

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)

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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 (other temperatures on request)
Housing material	1.0460 / A105 1.0571 / LF2 1.4404 / F316L 1.4462 / F51 1.4501 / F55
Housing type	Forged
Media	Liquids of all kinds (water, oils, chemicals and others)
Flanges	EN 1092-1, ASME B16.5, ISO 7005, JIS, JPI, welding ends on request
Designs	Vertical installation, horizontal installation, manual start-up, 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

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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.

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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.

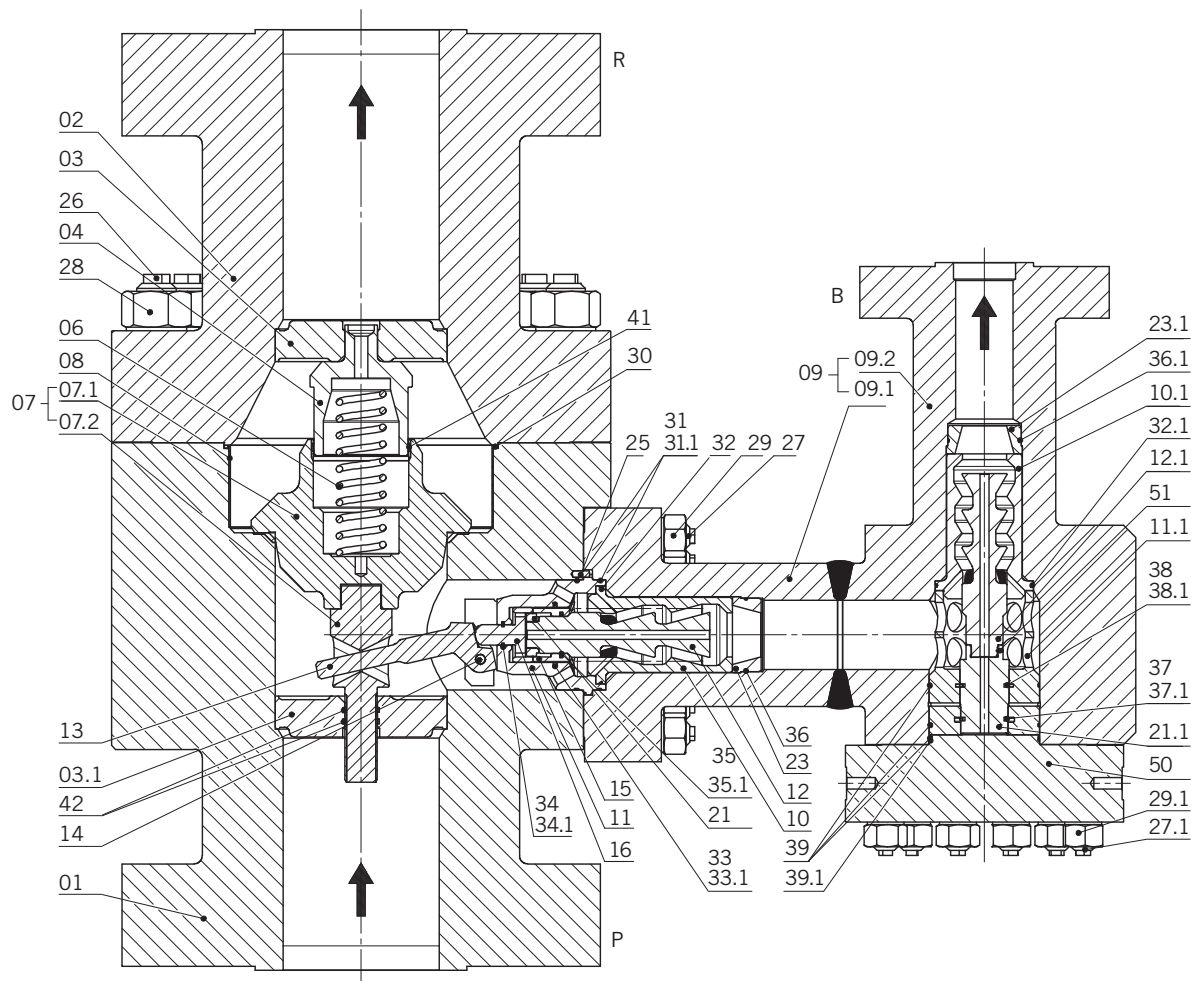
Vertical installation is preferred, but horizontal installation is also possible upon request. The MRK operates quietly and offers high reliability due to its sturdy design.

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.

