SCHROEDAHL

we protect your business

Series SUL

Automatic Recirculation Valve
for pump protection

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Preamble

Modern process industry often requires centrifugal pumps to operate with fluctuating flows. This is a result of automated control of such processes. Too low flows in centrifugal pumps however may result in overheating and lead to damage or cause unstable operation. It is important that flows through a pump do not get below a certain minimum as stated by the pump manufacturer.
The SUL valve is a reliable and economic solution.

Features:

- Dependable operation
- Low maintenance
- Easy to install
- Damping of system pulsations
- Suitable for many fluids
- Wide temperature range

Automatic Recirculation Valve

During the last 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.

All valves combine four functions in one:

1. The Automatic Recirculation Valve senses the mainflow and positions the disc accordingly.
2. The Automatic Recirculation Valve bypasses the minimum flow to a suction tank (or condensate tank), preventing overheating of the pump.
3. The cascade element in the bypass reduces the high pressure of the main flow to a lower pressure in the suction tank, this combined with a low noise level and minimum wear and tear.
4. The Automatic Recirculation Valve also operates as a checkvalve, preventing a return flow through the pump.

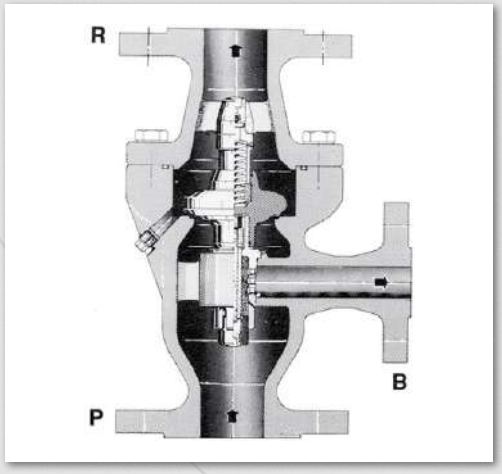
Besides the well-known TD and MRM series, the series SUL valve offer an effective, low cost protection for pumps in the chemical- and petrochemical industries.

Description

The SUL valve design is a further development of the SCHROEDAHL SU valve, an Automatic Recirculation Valve which is used on board ships since 1960. The valve consists of a valve body (pos. 01 and 02), and a check valve (pos. 07), which is guided at the top by the guide bushing (pos. 04) and the vortex bushing (pos. 10) at the bottom. The check valve is springloaded (pos. 06) and is fitted with a damping device (pos. 14, 15)

This arrangement ensures a stable operation of the valve, even if pulsations do occur in the system.

The automatic bypass section comprises the vortex bushing (pos. 10), in which a bushing/stem assembly (pos. 11/12) follows the movement of the check valve. The bypass capacity can be adjusted by changing the adjustment bolts (pos. 13), which is available with head dimensions as required to meet the field conditions. Therefore, any minimum flow value between 20% to 80% of the mainflow is possible.



Features

- Dependable operation – only a few moving parts
- Easy to install – in a vertical or horizontal position, direct to the pump outlet
- Easy to change flow characteristics (change of 1 part - pos. 13 - only)
- Suitable for a wide range of fluids such as water, oils, hydrocarbons, liquid gases and chemicals.
  Allowable temperatures from -200°C to +280° C.

Sizes

DN 25, 32, 40, 50, 65, 80, 100, 125, 150, 200 (1", 1¼", 1½", 2", 2½", 3", 4", 5", 6", 8" and 10").

Materials

Housing casted in carbon steel or stainless steel, internal always in forged stainless steel.

Connections

Flanges acc. DIN in PN 10, 16, 25, 40 and 63/64 or ASME PN150/300 lbs.

Sizing

1. Determine size of the valve with table 2.
2. Calculate the pressure difference at minimum flow: $\Delta p = p_M - p_{bypass} \leq$ (max. 40 bar)
3. Calculate the required bypass K_v or C_v
   $K_V = Q\ (m^3/hr) \times \sqrt{\frac{s.g.}{\Delta p\ (bar)}}$ $\quad C_V = \frac{28}{24} \times K_V$
4. Check if C_v required = C_v available according table 2 (if not, select next larger valve).
5. Determine the required pressure rating, vertical or horizontal installation, and the flanges required.

Example:

SUL 083UV-CS is an Automatic Recirculation Valve type SUL with 2" main flanges, Class 150, vertical installation, housing material out of carbon steel.

