

# Защитные клапаны насоса тип MRK

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## Type MRK

Pump protection valve for high pressure centrifugal pumps



> Type MRK, front view



> Type MRK, sectional view

### Product features

- Automatically modulating bypass function
- Forged housing material, carbon steel or stainless steel
- Special materials possible (e.g. Super Duplex)
- Internal operation (no external energy source required)
- Easy to install
- Low maintenance
- Suitable for all liquids

### Applications

- Boiler feed water
- Condensate
- Pumps in fossil power plants
- Chemical processes
- Offshore applications (seawater injection)

# Type MRK

Pump protection valve for high pressure centrifugal pumps

## Technical data

|                                    |                                                                                                          |
|------------------------------------|----------------------------------------------------------------------------------------------------------|
| Nominal diameter                   | DN 80–300 / NPS 3–12                                                                                     |
| Pressure class                     | PN 250–640 / Class 1500–4500                                                                             |
| Temperature                        | Up to 230 °C / 446 °F<br>(other temperatures on request)                                                 |
| Housing material                   | 1.0460 / A105<br>1.0571 / LF2<br>1.4404 / F316L<br>1.4462 / F51<br>1.4501 / F55                          |
| Housing type                       | Forged                                                                                                   |
| Media                              | Liquids of all kinds<br>(water, oils, chemicals and others)                                              |
| Flanges                            | EN 1092-1, ASME B16.5, ISO 7005, JIS, JPI,<br>welding ends on request                                    |
| Designs                            | Vertical installation, horizontal installation, manual start-up,<br>enlarged nominal width of the bypass |
| Number of stages (max.)            | 10                                                                                                       |
| Number of controlled stages (max.) | 10                                                                                                       |
| Operating range (max.)             | Delta p up to max. 500 bar                                                                               |
| Other                              | Bypass differential pressure up to 500 bar                                                               |

# Type MRK

## Pump protection valve for high pressure centrifugal pumps

### Function

The pump protection valve for high pressures. The MRK is used as a protection system for centrifugal pumps in water applications.

The MRK valve system comprises a non-return valve and a special control and throttle device for the bypass system.

The general valve functioning is related to the process quantity (flow sensitive). The bypass section itself consists of a primary control unit (multi stage) and a secondary, very special, multi stage pressure regulator. The functioning of the complete bypass is therefore split into two parts. Both parts (primary and secondary) must work together to perform the required pressure drop function. The secondary part is controlled via the outer-connected pressure piping on the bypass section.

The MRK valve protects high pressure centrifugal pumps against overheating and cavitation problems by automatically maintaining a minimum flow when the system flow is at low load condition. At lower process flows, the MRK valve activates the bypass trim parts via a lever system, so that the pump is protected with the correct minimum flow. When the process/system flow starts (increases), the main non-return valve lifts off its seat and starts to operate (modulate) the bypass recirculation flow that returns to the system tank. If the MRK valve detects a sufficiently high system flow the bypass closes automatically (switching point). As soon as the system flow decreases again, the bypass controls automatically.

The automatic recirculation valves usually operate in the load range from 40 % to 100 % of the rated process flow. The automatic valve handles the typical time limited start-up and shut-down phase by automatically modulating the bypass control operation.

MRK valves at high pressure service may also need an adequate bypass back pressure, e.g. an orifice restriction in bypass line, to prevent cavitation during bypass flow condition.

Full operation range application, which is typical for MRK applications: For high pressure MRK applications with the explicit definition of the full load range from 0 % to 100 % process flow, it is mandatory before order placement to evaluate design impacts on the valve.

For high load ranges it may be necessary to increase the bypass pressure to avoid cavitation, depending on the existing bypass pressure. This also applies to modulation processes in the bypass line. Therefore, the installation of a special back pressure valve BPV is recommended for the full operation range application to ensure that the bypass pressure level is always at a suitable level.

# Type MRK

Pump protection valve for high pressure centrifugal pumps

## Installation information

The MRK valve should be installed as close as possible to the discharge port of the centrifugal pump, preferably directly on the pump discharge port of the pump.

To avoid frequency interference due to pressure oscillations in the medium, the distance between the pump outlet and the valve inlet should not exceed 3 m. Care must be taken to ensure a straight inlet section. In case of deviations, please contact us.

