-fit the stuffing box allen screws and tighten evenly using an allen key.
15. Re-fit the indicator sleeve onto the valve bonnet hexagon in the same position as before. (I.e. indicator window position).
16. Re-fit the complete handwheel and indicator assembly onto the valve stem.
17. Close the valve and check that the indicator position is 0-0 (if not remove handwheel assembly and adjust to 0-0 and then re-fit to valve in the closed position).
18. Re-fit the handwheel retaining screw and open the valve to the previously set position (recorded at stage1).

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19. Use the key provided or screwdriver, rotate the regulation screw anti-clockwise to set the double regulation feature e.g. 5.6. A positive stop will be felt. Tightening is not necessary. The double regulation feature is now re-set.

Bonnet Gasket Replacement

During this maintenance exercise the bonnet assembly needs to be removed from the valve therefore requiring a complete valve isolation and local system drain.

1. Ensure the valve is at the regulated or fully open position.
2. Mark a reference line on the bonnet and body for assembly later.
3. Slacken and remove the bonnet screws.
4. Carefully lift the bonnet sub-assembly off the valve – ensuring that the handwheel assembly is free from lifting forces i.e. the handwheel assembly must not be used for lifting (a screw driver or lever may assist if necessary to separate the bonnet and body).
5. Clean both gasket-sealing faces and fit the new body bonnet gasket.
6. Inspect inside the body and clear any debris particularly from the valve seat area.
7. Lift the bonnet assembly onto the valve aligning the reference line previously marked. Check that the bonnet is sitting down evenly.
8. Re-fit the bonnet screws and tighten diagonally and evenly.
9. Fill and pressurize the system checking for leakage. Tighten the bonnet screws further if necessary.

Handwheel Assembly Replacement

1. Record the set position on the micrometer scale e.g. 5.6.
2. Operate the valve to the closed position (counting the number of turns, verifying the recorded position).
3. Remove the plastic handwheel cap and the adjusting key (if provided).
4. Remove the handwheel retaining screw and washer.
5. Lift the complete handwheel and indicator assembly off the valve.
6. Note the position of the indicator sleeve window – replace the indicator sleeve if necessary.
7. Fit the replacement handwheel and indicator assembly (please check that it reads 0-0 prior to fitting and adjust if necessary).
8. Fit the handwheel retaining screw and washer.
9. Operate the valve to the set position (stages 1 and 2).

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- Using the adjusting key (if provided) or screwdriver, rotate the regulation screw anti-clockwise to set the double regulation feature e.g. 5.6. A positive stop will be felt. Tightening is not necessary. The double regulation feature is now re-set.
- Replace the key (if provided) and the red plastic handwheel cap.

Disk Assembly Replacement

- Record the set position, on the micrometer scale e.g. 5.6.
- Operate the valve to the closed position.
- Remove the plastic handwheel cap and the adjusting screw key (if provided).
- Remove the handwheel retaining screw and washer.
- Lift the complete handwheel and indicator assembly off the valve.
- Note the position of the indicator sleeve window and remove the indicator sleeve off the valve.
- Mark a reference line on the bonnet and body for assembly later.
- Slacken and remove the bonnet screws.
- Refit the handwheel assembly and retaining screw and washer.
- Carefully lift the bonnet sub-assembly off the valve - ensuring that the handwheel assembly is free from lifting forces. (A screwdriver or lever may assist if necessary to separate the bonnet and body).
- Slacken and remove the disk assembly location screw from the bonnet underside spigot.
- Carefully rotate the disk anti-clockwise looking from the base of the disk until the disk assembly is free from the stem (count the number of turns necessary).
- Fit the new disk assembly by offering it to the stem end and by rotating the disk clockwise onto the stem the same number of turns as recorded in stage 12.
- Line up the disk nut drive slot with the location screw hole and fit the location screw.
- Using the handwheel assembly operate anti-clockwise for 2 or 3 turns.
- Clean both gasket sealing faces and fit new body bonnet gasket.
- Inspect inside the body and clear any debris particularly from the valve seat area.
- Lift the bonnet assembly onto the valve aligning the reference previously marked (stage 7). Check that the bonnet is sitting down evenly.
- Re-fit the bonnet screws and tighten diagonally and evenly.
- Operate the valve clockwise to the closed position.

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21. Remove the handwheel retaining screw and washer.
22. Remove the handwheel assembly.
23. Re-fit the indicator sleeve onto the valve bonnet hexagon in the same position as before (i.e. indicator window position stage 6).
24. Check that the handwheel indicator assembly reads 0-0 and fit on the valve stem.
25. Check that the indicator position is 0-0 in the indicator window. (If not remove handwheel assembly and adjust to 0-0 and then re-fit to valve in the closed position).
26. Re-fit the handwheel retaining screw and washer.
27. Open the valve to the set position checking that it is the same as recorded at stage 1 e.g. 5.6.
28. If the set position is different, please use the adjusting key (if provided) or screwdriver, to adjust as necessary.
29. Replace the key (if provided) and red plastic handwheel cap.
30. Fill and pressurize the system checking for leakage. Tighten the bonnet cap head screws further if necessary.

For the supply of genuine Hattersley spares, technical assistance or Hattersley ValveServe contact:

Address: Hattersley Newman Hender
Peel House,
Peel Road,
West Pimbo,
Skelmersdale,
Lancashire,
England.
WN8 9PT

Telephone: UK Sales 01695 712800
Export Sales 01695 712805

Facsimile: 01695 712820

Email: uksales@hattersley.com: export@hattersley.com

Service Freephone: 0500 618205