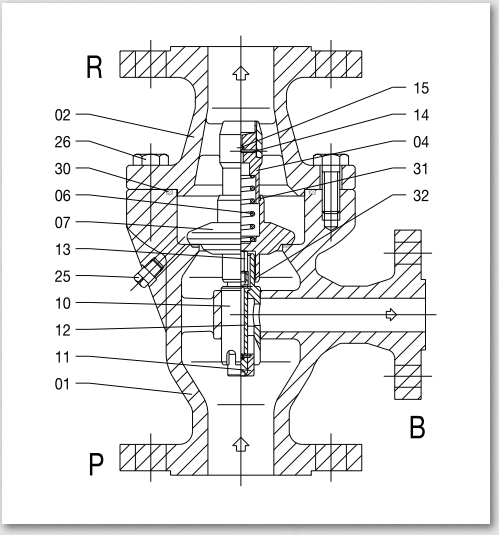
Valve code

Size		Pressure	Configuration
05 = DN 25(1")	11 = DN 100(4")	1 = PN 10	V = vertical installation
06 = DN 32(1¼")	12 = DN 125(5")	2 = PN 16	H = horizontal installation
07 = DN 40(1½")	13 = DN 150(6")	3 = PN 25 (ASME 150 lbs)	CS = carbon steel body
08 = DN 50(2")	15 = DN 200(8")	4 = PN 40	SS = stainless steel body
09 = DN 65(2½)	16 = DN 250(10")	5 = PN 63/64 (ASME 300 lbs)	D = with drainhole
10 = DN 80(3")			U = ASME-flanges
			F = DIN-Flanges

SUL in size DN 40/ PN 63 and DN 50/ PN 63 not possible with DIN flanges

Installation instructions:

The valve should be installed as close to the pump as possible; preferably on the pump outlet and in a vertical or horizontal position. The distance between valve inlet and pump outlet should not exceed 1.5 m to prevent low pressure pulsations caused by the elasticity of the fluid. Ensure that the drainhole (if provided) is at the bottom of the valve in case of horizontal installation.



Maintenance

Correct operation of the valve is to be checked with the usual operational test of the pump. By throttling the valve in the discharge piping the flow is reduced, thereby the bypass opens. With a technical stethoscope (or screwdriver) a flow through the bypass piping should be heard. With warm fluids the bypass piping will warm up. Dissassemble and clean the valve once per year. As the seals harden out during operation the seals should be replaced by new ones.

Part-No.	Description
01	Body
02	Bonnet
04	Guide bushing
06	Spring
07	Disc
10	Vortex bushing
11	Control bushing
12	Stem
13	Adjustment bolt
14	Pin
15	Ball
25*	Drain screw
26	Hex. Screw
30	O-ring
31	Guiding-Ring
32	Guiding-Ring

Recommended spare parts. Other materials upon request.

*Drain screw, if required (option)

Table 1 – Dimensions

Valve size (DN_R)	Dimensions mm (in)				Weight (kg)	
	S	H	L	(DN_M)	PN 10/16 150 lbs	PN 25/40/64 300 lbs
25 (1")	115	102	267	15 (½")	12	18
32 (1¼")	115	102	267	20 (¾")	14	20
40 (1½")	115	102	267	20 (¾")	14	20
50 (2")	130	108	305	25 (1")	22	26
65 (2½")	165	136	406	40(1½")	46	51
80 (3")	165	136	406	40(1½")	46	51
100 (4")	209	159	495	50 (2")	105	118
125 (5")	267	228	679	80 (3")	220	240
150 (6")	267	228	679	80 (3")	220	240
200 (8")	356	305	902	100 (4")	524	549
250 (10")	356	305	902	100 (4")	530	560

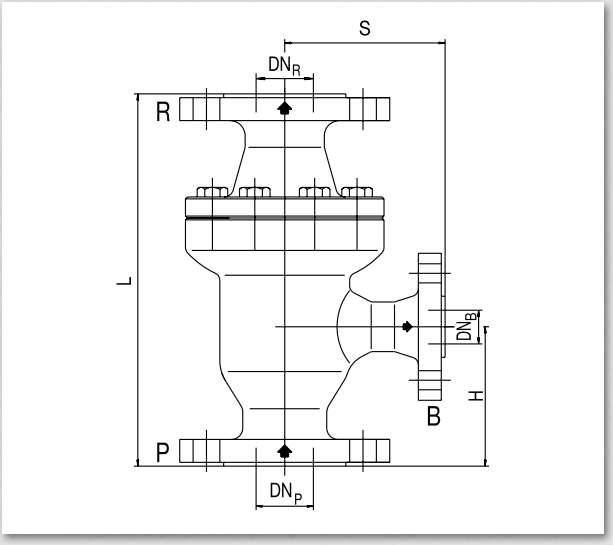


Table 2 – Sizing and selection

Valve size	mm (inches)	25 (1)	32 (1¼)	40 (1½)	50 (2)	65 (2½)	80 (3)	100 (4)	125 (5)	150 (6)	200 (8)	250 (10)
Max. main flow	m^3/hr	12	30	30	50	100	100	200	400	400	750	750
	GPM us.	52	135	135	220	440	440	800	1760	1760	3300	3300
	GPM imp.	44	110	110	183	366	366	732	1464	1464	2745	2745
Max. bypass flow	K_v	2	4	4	6	16	16	30	60	60	100	100
	C_v	2,3	4,6	4,6	6,9	18,5	18,5	34,7	69,3	69,3	116	116
	m^3/hr	6	8	8	18	42	42	65	180	180	280	280
	GPM us	26	35	35	80	185	185	280	790	790	1230	1230
	GPM imp.	22	29	29	65	153	153	237	657	657	1022	1022
bypass size	mm (inches)	15 (½)	20 (¾)	20 (¾)	25 (1)	40 (1½)	40 (1½)	50 (2)	80 (3)	80 (3)	100 (4)	100 (4)

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