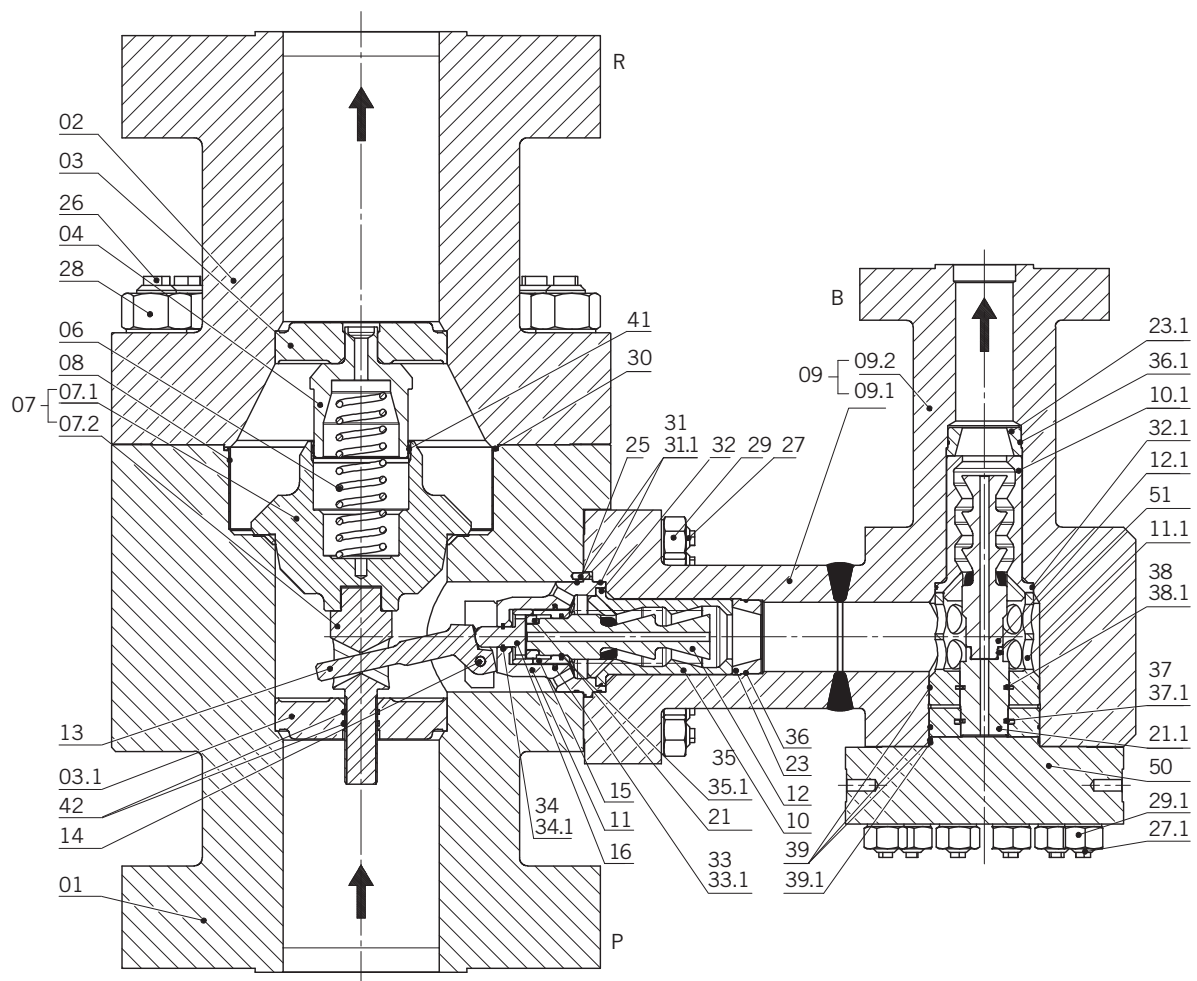
Vertical installation is preferred, but horizontal installation is also possible upon request. The MRK operates quietly and offers high reliability due to its sturdy design.

The recommended filter at the pump inlet should have a mesh size of 0.3 to 0.5 mm. A smaller mesh size of 0.1 mm for the filter is recommended for commissioning.

