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High technology at its best

High-quality valves for industrial applications and energy production

› Aerial view of the company premises in Reichshof

SCHROEDAHL is one of the leading international suppliers of high-quality special valves for industrial and process plants as well as for nuclear and fossil power plants.

With our know-how and decades of experience we provide reliable engineering solutions, which in each case are precisely adapted to the individual technical requirements. In doing so, we as a manufacturer of speciality valves insist on a strict quality management system from the development and planning up to the manufacturing, installation and service.

Experienced engineers individually plan, calculate and configure valve solutions for a wide range of applications enabling us to contribute to optimum processes and consequently to the success of our customers.

Through the use of special materials in combination with our CNC precision manufacturing, you can trust in the SCHROEDAHL products which protect processes in a durable and efficient way. As we archive all planning and production details relating to every SCHROEDAHL product, even decades later we can still supply you with suitable wear and spare parts.

Founded in 1962, the family business has been part of the American CIRCOR Group since 2015.

Table of contents

SCHROEDAHL Pump protection valves

The high-quality automatic solution for the protection of centrifugal pumps

SCHROEDAHL is the largest supplier of automatic recirculation valves in the world. These valves, referred to as pump protection valves, are our main products.

Since 1962 we have delivered over 60,000 valves to satisfied customers all over the world.

The SCHROEDAHL automatic recirculation valve is a high quality automatic solution to protect centrifugal pumps against overheating, instability and cavitation under no or low process volume conditions.

As soon as the flow rate of the process falls below a certain value, the bypass opens and thus guarantees the minimum flow required for the pump.

Special operating conditions, low load data, complex commissioning situations and pressures in the bypass line have an influence on the valve design and are therefore usually part of the enquiry information provided by our customers. This enables us to offer high-quality solutions.

The SCHROEDAHL automatic recirculation valve is a high quality and easier solution for centrifugal pump protection and more cost effective than a conventional control valve.

Function

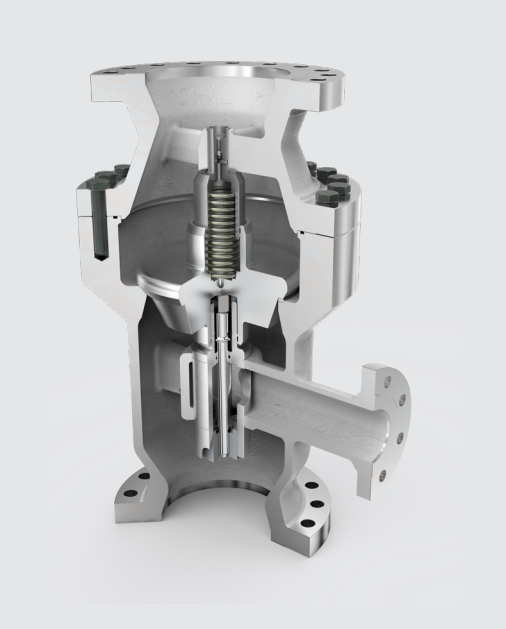
An automatic recirculation valve has four functions:

1. The automatic recirculation valve determines the flow rate in the system and takes up a corresponding stroke position.
2. Automatic recirculation flow: The automatic recirculation valve bypasses the minimum flow to the suction tank (or to the condenser), preventing overheating of the pump.
3. High pressure reduction: 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 has a safety function to prevent reverse flow into the pump.

Type SUL

Pump protection valve for centrifugal pumps

› Type SUL, front view



› Type SUL, sectional view

Product features

- Automatically modulating bypass function
- Cast material, carbon steel, stainless steel
- Single-stage pressure reduction (up to 20 bar)
- Internal operation (no external energy source required)
- Easy to install
- Low maintenance
- Suitable for all liquids

Applications

- Boiler feed water
- Condensate
- Chemical processes
- Extinguishing water

Type SUL

Pump protection valve for centrifugal pumps

Technical data

Nominal diameter	DN 25–250 / NPS 1-10
Pressure class	PN 10–63 / Class 150–300
Temperature (max.)	Up to 230 °C / 446 °F (other temperatures on request)
Housing material	1.0619 / A216WCB 1.4408 / A351CF8M 1.4410 / A9955A 1.4501 / A9956A
Housing type	Cast
Media	Liquids of all kinds (water, oils, chemicals and others)
Flanges	EN 1092-1, ASME B16.5, ISO 7005, JIS, JPI
Designs	vertical installation, horizontal installation, drain hole, optional non-return, design for particals (with wiper)
Number of stages (max.)	1
Number of controlled stages (max.)	1
Operating range (max.)	Delta p up to max. 20 bar (water)

Type SUL

Pump protection valve for centrifugal pumps

Function

The SUL valve design is a further development of the SCHROEDAHL SU valve, an automatic recirculation valve that has been used in ships since 1960.

In addition to the well-known TD series, the SUL series offers effective and cost-effective protection for pumps used in the energy, chemical and petrochemical industries.

The SUL consists of two housing parts (items 01, 02) made of cast steel or stainless steel, a non-return check-valve (item 07) with guide (item 04) and closing spring (item 06) as well as the bypass-inserts (items 10-13) and the damping device (items 14, 15).

Based on long series of tests and operating experience, these parts are matched to each other in such a way that stable operation is guaranteed, even with a slight tendency for the system to vibrate.

The automatic bypass section comprises the vortex bushing (item 10), in which a bushing/stem assembly (item 11/12) follows the movement of the non-return valve plug and the adjustment bolt (item 13).

Special features

- Reliable operation with only a few moving parts
- Easy to install – in a vertical or horizontal position, directly on the pump outlet
- Easy to change flow characteristics (change of one part - item 13 - only).
- Can be used for a wide range of liquids such as water, oil, hydrocarbonates, liquid gas and many other types of chemical media.
- Temperature range -200 °C to +230 °C

Installation information

SUL valves should be installed as close as possible to the pump, preferably at the discharge port of the pump, in a vertical position. Horizontal installation is also possible.

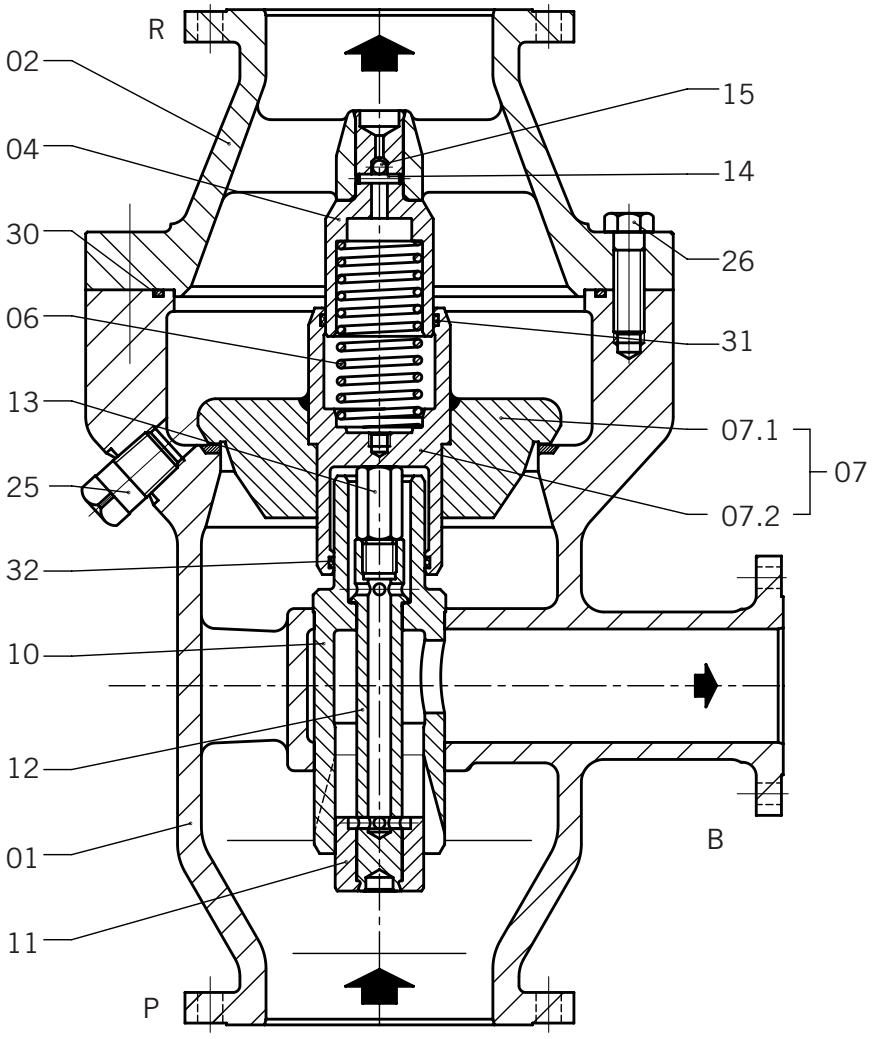
The distance between valve inlet and pump outlet should not exceed 3 m to prevent pressure pulsations caused by the elasticity of the medium.

Ensure that the drain screw (if provided) is at the bottom of the valve in case of horizontal installation.

Type SUL

Pump protection valve for centrifugal pumps

Sectional drawing



Type SUL

Pump protection valve for centrifugal pumps

Parts list

Pos.	Item	Material
01	Lower body	*
02	Upper body	*
04	Guide bolt	1.4301
06	Spring	1.4310
07	Check valve cpl.	1.4404
10	Vortex bushing	1.4542
11	Control bushing	1.4122
12	Stem	1.4122
13	Adjustment bolt	1.4301
14	Pin	1.4301
15	Ball	1.4401
25	Drain screw	***
26	Hexagon screw	**
30	O-Ring	*
31	Guiding ring	PTFE/Carbon
32	Guiding ring	PTFE/Carbon

Recommended spare/wear parts

* Depending on customer requirements

** Depending on size and pressure rating

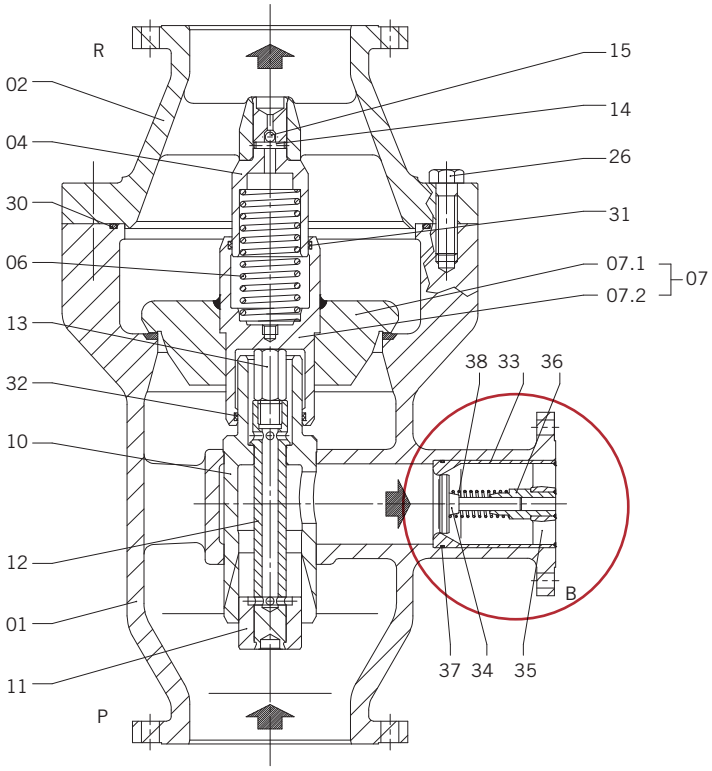
*** Depending on housing matierial

Parts list as an example of the standard configuation

Type SUL

Pump protection valve for centrifugal pumps

Sectional drawing (non-return function)



Parts list (non-return function)

Pos.	Item	Material
33	Check valve housing	1.4404
34	Reaction piston	1.4122
35	Stemguide	1.4408
36	Slide bushing	1.4404
37	O-Ring	*
38	Spring	1.4310

* Depending on customer requirements

Parts list as an example of the standard configuation

Type SUL

Pump protection valve for centrifugal pumps

Dimensions EN

DN_R / DN_P	PN	DN_B	Type	L (mm)	S (mm)	H (mm)	Weight (kg) PN10/16	Weight (kg) PN25/40/63
25	10-63	15	051-055	267	115	102	12	18
32	10-40	20	061-064	267	115	102	15	20
32	63	15	065	267	115	102	15	20
40	10-40	20	071-074	267	115	102	15	20
40	63	15	075	267	115	102	15	20
50	10-63	25	081-085	305	130	108	22	25
65	10-63	40	091-095	406	165	136	45	50
80	10-63	40	101-105	406	165	136	45	50
100	10-63	50	111-115	495	209	159	105	118
125	10-63	80	121-125	679	267	228	220	240
150	10-63	80	131-135	679	267	228	220	240
200	10-63	100	151-155	902	356	305	525	550
250	10-63	100	161-165	902	356	305	530	560

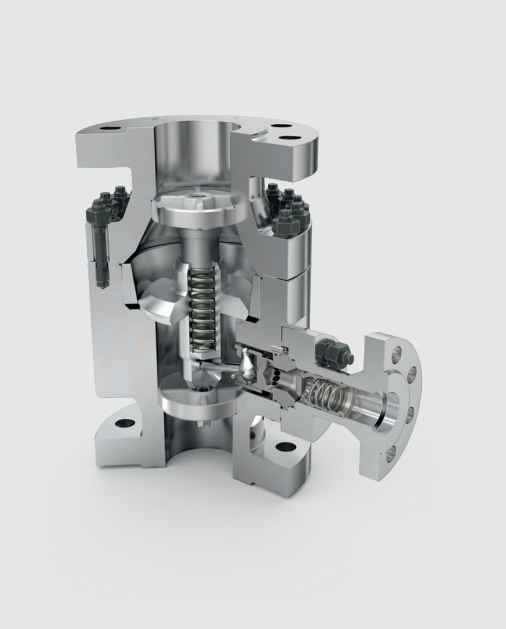
Dimensions ASME

DN_R / DN_P	PN	DN_B	Type	L (mm)	S (mm)	H (mm)	Weight (kg) 150 lbs	Weight (kg) 300 lbs
NPS 1	150-300	NPS 0,5	054-055	267	115	102	12	18
NPS 1,25	150-300	NPS 0,75	064-065	267	115	102	15	20
NPS 1,5	150-300	NPS 0,75	074-075	267	115	102	15	20
NPS 2	150-300	NPS 1	084-085	305	130	108	22	25
NPS 2,5	150-300	NPS 1,5	094-095	406	165	136	45	50
NPS 3	150-300	NPS 1,5	104-105	406	165	136	45	50
NPS 4	150-300	NPS 2	114-115	495	209	159	105	118
NPS 5	150-300	NPS 3	124-125	679	267	228	220	240
NPS 6	150-300	NPS 3	134-135	679	267	228	220	240
NPS 8	150-300	NPS 4	154-155	902	356	305	525	550
NPS 10	150-300	NPS 4	163-165	902	356	305	530	560

Type TDL

Pump protection valve for centrifugal pumps
Compact pump protection - high bypass flow

› Type TDL, front view



› Type TDL, sectional view

Product features

- Automatically modulating bypass function
- 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
- Chemical processes
- Extinguishing water
- Snow canons

Type TDL

Pump protection valve for centrifugal pumps
Compact pump protection - high bypass flow

Technical data

Nominal diameter	DN 25–500 / NPS 1–20
Pressure class	PN 10–160 / Class 150–900
Temperature (max.)	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 or cast
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, degassing connection
Number of stages (max.)	1
Number of controlled stages (max.)	1
Operating range (max.)	Delta p up to max. 40 bar
Other	Bypass differential pressure up to 40 bar

Type TDL

Pump protection valve for centrifugal pumps
Compact pump protection - high bypass flow

Function

The outlet main flow controls the non-return valve and positions it in proportion to the flow. The stem of the non-return valve transmits the motion via a lever to the bypass. The bypass system regulates the bypass flow in a modulating way and reduces the pressure to the bypass outlet pressure level without cavitation.

When the non-return valve is completely closed, the entire minimum flow is routed through the bypass. The bypass is fully closed when the non-return valve is in its upper position, thereby allowing full pump flow to the system.

Flow sensitive modulating bypass control

The non-return valve moves upwards with increasing main flow and downwards with decreasing flow. The non-return valve transmits this movement to the control lever.

The movement of the control lever is transferred to the control bushing. This opens the control holes in the control head by a greater or lesser degree. The opening characteristic is linear. Applicable for differential pressures up to 40 bar. Standard with non-return function.

Manual bypass options for TDL valves

Depending on the plant design or additional requirements, various options can be selected for the start-up / warm-up side (A) and for the bypass side (B).

Option A:

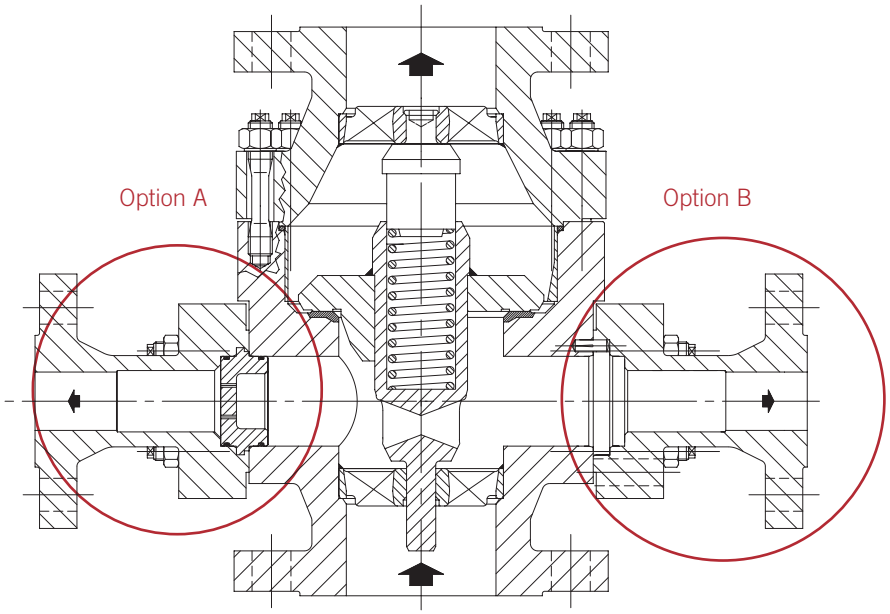
One frequently used option is to feed low pressure flow to the process / boiler via the manual start-up. Either for the warm-up process or for heating the adjacent pumps/systems.

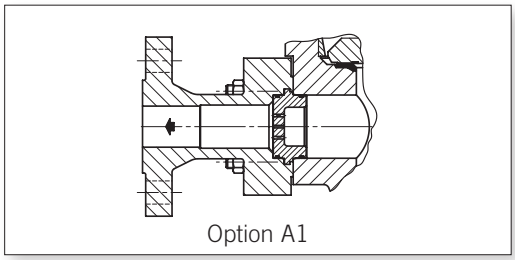
Option B:

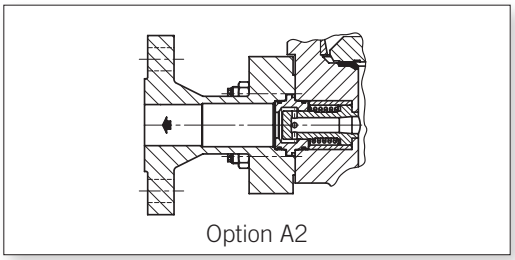
Depending on the operating conditions of the system (dirt, certain load cases, etc.), special internal parts can be selected for the bypass. The valve is then supplied with the integrated optional bypass set. In this case the original internal parts for the bypass are supplied and installed after commissioning.

