SCHROEDAHL

we protect your business

Series MRK and MRM

For nominal pressures
up to 640 bar / 4500 lbs

Automatic Recirculation Valve
for pump protection

Series MRK and MRM

The ultimate high pressure SCHROEDAHL Automatic Recirculation Valve, type MRK and MRM, is used as a pump protection system for centrifugal pumps for water applications

Preamble

SCHROEDAHL is the largest supplier of Automatic Recirculation Valves in the world. These ARVs, or pump protection systems, are our principal products. During the last 50 years we have supplied more than 50,000 of these valves to satisfied customers all over the world. In addition to the long time existing MRM-type, we have succesfully devoloped the MRK-type.

Features

- Automatic bypass operation
- Modulating functioning
- Low maintenance
- Easy to install
- Damping of system pulsations
- Self operated
- Reduces plant investment and operational costs

Function MRM

The check valve (pos. 07, page 04) 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, page 04) 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.
Only when the bypass is completely closed, full flow to the system is allowed.
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).

Function MRK

The MRK valve system comprises a check valve in the main line and also the special control and throttle device for the minimum flow recirculation system (bypass system).
The general valve functioning is related to the process flow quantity (flow sensitive).
The bypass system itself consists of a primary regulating device (multi-staged), which is controlled by the main check valve and also a secondary extra special multi-staged pressure regulator. The functioning of the complete bypass is therefore split into 2 parts. Both parts (primary and secondary part) have to work together to fulfil the required pressure drop function as declared in our data sheet. The secondary part is controlled via the outer-connected pressure piping on the bypass section

The valve protects high pressure centrifugal pumps against overheating and cavitation problems, by maintaining, automatically, a minimum flow when the system flow is at low load condition. At lower process flows the check 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 check valve lifts off its seat and starts to operate (modulate) the bypass recirculation flow that returns to the system tank. When the check valve identifies enough system flow, the bypass closes automatically (switch point). If the system flow decreases again, then the bypass also starts to recirculate automatically.

Typical drawing:
Automatic Recirculation Valve MRK and MRM

Fig. 1: Valve type MRM

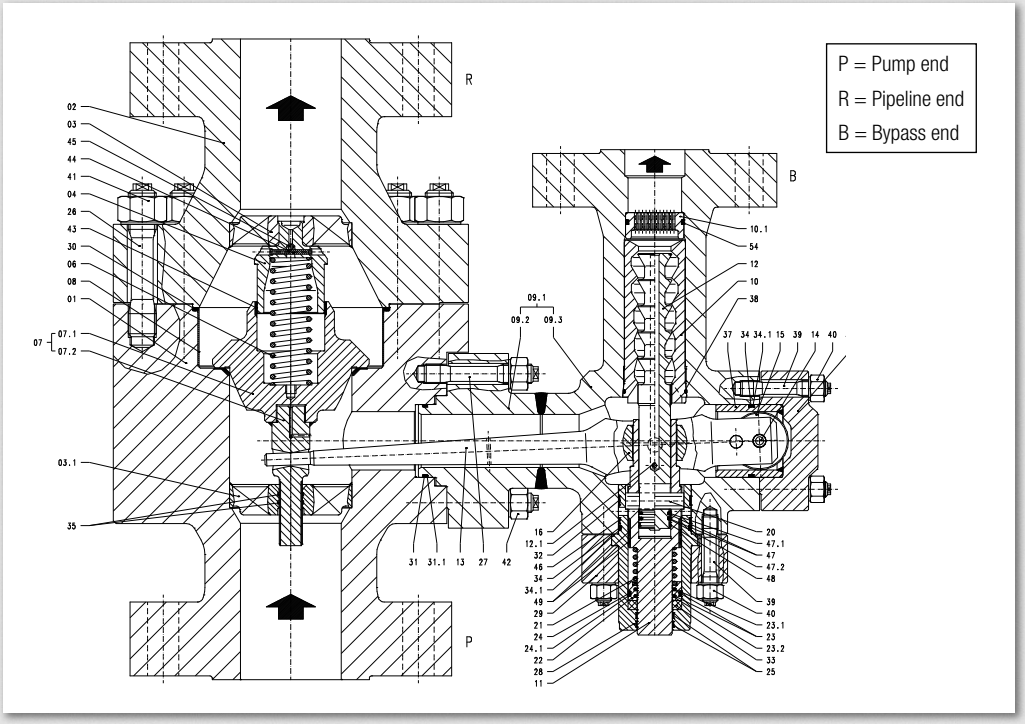
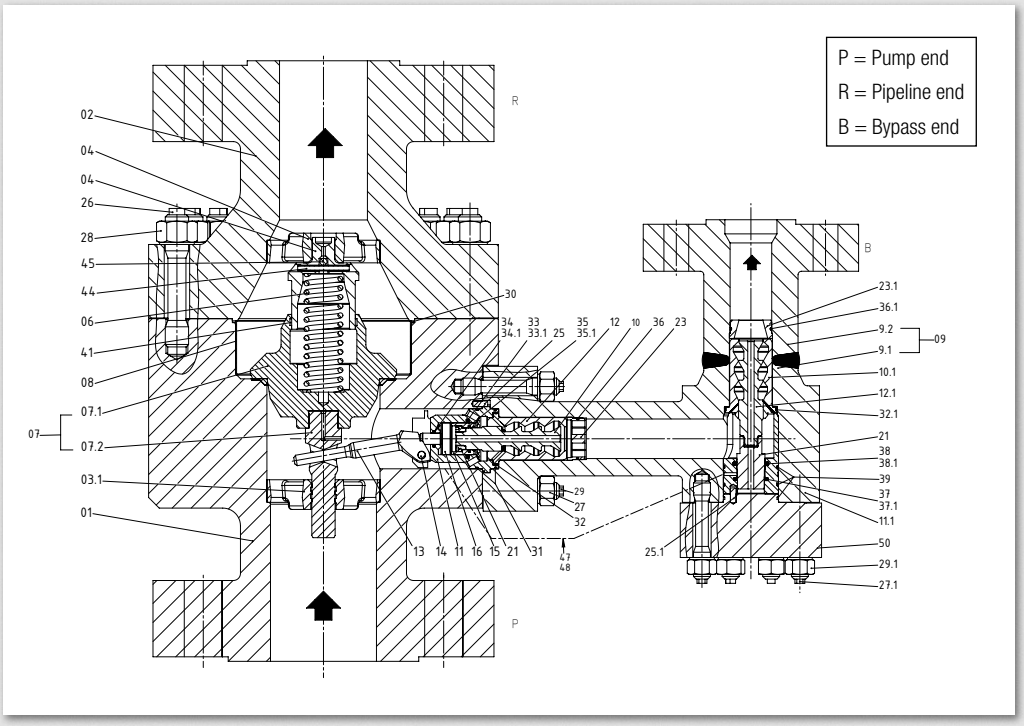


