SCHROEDAHL

we protect your business

Series MRM / MRK

For nominal pressures
up to 640 bar / 4500 lbs

Automatic Recirculation Valve
for pump protection

Series MRM

Introduction

Modern processing industry often requires centrifugal pumps to operate with fluctuating flows. This is because of automated control of such processes. When flows are too low in centrifugal pumps, however, this may result in overheating and lead to damage or cause unstable operation. It is important that the flow through a pump does not fall below a certain minimum as stated by the pump manufacturer.

Automatic recirculation control

During the last few decades SCHROEDAHL has developed a series of valves, which provide automatic bypass at low flow conditions. The bypass opens only when the mainflow is throttled to less than the minimum flow. In these valves, which are basically disc-type non-return valves, the movement of the disc is used to open or close the bypass.

Description

The Automatic Recirculation Valve type MRM/MRK automatically protects high pressure centrifugal pumps, especially boiler feed water pumps and high pressure injection pumps in offshore applications, during low loads by ensuring the required minimum flow for the pump.

Installation instructions

The Automatic Recirculation Valve type MRM/MRK should be installed as close to the pump as possible, preferably on the pump outlet and in vertical position. Horizontal installation is also possible. The distance between the valve and the pump should not exceed 1.5 m (5ft.) to prevent pressure pulsations of the fluid column.

Maintenance

Installation and maintenance instructions upon request. Correct operation of the pump is to be checked with the usual operational test of the pump.

All valves combine 4 functions in 1

- Flow sensitive:
  The Automatic Recirculation Valve senses the main flow and positions the disc accordingly.
- Non return function:
  The Automatic Recirculation Valve also operates as a check valve, preventing a return flow through the pump.
- Automatic recirculation flow:
  The Automatic Recirculation Valve bypasses the minimum flow to a receiving vessel preventing overheating of the pump.
- High pressure reduction:
  The cascade element in the bypass reduces the high pressure. This is combined with a low noise level and minimum wear and tear.

Function

The check valve (Pos. 07) moves upwards with an increase in main flow and downwards with a decrease in flow.
The movement of the check valve is transmitted directly via the lever (Pos. 13) to the bypass system.
When the check valve is closed, the bypass is completely open and full bypass flow is allowed to the deaerator (suction tank).
With increasing main flow the check valve is lifted off its seat and moves upwards.
As this occurs the lever closes the bypass in such a way that the sum of process and bypass flow remains almost constant. Therefore, the pump will always run at minimum flow or slightly higher till the vortex plug (Pos.12) is completely closed. Only when the bypass is completely closed, full flow to the system is allowed.
The plunger (Pos. 11) hydraulically relieves this system when the bypass is open. As soon as the vortex plug is seated, however, the hydraulic force of the plunger is transmitted via the lever to the check valve. The check valve can therefore only move further upwards when the main flow has increased so much, that the additional closing force is exceeded. The total system is thereby stabilised, which is especially important while closing or opening the bypass system.
The valve is set in the factory in such a way that the specified minimum flow is reached when the check valve is seated (this means that the main flow is zero).
The check valve is strongly dampened in its upward movement by a damper system (Pos. 45).
Should medium oscillation occur with small amplitudes, caused by slight instablity and variations in the control application, then the check valve only moves downwards towards its closing position.Thereby, the check valve moves increasingly downwards towards its seat and reduces the flow. This increases the pressure required for the same flow and solves the swinging automatically. This also applies during system vibrations resulting from other causes.

Special design feature

In comparison to other Automatic Recirculation Valves the MRM/MRK offers the possibility of adjusting the minimum flow (±10%) on site, without having to remove the valve. (Please consult us for service).

