Engineering Data Sheet

Installation, Operation & Maintenance Instructions for
971 & 971YL Butterfly Valves

Document No:- 050M00971D799 rev 1

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Date 28th April 2003

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.)

CE MARKING AND THE ATEX Directive 94/9/EC

Concerning equipment and protection systems intended for use in potentially explosive atmospheres.

This has been implemented in United Kingdom law by the Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres Regulations 1996 (SI 1996/192) and amended by The Equipment and Protective Systems (amendment) Regulations 2001 (SI 2001/3766).

The regulations apply to all valves where each valve:

- has its own potential source of ignition.
- operates in a potentially explosive atmosphere created by:
    - the presence of air / dust mixtures external to the valve.
    - the presence of gases, vapours, mists released from the valve through leakage.

The regulations will not apply to a valve without a potential source of ignition, which operates in a dust free environment and the fluid being transported is cold, inert gas or non-flammable liquid.
The requisite level of protection for valves not exempt from the regulations is defined as Group II category 2 and shall bear the following marking:

 **II 2 GD X**

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:

a) categorised in accordance with the Pressure Equipment Directive.
b) designated with the requisite level of protection in the ATEX Directive as Group II Category 2 non-electrical equipment.

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These products are categorised for Group 1 gas, but are not necessarily suitable for all fluids in this group. Refer to Hattersley Technical Application Engineers for advice. Codes of practice, specifications and regulations should be referred to for specific guidance for valve selection on hazardous service.

Fluid	Group 1 Gas		
Fig No.	PN	DN	Category
971	16	50 65-200 250-600	I * II * III *

*** Categories I, II and III require the CE mark**

Operating pressures and temperatures

Rating	Seat Trim	Non-shock pressure at temperature range	Non-shock pressure at max. temperature
16	Nitrile	16 bar from 0 to 80°C	16 bar at 80 °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 the above 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 M2000 metering stations (a spool piece should be fitted between the metering station and the valve. (For sizes up to 300mm 1 diameter minimum length spool piece is required and for sizes 350mm and larger, a 3 diameter minimum length spool piece is required).
Flow must pass through the metering station first and secondly through the valve.

These valves can be fitted in either 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.

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.

Heavy valves may need independent support or anchorage.

Valves categorised as Category SEP or Category I are suitable for end-of-line application. However, valves categorised as Category II or Category III are not and must not be used on end-of-line service.

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

The Fig 971 & 971YL Series are fully located between flanges utilising the flange bolt holes.

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

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/lever 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 packaging 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.

These Butterfly valves have integral rubber sealing faces and gaskets must not be used.

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 integral rubber sealing faces between the flange surfaces until metal to metal contact is achieved.

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

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 to the intermediate regulated travel stop (memory stop) if fitted on the double regulating version.

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 Fig 1)

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 if felt.

Lever operated

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 may cause 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.

Valve closing is by clockwise motion of the lever. After lifting the lever and disengaging the lever from the fully open (or regulated) notch position, the lever can be rotated to the closed position notch and lowered to re-engage. See note on Hydrodynamic force above.

Note:- For valves fitted with a memory device a locking screw is provided in the wrench which when screwed in, prevents the wrench from being lifted and the regulated position changed. (Check that this is retracted prior to operation)
The valve is despatched from the factory with this screw fully retracted allowing freedom of operation. The screw should only be engaged after all commissioning is completed and should be withdrawn when operation of valve is necessary.

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

After lifting the lever and disengaging, counter clockwise rotation of the lever will open the valve from the closed notch to the fully open (or regulated) notch and lowered to re-engage. See note on Hydrodynamic force above.

Memory Device
The regulating device comprises of two steel plates, a lower one fixed to the valve and upper rotation plate. An indicator mark on the lower plate shows the valve position against the moving scale on the top plate.

Setting the lever memory stop (refer to Fig 2)

With set-screw 'A' slackened (care should be taken to prevent the valve slamming shut due to water velocity) the lever can be moved to any infinitely variable position between closed and fully open. As the lever moves, the upper plate 'B' with the travelling notch 'C' moves with the lever. When the required regulated position is achieved, locking set screw 'A' will fix this set position but will allow the lever to be disengaged from travelling notch 'C' by lifting and moved to the fixed notch 'D' of the closed position. Reversing this procedure will return the lever to the previously regulated position.

MAINTENANCE

These butterfly valves are maintenance free.