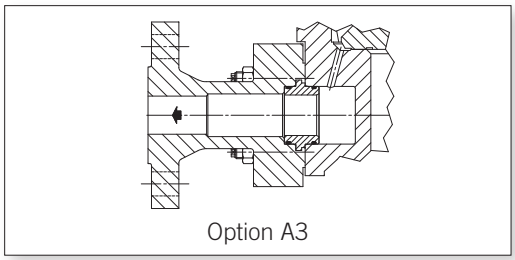
Type TDL

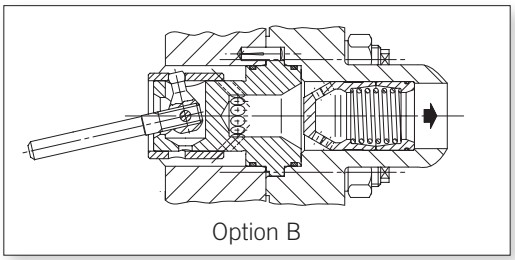
Pump protection valve for centrifugal pumps
Compact pump protection - high bypass flow




Option A1


Option A2


Option A3


Option B

Option A1 - Start-up/heating connection under the non-return valve plug

Option A2 - Degassing system

Option A3 - Start-up/heating connection above the non-return valve plug

Option B - Commissioning the internal parts for the TDL valve
(for commissioning with enlarged clearances)

Type TDL

Pump protection valve for centrifugal pumps
Compact pump protection - high bypass flow

Installation information

The TDL 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. Take care to ensure a straight inlet section. Exceptions have to be confirmed to SCHROEDAHL.

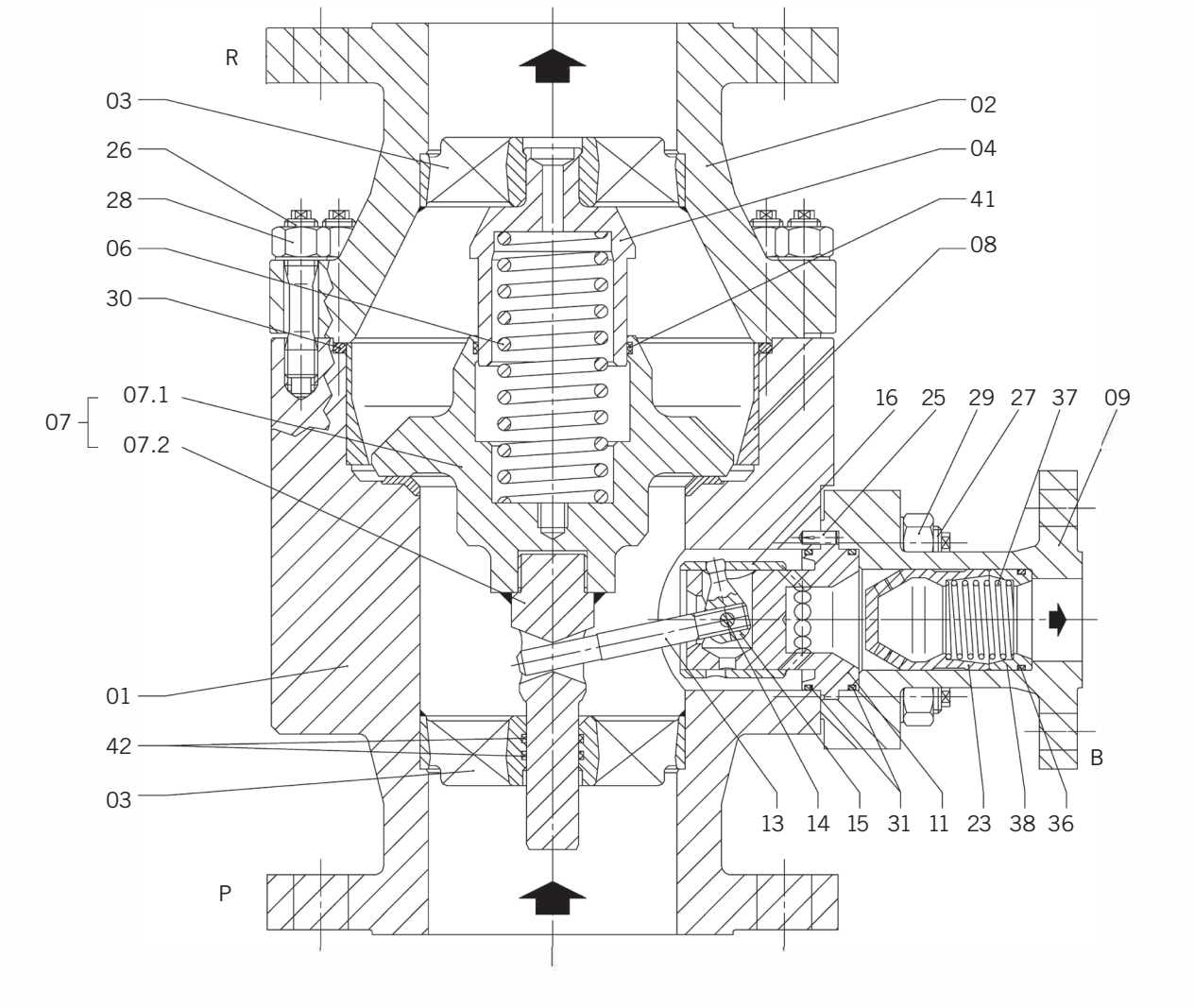
Vertical installation is preferred, but horizontal installation is also possible upon request. TDL valves operate at a low noise level and ensure a high reliability due to their sturdy design.

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

Type TDL

Pump protection valve for centrifugal pumps

Sectional drawing (housing)



Type TDL

Pump protection valve for 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 bolt	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 or venturi ring	1.4300 o. 1.4301
09	Bypass branch	*
25	Guide pin	A2
26	Bolt	**
27	Bolt	**
28	Hexagon nut	**
29	Hexagon nut	**
30	O-Ring	*
41	Guide ring	PTFE/Carbon
42	Guide ring	PTFE/Carbon

Recommended spare/wear parts

* Depending on customer requirements

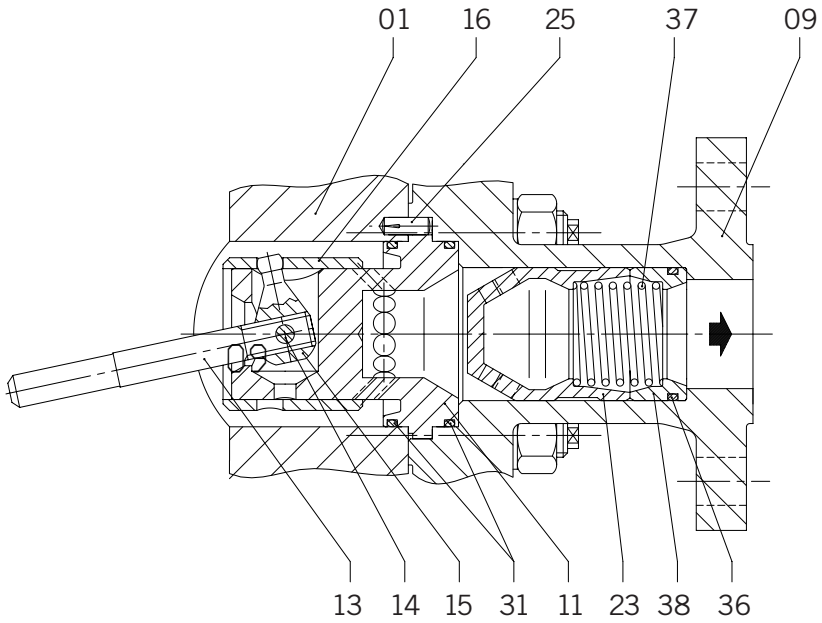
** Depending on size and pressure rating

Parts list as an example of the standard configuation

Type TDL

Pump protection valve for centrifugal pumps

Sectional drawing (bypass)



Parts list (bypass)

Pos.	Item	Material
11	Control head	1.4122
13	Lever	1.4021
14	Pivot pin	1.4301
15	Crank arm	1.4122
16	Control bushing	1.4122
23	Orifice bushing	1.4122
31	O-Ring	*
36	O-Ring	*
37	Spring	1.4310
38	Bottom ring	1.4122

Recommended spare/wear parts

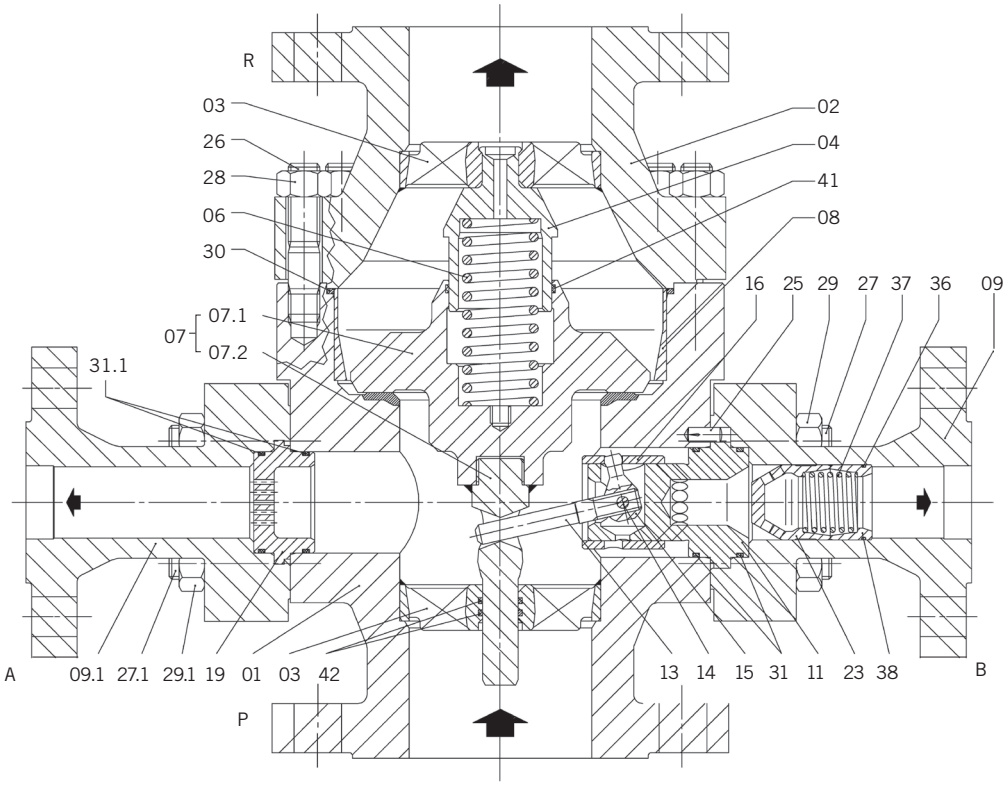
* Depending on customer requirements

Parts list as an example of the standard configuation

Type TDL

Pump protection valve for centrifugal pumps

Sectional drawing (manual start-up)



Parts list (manual start-up)

Pos.	Item	Material
09.1	Bypass branch	*
19	Start-up insert	1.4122
27.1	Bolt	**
29.1	Hexagon nut	**
31.1	O-Ring	*

Recommended spare/wear parts

* Depending on customer requirements

** Depending on size and pressure rating

Parts list as an example of the standard configuation

Type TDL

Pump protection valve for centrifugal pumps

Dimensions EN

DN_R / DN_P	PN	DN_B	Type	L (mm)	S (mm)	H (mm)	Weight (kg)
25	10-16-25-40	25	051-052-053-054	190	153	73	15
	63		055	250	182	90	35
	100		056	250	182	90	35
32	10-16-25-40	25	061-062-063-064	190	153	73	20
	63		065	250	190	90	30
	100		066	250	190	90	30
40	10-16-25-40	25	071-072-073-074	200	155	75	20
	63-100-160		075-076-077	260	190	90	35
50	10-16-25-40	25	081-082-083-084	230	163	90	30
	63		085	300	185	115	50
	100-160		086-087	300	193	110	60
65	10-16-25-40	40	091-092-093-094	290	184	110	40
	63		095	340	219	125	60
	100-160		96-097	340	227	125	85
80	10-16-25-40	40	101-102-103-104	310	191	115	50
	63		105	380	233	140	70
	100-160		106-107	380	240	140	85
100	10-16-25-40	50	111-112-113-114	350	221	125	75
	63		115	430	258	155	105
	100-160		116-117	430	266	155	150
125	10-16-25-40	50	121-122-123-124	400	266	135	105
	63		125	500	280	175	185
	100-160		126-127	500	291	175	225
150	10-16-25-40	65	131-132-133-134	480	295	165	195
	63		135	550	350	190	255
	100		136	550	355	190	270
	160		137	585	355	200	275
200	10-16-25-40	80	151-152-153-154	600	395	200	355
	63		155	650	405	215	470
	100-160		156-157	680	430	225	550
250	10-16-25-40	100	161-162-163-164	730	475	240	500
	63		165	775	520	260	700
	100		166	775	560	260	1000
	160		167	800	560	270	1000
300	10-16-25-40	125	171-172-173-174	850	530	280	1050
	63		175	900	550	300	950
	100-160		176-177	1050	650	360	1600

Type TDL

Pump protection valve for centrifugal pumps

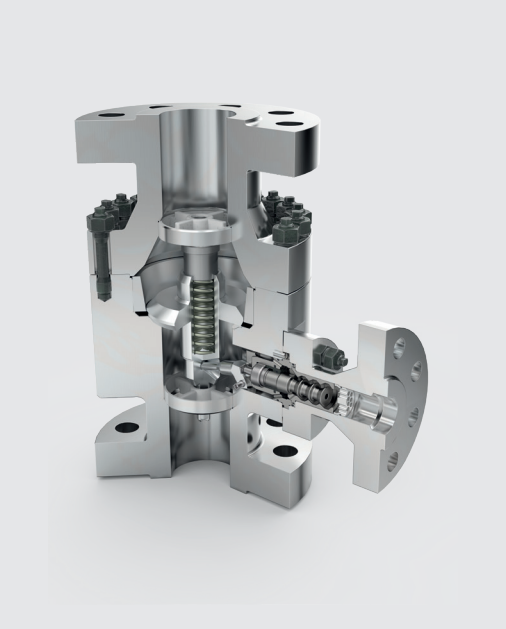
Dimensions ASME

DN_R / DN_P	PN	DN_B	Type	L (mm)	S (mm)	H (mm)	Weight (kg)
NPS 1	150	NPS 1	053	215	153	73	15
	300		055	250	190	90	30
	600		056	250	190	90	30
NPS 1,25	150	NPS 1	063	190	153	73	20
	300		065	250	190	90	35
	600		066	250	190	90	35
NPS 1,5	150	NPS 1	073	200	155	75	20
	300		075	260	190	90	35
	600		076	260	190	90	35
NPS 2	150	NPS 1	083	230	163	90	30
	300		085	300	185	115	50
	600		086	300	193	110	60
NPS 2,5	150	NPS 1,5	093	290	174	110	40
	300		095	340	199	125	60
	600		096	340	220	125	85
NPS 3	150	NPS 1,5	103	310	191	115	50
	300		105	380	220	140	70
	600		106	380	240	140	85
NPS 4	150	NPS 2	113	350	211	125	75
	300		115	430	240	155	105
	600		116	430	266	155	150
NPS 5	150	NPS 2	123	400	266	135	100
	300		125	500	290	175	185
	600		126	500	300	175	225
NPS 6	150	NPS 2,5	133	480	295	165	195
	300		135	550	350	190	255
	600		136	550	355	190	270
NPS 8	150	NPS 3	153	600	395	200	355
	300		155	650	405	215	470
	600		156	680	430	225	550
NPS 10	150	NPS 4	163	730	475	240	500
	300		165	775	520	260	700
	600		166	800	560	270	1000
NPS 12	150	NPS 5	173	850	530	280	1020
	300		175	900	550	300	950
	600		176	1050	650	360	1600
NPS 14	300	NPS 6	185	1100	640	340	1360
	600		186	1100	650	350	1510
NPS 16	150	NPS 8	193	1155	678	380	1900

Type TDM

Pump protection valve for centrifugal pumps

› Type TDM, front view



› Type TDM, 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
- Chemical processes
- Extinguishing water
- Snow canons

Type TDM

Pump protection valve for centrifugal pumps

Technical data

Nominal diameter	DN 25–300 / NPS 1–12
Pressure class	PN 63–400 / Class 150–2500
Temperature (max.)	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, degassing connection
Number of stages (max.)	5
Number of controlled stages (max.)	5
Operating range (max.)	Delta p up to max. 230 bar
Other	Bypass differential pressure 20–230 bar

Type TDM

Pump protection valve for centrifugal pumps

Function

The outlet main flow controls the non-return valve and positions it in proportion to the flow. The stem of the non-return valve transmits the motion via a lever to the bypass. The bypass system regulates the bypass flow in a modulating way and reduces the pressure to the bypass outlet pressure level without cavitation.

When the non-return valve is completely closed, the entire minimum flow is routed through the bypass. The bypass is fully closed when the non-return valve is in its upper position, thereby allowing full pump flow to the system.

Flow sensitive modulating bypass control

The non-return valve moves upwards with increasing main flow and downwards with decreasing flow. The non-return valve transmits this movement to the control lever.

The movement of the lever is transmitted via a piston to the multi-stage vortex plug. The minimum flow is then bypassed in a modulating way over several pressure reduction stages.

The TDM can be used for differential pressures from 20 bar up to 230 bar. The standard TDM design has a built-in bypass non-return function (~2 bar dp level required).

Manual bypass options for TDM valves

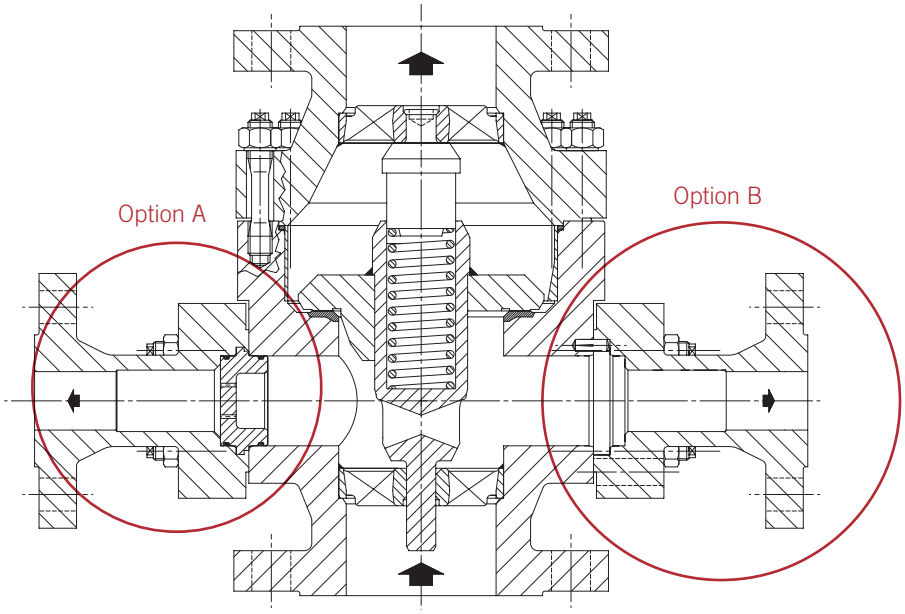
Depending on the plant design or additional requirements, various options can be selected for the start-up / warm-up side (A) and for the bypass side (B).

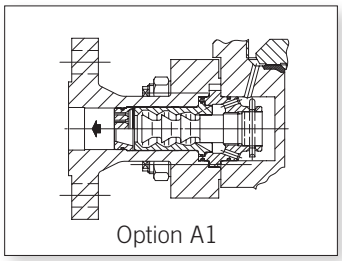
Option A:
One frequently used option is to feed low pressure flow to the process / boiler via the manual start-up. Either for the warm-up process or for heating the adjacent pumps/systems.

