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0.- DESCRIPTION

The RM model non-return valve is a reliable metal-seated non-return valve with an oblique seating angle to provide rapid closure.

Non-return valves only allow the passage of fluid in a single direction. Should the fluid flow return, the valve prevents this by shutting under its' own weight.

The RM valve can also be supplied with a return spring to allow faster closure.

The RM is a "wafer" type valve and can be mounted between standard flanges according to the diameters shown in table 1.

With rising water, and/or larger diameters, it is possible to fit the valve with a hydraulic damper, or dashpot, to reduce effect of the valve closing (i.e. water hammer).

Table 1

| DN | Weight (Kg) | Standard flanges | | | |
|-----|----------------|------------------|------|------|------|
| | | PN10 | PN16 | PN25 | PN40 |
| 40 | 0.8 | X | X | X | X |
| 50 | 1 | X | X | X | X |
| 65 | 2 | X | X | X | X |
| 80 | 3 | X | X | X | X |
| 100 | 4.5 | X | X | X | X |
| 125 | 6.5 | X | X | X | X |
| 150 | 7.5 | X | X | X | X |
| 200 | 15 | X | X | X | X |
| 250 | 26.5 | X | X | X | |
| 300 | 33.5 | X | X | X | |
| 350 | 54 | X | X | X | |
| 400 | 65.5 | X | X | X | |
| 450 | 92 | X | X | X | |
| 500 | 110 | X | X | X | |
| 600 | 178 | X | X | X | |

1.- INSTALLATION

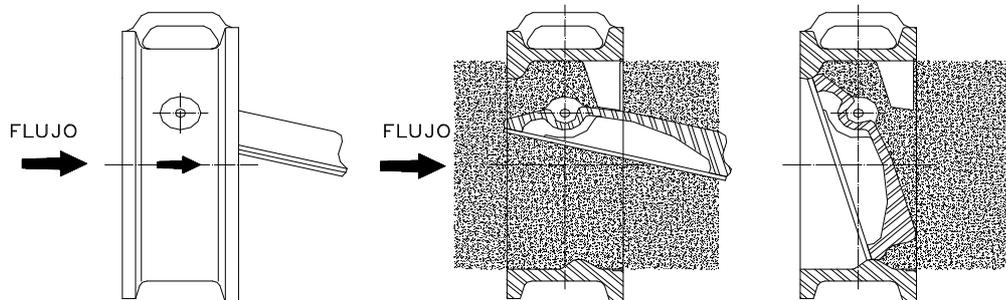


To avoid personal injury or damage to property from the release of process fluid:

- Those in charge of handling and maintenance of the valve must be qualified and trained in valve operations.
- Use appropriate personal protection equipment (gloves, safety shoes, etc).
- Shut off all operating lines to the valve and place a warning sign.
- Isolate the valve completely from the process.
- Release process pressure.
- Drain the process fluid from the valve.

Before installation, inspect the valve body and components for any damage that may have occurred during shipping or storage. Make sure the internal cavities within the valve body are clean. Inspect the pipeline and mating flanges, making sure the pipe is free of foreign material and that the flanges are clean.

The RM valve only works in one direction, and therefore it is important to consider this during installation. The direction of flow is indicated by an arrow on the valve body.