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

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

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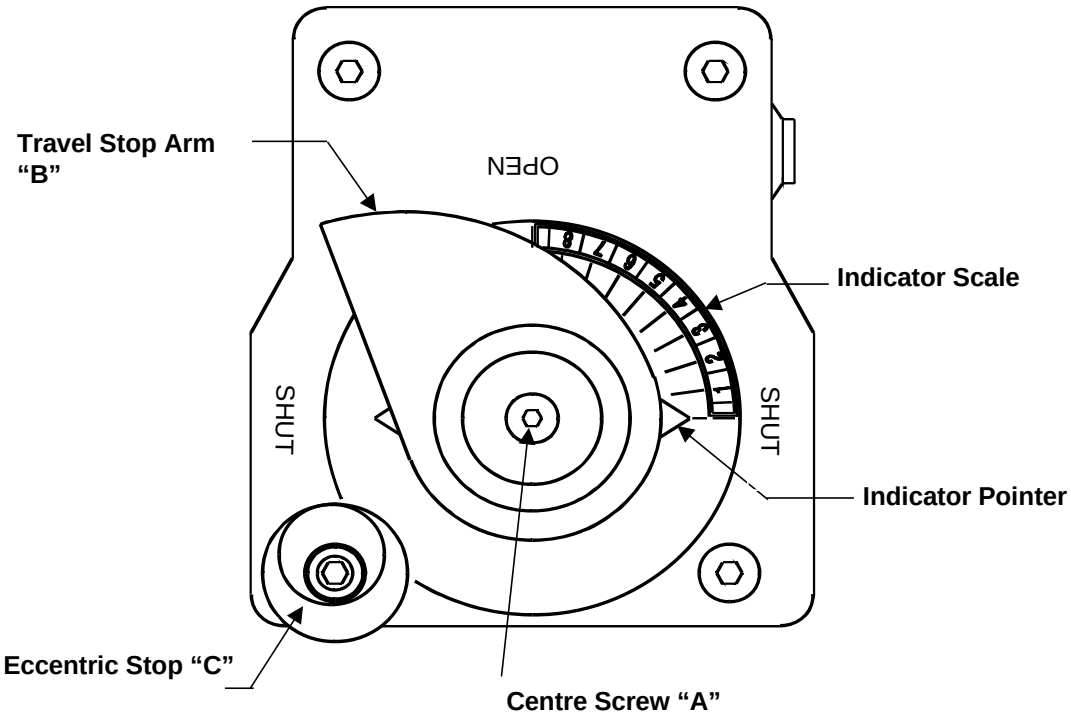

Fig 1

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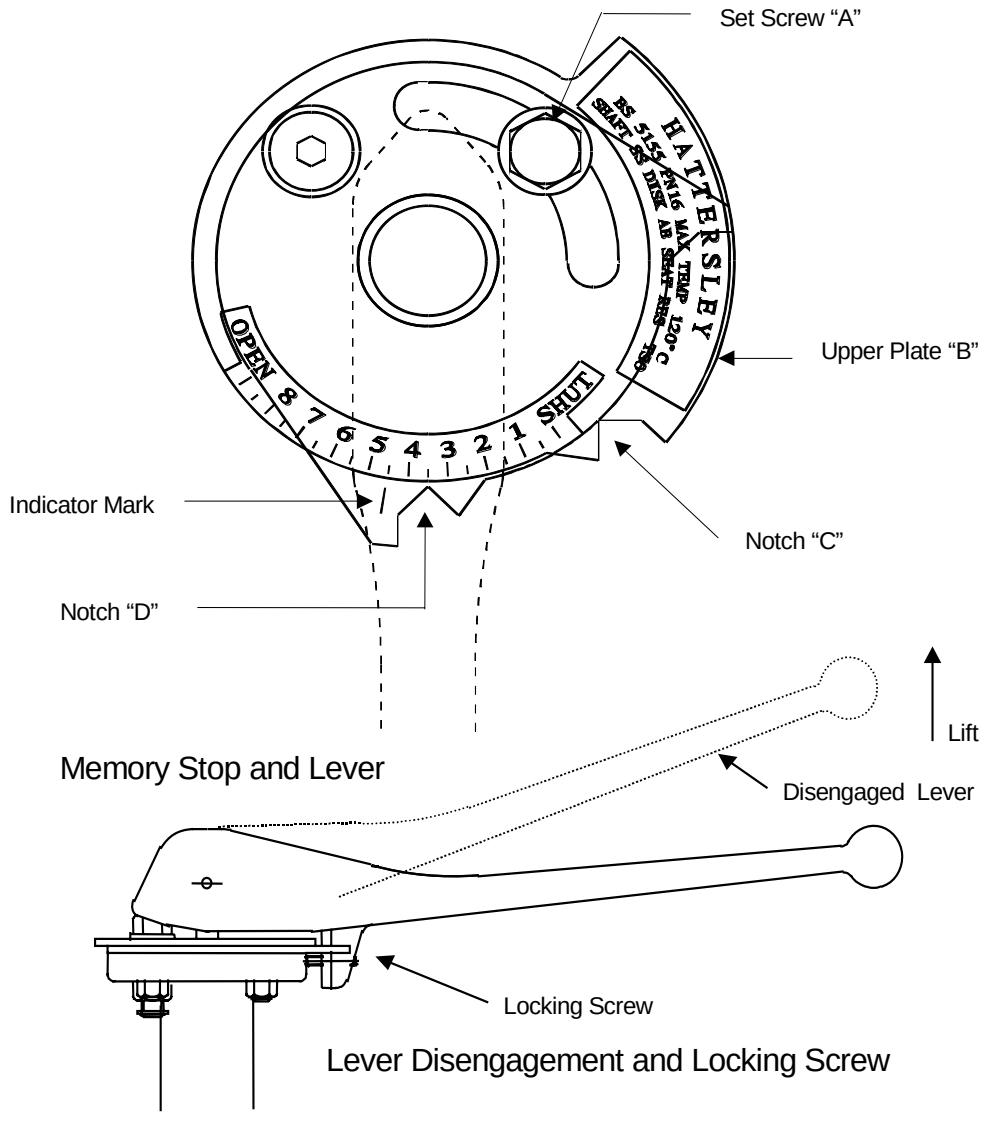

Memory Stop and Lever

Lever Disengagement and Locking Screw

Fig 2