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Sectional drawing (housing)



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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

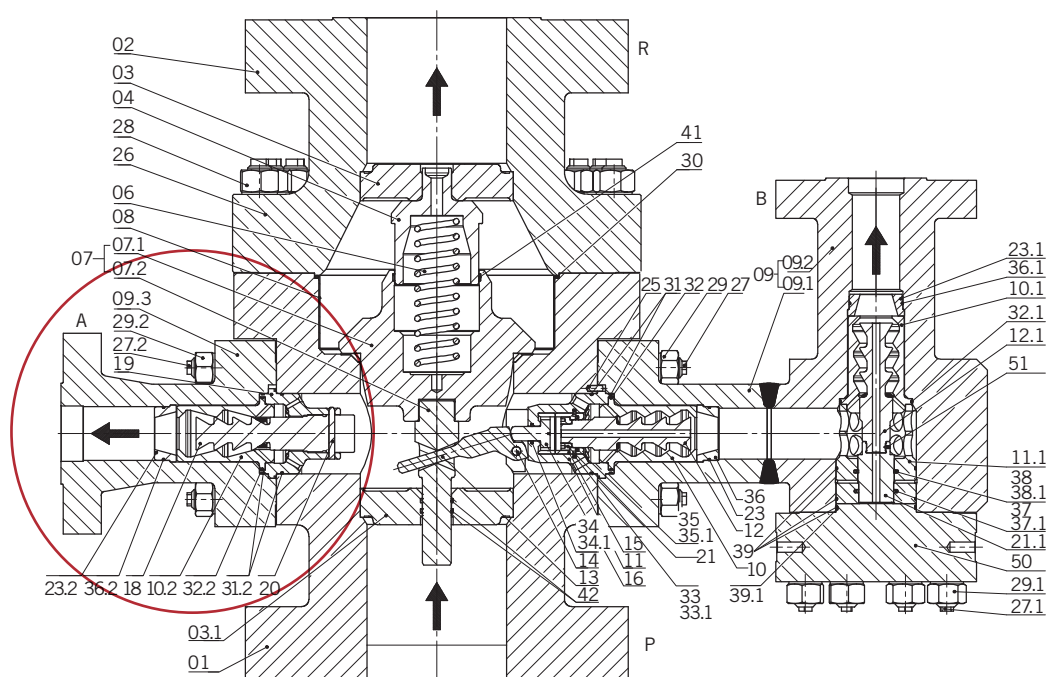
** Depending on size and pressure rating

Parts list as an example of the standard configuration

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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

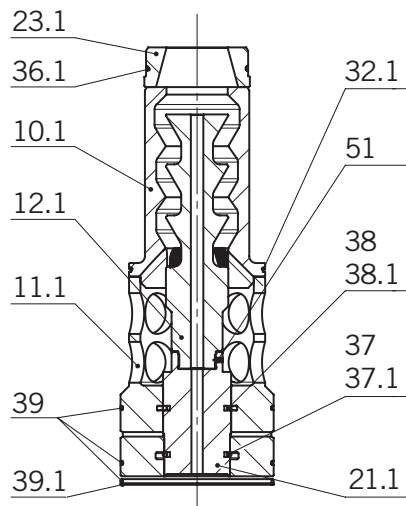
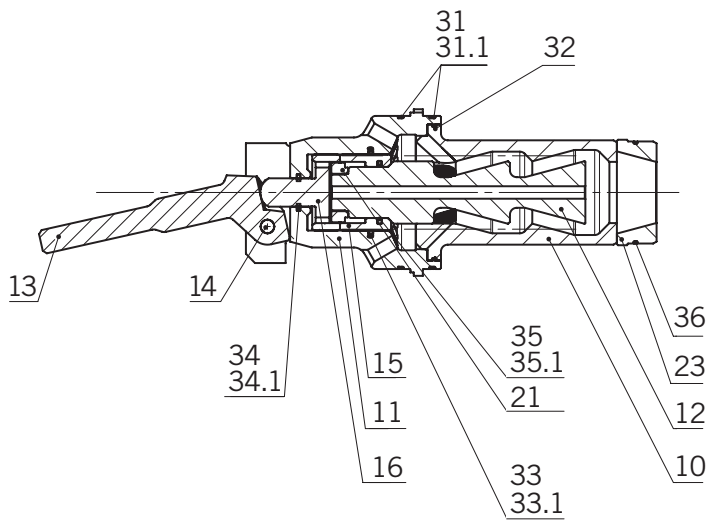
** Depending on size and pressure rating

Parts list as an example of the standard configuration

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Sectional drawing (bypass)



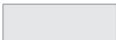
Dimensions: on request

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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