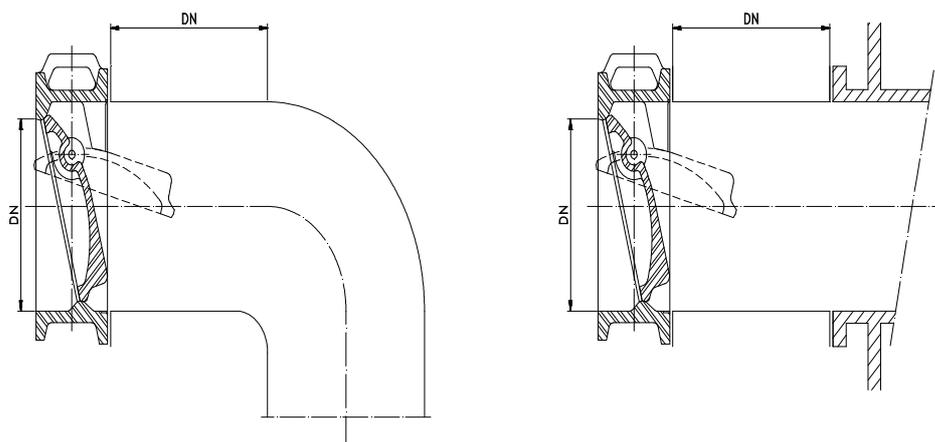


The valve should be mounted between two parallel flanges. It is essential that the valve is centred correctly between them to let the disc move freely. The valve is correctly centred when the distances between the external diameter of the flanges and the external diameter of the valve are the same through any diameter of the body valve.

It is necessary to place a suitable gasket between the valve body and the pipe flange.

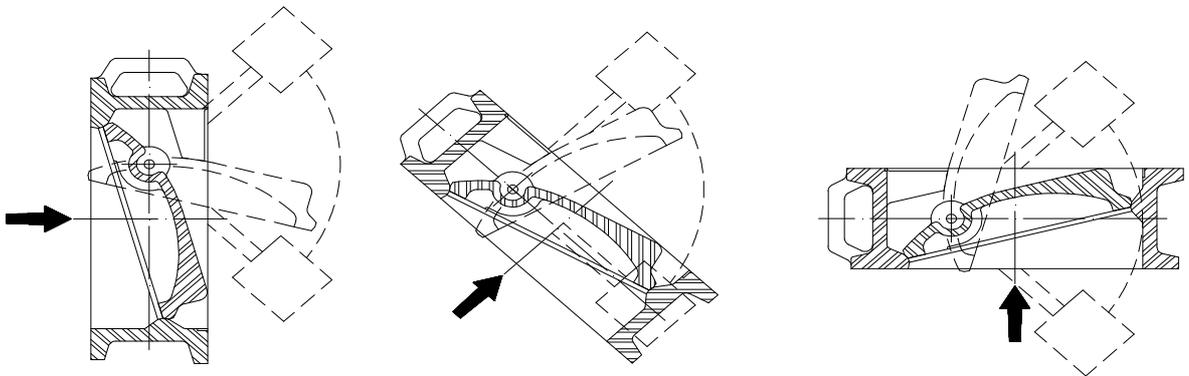
With diameters greater than DN 400 it is advisable to use “spools” which facilitate installation and possible future maintenance of the valve.

It is necessary to keep a minimum distance, equal to the nominal diameter of the valve (DN), between the rear of the valve and the next bend, valve or accessory (see following diagram).

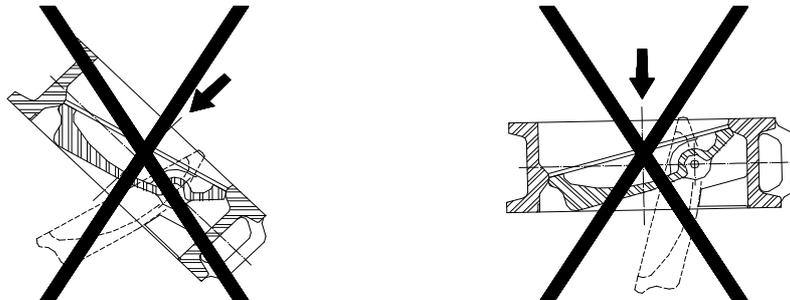


The position of the disc is also of vital to valve operation. Make sure that the axis of rotation of the disc is in a horizontal plane, regardless of the pipe position (see the following diagram).

If the RM valve is fitted with a damping system, or dashpot, it must be mounted in such a way that the counterweight can move freely in an arc of $+45^\circ$ and -45° to the horizontal. This guarantees the necessary movement to close the valve. Also note that the hydraulic reservoir located on the upper part of the assembly should always be positioned horizontally.