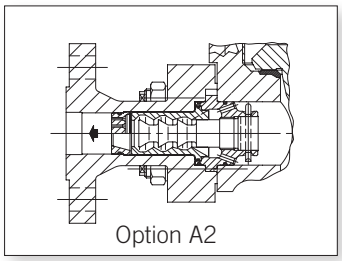
Option B:
Depending on the operating conditions of the system (dirt, certain load cases, etc.), special internal parts can be selected for the bypass. The valve is then supplied with the integrated optional bypass set. In this case the original internal parts for the bypass are supplied and installed after commissioning.

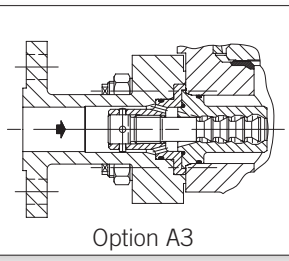
Type TDM

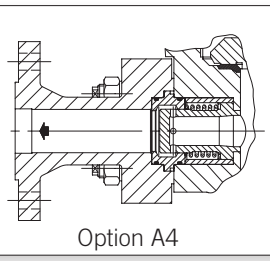
Pump protection valve for centrifugal pumps

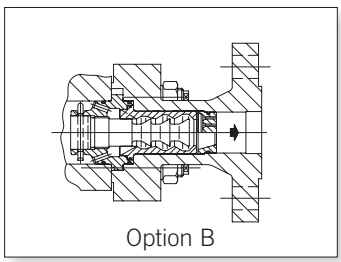



Option A1


Option A2


Option A3


Option A4


Option B

Option A1 - Start-up/heating connection above the non-return valve
Option A2 - Start-up/heating connection under the non-return valve
Option A3 - Heating under the non-return valve
Option A4 - Degassing system
Option B - Commissioning internal parts for the TDM valve

Type TDM

Pump protection valve for centrifugal pumps

Installation information

The TDM 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. Take care to ensure a straight inlet section. Exceptions have to be confirmed to SCHROEDAHL.

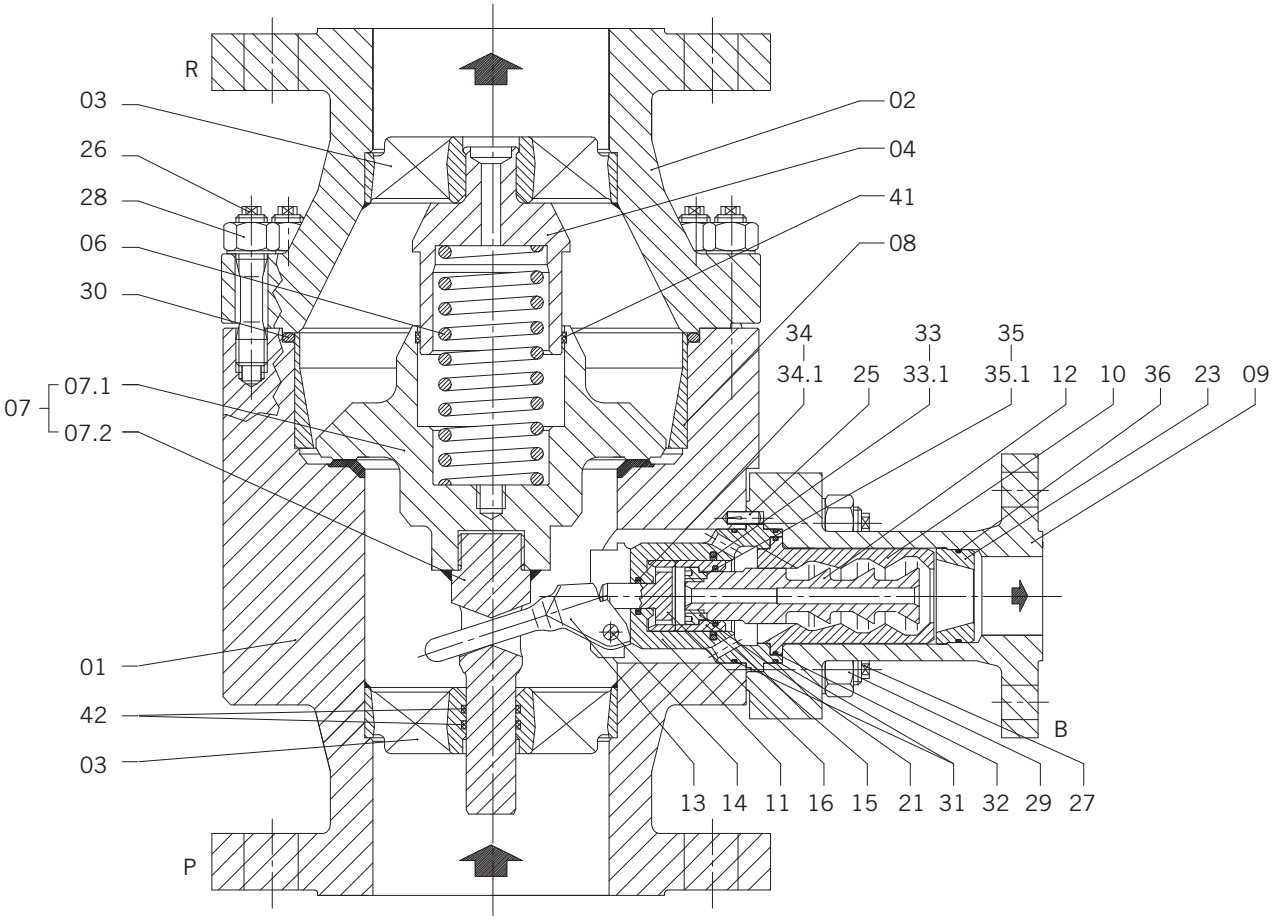
Vertical installation is preferred, but horizontal installation is also possible upon request. TDM valves operate at a low noise level and ensure a high reliability due to their sturdy design.

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

Type TDM

Pump protection valve for centrifugal pumps

Sectional drawing (housing)



Type TDM

Pump protection valve for 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 bolt	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 or venturi ring	1.4300 o. 1.4301
09	Bypass branch	*
25	Guide pin	A2
26	Bolt	**
27	Bolt	**
28	Hexagon nut	**
29	Hexagon nut	**
30	O-Ring	*
41	Ring	PTFE/Carbon
42	Guide ring	PTFE/Carbon

Recommended spare/wear parts

* Depending on customer requirements

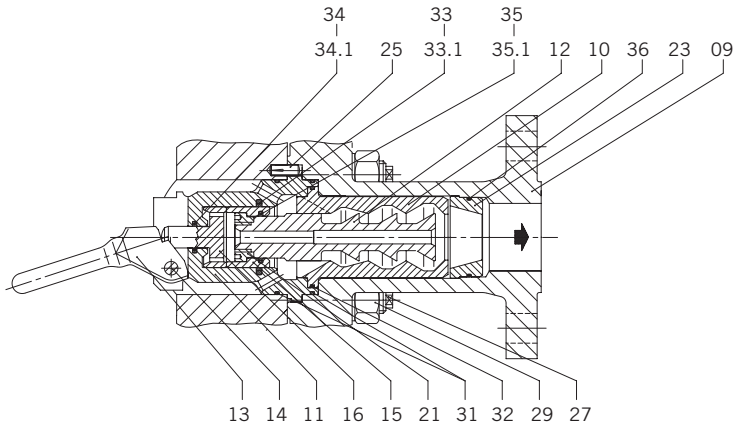
** Depending on size and pressure rating

Parts list as an example of the standard configuation

Type TDM

Pump protection valve for centrifugal pumps

Sectional drawing (bypass)



Parts list (bypass)

Pos.	Item	Material
10	Vortex bushing	1.4122
11	Control head	1.4122
12	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
23	Orifice bushing / nozzle	1.4122
31	O-Ring	*
32	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	*

Recommended spare/wear parts

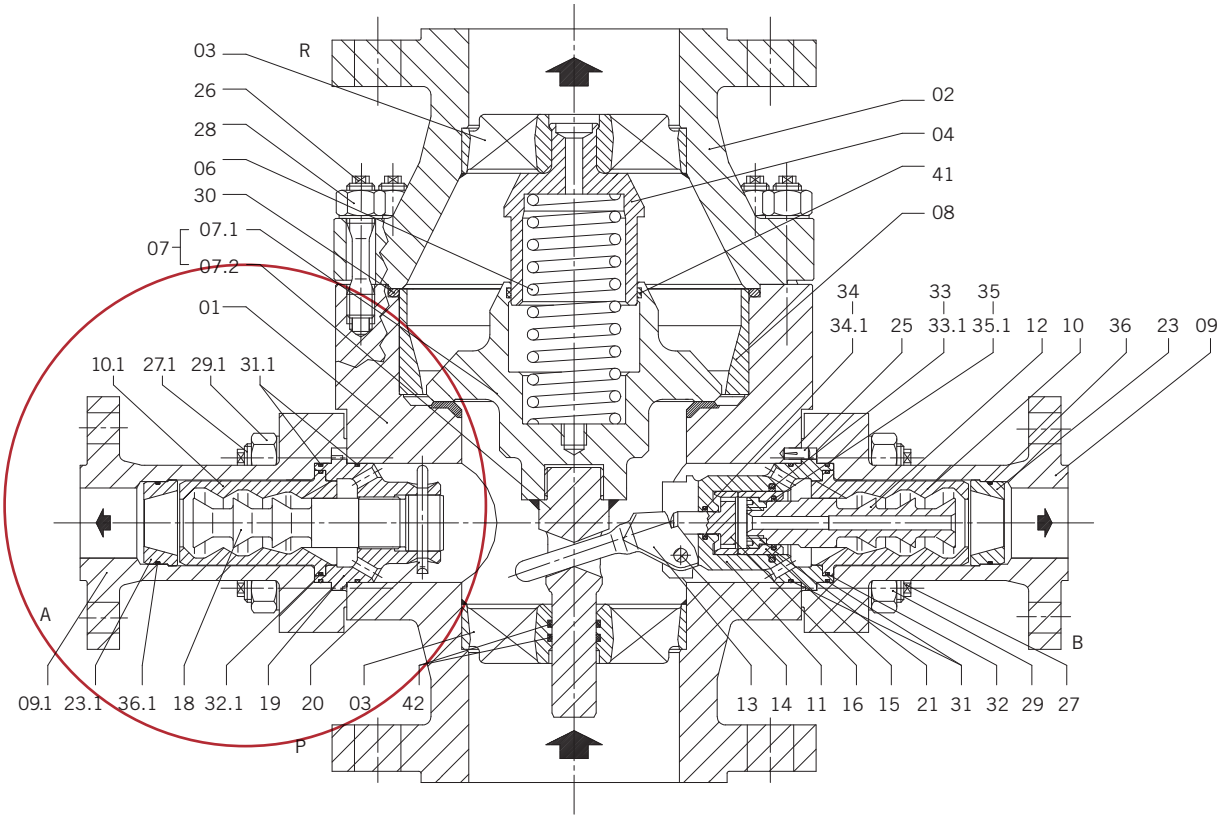
* Depending on customer requirements

Parts list as an example of the standard configuation

Type TDM

Pump protection valve for centrifugal pumps

Sectional drawing (manual start-up)



Parts list (manual start-up)

Pos.	Item	Material
09.1	Bypass branch	*
10.1	Vortex bushing	1.4122
18	Start-up vortex plug	1.4122
19	Holder	1.4122
20	Pin	1.4300
23.1	Orifice bushing / nozzle	1.4122
27.1	Bolt	**
29.1	Hexagon nut	**
31.1	O-Ring	*
32.1	O-Ring	*
36.1	O-Ring	*

Recommended spare/wear parts

* Depending on customer requirements

** Depending on size and pressure rating

Parts list as an example of the standard configuation

Type TDM

Pump protection valve for centrifugal pumps

Dimensions EN

DN_R / DN_P	PN	DN_B	Type	L (mm)	S (mm)	H (mm)	Weight (kg)
25	63-160	15	055-057	250	190	90	30
32	63	25	065	250	190	90	30
	100		066	250	190	90	30
40	63-100-160	25	075-076-077	260	190	90	35
	250		078	300	215	120	50
50	63	25	085	300	185	115	50
	100-160		086-087	300	193	110	60
	250		088	350	223	130	85
65	63	40	095	340	219	125	60
	100-160		096-097	340	227	125	85
	250		098	400	260	145	90
80	63	40	105	380	233	140	70
	100-160		106-107	380	240	140	85
	250		108	450	265	165	125
	320		109	510	300	185	180
100	63	50	115	430	258	155	105
	100-160		116-117	430	266	155	150
	250		118	520	300	190	200
125	63	50	125	500	280	175	185
	100-160		126-127	500	291	175	225
	250		128	600	321	215	345
	320		129	710	390	250	450
	400		120	780	420	290	580
150	63	65	135	550	350	190	255
	100		136	550	355	190	270
	160		137	585	355	200	275
	250		138	700	405	250	480
	320		139	805	400	270	770
	400		130	850	500	315	900
200	63	80	155	650	405	215	470
	100-160		156-157	680	430	225	550
	250		158	830	485	290	950
	320		159	910	515	340	1200
	400		150	1150	600	410	1700
250	63	100	165	775	520	260	700
	100-160		166-167	775	560	260	1000
	250		168	900	560	310	1500
300	63	125	175	900	550	300	950
	100-160		176-177	1050	650	360	1600
	250		178	1200	720	420	2100

Type TDM

Pump protection valve for centrifugal pumps

Dimensions ASME

DN_R / DN_P	PN	DN_B	Type	L (mm)	S (mm)	H (mm)	Weight (kg)
NPS 1	300	NPS 1	055	250	190	90	30
	600		055	250	190	90	30
	900		057	310	200	120	40
	1500		058	320	215	130	50
NPS 1,25	300	NPS 1	065	250	190	90	30
	600		066	250	190	90	30
	900		067	310	200	120	40
	1500		068	320	215	130	50
NPS 1,5	300	NPS 1	075	260	190	90	35
	600		076	260	190	90	35
	900		077	300	200	110	35
	1500		078	310	215	120	50
NPS 2	300	NPS 1	085	300	185	115	50
	600		086	300	193	110	60
	900		087	340	203	130	60
	1500		088	350	233	130	85
NPS 2,5	300	NPS 1,5	095	340	199	125	60
	600		096	340	220	125	85
	900		097	380	230	140	85
	1500		098	400	250	145	90
NPS 3	300	NPS 1,5	105	380	220	140	70
	600		106	380	240	140	85
	900		107	410	250	150	85
	1500		108	450	275	165	125
NPS 4	300	NPS 2	115	430	240	155	105
	600		116	430	266	155	150
	900		117	450	280	160	150
	1500		118	520	300	190	200
NPS 5	300	NPS 2	125	500	290	175	185
	600		126	500	300	175	225
	900		127	525	310	185	225
	1500		128	650	341	235	345
	2500		120	780	420	290	580
NPS 6	300	NPS 2,5	135	550	350	190	255
	600		136	550	355	190	270
	900		137	585	355	200	275
	1500		138	700	405	250	480
	2500		130	850	500	315	900

Type TDM

Pump protection valve for centrifugal pumps

DN_R / DN_P	PN	DN_B	Type	L (mm)	S (mm)	H (mm)	Weight (kg)
NPS 8	300	NPS 3	155	650	405	215	470
	600		156	680	430	225	550
	900		157	700	430	225	550
	1500		158	880	485	310	950
	2500		150	1150	600	410	1700
NPS 10	300	NPS 4	165	775	520	260	700
	600		166	800	560	270	1000
	900		167	800	560	270	1000
	1500		168	980	570	340	1500
	2500		160	1420	650	500	1600
NPS 12	300	NPS 5	175	900	550	300	950
	600		176	1050	650	360	1600
	900		177	1050	650	360	1600
	1500		178	1250	720	440	2100
NPS 14	300	NPS 6	185	1100	640	340	1360
	600		186	1100	650	350	1510

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 (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

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.

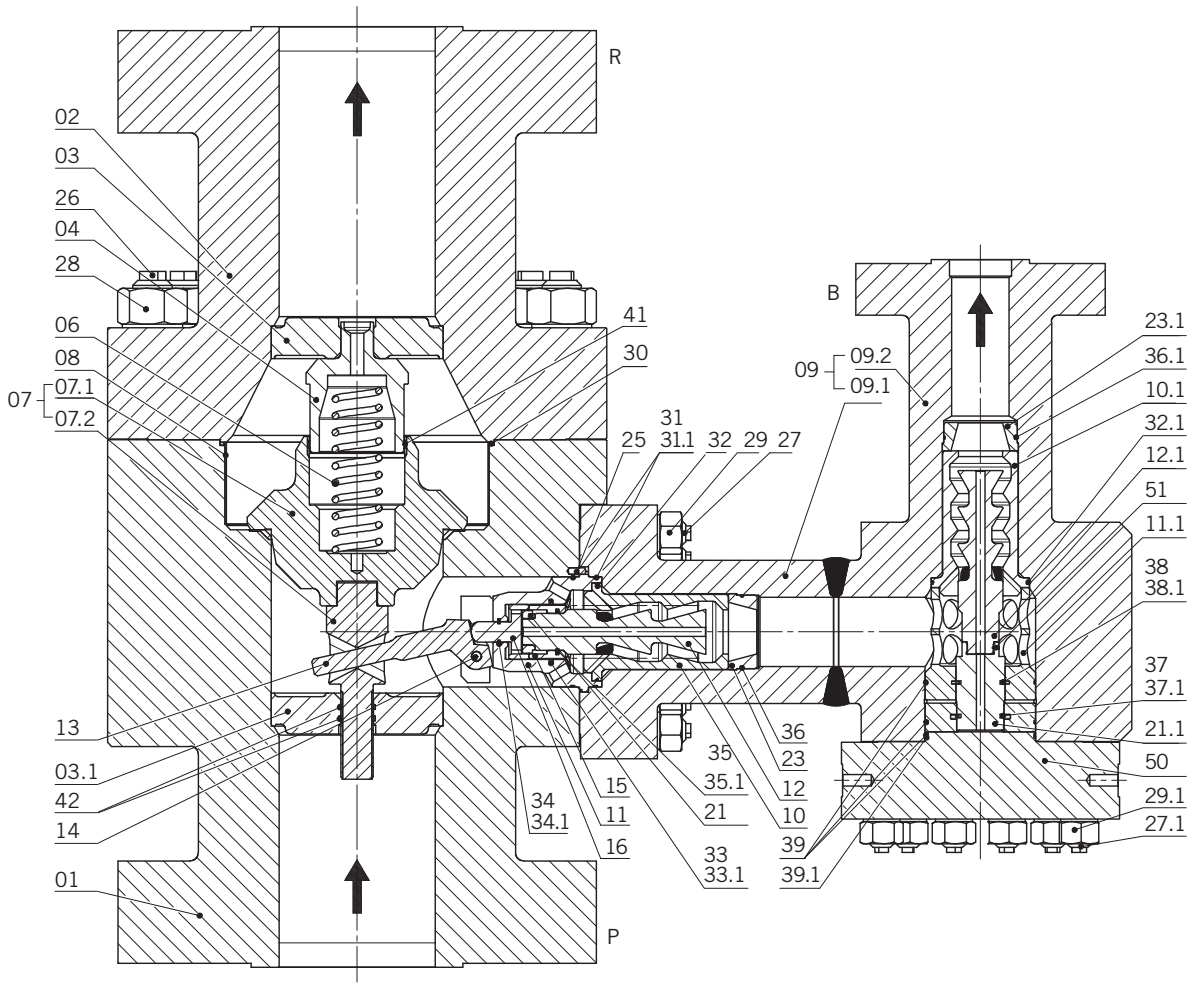
Vertical installation is preferred, but horizontal installation is also possible upon request. The MRK operates quietly and offers high reliability due to its sturdy design.

