

# Engineering Data Sheet

Document No:- 050M4990D799 rev 1

Installation, Operation & Maintenance Instructions for  
Fig 4990 Butterfly Valves

Page 1 of 7

Date 24<sup>th</sup> November 2005

## 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.**

Fluid	Group 2 Liquid		
Fig No.	PN	DN	Category
4990PN16	16	50-300 350-600	SEP I *
4990PN25	25	50-200 250-600	SEP I *
4990PN40	40	50-200 250-600	SEP I *

\* Category I requires CE mark

## Operating pressures and temperatures

# Engineering Data Sheet

Document No:- 050M4990D799 rev 1

Installation, Operation & Maintenance Instructions for  
Fig 4990 Butterfly Valves

Page 2 of 7

Date 24<sup>th</sup> November 2005

PN	Non-shock pressure at temperature range	Non-shock pressure at max. temperature
PN16	16 bar from -10°C to 163°C	3.4 bar at 204 °C
PN25	25 bar from -10°C to 135°C	3.4 bar at 204 °C
PN40	40 bar from -10°C to 90°C	3.4 bar at 204 °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

These valves must be installed in a piping system whose normal pressure and temperature do not exceed these ratings.

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

These Butterfly valves may be used in conjunction with metering stations (for sizes upto 300mm a 1 diameter minimum length spool piece should be fitted between the metering station and the valve, for sizes 350mm and larger a 3 diameter minimum length spool piece should be fitted). Flow must pass through the metering station first and secondly through the valve.

These valves can be fitted in either a horizontal or vertical pipework. When installed in a horizontal pipeline, the valve stem should be preferably horizontal. This enables the butterfly valve to be self-cleaning and also enables the weight of the disk to be equally borne by the bearings.

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.

**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. The disk will be in the fully closed position to avoid collision with the blanking flange.**

---

# Engineering Data Sheet

Document No:- 050M4990D799 rev 1

Installation, Operation & Maintenance Instructions for  
Fig 4990 Butterfly Valves

Page 3 of 7

Date 24<sup>th</sup> November 2005

---

## **INSTALLATION**

The Fig 4990 Butterfly valves are fully located between flanges utilising the flange bolt holes.

The flange bolts or studs should be tightened cross wise until the body touches the flange face with metal to metal contact.

These valves are bi-directional. However, the preferred installation is with the seat downstream.

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.

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

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.

---

# Engineering Data Sheet

Document No:- 050M4990D799 rev 1

Installation, Operation & Maintenance Instructions for  
Fig 4990 Butterfly Valves

Page 4 of 7

Date 24<sup>th</sup> November 2005

---

## **OPERATING**

### **Gear Operated**

An enclosed worm gear reduction operator (gearbox) is mounted on the valve body with the gear quadrant intimately connected with the valve shaft. The full open and full closed position travel stops are set at the factory and require no further adjustment.

**Note:-** If the gearbox is fitted with an operational padlock and locking ring, the padlock will require removal prior to operation.

Valve closure is by clockwise rotation of the handwheel until the travel stop restriction is felt. No excessive force is required to effect tight shut off and under no circumstances should additional wrenches or wheelkeys be used on the handwheel.

Counter clockwise rotation of the handwheel will open the valve until the full open travel stop or the intermediate regulated travel stop (memory stop) fitted on the double regulating version is reached.

A non-adjustable pointer indicates the actual valve disk position against a fixed scale.

The memory stop (double regulating versions only) device is fitted at the factory so that the valve may be operated over its full travel prior to commissioning without the need for adjustment.

### **Setting the gearbox memory stop (refer to attached drawing)**

Using the usual commissioning procedures, establish the required regulated position of the valve.

Slacken the centre screw sufficiently for the travel stop arm to be lifted and disengaged from the drive spline. Rotate the travel stop arm as near as possible to the eccentric stop and re-engage on the spline. Tighten the centre screw.

Slacken the eccentric stop screw and rotate the eccentric stop until it firmly touches the travel stop arm and re-tighten the screw.

It is recommended that the eccentric stop is rotated in a clockwise direction to touch the travel stop arm so that the tightening effect of the screw will maintain the stop position.

Record the regulation position.

**Note:-** Excessive-opening effort on the intermediate stop is not necessary. Handwheel effort should cease when obvious resistance is felt.