Valves installed in vertical lines must also be accurately centred. In all conventional applications, the valve must open upwards with respect to the direction of flow.



Weight of the RM standard valve:

| | | | | | | | | | | | | | | | | | | | |
|------------|-----|----|----|----|-----|-----|-----|-----|------|------|-----|------|-----|-----|-----|-----|-----|-----|-----|
| ND | 40 | 50 | 65 | 80 | 100 | 125 | 150 | 200 | 250 | 300 | 350 | 400 | 450 | 500 | 600 | 700 | 750 | 800 | 900 |
| Weight(Kg) | 0,8 | 1 | 2 | 3 | 4,5 | 6,5 | 7,5 | 15 | 26,5 | 33,5 | 54 | 65,5 | 92 | 110 | 178 | 245 | 310 | 385 | 445 |

2.- OPERATION

2.1.- RM Estandard

The RM non-return valve has an obliquely angled, metal-metal seat. Open, it only allows the passage of fluid in a single direction. Should the fluid flow return, the valve closes under its' own weight.

2.2.- RM with damping system

With rising water, or with larger diameters (DN 300) it is possible install a damping system. This comprises a counterweight (5) and hydraulic damper (or dashpot), which is used to reduce the impact of valve closure.

To reduce the impact, which can cause excessive back-pressures (water-hammer), the closure of the valve is controlled by an hydraulic circuit consisting of an hydraulic cylinder (6), reservoir (7) and regulator (8).

With the valve in the open position, and just at the instant of the flow returning, the counterweight (5) serves to generate an initial turning moment.

The damper acts throughout the closing action and is in the form of a closed hydraulic circuit, with adjustable flow, that controls the rate of closure. This rate can be adjusted by means of the regulator (8), which varies the flow of hydraulic fluid from the cylinder (6) to the reservoir. The valve is opened by the pressure of flow in the pipeline. The action of the hydraulic circuit does not oppose this, with the exception of minor internal resistance.

Important Note:

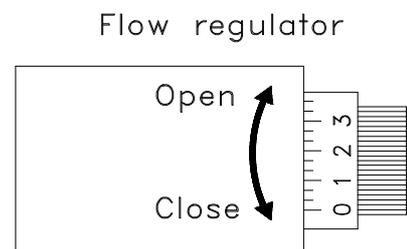
These valves are not designed to work in intermediate positions. Each of the valves with damping systems must be regulated individually in the field by competent personnel.

1-It should always be verified that the hydraulic circuit is full, checking in it the oil level.

2-If the valve will be adjusted with no load in the system, initially the valve should open up lifting it from the counterweight in a manual way. It is necessary to close first the flow regulator completely and to open it progressively until the closing speed is adjusted. (See the following figure)

Always make sure that the flow regulator (8) is finally in an intermediate position. This position will be valid for the beginning of the tests in load.

3-For the regulation of the valve with the system with load, begin assuring that the flow regulator (8) is in the intermediate position and adjust the closing speed progressively opening or closing the flow regulator (8) according to the demands of the service.



Special care must be taken when controlling the closure rate. Avoid closing the regulator completely to prevent the valve disc (2) being held in an intermediate position.

It is advisable that valve closure times do not exceed eight seconds, to prevent excessive torsion of the valve shaft.

The maximum back pressures supportable by RM valves according to varying valve shaft diameter are shown in the following table. For increased performance, please consult the technical department at Orbinox.

| | | | | | | | | | |
|---------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| DN (mm) | 150 | 200 | 250 | 300 | 350 | 400 | 450 | 500 | 600 |
| Back pressure (bar) | 5 | 5 | 2,5 | 2,5 | 2,5 | 2,5 | 2,5 | 2,5 | 2 |

3.- MAINTENANCE

3.1. – RM Standard

Due to the robust design of the RM non-return valve, it requires practically no maintenance if properly installed. It is advisable, however, to check operation periodically.