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

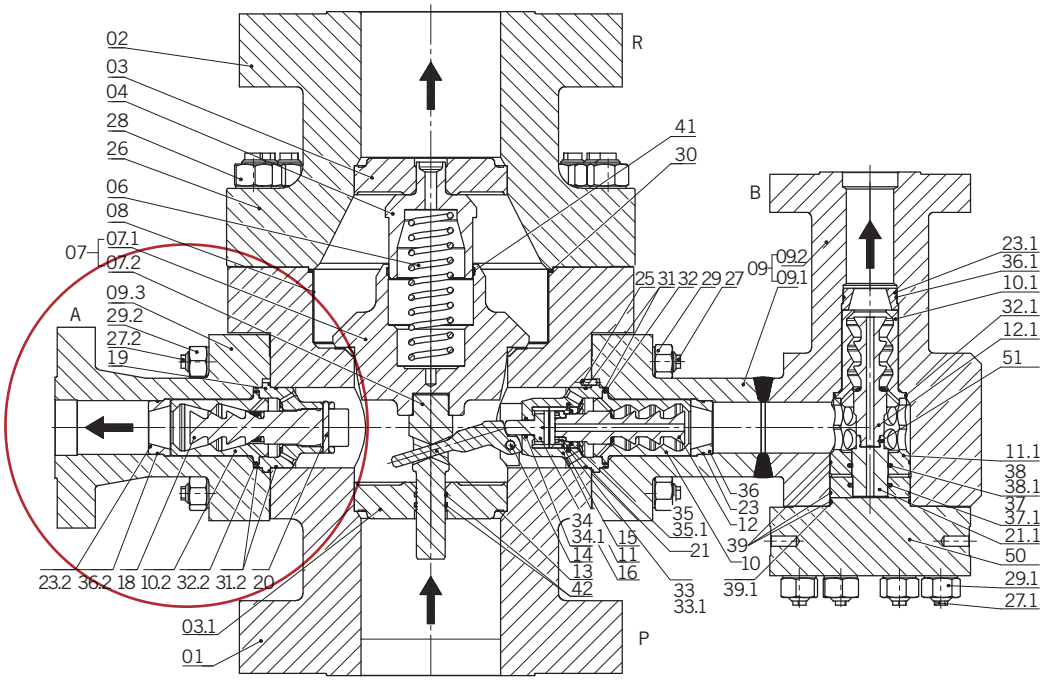
** Depending on size and pressure rating

Parts list as an example of the standard configuation

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

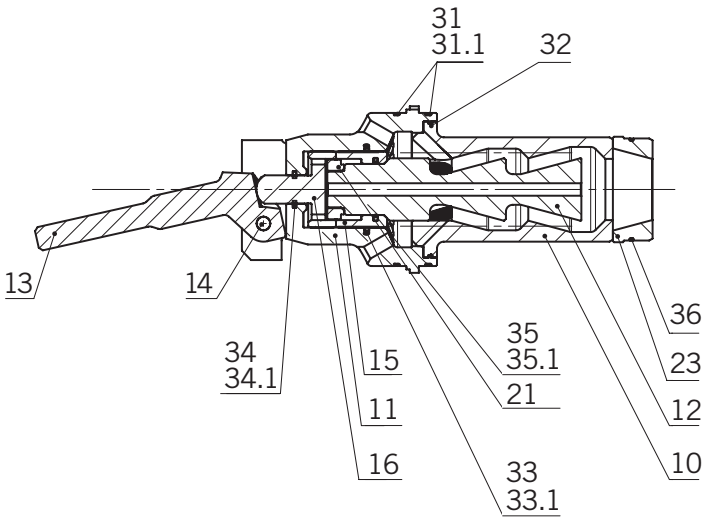
** Depending on size and pressure rating

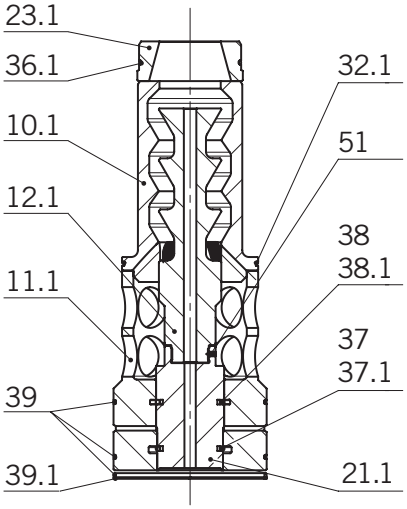
Parts list as an example of the standard configuation

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 configuation

Type BPV

Back pressure regulator to guarantee a defined back pressure

› Type BPV, front view

› Type BPV, sectional view

Product features

- Prevents evaporation and cavitation and ensures smooth operation
- Forged housing material, carbon steel or stainless steel
- Special material possible
- Internal operation (no external energy source required)
- Easy to install
- Low maintenance

Application

- Maintaining the pressure in the flow recirculation or return line to the tank

Type BPV

Back pressure regulator to guarantee a defined back pressure

Technical data

Nominal diameter	DN 25–300 / NPS 1–12
Pressure class	PN 16–400 / Class 150–2500
Temperature (max.)	Up to 230 °C / 446 °F (other temperatures on request)
Housing material	1.0460 / A105 1.0571 / LF2 1.4404 / F316L 1.4501 / F55
Housing type	Forged
Media	Liquids of all kinds (water, oils, chemicals...)
Flanges	As intermediate flange version (Z version) or with integrated flanges (K version)
Number of stages (max.)	1
Number of controlled stages (max.)	1
Operation Range	Delta p up to max. 10 bar

Type BPV

Back pressure regulator to guarantee a defined back pressure

Function

Even the optimal and sophisticated pressure reduction of the SCHROEDAHL automatic recirculation valves and control valves set extreme conditions limits in some installations.

SCHROEDAHL back pressure regulators type BPV are used in such cases.

They increase the distance to the evaporation pressure of the medium by generating a defined pressure difference. This prevents unwanted evaporation and cavitation and ensures smooth and gentle operation.

Careful adjustment of the operating parameters between minimum flow or control and back pressure valves ensures optimum system operation.

The pressure difference at the back pressure valve as specified in the design shifts the bushing (item 204) in the direction of flow against the pressure spring (item 237). This releases the throttle cross sections at the bushing until the specified pressure difference is attained.

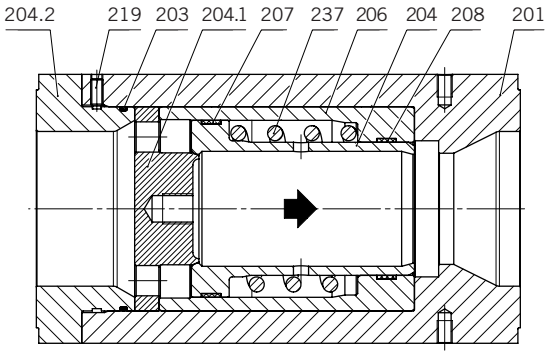
Installation information

The BPV is used in the pipeline at the point where the highest pressure level is required. We recommend installation directly to the tank.

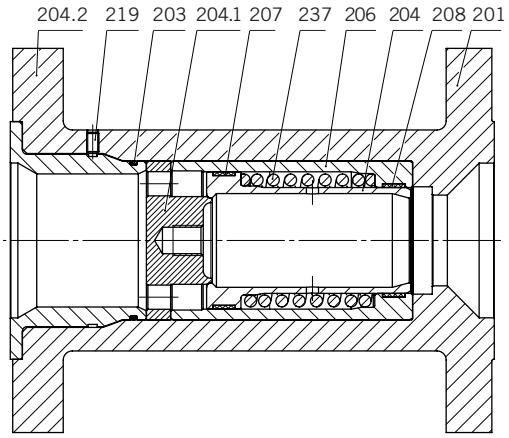
Type BPV

Back pressure regulator to guarantee a defined back pressure

Sectional drawing
(z-type)



Sectional drawing
(k-type)



Parts list

Pos.	Item	Material
201	Housing	*
203	O-Ring	*
204	Control bushing	1.4057
204.1	Orifice plate	1.4404
204.2	Flange	*
206	Bushing	1.4057
207 / 207.1**	O-Ring and glyd ring / guide ring	*
208 / 208.1**	O-Ring and glyd ring / guide ring	*
219	Grub screw	45H
237	Spring	1.4310

Recommended spare/wear parts

* Depending on customer requirements

** Depending on size and pressure rating

Parts list as an example of the standard configuation

Type BPV

Back pressure regulator to guarantee a defined back pressure

Dimensions EN (z-type)

DN_1 / DN_2	PN	Type	L (mm)	Ø (mm)
25	25	053	170	71
	40	054	170	71
	63	055	170	86
	100	056	170	86
	160	057	170	82
	250	058	170	83
	320	059	170	93
	400	050	170	105
32	25	063	170	82
	40	064	170	82
	63	065	170	88
	100	066	170	88
	160	067	-	-
	250	068	-	-
	320	069	-	-
	400	060	-	-
40	25	073	220	92
	40	074	220	92
	63	075	220	103
	100	076	220	103
	160	077	220	103
	250	078	220	109
	320	079	220	119
	400	070	220	135
50	25	083	220	107
	40	084	220	107
	63	085	220	113
	100	086	220	119
	160	087	220	119
	250	088	220	124
	320	089	220	134
	400	080	220	150
65	25	093	260	127
	40	094	260	127
	63	095	260	138
	100	096	260	144
	160	097	260	144
	250	098	260	154
	320	099	260	170
	400	090	260	192

DN_1 / DN_2	PN	Type	L (mm)	Ø (mm)
80	25	103	260	142
	40	104	260	142
	63	105	260	148
	100	106	260	154
	160	107	260	154
	250	108	260	170
	320	109	260	190
	400	100	260	207
100	25	113	320	168
	40	114	320	168
	63	115	320	174
	100	116	320	180
	160	117	320	180
	250	118	320	202
	320	119	320	229
	400	110	320	256
125	25	123	320	194
	40	124	320	194
	63	125	320	210
	100	126	320	217
	160	127	320	217
	250	128	320	242
	320	129	320	274
	400	120	320	301
150	25	133	320	224
	40	134	320	224
	63	135	320	247
	100	136	320	257
	160	137	320	257
	250	138	320	284
	320	139	320	311
	400	130	320	348
200	25	153	-	284
	40	154	-	290
	63	155	-	309
	100	156	-	324
	160	157	-	324
	250	158	-	358
	320	159	-	398
	400	150	-	442

Dimensions EN (k-type): on request

Type BPV

Back pressure regulator to guarantee a defined back pressure

Dimensions ASME (z-type)

DN_1 / DN_2	PN	Type	L (mm)	Ø (mm)
NPS 1	150	053	170	63,5
	300	055	-	69,8
	600	056	170	69,8
	900	057	170	76,2
	1500	058	170	76,2
	2500	050	170	82,6
NPS 1,25	150	063	-	73,2
	300	065	170	79,5
	600	066	170	79,5
	900	067	-	85,9
	1500	068	170	85,9
	2500	060	170	101,6
NPS 1,5	150	073	170	82,9
	300	075	170	91,9
	600	076	-	91,9
	900	077	170	95,6
	1500	078	220	95,6
	2500	070	220	114,3
NPS 2	150	083	220	101,6
	300	085	220	107,9
	600	086	220	107,9
	900	087	220	139,7
	1500	088	-	139,7
	2500	080	220	143,1
NPS 2,5	150	093	220	120,5
	300	095	-	127
	600	096	220	127
	900	097	220	162,1
	1500	098	220	162,1
	2500	090	220	155,1
NPS 3	150	103	-	133,3
	300	105	220	145,7
	600	106	260	145,7
	900	107	-	165,1
	1500	108	260	171,4
	2500	100	260	193,5

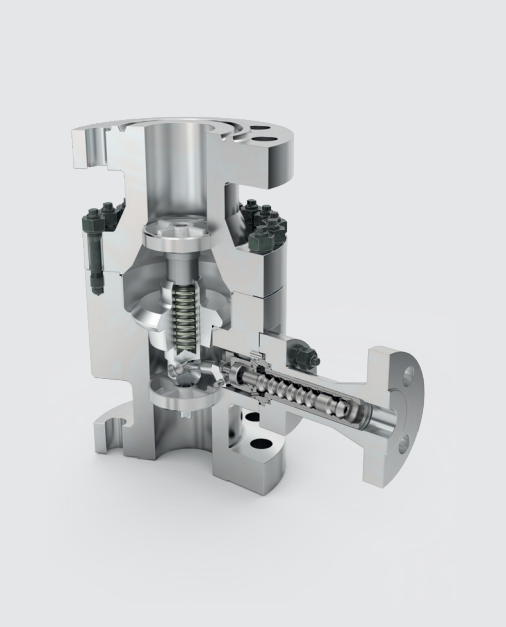
DN_1 / DN_2	PN	Type	L (mm)	Ø (mm)
NPS 4	150	113	320	171,4
	300	115	320	177,8
	600	116	320	190,5
	900	117	320	203,1
	1500	118	320	206,2
	2500	110	320	232
NPS 5	150	123	320	193,5
	300	125	320	212,6
	600	126	320	238,3
	900	127	320	244,3
	1500	128	320	251
	2500	120	320	276,1
NPS 6	150	123	320	218,9
	300	125	320	247,3
	600	126	320	263,7
	900	127	320	285,7
	1500	128	320	279,4
	2500	120	320	314,5
NPS 8	150	123	320	279,1
	300	125	320	304,8
	600	126	320	318
	900	127	320	355,6
	1500	128	320	349,2
	2500	120	320	384,4

Dimensions ASME (k-type): on request

Type TDC

Pump protection valve for centrifugal pumps used in descaling applications

› Type TDC, front view



› Type TDC, sectional view

Product features

- Particularly robust design for descaling applications
- Automatically modulating bypass function
- Forged housing material, carbon steel or stainless steel
- Special material possible
- Internal operation (no external energy source required)
- Easy to install
- Low maintenance
- Design optimised for frequent switching cycles

Applications

- Descaling applications

Type TDC

Pump protection valve for centrifugal pumps used in descaling applications

Technical data

Nominal diameter	DN 80–250 / NPS 3–10
Pressure class	PN 100–400 / Class 600–2500
Temperature (max.)	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	Descaling water (other liquids possible)
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.)	8
Number of controlled stages (max.)	8
Operating range (max.)	Delta p up to max. 230 bar
Other	Bypass differential pressure 20–250 bar

Type TDC

Pump protection valve for centrifugal pumps used in descaling applications

Function

The outlet main flow controls the non-return valve and positions it in proportion to the flow. The stem of the non-return valve transmits the motion via a lever to the bypass. The bypass system regulates the bypass flow in a modulating way and reduces the pressure to the bypass outlet pressure level without cavitation.

When the non-return valve is completely closed, the entire minimum flow is routed through the bypass. The bypass is fully closed when the non-return valve is in its upper position, thereby allowing full pump flow to the system.

Flow sensitive modulating bypass controll

The non-return valve moves upwards with increasing main flow and downwards with decreasing flow. The non-return valve transmits this movement to the control lever.

The movement of the lever is transmitted via a piston to the multi-stage vortex plug. The minimum flow is then bypassed in a modulating way over several pressure reduction stages.

The TDC can be used for differential pressures above 20 bar up to 250 bar for drainage.

Installation information

The TDC 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.

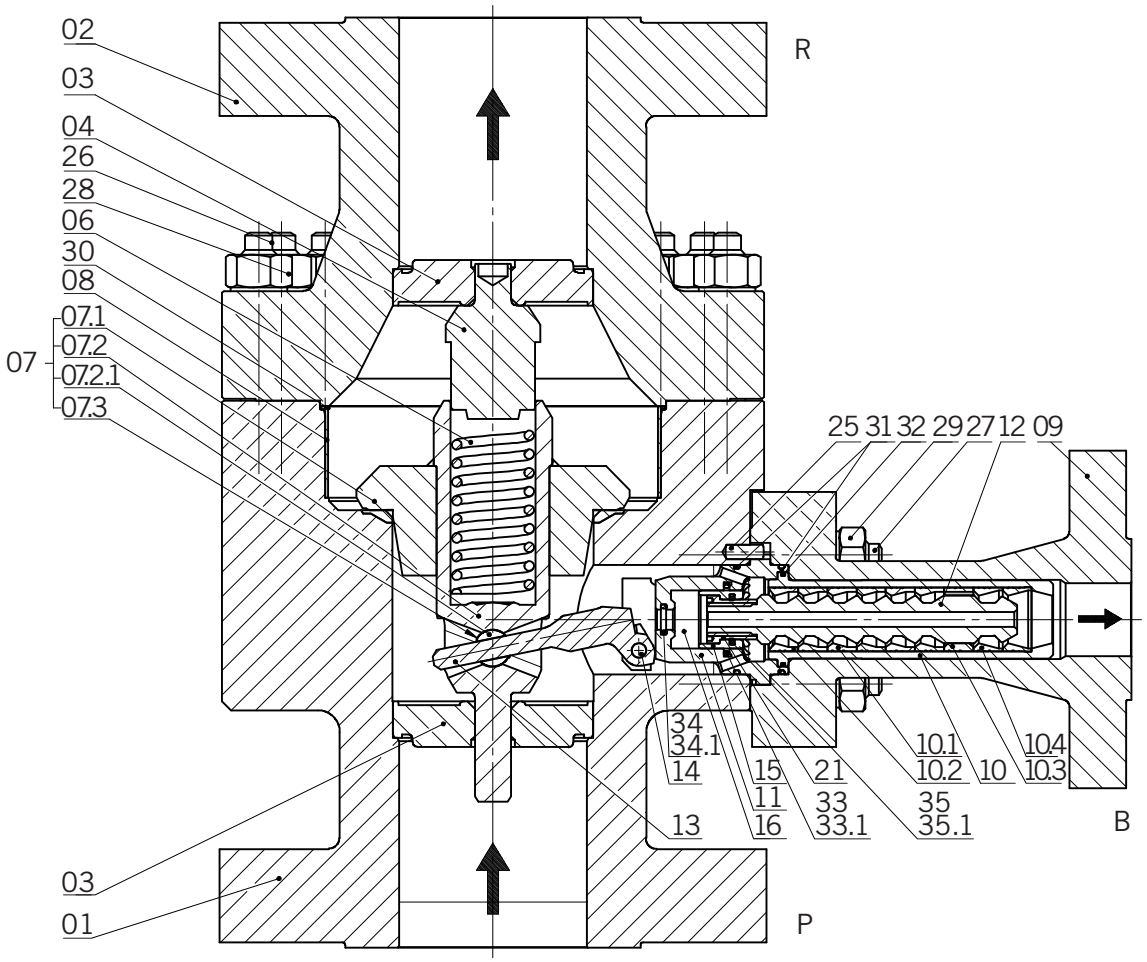
To avoid frequency interference due to pressure oscillations in the medium, the distance between the pump outlet and the valve inlet should not exceed 3 m. Tale care to ensure a straight inlet section. Exceptions have to be confirmed to SCHROEDAHL.