Fig. 2: Valve type MRK



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 A479 (F51), DIN 1.4462 or ASTM A479 (F55), DIN 1.4501, plus materials for NORSOK applications.

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 and 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.

Operation range definition for MRK and MRM

The following two descriptions typically classify the pump protection application:

1. Standard Operation Range Application, which is more typical for lower pressure applications rather than the high pressure MRK and MRM type applications:
The pump protection 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/MRM valves for high pressure services typically also need an adequately high bypass back pressure, e.g. an orifice restriction in the bypass line, to prevent cavitation during bypass flow condition.

MRK and MRM valves should follow following classification:

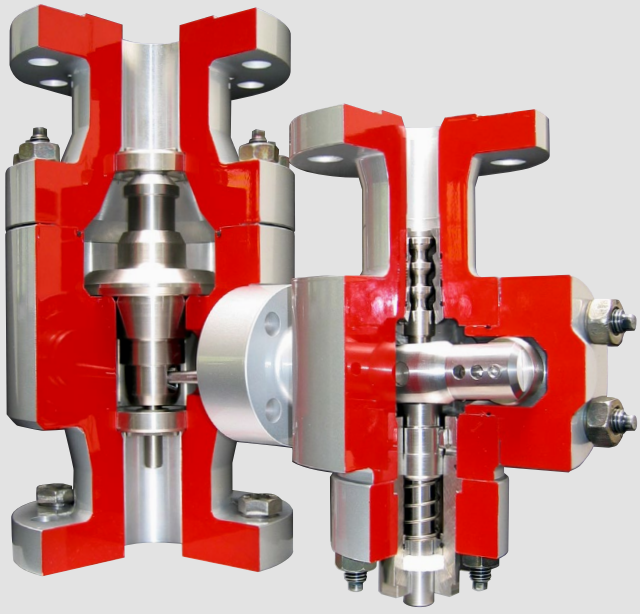
2. Full Operation Range Application, which is typical for MRK/MRM applications:
For high pressure MRK (also for MRM) applications with the explicit definition of the full load range from 0% to 100% process flow, it is mandatory, before order placement, to evaluate special design influences for the valve. Otherwise the application will be classified as a standard range type. For the high load range, depending on the existing bypass pressure level, it may be necessary to increase the bypass back pressure to prevent cavitation, also in the low load range where the bypass is in modulating action. 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.