3.2. – RM with damping system

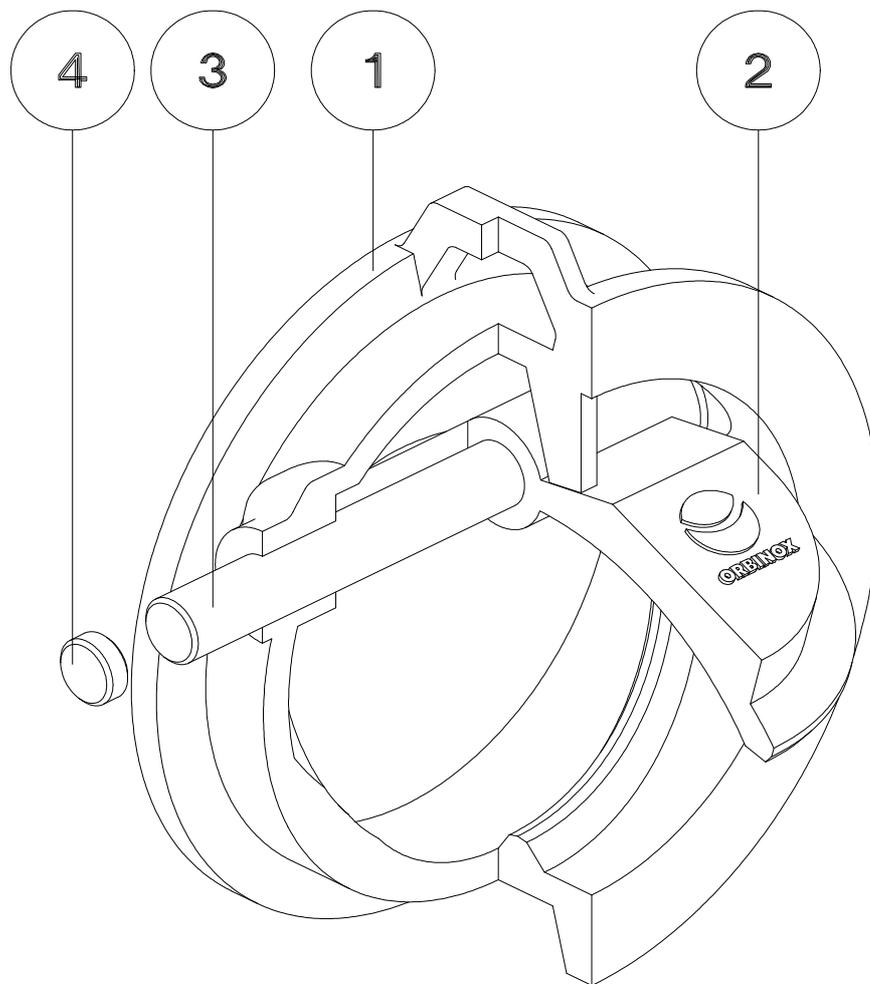
The resilient design of the RM valve with damping system requires very little maintenance.

It is advisable to periodically check the shaft end caps (4) in the body of the valve. If there is minor leakage, tighten the cap bolts. If this is not sufficient replace the sealing rings (see detail A).

With the hydraulic damper it is advisable to check the following points:

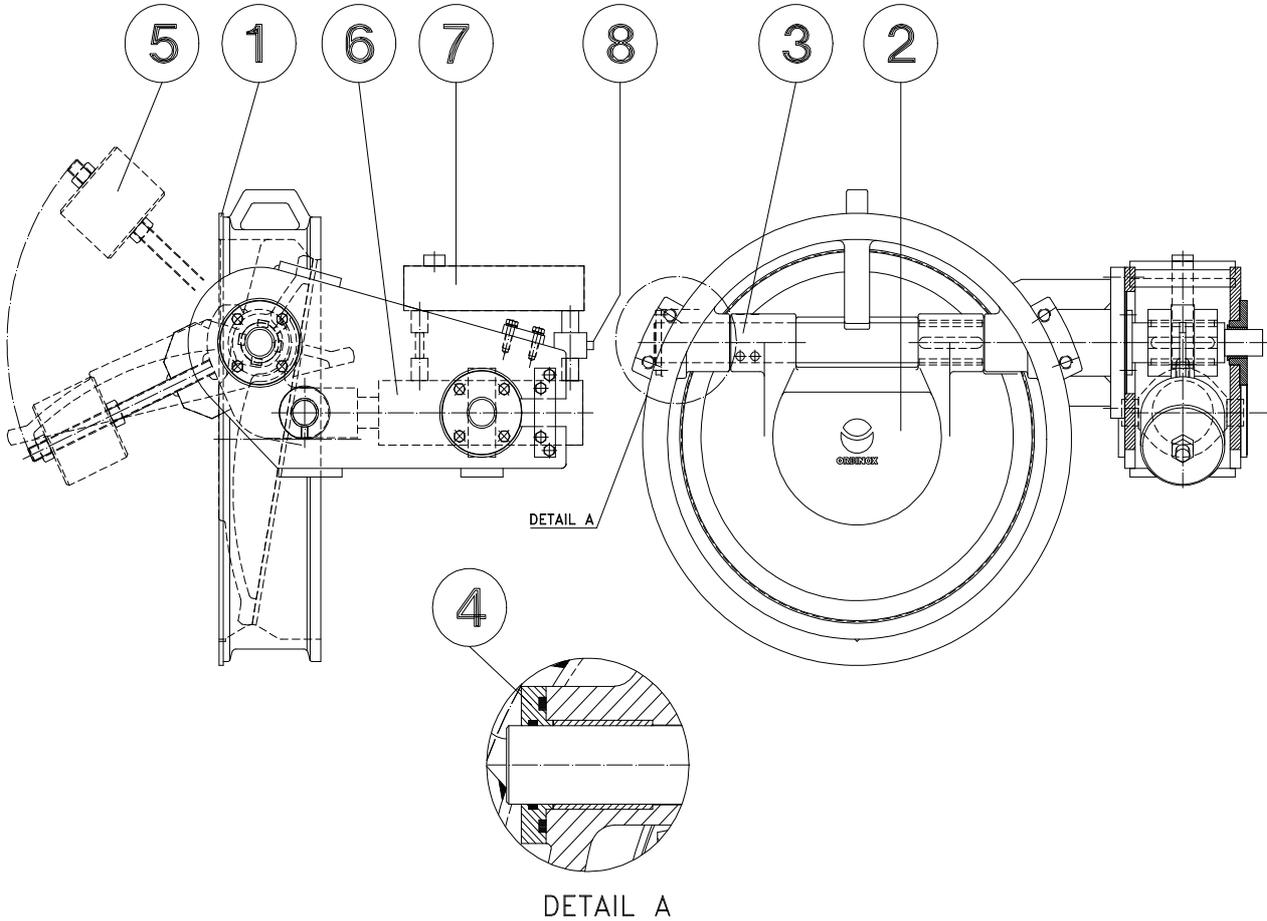
Level of the hydraulic fluid: If the level is low, refill via the filler plug provided. The use of hydraulic fluid with a kinematic viscosity of 30-50 mm²/s is recommended.

Check that the connections of the each of the components in the hydraulic circuit are tight.

4.- PARTS LIST & DRAWINGS4.1.- RM Standard

- 1.- VALVE BODY
- 2.- DISC
- 3.- SHAFT
- 4.- END CAP

4.2.- RM with damping system



- 1.- VALVE BODY
- 2.- DISC OR FLAP
- 3.- SHAFT
- 4.- END CAP
- 5.- COUNTER WEIGHT
- 6.- HYDRAULIC CYLINDER
- 7.- RESERVOIR
- 8.- REGULATOR