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

Type TDC

Pump protection valve for centrifugal pumps
used in descaling applications

Sectional drawing (housing)



Type TDC

Pump protection valve for centrifugal pumps
used in descaling applications

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
07.2.1	Bushing	1.4122
07.3	Snap ring	1.4122
08	Liner	1.4300
09	Bypass branch	*
25	Guide pin	A2
26	Bolt	**
27	Bolt	**
28	Hexagon nut	**
29	Hexagon nut	**
30	O-Ring	*

Recommended spare/wear parts

* Depending on customer requirements

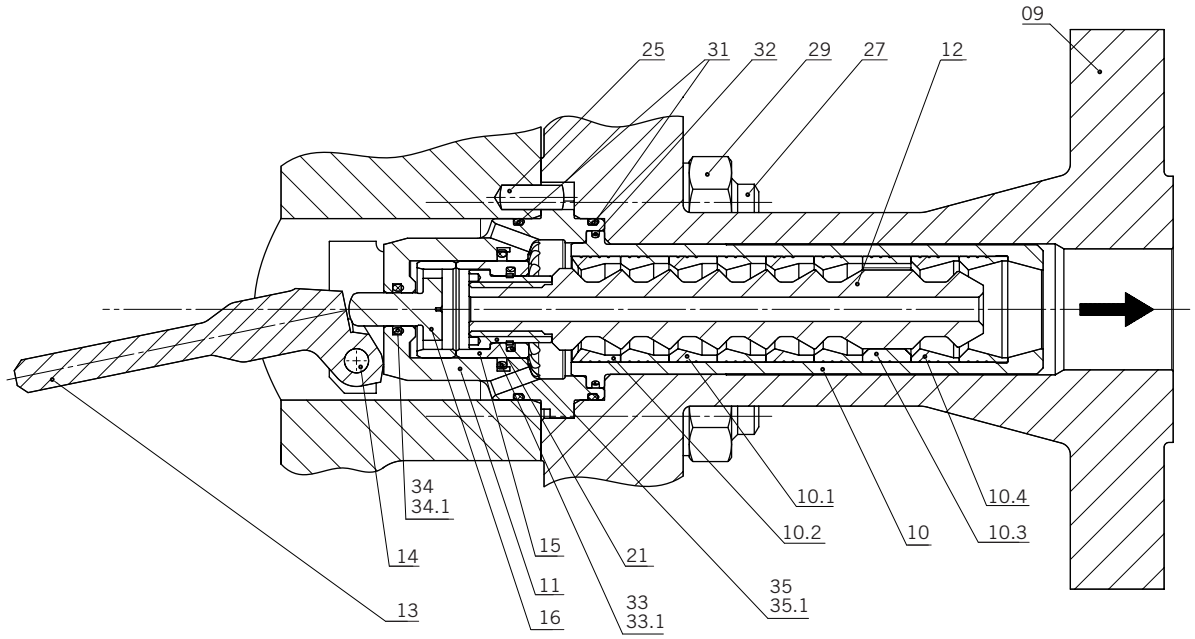
** Depending on size and pressure rating

Parts list as an example of the standard configuation

Type TDC

Pump protection valve for centrifugal pumps
used in descaling applications

Sectional drawing (bypass)



Dimensions: on requst

Type TDC

Pump protection valve for centrifugal pumps used in descaling applications

Parts list (bypass)

Pos.	Item	Material
10	Bushing	1.4122
10.1	Control bushing	1.4122
10.2	Seat bushing	1.4122
10.3	Control bushing	1.4122
10.4	Control bushing	1.4122
11	Control head	1.4122
12	Vortex plug	1.4122
13	Lever	1.4313
14	Pivot pin	1.4122
15	Relief bushing	1.4122
16	Relief piston	1.4122
21	Threaded ring	1.4122
31	O-Ring	*
32	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
41	Guide ring	PTFE/Carbon
42	Guide ring	PTFE/Carbon

Recommended spare/wear parts

* Depending on customer requirements

Parts list as an example of the standard configuation

SCHROEDAHL Control valves

Special valves for high pressure applications in steam and water circuits

High technology at its best

Developing solutions beyond the standards belongs to one of the challenges we manage day by day.

SCHROEDAHL control valves are developed to customer specifications to make control processes in power plants or industrial plants particularly effective and efficient.

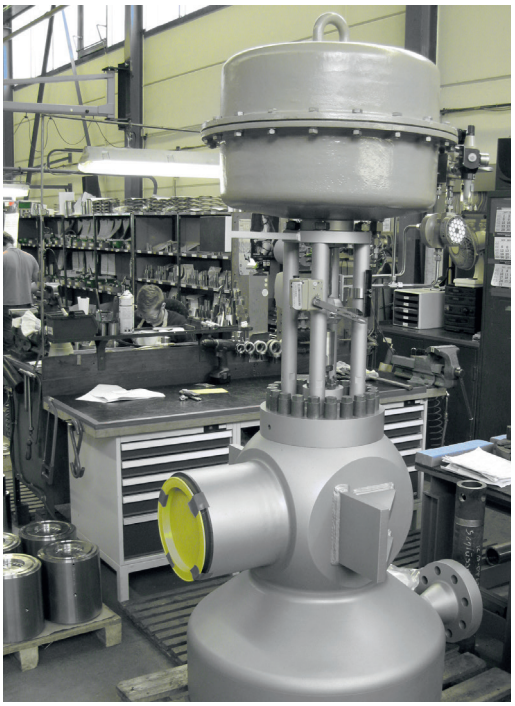
As a result of decades of development work, we have a wide range of product variants available for pressure, temperature, level and volume control. These product variants are adapted to the respective customer requirements in design, dimensioning and manufacture through detailed engineering.

The spectrum reaches from small applications like biogas plants up to major projects like power plants with a capacity of 1600 MW. In those cases, a considerable amount of processing applications are used:

- Steam conversion
- Steam cooling
- Cooling water and feed water control
- Pump protection or
- Level control

The entire production and process chain is aligned with the most important national and international regulations and standards (EN, ASME etc.).

We also use only high quality materials from high temperature resistant material up to high alloyed duplex steel to ensure reliability by durable efficient functioning.



Customised solutions for special applications

We develop control valves for every application – even if the requirements are far beyond the standards.

Special requirements demand special solutions. We have a large number of different product platforms at our disposal for a wide variety of special applications based on decades of development work. Specific safety requirements come first, especially in nuclear power plants or in the chemical industry.

We are responsible for detailed engineering, the processing of special materials and certified, high-quality manufacturing. We add to the realization of the highest safety standards.

SCHROEDAHL Control valves

› Control valves for steam applications

Valves for pressure/temperature reduction and steam conversion

Low-noise pressure reducing valves with multi-stage controlled internal fittings can be used for starting up the plant and for process steam cooling or process steam conversion.

Features and advantages

Pressure reduction via multi-stage controlled, sub-critical expansion is particularly low-noise.

- The valve seat and perforated basket can be replaced
- Large control ratio for control in the start-up range with high differential pressure
- Low-maintenance, adjustable stuffing box (packing pure graphite)

Options:

- Balanced plug
- Armoured sealing surfaces
- Heating and drainage nozzles

Designs according to customer requirements are also available.

All common drive types can be used.

Type DR

Steam pressure reduction valve

› Type DR, front view

› Type DR, sectional view

Product features

- Customised, high-quality steam pressure valve with cage-guided perforated bushing in a single-stage or multi-stage design
- For the best handling of difficult operating conditions with high grade pressure control
- Low-noise, multi-stage design of the throttle body (perforated bushing)
- Screwed cover or self-sealing design

Applications

- Reduction of steam pressure in energy and process engineering for controlling high-pressure

Type DR

Steam pressure reduction valve

Technical data

Nominal diameter	DN 50–1200 / NPS 2–48
Pressure class	PN 16–640/Class 150 –4500
Temperature (max.)	650 °C / 1200 °F
Housing material	1.0460 / A105 1.5415 1.7335 / A182F12Cl.2 1.7383 / A182F22Cl.3 1.4903 / A182F91
Housing type	Forged
Media	Superheated steam
Flanges	EN 1092-1, ASME B16.5, ISO 7005, JIS, JPI, welding ends on request
Designs	Angle type, globe type
Actuators	Pneumatic, electric, hydraulic
Number of stages (max.)	9
Number of controlled stages (max.)	4
Operating range (max.)	1:50

Type DR

Steam pressure reduction valve

SCHROEDAHL develops and produces high-quality and individually configured steam pressure reduction control valves

We develop steam pressure reduction valves, which are precisely adapted to the requirements in power plant- or industrial processes. SCHROEDAHL single and multi-stage solutions cover all pressure ranges, mounting situations and nominal widths.

Based on the process data, we supply our customers with tailor-made control valves for the optimum operation of their plant. You can benefit from our extensive experience and engineering at the highest level.

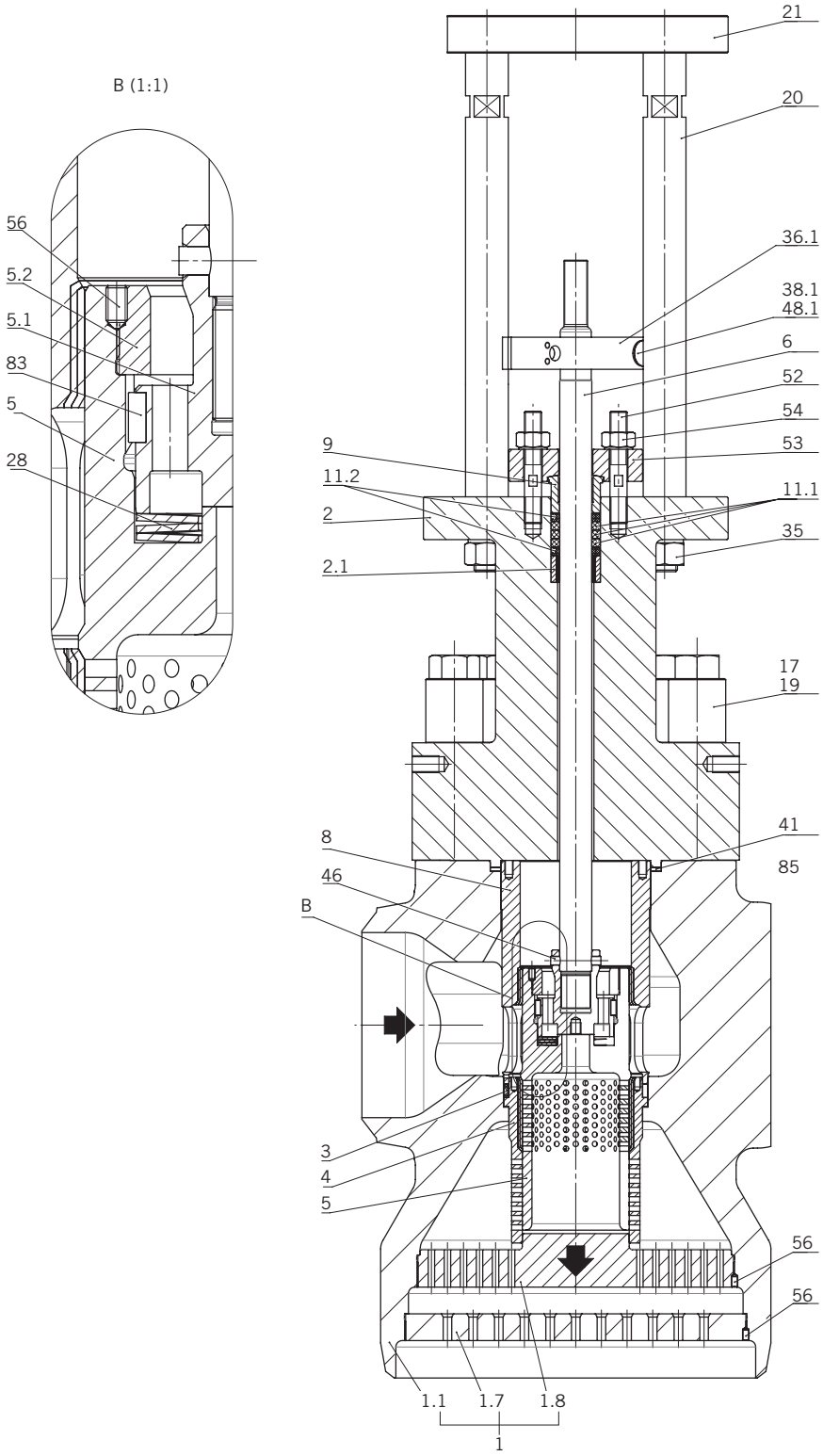
SCHROEDAHL steam pressure reduction control valves are high-quality products that are fully function-optimized through continuous further development. It was possible to minimize the actuator forces even during high pressure applications, which in turn leads to the use of smaller and cost-saving actuators.

The internal construction is designed for low noise operation, which guarantees environmentally-friendly handling. Forged housings combined with a consistent, well thought-out engineering ensures a strong, durable and resistant quality.

Type DR

Steam pressure reduction valve

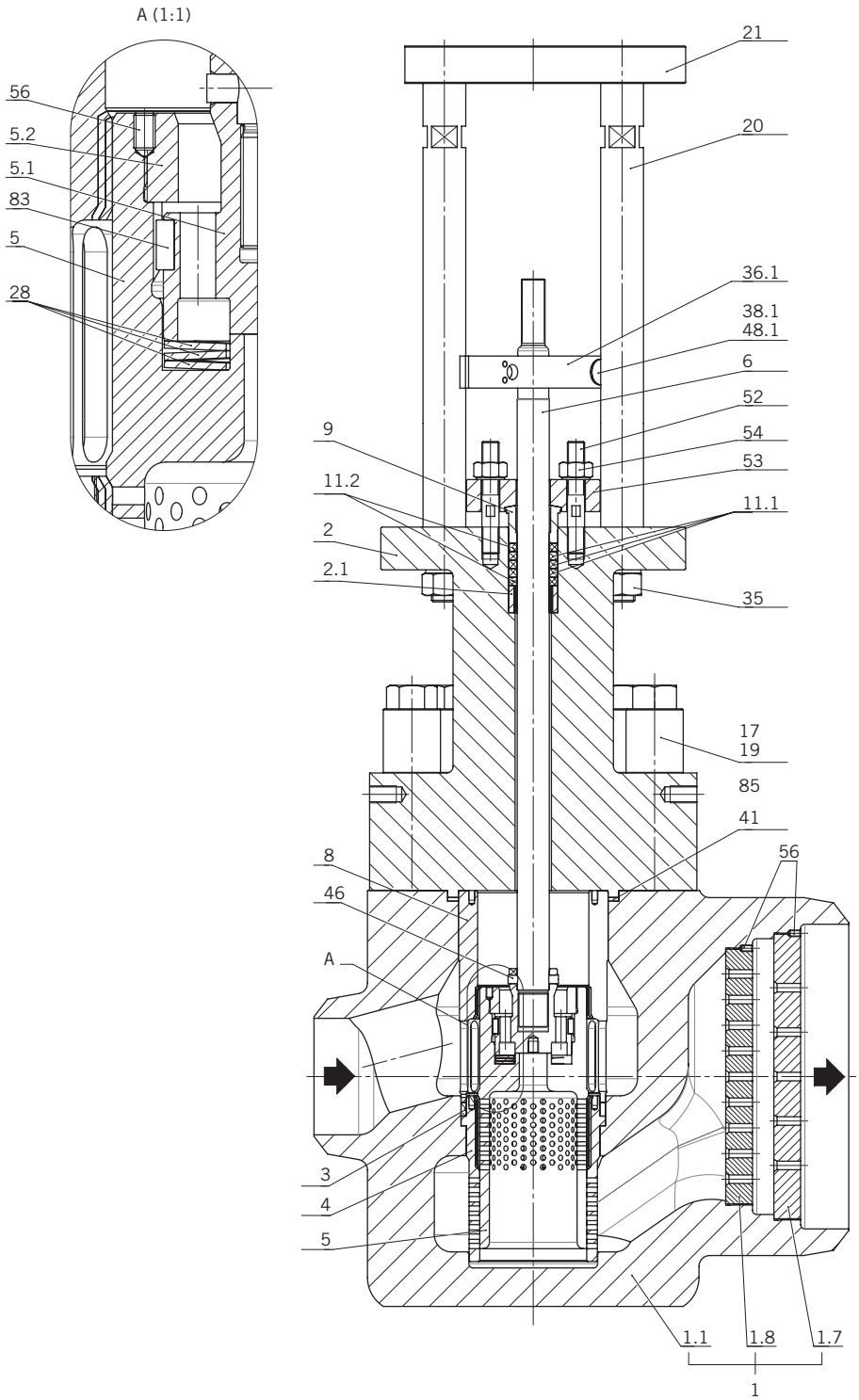
Sectional drawing (angle type)



Type DR

Steam pressure reduction valve

Sectional drawing (globe type)



Type DR

Steam pressure reduction valve

Parts list (angle type, globe type)

Pos.	Item	Material
1	Housing cpl.	*
1.1	Housing	*
1.7	Orifice	*
1.8	Perforated bushing	*
2	Cover	*
2.1	Bushing	**
3	Profile ring	Grafit
4	Seat bushing	**
5	Valve plug	1.4903/A182F91
5.1	Pilot plug	2.4668
5.2	Ring	1.4903/A182F91
6	Valve spindle	1.4922
8	Bushing	**
9	Packing follower	1.4122
11.1	Packing	Grafit
11.2	Packing	Grafit
17	Capped nut	**
19	Bolt	**
20	Spacer bolt	**
21	Flange	1.0460/A105
28	Washer	2.4668
35	Hexagon nut	1.4923
36.1	Bridge	1.4571
38	Socket head screw	8.8
41	Spiral gasket	1.4541/Grafit
46	Pin	1.4301
48	Lock washer	1.1211
52	Stud bolt	**
53	Gland plate	*
54	Hexagon nut	*
56	Threaded pin	A4
83	Parallel key	1.0540

* See table “Technical data”

** Depending on customer requirements

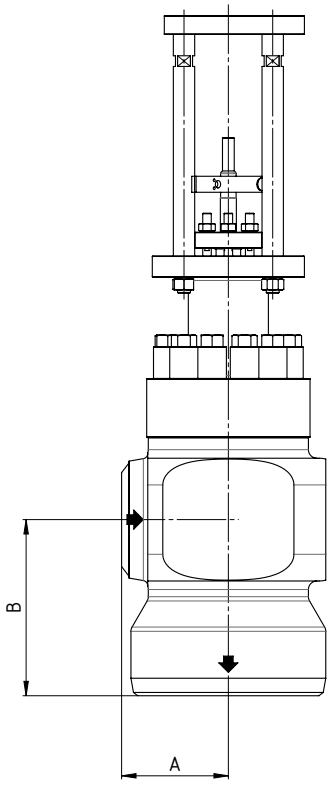
Parts list as an example of the standard configuation

Type DR

Steam pressure reduction valve

Dimensions (angle type)

Seat-Ø (mm)	Measures A (mm)	Measures B (mm)	Weight (kg)
40	125	150	120
50	130	175	200
65	140	200	250
80	170	250	350
100	185	300	550
125	210	400	700
150	240	475	1000
180	250	550	1400
210	250	725	1800
250	275	850	2200

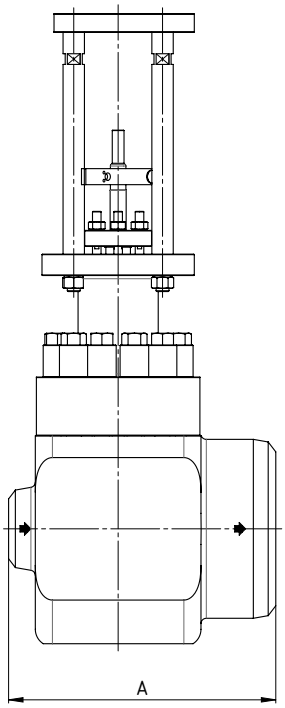


Type DR

Steam pressure reduction valve

Dimensions (globe type)

Seat-Ø (mm)	Measures A (mm)	Weight (kg)
40	275	130
50	300	225
65	350	275
80	425	385
100	475	600
125	600	775
150	725	1100
180	800	1500
210	975	2000
250	1125	2400



Type DKV

Desuperheater to control the temperature of superheated steam or gas

› Type DKV, front view

› Type DKV sectional view

Product features

- The spray water cooler (lance design) works with controlled nozzle technology for extremely effective steam cooling
- Spray head with integrated high-performance nozzles.
  Selectable control characteristics for precise temperature control
- A large water vapour pressure difference Delta p is permitted
- Excellent pressure atomization
- Tight shut-off, no leakage in closed position
- High control accuracy over the entire control range
- Tightly closing metallic seat. No leakage in closed position and thus no emptying of the cooling water lines possible.
- Contains the pressure injection nozzle, no additional control valves required
- High operational reliability through the use of simple components, minimal wear and tear
- Excellent control accuracy over the entire control range