Type description

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") = 13	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 (3200lbs) = A		SD = Duplex Steel Body
	PN 640 (4500lbs) = B		

Example of type description for MRK and MRM valves

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



Installation information

The Automatic Recirculation Valve should be installed as close as possible to the centrifugal pump discharge, preferably directly on the outlet of the pump.

To prevent low frequency shocks, caused by pulsation of the medium, the distance between pump outlet and valve inlet should not exceed 5 m with straight pipe run at the inlet. Exceptions have to be communicated with SCHROEDAHL.

Vertical installation is preferred, but horizontal installation is also possible upon request. MRK and MRM valves operate at a low noise level and ensure a high reliability due to their sturdy design.

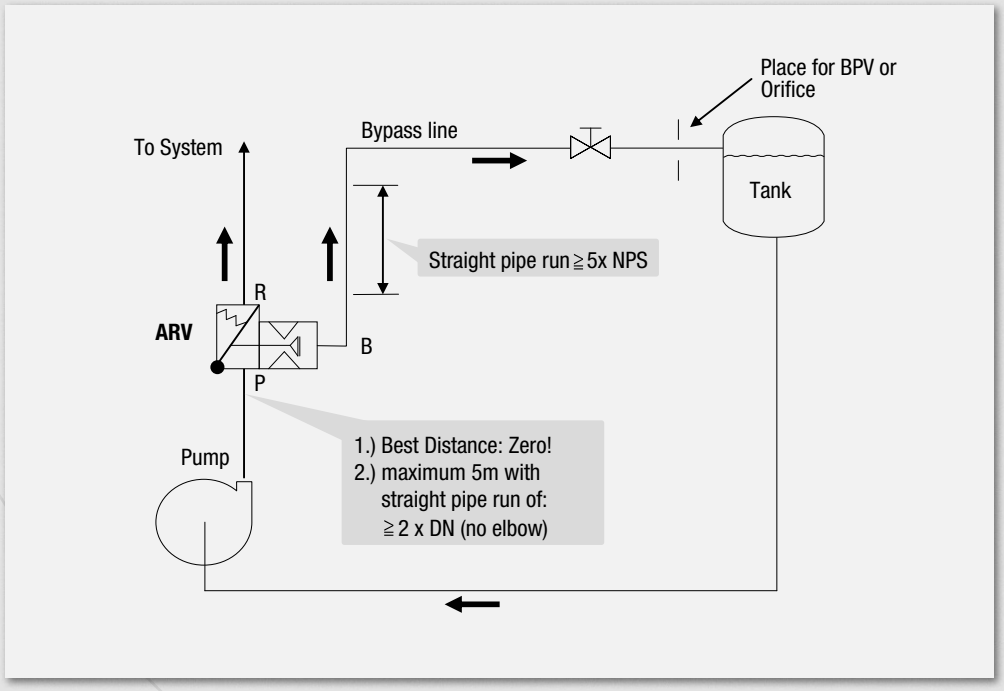
The recommended filter at the pump inlet should have a maximum mesh size of 0.3 to 0.5 mm. During commissioning we recommend a smaller filter mesh size (e.g. 0.1 mm).

Maintenance, spares and testing

Maintenance instructions are available upon request or at www.schroedahl.com.

Typically we recommend an inspection after commissioning (a gasket set is then required) and for two years operation we recommend a bypass set (one complete bypass unit) for your stock.

A complete valve performance test run is recommended to be done together with the original pump. The bypass Kv/Cv value test can be certified at our test facility. Please contact SCHROEDAHL for additional information.



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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

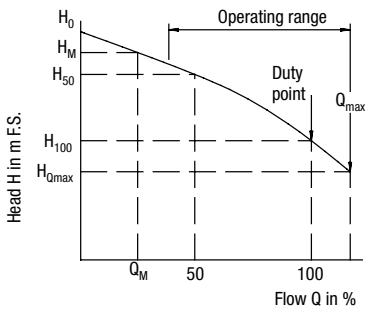
Housing:	Internals:	Seals:

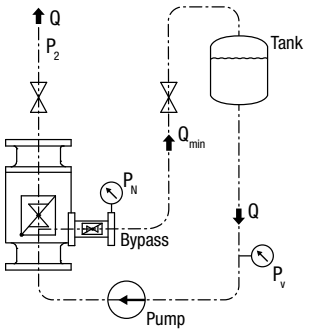
Medium:		Operating temp.:	°C
S.G.:	kg/m³	Design temp.:	°C
		Desing Pressure:	barg

			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





Notes:

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