### **Lever operated** (50mm to 150mm PN16 valves only)

### **Hydrodynamic Torque**

Care must be taken when operating the valve by the lever as high rates of flow induce a hydrodynamic torque on the disk which causes it to move position rapidly, either more open or slamming shut, depending on its initial position. The sudden movement on the lever can cause injury and if closing, water hammer on liquid service and system damage.

---

# Engineering Data Sheet

Document No:- 050M4990D799 rev 1

Installation, Operation & Maintenance Instructions for  
Fig 4990 Butterfly Valves

Page 5 of 7

Date 24<sup>th</sup> November 2005

---

Valve closing is by clockwise motion of the lever. After disengaging the lever from the fully open notch position the lever can be rotated to the closed position notch. See note on Hydrodynamic force above.

No excessive force is required to effect tight shut off and under no circumstance should additional wrenches be used.

After disengaging, counter clockwise rotation of the lever will open the valve from the closed notch to the fully open notch. See note on Hydrodynamic force above.

## **MAINTENANCE**

These butterfly valves are maintenance free. However, if the upper or lower stem glands require adjustment the following procedures should be followed.

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.

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

The glands may require adjustment during installation and then periodically thereafter to maintain a stem gland seal. Under normal working conditions Hattersley valves should not need further attention but when required the following procedures are recommended.

## **Upper Stem Gland**

### Adjustment

Each gland nut should be tightened evenly in a clockwise direction until increased resistance to operate the valve is obtained, or if leakage is present until the leakage stops.

**Note:-** It is recommended that within the 1st year the gland be inspected at 3 monthly intervals to check for gland leakage.

### Fitting Additional Packing Ring

### Gearbox Operation

This procedure necessitates the removal of the gearbox.

1. Turn off circulating pumps, the valve should be at zero pressure.
2. Position the valve into the fully closed position and back off slightly.
3. Slacken and remove the Gearbox set screws.
4. Remove the gearbox, noting the handwheel position and stem orientation with respect installation.
5. Slacken and remove the mounting bracket bolting.

---

# Engineering Data Sheet

Document No:- 050M4990D799 rev 1

Installation, Operation & Maintenance Instructions for  
Fig 4990 Butterfly Valves

Page 6 of 7

Date 24<sup>th</sup> November 2005

---

6. Loosen both gland nuts anti-clockwise and remove.
7. Remove the gland flange, Belville washers, gland sleeve and mounting bracket.
8. Fit additional packing by wrapping the packing round the stem and pushing into the valve chamber.
9. If partially repacking valves, remove old packing by means of a thin bladed screw driver or suitable packing removal tool, taking care not to damage the valve stem. Fit new packing as 8.
10. Refit the gland sleeve, gland flange and both nuts, tighten gland nuts evenly in a clockwise direction.
11. When the gland is repacked, remove the gland nuts, gland and gland sleeve.
12. Refit the mounting bracket, gland sleeve, Belville washers (outer periphery of Belville washer in contact with one inverted), gland flange and nuts.
13. Refit and tighten the mounting bracket bolting.
14. Refit the gearbox into previous noted installation position.
15. Refit and tighten the gearbox set screws.
16. Tighten the gland nuts evenly as per the upper stem adjustment procedure.
17. Operate the gearbox to check valve operation.

## Lever Operation

This procedure necessitates the removal of the Lever and position plate.

1. Turn off circulating pumps, the valve should be at zero pressure.
2. Position the valve into the fully closed position.
3. Slacken the lever retaining screw and remove the lever, noting the stem orientation with respect installation.
4. Slacken and remove the position plate set screws and plate
5. As above 5 to 13
6. Refit the position plate.
7. Refit and tighten the position plate set screws.
8. Refit the lever and tighten the retaining set screw as previous noted.
9. Operate the lever to check valve operation.

## Lower Stem Gland

### Adjustment

The lock nut requires slackening to enable the central screw to be adjusted in a clockwise direction until the leakage stops. When complete re-tighten the lock nut.

**Note:-** It is recommended that within the 1st year the gland be inspected at 3 monthly intervals to check for gland leakage.