Applications

For steam cooling in power plant applications and for general gas cooling applications with water injection

Type DKV

Desuperheater to control the temperature of superheated steam or gas

Technical data

Nominal diameter	DN 150–1200 / NPS 6–24
Pressure class	PN 15–250 / Class 150–1500
Temperature (max.)	650 °C / 1200 °F
Housing material	1.0460 / A105 1.5415 1.7335 / A182F12Cl.2 1.7383 / A182F22Cl.3 1.4903 / A182F91
Housing type	Forged
Media	Superheated steam, gas
Flanges	EN 1092-1, ASME B16.5, ISO 7005, JIS, JPI
Actuators	Electric, pneumatic, hydraulic, handwheel (for manual operation)
Number of stages (max.)	1
Number of controlled stages (max.)	1
Operating range (max.)	1:100

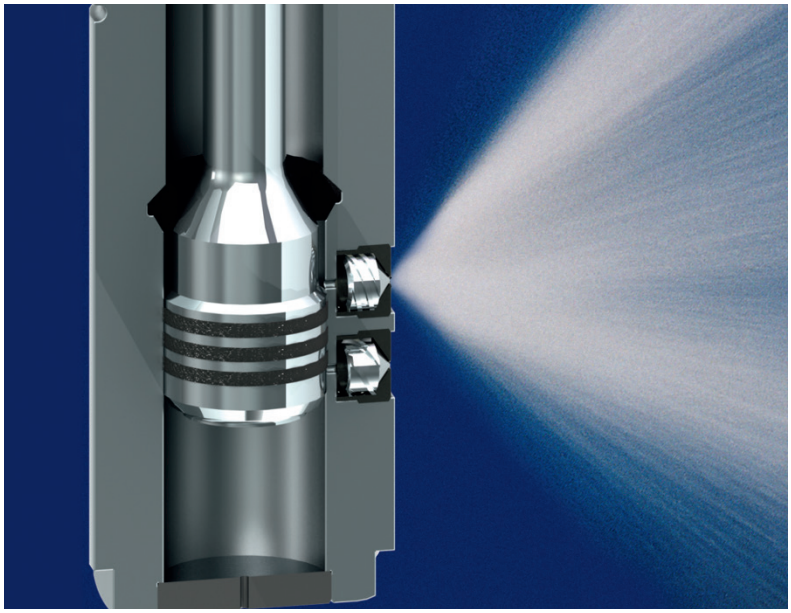
Type DKV

Desuperheater to control the temperature of superheated steam or gas

Function

Desuperheating (cooling) the steam can simply be achieved by injecting water into the steam flow. When injected, the water is evaporated by means of the desuperheater nozzles. Thereby the water absorbs heat and consequently the temperature of steam is reduced. The desuperheater type DKV is designed so that even at low injection water quantities an efficient spray of very fine droplets (mist) is obtained.

The nozzles in the sprayhead are designed to give the injection water a high velocity and a radial rotating movement under all conditions. This achieves a very fine atomization and consequently a rapid evaporation of the water.



› Fine atomization by the desuperheater even with the smallest amount of water

The temperature sensor sends a control signal to the actuator, bringing the control spool into a stroke position corresponding to the characteristic curve. The cooling fluid is now admitted to the injection nozzle and is accelareated at the nozzle insert.

In the nozzle chamber, the cooling medium is accelerated and rotated by means of a swirl insert, so that a spray of the finest atomization is produced when it exits into the steam line. Our high quality atomization of the cooling liquid is the basis of a good mixing from cooling fluid and steam at all load conditions. The position of the valve seat, just before the spray head, provides a tight shut-off in the closed position, so that dripping is prevented (the piston is lapped into the seat!). The small number of moving parts results in a reliable operation of the valve.

Type DKV

Desuperheater to control the temperature of superheated steam or gas

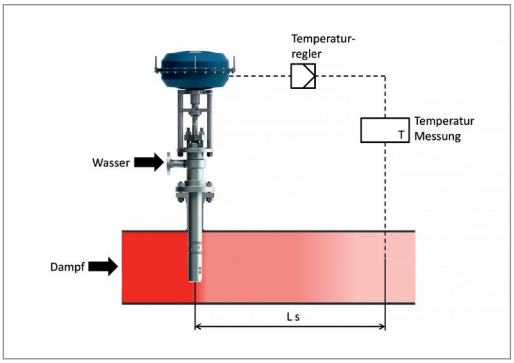
Installation

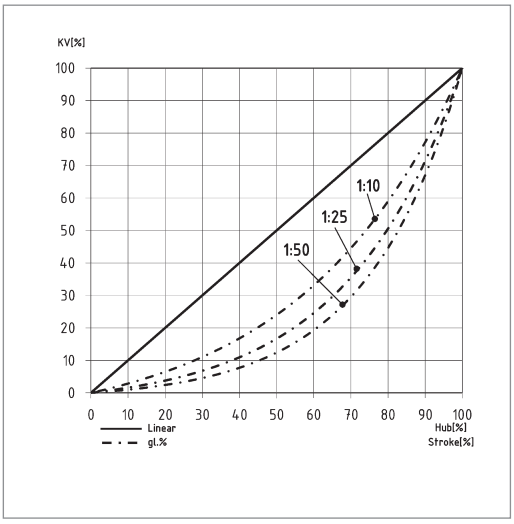
The DKV can be installed on a stub on the steam pipe. A minimum height between the flange and the steam line must be taken into account. Water is injected in the same direction as the steam flow. The superheated steam cooler can be installed vertically and horizontally. Relative to the position of the water injection flange, the direction of spraying can be set in the flow direction of the steam.

We recommend installing a hat shaped sieve in front of the radiator with a mesh of 0.1 mm and a wire diameter of 0.063 mm.

Instrumentation

A temperature sensing element transmits the steam temperature to a temperature controller. This controller sends a signal (electric or pneumatic) to the actuator, which results in an upward or downward repositioning of the desuperheater stem and control piston. Thus the injection water quantity and subsequently the steam temperature are controlled.

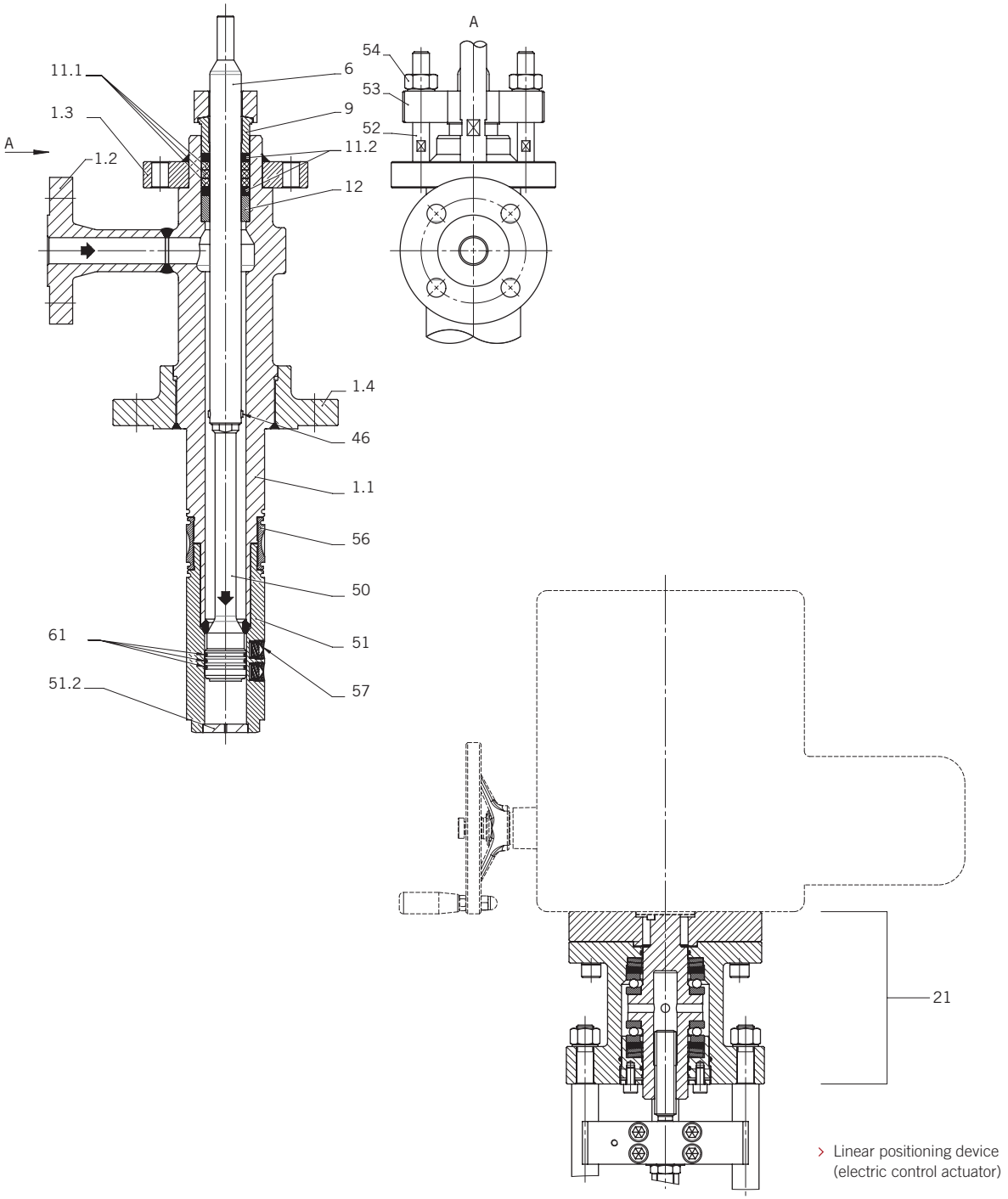




Type DKV

Desuperheater to control the temperature of superheated steam or gas

Sectional drawing



› Linear positioning device (electric control actuator)

Type DKV

Desuperheater to control the temperature of superheated steam or gas

Parts list

Pos.	Item	Material
1	Housing cpl.	*
1.1	Housing	*
1.2	Flange	*
1.3	Flange	*
1.4	Flange	*
6	Valve spindle	1.4057
9	Packing follower	1.4122
11.1	Packing	Grafit
11.2	Packing	Grafit
12	Bottom ring	1.4122
20	Spacer bolt	1.1181
21	Gearbox control	1.0460
46	Pin	1.4301
50	Control piston	1.4122
51	Spray head	1.4006
51.2	Insert	1.4006
52	Stud bolt	**
53	Grand plate	*
54	Hexagon nut	**
56	Clamping nut	1.4006
57	Spray nozzle	1.4301/1.4313
61	Piston ring	**

* See table “Technical data”

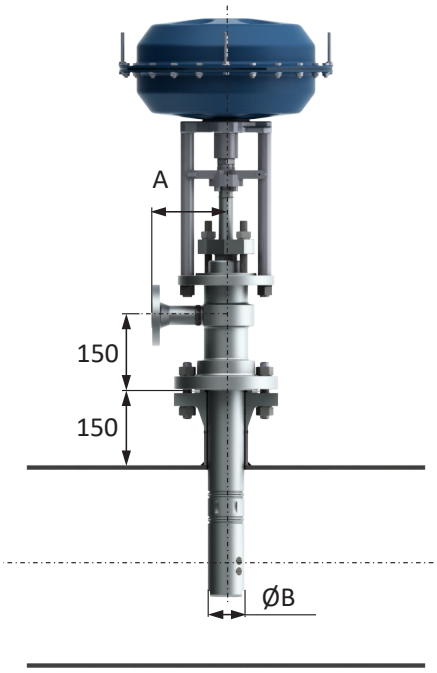
** Depending on customer requirements

Parts list as an example of the standard configuation

Type DKV

Desuperheater to control the temperature of superheated steam or gas

Dimensions



DN / NPS	PN / CLASS				
	63 / 300	100 / 600	160 / 900	250 / 1500	400 / 2500
≤40 / 1½	A = 150		A = 175		A = 250
>40 / 1½	A = 175		A = 225		A = 300

Type DKM

Small desuperheater to control the temperature of superheated steam or gas

› Type DKM, front view

› Type DKM, sectional view

Product features

- Excellent for small mass flows
- The injection cooler has a reduced spray head especially for small pipelines and additionally uses a multi-level control system
- Spray head with integrated high-performance nozzles. Selectable control characteristics for precise temperature control
- Cascade trim design
- High control accuracy over the entire control range
- Tightly closing metallic seat. No leakage in closed position and thus no emptying of the cooling water lines possible.
- No additional control valves required
- High operational reliability through the use of simple components, minimal wear and tear

Applications

- For small boiler and process applications and for the food and beverage industry
- Suitable for small piping applications

Type DKM

Small desuperheater to control the temperature of superheated steam or gas

Technical data

Nominal diameter	DN 50–400 / NPS 2–16
Pressure class	PN 16–400 / Class 150–2500
Temperature (max.)	Up to 650 °C / 1200 °F
Housing material	1.0460 / A105 1.5415 1.7335 / A182F12Cl.2 1.7383 / A182F22Cl.3 1.4903 / A182F91
Housing type	Forged
Media	Superheated steam, gas
Flanges	EN 1092-1, ASME B16.5, ISO 7005, JIS, JPI
Actuators	Electric, pneumatic, hydraulic, handwheel (for manual operation)
Number of stages (max.)	6
Number of controlled stages (max.)	6
Operating range (max.)	1:15 (water)

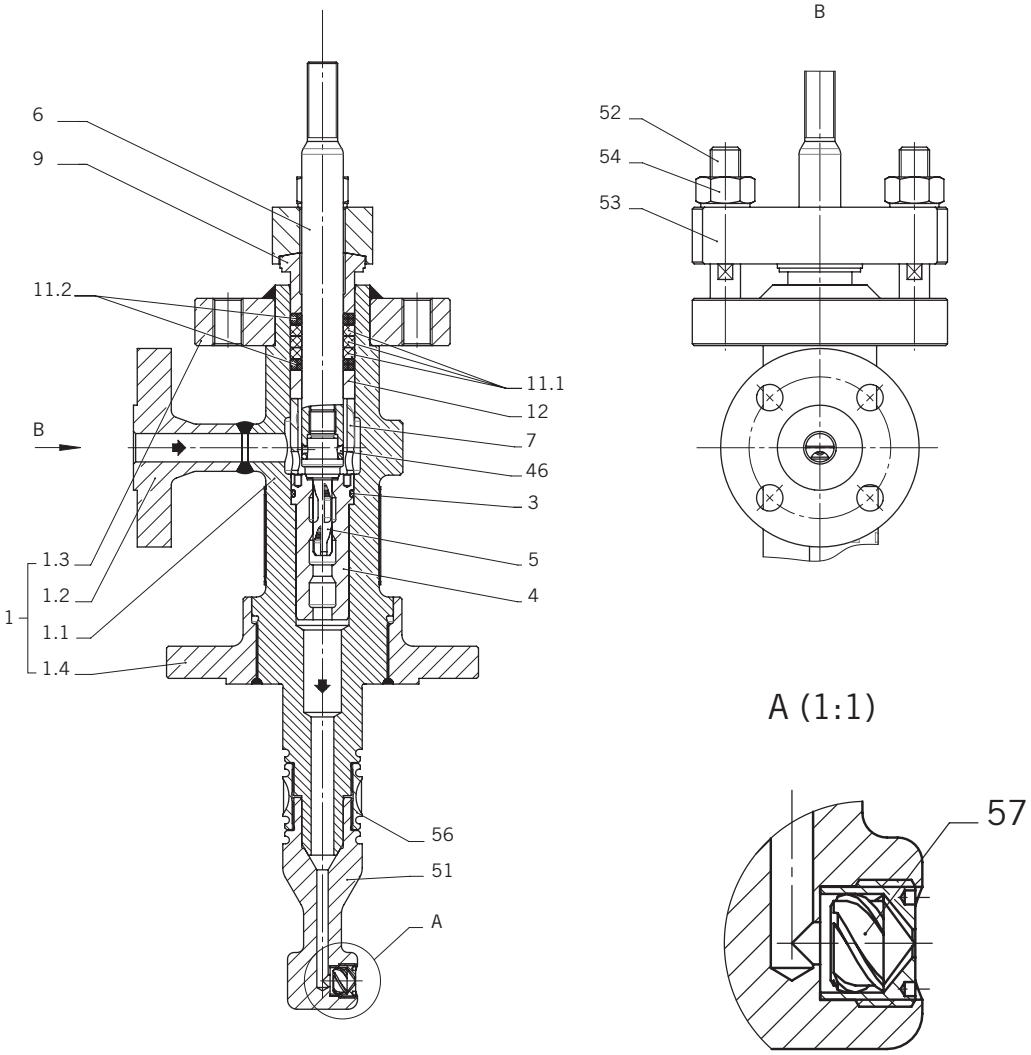
Function

see chapter DKV (Page 69)

Type DKM

Small desuperheater to control the temperature of superheated steam or gas

Sectional drawing



Type DKM

Small desuperheater to control the temperature of superheated steam or gas

Parts list

Pos.	Item	Material
1	Housing cpl.	*
1.1	Housing	*
1.2	Flange	*
1.3	Flange	*
1.4	Flange	*
3	O-Ring	**
4	Cascade bushing	1.4122
5	Valve plug	1.4122
6	Valve spindle	1.4057
7	Spacer ring	1.4122
9	Packing follower	1.4122
11.1	Packing	Grafit
11.2	Packing	Grafit
12	Bottom ring	1.4122
20	Spacer bolt	1.1181
35	Hexagon nut	8
46	Pin	1.4301
51	Spray head	1.4006
52	Stud bolt	1.7709
53	Gland plate	*
54	Hexagon nut	1.7218
56	Clamping nut	1.4006
57	Spray nozzle	1.4301/1.4313
121	Piston ring	1.0460

* See table “Technical data”

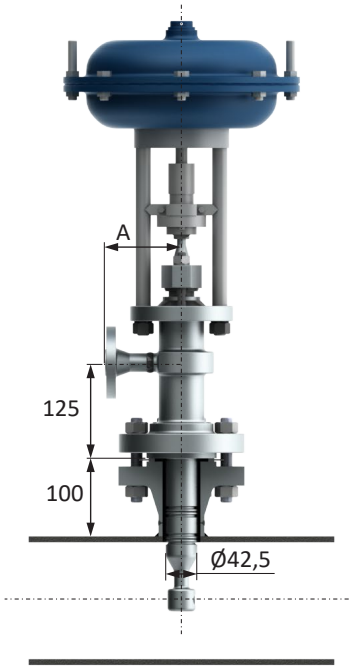
** Depending on customer requirements

Parts list as an example of the standard configuation

Type DKM

Small desuperheater to control the temperature of superheated steam or gas

Dimensions



DN / NPS	PN / CLASS				
	63 / 300	100 / 600	160 / 900	250 / 1500	400 / 2500
≤25 / 1	A = 135		A = 160		
>25 / 1			A = 185		

Type DKH

High-pressure / high-temperature steam cooler for extreme conditions

› Type DKH, front view

› Type DKH, sectional view

Product features

- Special design for higher pressures and higher temperatures
- The DKH injection cooler works like the DKV type, with controlled nozzle technology (pressure atomization via controlled nozzle technology)
- Spray head with integrated high-performance nozzles and excellent atomization
- No additional control valve required
- Selectable control characteristics for precise temperature control
- Tightly closing metallic seat
- Large permissible water vapor pressure difference delta p up to 100 bar / 1450 PSI
- High control accuracy over the entire control range
- High operational reliability by using simple components, minimal wear and tear
- Excellent control accuracy over the entire control range
- Special materials available