Typical drawing:
Automatic Recirculation Valve MRM/MRK

Fig. 1: Valve type MRM

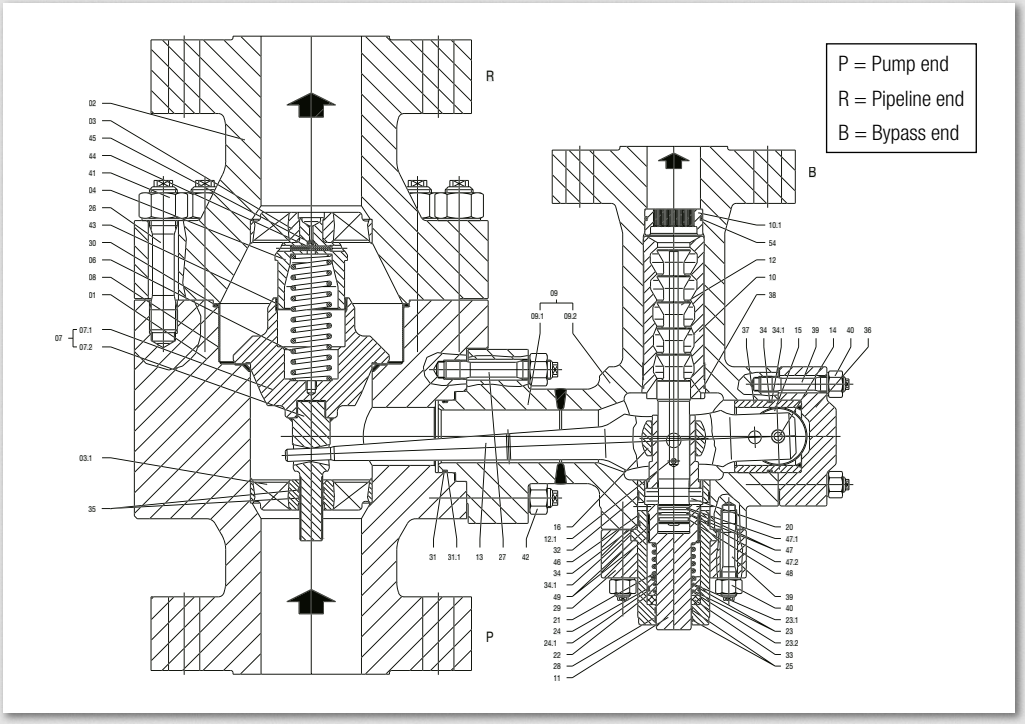
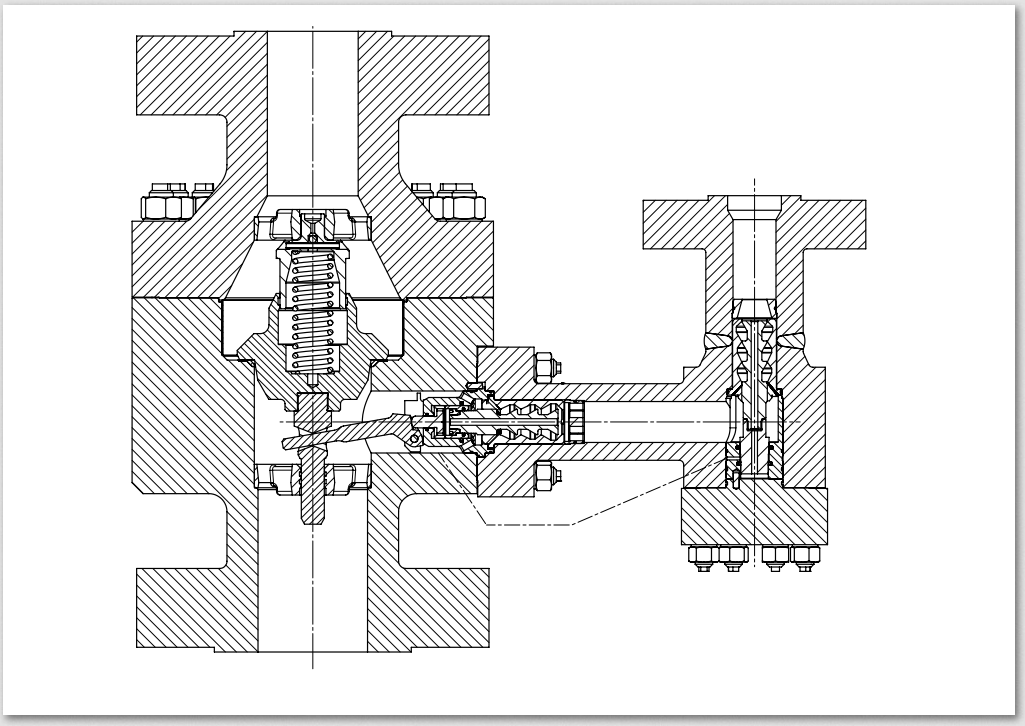


Fig. 2: Valve type MRK



Design and number of stages depends on load conditions.

Parts list
Example for MRM type

MRM standard parts list	
Pos.	Description
01	Lower Body
02	Upper Body
03	Stemguide
03.1	Stemguide
04	Guide Bolt
06	Spring
07	Check Valve Cpl.
07.1	Check Valve
07.2	Stem
08	Liner
09	Bypass Housing Cpl.
09.1	Flange
09.2	Bypass
10	Vortex Bushing
10.1	Orifice Plate
11	Plunger
12	Vortex Plug
12.1	Pin
13	Lever
14	Pin

MRM standard parts list	
Pos.	Description
15	Roller
16	Link Nut
20	Cotter
21	Spring
22	Gland
23	O-Ring
23.1	Step Seal
23.2	Glyd Ring
24	O-Ring
24.1	Guide Ring
25	Guide Ring
26	Stud Bolt
27	Stud Bolt
28	Packing Bushing
29	Packing Bushing Flange
30	O-Ring
31	O-Ring
31.1	Support Ring
32	Guide Ring
33	Packing Ring

MRM standard parts list	
Pos.	Description
34	O-Ring
34.1	Support Ring
35	Guide Ring
36	Cover
37	Bushing
38	O-Ring
39	Stud Bolt
40	Hexagon Nut
41	Hexagon Nut
42	Hexagon Nut
43	Guide Ring
44	Pin
45	Ball
46	Guide Ring
47	O-Ring
47.1	Step Seal
47.2	Glyd Ring
48	Guide Ring
49	Guide Ring
54	O-Ring

Materials

Standard housing materials available:

- Carbon steel ASTM A105, DIN 1.0460
- Stainless steel ASTM A182, F316L, DIN 1.4404 or ASTM A182 F347, DIN 1.4550
- Duplex steel ASTM A182 F51, DIN 1.4462 or ASTM A182 F55, DIN 1.4501

The standard internals are made of stainless steel with a minimum chrome content of 13 % (not valid for duplex housing material).