### Fitting Additional Packing Ring

1. Turn off circulating pumps, the valve should be at zero pressure.
2. Position the valve into the full open position.
3. Slacken the lock nut and retract the adjusting screw.
4. Slacken and remove the lower plate bolting.
5. Remove the Belville washers and gland sleeve.
6. Fit additional packing by wrapping the packing round the stem and pushing into the valve chamber.
7. Refit gland sleeve, Belville washers (outer periphery of Belville washer in contact with one inverted) and lower plate.
8. Refit and tighten the lower plate bolting.
9. Tighten the adjustment grub screw and tighten lock screw.
10. Tighten the lower gland as per the lower stem adjustment procedure.

## Engineering Data Sheet

Document No:- 050M4990D799 rev 1

Installation, Operation & Maintenance Instructions for  
Fig 4990 Butterfly Valves

Page 7 of 7

Date 24<sup>th</sup> November 2005

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

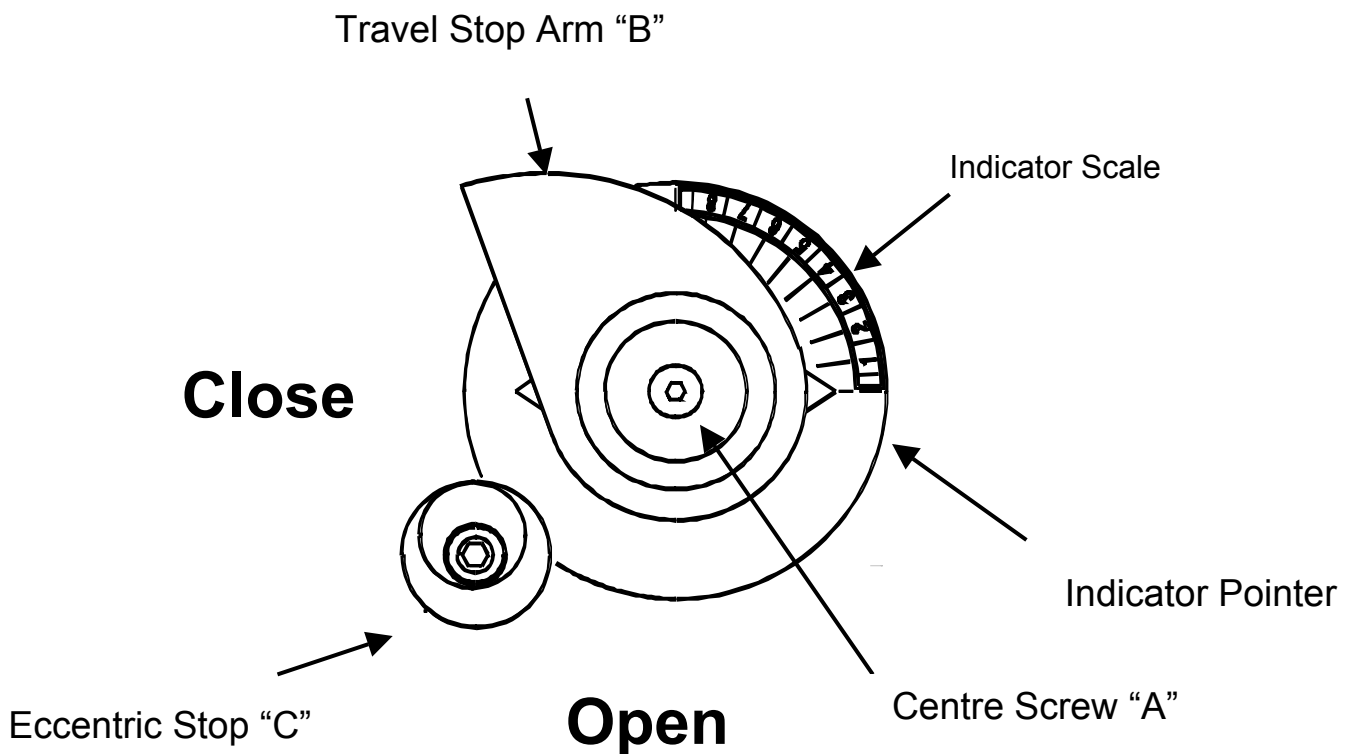
**Hattersley Newman Hender**  
**Peel House, Peel Road, West Pimbo, Skelmersdale, Lancashire. WN8 9PT**

Telephone : 01695 712800

Facsimile : 01695 712820

Email : [uksales@hattersley.com](mailto:uksales@hattersley.com)  
: [export@hattersley.com](mailto:export@hattersley.com)

Service Freephone : 0500 618205



## Double Regulating Feature