## Type MRK

Pump protection valve for high pressure centrifugal pumps

Sectional drawing (housing)

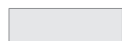


# Type MRK

Pump protection valve for high pressure centrifugal pumps

## Parts list (housing)

| Pos. | Item                | Material    |
|------|---------------------|-------------|
| 01   | Lower body          | *           |
| 02   | Upper body          | *           |
| 03   | Stemguide           | 1.4408      |
| 03.1 | Stemguide           | 1.4408      |
| 04   | Guide bushing       | 1.4021      |
| 06   | Spring              | 1.4310      |
| 07   | Check valve cpl.    | 1.4404      |
| 07.1 | Check valve         | 1.4404      |
| 07.2 | Stem                | 1.4404      |
| 08   | Liner               | 1.4300      |
| 09   | Bypass housing cpl. | *           |
| 09.1 | Bypass branch       | *           |
| 09.2 | Bypass              | *           |
| 09.3 | Bypass              | *           |
| 25   | Guide pin           | A2          |
| 26   | Bolt                | **          |
| 27   | Bolt                | **          |
| 27.1 | Bolt                | **          |
| 28   | Hexagon nut         | **          |
| 29   | Hexagon nut         | **          |
| 29.1 | Hexagon nut         | **          |
| 30   | O-Ring              | *           |
| 41   | Guide ring          | PTFE/Carbon |
| 42   | Guide ring          | PTFE/Carbon |
| 47   | Pipe joint          | 1.4401      |
| 48   | Pipe                | 1.4541      |
| 50   | Cap                 | *           |

 Recommended spare/wear parts

\* Depending on customer requirements

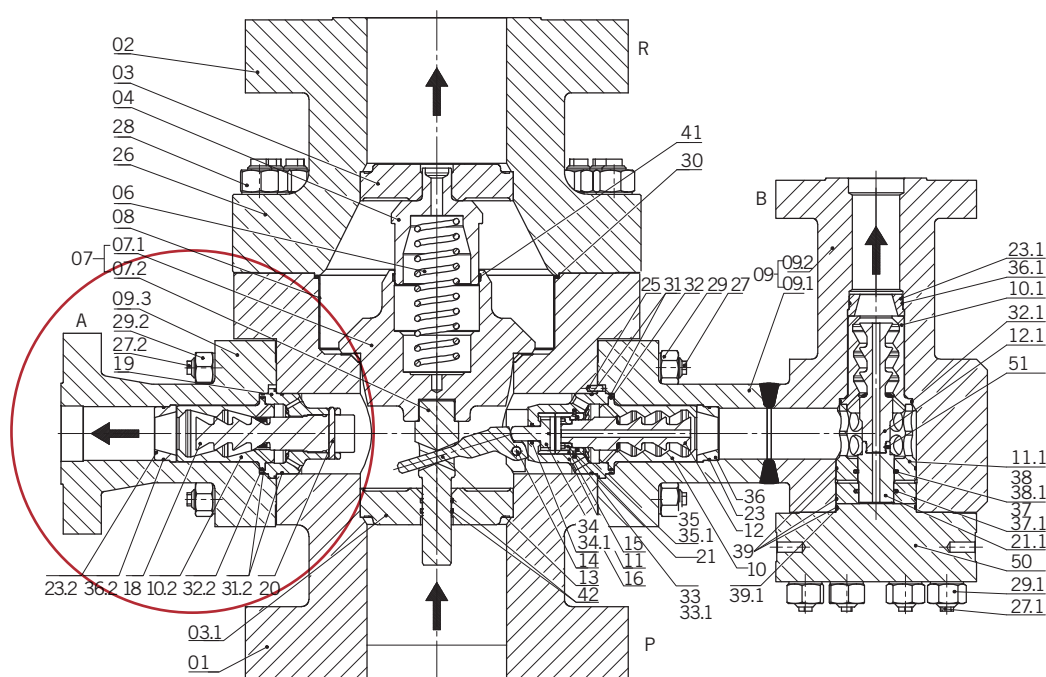
\*\* Depending on size and pressure rating

Parts list as an example of the standard configuration

# Type MRK

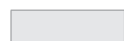
Pump protection valve for high pressure centrifugal pumps

Sectional drawing (manual start-up)



Parts list (manual start-up)

| Pos. | Item                     | Material |
|------|--------------------------|----------|
| 09.3 | Bypass branch            | *        |
| 10.2 | Vortex bushing           | 1.4122   |
| 18   | Start-up vortex plug     | 1.4122   |
| 19   | Holder                   | 1.4122   |
| 20   | Cotter                   | 1.4300   |
| 23.2 | Orifice bushing / nozzle | 1.4122   |
| 27.2 | Bolt                     | **       |
| 29.2 | Hexagon nut              | **       |
| 31.2 | O-Ring                   | *        |
| 32.2 | O-Ring                   | *        |
| 36.2 | O-Ring                   | *        |