Other materials for housing and internals upon request.

Selection of the seal material according to medium and temperature conditions.

Selection of the housing material according to design pressure, design temperature and medium.

Valve sizes

The MRM/MRK type valves are available in sizes from DN 80 (3“) to DN 300 (12“). Special sizes are available on request.

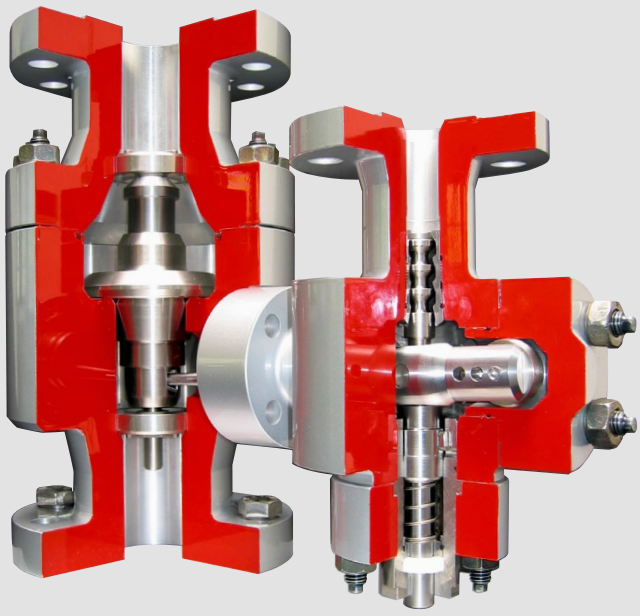
Connections

Flanges according to EN or ASME, flanges according to other standards (ISO, BS, JIS, NF) or hub connections upon request.
The valve in- and outlet can also be supplied with welding ends.

Size code	Pressure class code	Connection code	Configuration code
DN 80 (3") = 10	PN 63 (300lbs) = 5	F = EN Flanges	V = Vertical Installation
DN 100 (4") = 11	PN 100 (600lbs) = 6	U = ASME Flanges	H = Horizontal Installation
DN 125 (5") = 12	PN 160 (900lbs) = 7	S = Welding Ends	A = Manual Start-up
DN 150 (6") = 14	PN 250 (1500lbs) = 8		W = Oversized Bypass or Start-up Connection
DN 200 (8") = 15	PN 320 = 9		CS = Carbon Steel Body
DN 250 (10") = 16	PN 400 (2500lbs) = 0		SS = Stainless Steel Body
DN 300 (12") = 17	PN 500 = A		SD = Duplex Steel Body
	PN 640 = B		

Example type description

MRM 150UVW-CS: valve type MRM, 8“, 2500 lbs, ASME flanges, vertical installation, carbon steel housing material



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Automatic Recirculation Valve Technical Data

Customer:		Quantity:	
Enquiry no.:		TAG-No.:	
Prior reference:			
Order no.:			
Project:			

Automatic Recirculation Valve type:

Valve inlet	DN		PN		Flange Code:
Valve outlet	DN		PN		Installation: ☐ vertical ☐ horizontal
Bypass outlet	DN		PN		Paint:
Start-up	DN		PN		Start-up: ☐ above ☐ below checkvalve

Mat.-/test certificates:

Materials

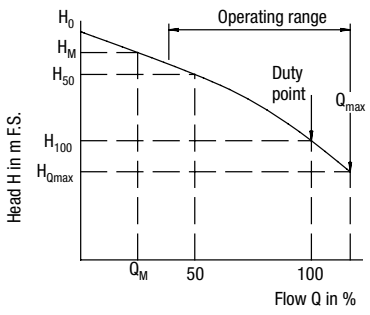
Housing:	Internals:	Seals:

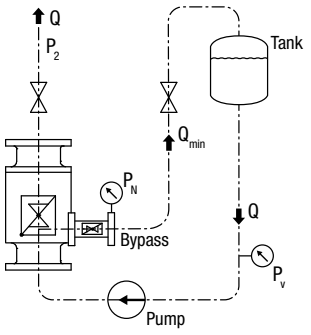
Medium:		Operating temp.:	°C
S.G.:	kg/m³	Design temp.:	°C
		Desing Pressure:	barg

			H_0 =		m		
Q_M =		m³/h	H_M =		m	Suction pr. pv	barg
Q_{100} =		m³/h	H_{100} =		m	Differential pr. (p_1-p_n)	bar
Q_{max} =		m³/h	H_{Qmax} =		m	Backpress p_N	barg
Q_A =		m³/h	H_A =		m	Backpress p_A	barg

Notes:

Revision	Date	Description	Name	Signature





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