Applications

For the special demands place on temperature control in power plants and in the process industry

Type DKH

High-pressure / high-temperature steam cooler for extreme conditions

Technical data

Nominal diameter	DN 150–1200 / NPS 6–48
Pressure class	PN 250–400 / Class 1500–2500
Temperature range	650 °C / 1200 °F
Housing material	1.0460 / A105 1.5415 1.7335 / A182F12Cl.2 1.7383 / A182F22Cl.3 1.4903 / A182F91
Housing type	Forged
Media	Superheated steam, gas
Flanges	EN 1092-1, ASME B16.5, ISO 7005, JIS, JPI
Actuators	Electric, pneumatic, hydraulic, handwheel (for manual operation)
Number of stages (max.)	1
Number of controlled stages (max.)	1
Operating range (max.)	1:100 (water)

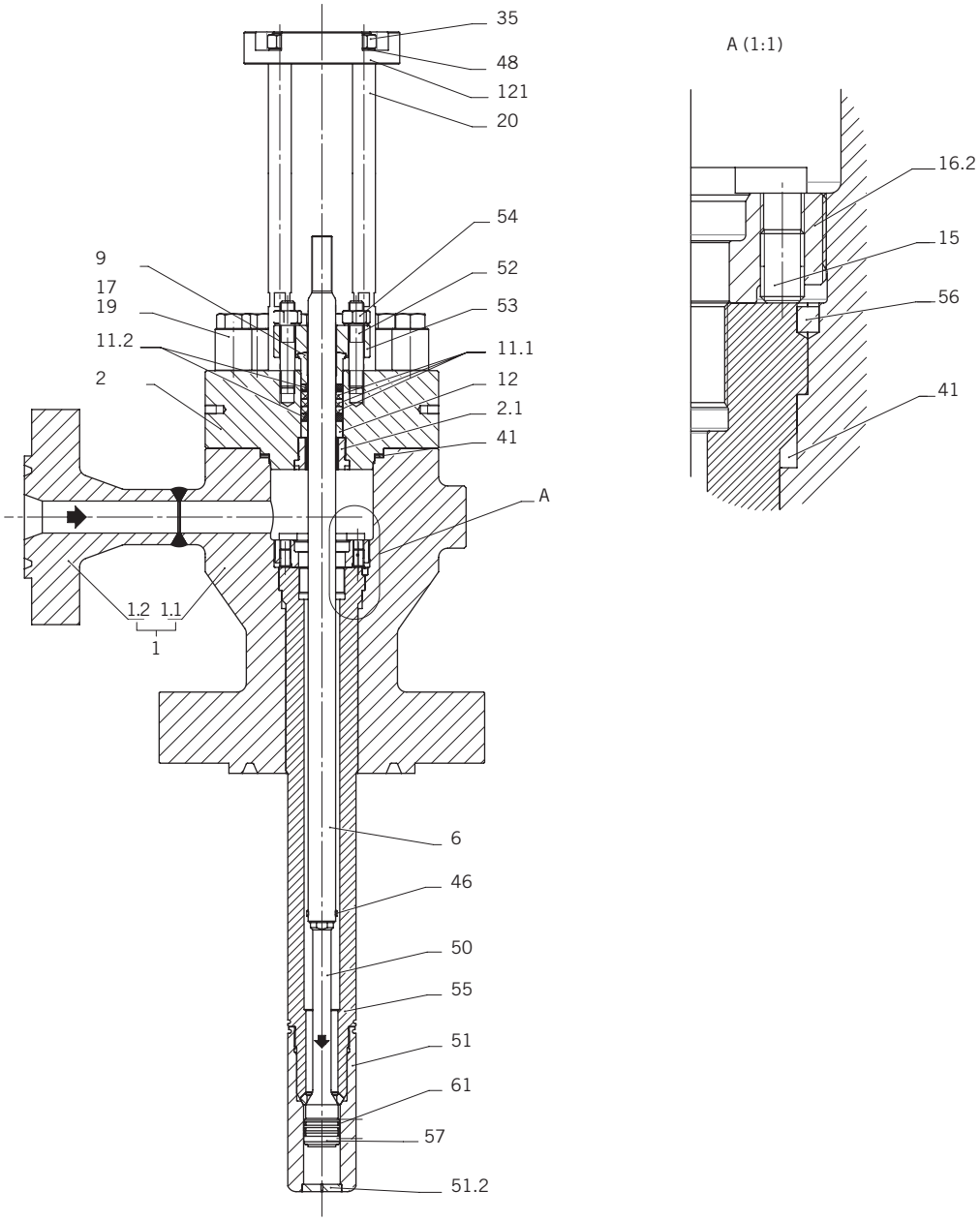
Function

see chapter DKV (Page 69)

Type DKH

High-pressure / high-temperature steam cooler for extreme conditions

Sectional drawing



Type DKH

High-pressure / high-temperature steam cooler for extreme conditions

Parts list

Pos.	Item	Material
1	Housing cpl.	*
1.1	Housing	*
1.2	Flange	*
2	Cap	*
2.1	Bushing	*
3	Cap gasket	Grafit
6	Valve spindle	1.4057
9	Packing follower	1.4122
11.1	Packing	Grafit
11.2	Packing	Grafit
15	Threaded pin	A2
17	Capped nut	**
19	Stud bolt	**
20	Spacer bolt	**
35	Hexagon nut	8
41	Spiral gasket	1.4541/Grafit
46	Pin	1.4301
48	Lock washer	1.1211
50	Control piston	1.4122
51	Spray head	1.4006
51.2	Ground plate	1.4006
52	Stud bolt	**
53	Gland plate	*
54	Hexagon nut	**
55	Lance	*
56	Pin	1.4122
57	Spray nozzle	**
61	Piston ring	**
121	Plate	1.0460

* See table “Technical data”

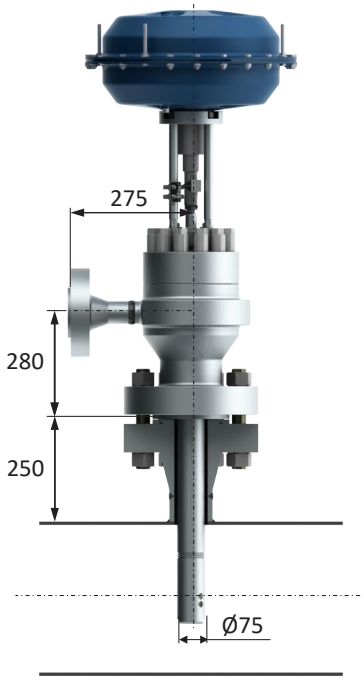
** Depending on customer requirements

Parts list as an example of the standard configuation

Type DKH

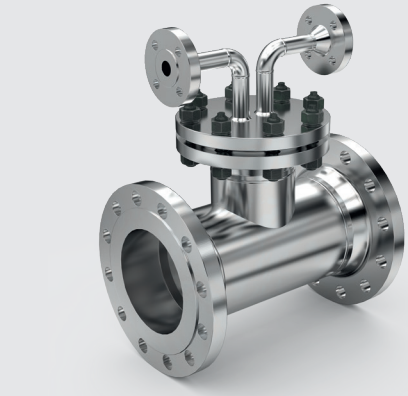
High-pressure / high-temperature steam cooler for extreme conditions

Dimensions

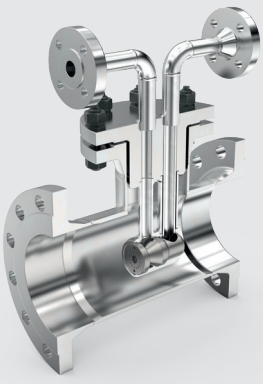


Type DKT

Steam-atomising desuperheater



› Type DKT, front view



› Type DKT, front view

Product features

- Suitable for difficult operating conditions, high quality temperature control and avoidance of temperature shocks (valve and piping)
- Allows cooling operation when all other systems typically fail
- For optimum temperature control close to saturation with a control ratio of up to 100:1
- Ultimate cooler for low-speed steam cooling applications, large bandwidth and small distance/separation to saturation
- The additional cooling water and atomizing steam control valve must be considered in the planning

Applications

For low speed, highly adjustable desuperheater applications and low saturation separation.

Type DKT

Steam-atomising desuperheater

Technical data

Nominal diameter	DN 150–800 / NPS 6–32
Pressure class	PN 25–250 / Class 150–1500
Temperature (max.)	650 °C / 1200 °F
Housing material	1.0460 / A105 1.5415 1.7335 / A182F12Cl.2 1.7383 / A182F22Cl.3 1.4903 / A182F91
Housing type	Forged
Media	Superheated steam, gas
Flanges	EN 1092-1, ASME B16.5, ISO 7005, JIS, JPI, welding ends on request
Number of stages (max.)	4 (water side)
Number of controlled stages (max.)	4 (water side)
Operating range (max.)	1:100 (water)
Other	Type DKT requires an injection pressure control valve AK or AV

Type DKT

Steam-atomising desuperheater

Function

Desuperheating (cooling) the steam can simply be achieved by injecting water into the steam flow.

When injected, the water is evaporated by means of the desuperheater nozzles. Thereby the water absorbs heat and consequently the temperature of steam is reduced. The desuperheater is designed so that a very fine atomisation (mist) is achieved even when injecting very small amounts of atomising steam. This both minimizes the distance required for cooling and homogenizing the steam and guarantees reliable cooling until close to the saturation point.

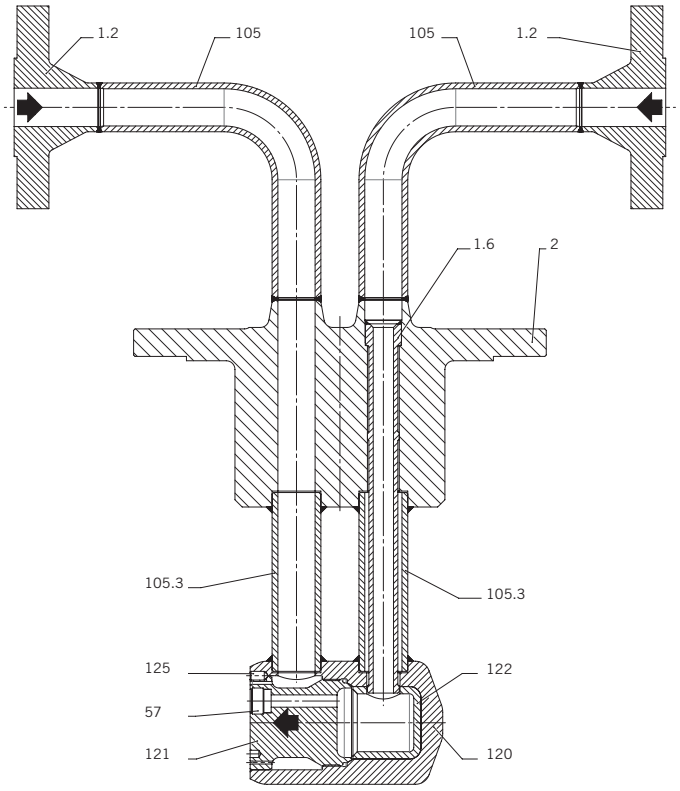
The good homogenisation and rapid evaporation means that no additional protective pipes are required in the steam line.

Cooling medium is introduced into the nozzle head via an injection valve. In the nozzle chamber inside the nozzle head the medium is accelerated and rotated by a swirl insert, so that a spray mist develops when it exits into the steam line. The atomising steam is introduced into the steam line through holes arranged around the nozzle. This atomises the water droplets to a very fine mist that evaporates very rapidly.

Type DKT

Steam-atomising desuperheater

Sectional drawing



Parts list

Pos.	Item	Material
1.2	Flange	*
1.6	Protection pipe	*
2	Cap	*
57	Spray nozzle	1.4301/1.4313
105	Pipe	*
105.3	Pipe	*
120	Housing	*
121	Insert	**
122	Bushing	*
125	Threaded pin	A4

* See table “Technical data”

** Depending on customer requirements

Parts list as an example of the standard configuation

Dimensions: on request

Type DU

Pressure reducing valve with integrated atomising steam cooling for heavy steam conversion applications

› Type DU, front view

› Type DU, sectional view

Produktfeatures

- Particularly large power range thanks to integrated motive steam cooling system for perfect cooling
- For optimum handling of difficult operating conditions, high-quality temperature control and optimum protection against temperature shocks (valve and piping)
- Low-noise, multi-stage design of the throttle body (perforated bushing)
- Screwed cover or self-sealing design
- High quality multi-level perforated bushing design for pressure control and quiet operation
- Special solutions for installation in existing systems possible

Applications

- Steam conversion for high pressure and high temperature reduction, e.g. high pressure to low pressure bypass stations and for process steam conversion

Type DU

Pressure reducing valve with integrated atomising steam cooling for heavy steam conversion applications

Technical data

Nominal diameter	DN 25–1200 / NPS 1–48
Pressure class	PN 40–640/Class 150 –4500
Temperature (max.)	Up to 600 °C / 1120 °F and above
Housing materials	1.0460 / A105 1.5415 1.7335 / A182F12Cl.2 1.7383 / A182F22Cl.3 1.4903 / A182F91
Housing type	Forged
Media	Superheated steam
Flanges	EN 1092-1, ASME B16.5, ISO 7005, JIS, JPI, welding ends on request
Designs	Angle type, globe type
Actuators	Pneumatic, electric, hydraulic
Number of stages (max.)	9
Number of controlled stages (max.)	4
Operating range (max.)	1:40
Other	The DU type requires injection pressure control valve AK

Type DU

Pressure reducing valve with integrated atomising steam cooling for heavy steam conversion applications

Function

SCHROEDAHL belongs to the internationally leading suppliers of innovative, modern steam converting technology.

Our intensive development work means that we are always able to overcome barriers and implement new, ground breaking solutions in the fields of steam conversion valves and steam cooling in the interest of our customers. In addition, we develop our own mathematical models through a sophisticated engineering, analyse different loads and stresses and detect potential weak spots.

For the manufacturing, we have an extensive amount of CNC-machines. Based on our considerable material know-how, we use selective material characteristics and construct high-quality welding connections.

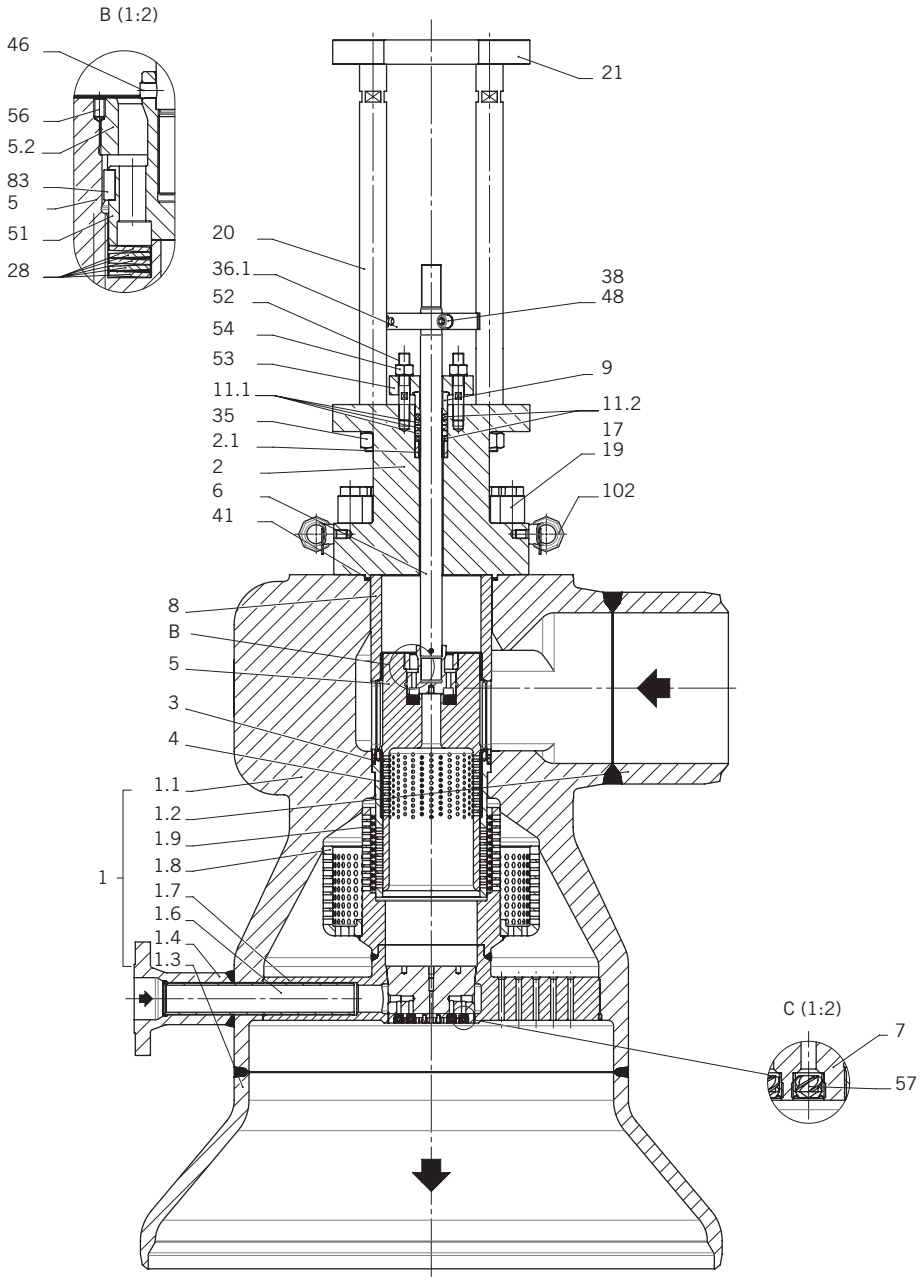
Thus, we are able consistently to expand the limits of what is technically possible. Even within the scope of extremely challenging, highly complex processes and tasks, we will find the technically appropriate solution.

We were, for instance, the first supplier to develop a steam converting valve with a nominal size of just one inch. We have exceeded the temperature range limit of 560° C/1040° F. Some of the SCHROEDAHL products can also resist a pressure of up to 500 bar/7250 psi.