 Recommended spare/wear parts

\* Depending on customer requirements

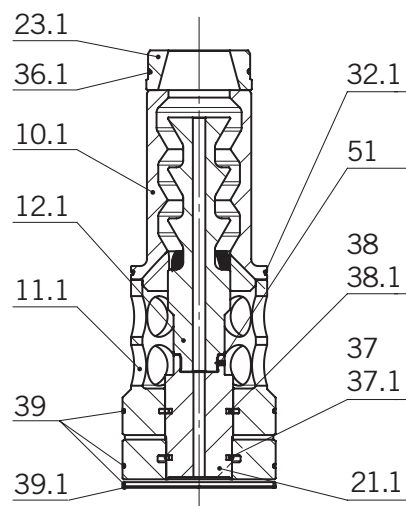
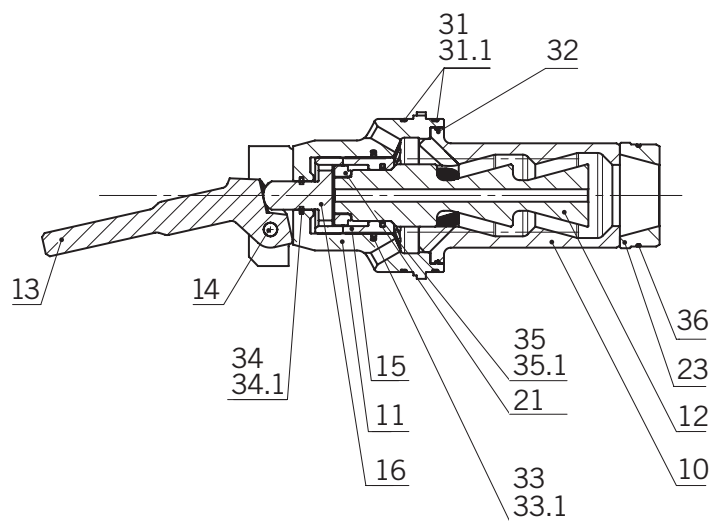
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Parts list as an example of the standard configuration

## Type MRK

Pump protection valve for high pressure centrifugal pumps

Sectional drawing (bypass)



Dimensions: on request

# Type MRK

Pump protection valve for high pressure centrifugal pumps

## Parts list (bypass)

| Pos. | Item                     | Material       |
|------|--------------------------|----------------|
| 10   | Vortex bushing           | 1.4122         |
| 10.1 | Vortex bushing           | 1.4122         |
| 11   | Control head             | 1.4122         |
| 11.1 | Control bushing          | 1.4122         |
| 12   | Vortex plug              | 1.4122         |
| 12.1 | Vortex plug              | 1.4122         |
| 13   | Lever                    | 1.4313         |
| 14   | Pivot pin                | 1.4021         |
| 15   | Relief bushing           | 1.4122         |
| 16   | Relief piston            | 1.4122         |
| 21   | Threaded ring            | 1.4122         |
| 21.1 | Control piston           | 1.4122         |
| 23   | Orifice bushing / nozzle | 1.4122         |
| 23.1 | Orifice bushing / nozzle | 1.4122         |
| 31   | O-Ring                   | *              |
| 31.1 | Support ring             | PTFE/Glasfibre |
| 32   | O-Ring                   | *              |
| 32.1 | O-Ring                   |                |
| 33   | O-Ring                   | *              |
| 33.1 | Glyd ring                | PTFE/Carbon    |
| 34   | O-Ring                   | *              |
| 34.1 | Glyd ring                | PTFE/Carbon    |
| 35   | O-Ring                   | *              |
| 35.1 | Glyd ring                | PTFE/Carbon    |
| 36   | O-Ring                   | *              |
| 36.1 | O-Ring                   | *              |
| 37   | O-Ring                   | *              |
| 37.1 | Glyd ring                | PTFE/Carbon    |
| 38   | O-Ring                   | *              |
| 38.1 | Glyd ring                | PTFE/Carbon    |
| 39   | O-Ring                   | *              |
| 39.1 | Support ring             | PTFE/Carbon    |
| 50   | Cap                      | *              |
| 51   | Grub screw               | 45H            |

Recommended spare/wear parts

\* Depending on customer requirements

Parts list as an example of the standard configuration

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