Type DU

Pressure reducing valve with integrated atomising steam cooling for heavy steam conversion applications

Sectional drawing (angle type)



Type DU

Pressure reducing valve with integrated atomising steam cooling for heavy steam conversion applications

Parts list (angle type)

Pos.	Item	Material
1	Housing cpl.	*
1.1	Housing	*
1.2	Pipe	*
1.3	Plug	*
1.4	Flange	*
1.6	Protection pipe	*
1.7	Orifice	*
1.8	Perforated bushing	*
1.9	Perforated bushing	*
2	Cap	*
2.1	Bushing	**
3	Profile ring	Grafit
4	Seat bushing	**
5	Valve plug	1.4903/A182F91
5.1	Pilot plug	2.4668
5.2	Ring	1.4903/A182F91
6	Valve spindle	1.4922
7	Insert	1.4057
8	Bushing	**
9	Packing follower	1.4122
11.1	Packing	Grafit
11.2	Packing	Grafit
17	Hexagon nut	**
19	Stud bolt	**
20	Spacer bolt	1.7709
21	Plate	1.0460/A105
28	Washer	2.4668
36.1	Bridge	1.4571
38	Socket head screw	8.8
41	Spiral gasket	1.4541/Grafit
46	Pin	1.4301
48	Lock washer	1.1211
52	Stud bolt	**
53	Gland plate	*
54	Hexagon nut	**
56	Threaded pin	A4
57	Spray nozzle	1.4301/1.4313
83	Parralel key	A4
102	Starpoint Vrs-F	1.6541

* See table “Technical data”

** Depending on customer requirements

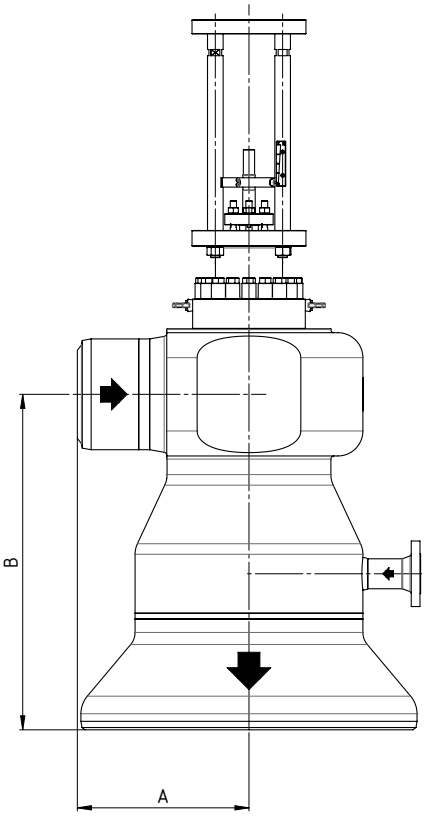
Parts list as an example of the standard configuation

Type DU

Pressure reducing valve with integrated atomising steam cooling for heavy steam conversion applications

Dimensions (angle type)

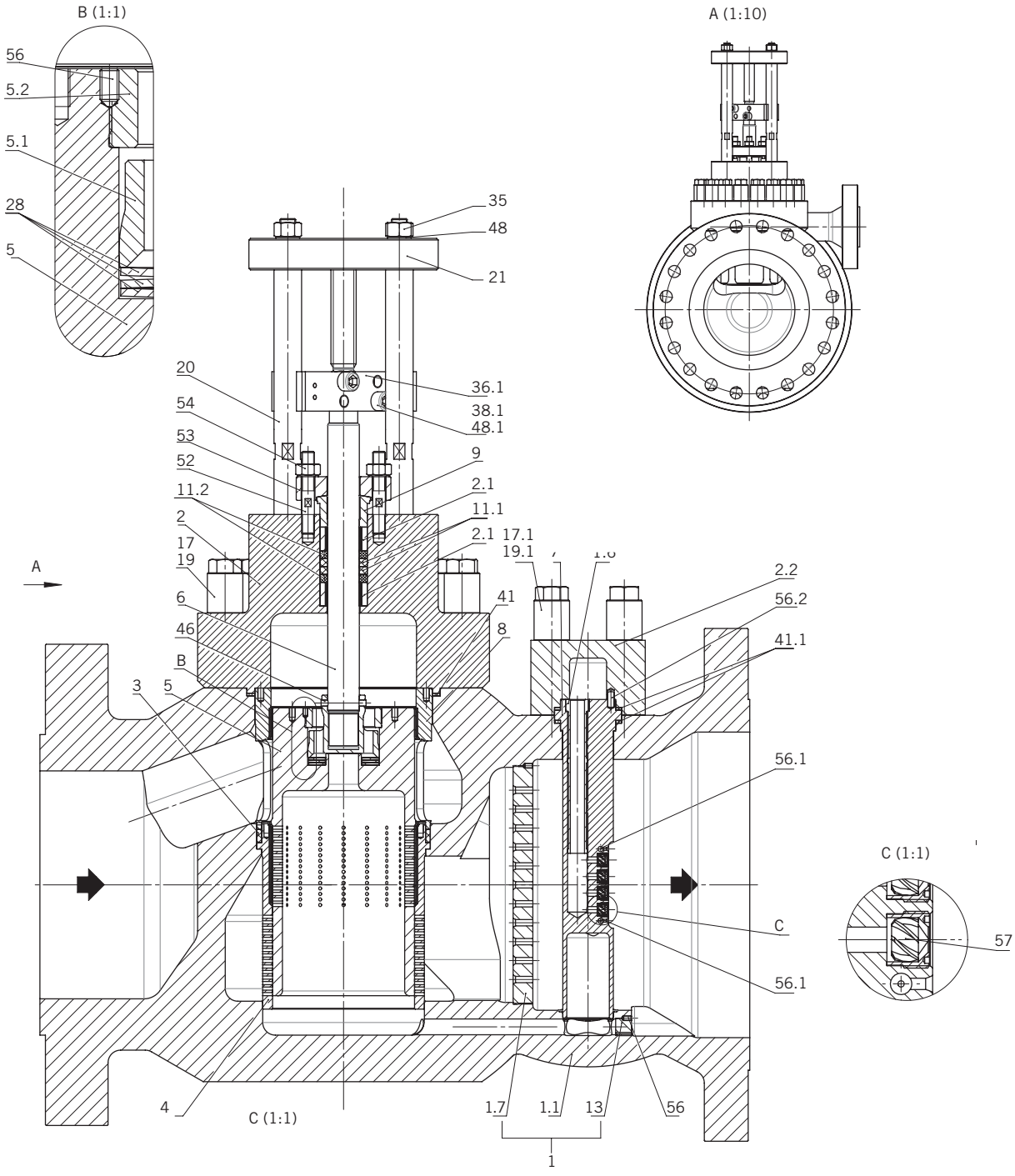
Seat-Ø (mm)	Measures A (mm)	Measures B (mm)	Weight (kg)
40	150	125	120
50	175	130	200
65	200	140	250
80	250	170	350
100	300	185	550
125	400	210	700
150	475	240	1000
180	550	250	1400
210	725	250	1800
250	850	275	2200



Type DU

Pressure reducing valve with integrated atomising steam cooling for heavy steam conversion applications

Sectional drawing (globe type)



Type DU

Pressure reducing valve with integrated atomising steam cooling for heavy steam conversion applications

Parts list (globe type)

Pos.	Item	Material
1	Housing cpl.	
1.1	Housing	*
1.3	Insert	*
1.6	Protection pipe	*
1.7	Orifice	*
2	Cap	*
2.1	Bushing	*
2.2	Cover	*
3	Profile ring	Grafit
4	Seat bushing	*2
5	Valve plug	1.4903/A182F91
5.1	Pilot plug	2.4668
5.2	Ring	1.4903/A182F91
6	Valve spindle	1.4922
7	Insert	1.4903/A182F91
8	Bushing	**
9	Packing follower	1.4122
11.1	Packing	Grafit
11.2	Packing	Grafit
17	Capsule nut	**
17.1	Capped nut	**
19	Stud bolt	**
19.1	Stud bolt	**
20	Spacer bolt	**
21	Flange	1.0460
28	Washer	2.4668
35	Hexagon nut	8
36.1	Coupling	1.4571
38.1	Socket head screw	A4-70
41	Spiral gasket	1.4541/Grafit
41.1	Spiral gasket	1.4541/Grafit
46	Pin	1.4301
48	Lock washer	1.1211
48.1	Lock washer	1.1211
52	Stud bolt	**
53	Gland plate	*
54	Hexagon nut	**
56	Threaded pin	A4
56.1	Threaded pin	A4
56.2	Guide pin	A2
57	Spray nozzle	1.4301/1.4313

* See table “Technical data”

** Depending on customer requirements

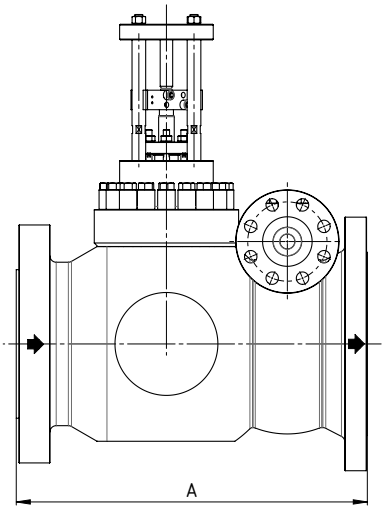
Parts list as an example of the standard configuation

Type DU

Pressure reducing valve with integrated atomising steam cooling for heavy steam conversion applications

Dimensions (global type)

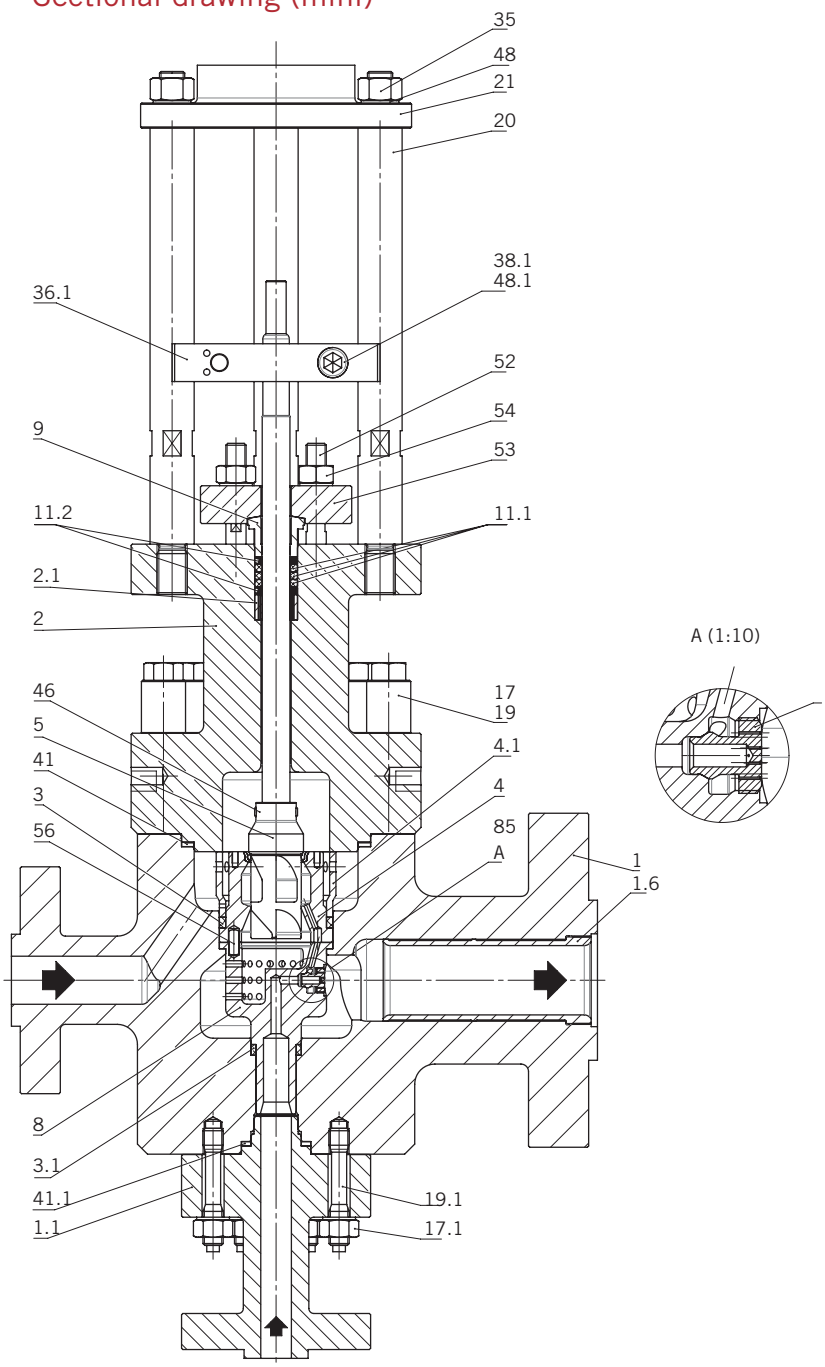
Seat-Ø (mm)	Measures A (mm)	Weight (kg)
40	275	150
50	300	260
65	350	320
80	425	450
100	475	700
125	600	900
150	725	1250
180	800	1750
210	975	2300
250	1125	2800



Type DU

Pressure reducing valve with integrated atomising steam cooling for heavy steam conversion applications

Sectional drawing (mini)



Type DU

Pressure reducing valve with integrated atomising steam cooling for heavy steam conversion applications

Parts list (mini)

Pos.	Item	Material
1	Gehäuse	*
1.1	Deckel	*
1.6	Schutzrohr	*
2	Deckel	*
2.1	Buchse	*
3	Profilring	Grafit
3.1	Profilring	Grafit
4	Sitzbuchse	**
4.1	Hülse	**
5	Ventilkörper	1.4903/A182F91
6	Ventilspindel	1.4922
7	Sprühkopf	1.4903/A182F91
8	Düse	**
9	Stopfbuchsendrücker	1.4122
11.1	Packung	Grafit
11.2	Packung	Grafit
17	Kapselmutter	**
17.1	Sechskantmutter	**
19	Stiftschraube	**
19.1	Stiftschraube	**
20	Distanzbolzen	**
21	Anbauflansch	1.0460/A105
35	Sechskantmutter	8
36.1	Steg	1.4571
38.1	Zylinderschraube	8.8
41	Spiraldichtung	1.4541/Grafit
41.1	Spiraldichtung	1.4541/Grafit
46	Stift	1.4301
48	Sicherungsscheibe	1.8159
48.1	Sicherungsscheibe	1.8159
52	Stiftschraube	**
53	Stopfbuchsenscheibe	*
54	Sechskantmutter	**
56	Gewindestift	A4
56.1	Gewindestift	A4
56.2	Steckkerbstift	A2
57	Sprühdüse	1.4301/1.4313

* See table „Technical data“

** Depending on customer requirements

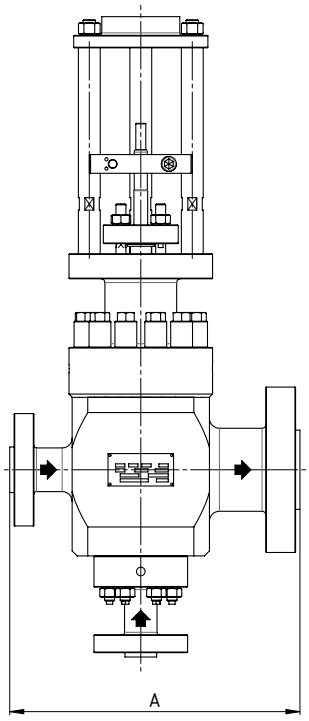
Parts list as an example of the standard configuation

Type DU

Pressure reducing valve with integrated atomising steam cooling for heavy steam conversion applications

Dimensions (mini)

Seat-Ø (mm)	Measures A (mm)	Weight (kg)
22	350	225
30	400	250
40	450	275



SCHROEDAHL Control valves

› Control valves for water applications

SCHROEDAHL cooling water and feed water Control Valves represent high precision work.

We supply various high-quality cooling water and feed water valves for pure water applications in industrial or power plant processes.

Forged housings as globe, z or angle valves are configurable in various nominal sizes and pressure ratings.

Besides a feed water valve with injection function, we offer an innovative feed water combined valve, which has two functions in one system – for example the control of the start-up and the main load case. Thereby, time and effort of installing a plant and mainly the costs can be reduced.

Our cooling water control valves are conceived as space saving, compact control valves for injection and temperature control. The optimum mechanics reduce the required actuating forces to a minimum, so that small, cost-effective actuators can be used. Even here SCHROEDAHL adds to a higher economic efficiency.

The design of our control valves enables some of them to also be used as high-quality pump protection valves.

Type AK

High pressure control valve with axial throttle body

› Type AK, front view

› Type AK, sectional view

Product features

- Cavitation-free, low-noise, multi-stage throttle body in a cascade design with axial flow direction under high pressure
- Identical procedural characteristic or according to valve sizing
- Screwed-on housing cover
- Designed for extreme high pressure control and to avoid cavitation damage and to be suitable for a wide range of applications
- The multi stage throttle body is designed as a cascade with an axial flow direction permits an extremely wide application range of up to 50:1 at constant high pressure loss without cavitation problems

Applications

High-pressure control, high-pressure injection for power plant and process technology applications

Type AK

High pressure control valve with axial throttle body

Technical data

Nominal diameter	DN 15–100 / NPS ½-4
Pressure class	PN 16–640/Class 150 –4500
Temperature (max.)	280 °C / 536 °F
Housing material	1.0460 / A105 1.5415 1.7335 / A182F12Cl.2 1.7383 / A182F22Cl.3 1.4903 / A182F91 1.6368 1.4404 / A182F316L
Housing type	Forged
Medium	Water
Flanges	EN 1092-1, ASME B16.5, ISO 7005, JIS, JPI, welding ends on request
Designs	Angle type, globe type
Actuators	Electric, pneumatic, hydraulic
Number of stages (max.)	6
Number of controlled stages (max.)	6
Operating range (max.)	1:50

Type AK

High pressure control valve with axial throttle body

Function

The AK series pressure reducing control valves enable reliable controllability even with high pressure differences and with the necessary broad rangeability. The multi-stage design of the throttle body makes possible the reduction of even very high pressures with low wear.

The AK series is characterised by the special design of the valve plug. These are designed with milled chambers on the cylindrical body that are specially tailored to the respective application. This means that even very small Kv values can be reliably controlled. The special arrangement of the chambers on the throttle unit also results in the flow being deflected, which reduces speed and further minimizes resulting wear. This ensures that the valve operates reliably over a long period of time.

Optional perforated throttle plates can be used to reduce noise and homogenise flow ensuring that the control valve operates quietly under all conditions.

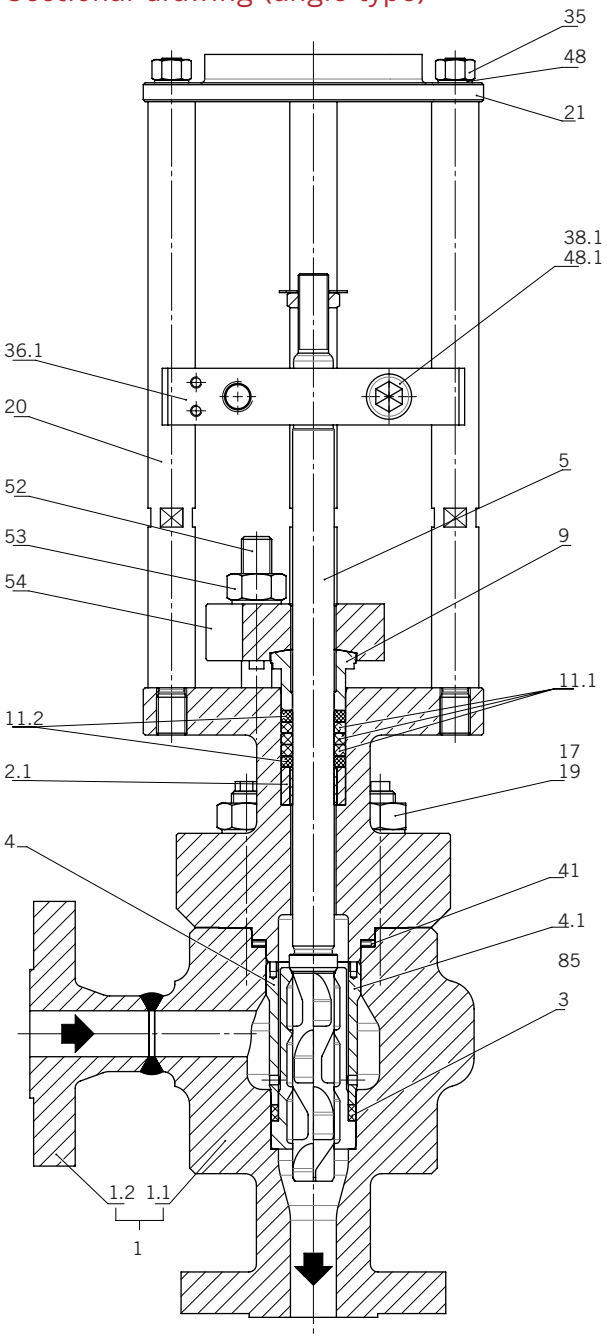
The parts of the throttle body are perfectly matched to each other so that best sealing properties are guaranteed even without the use of additional elastomers.

On moving away from the closed position the chambers create an opening for the process medium. As the stroke increases, more medium can flow through the chambers axially over the valve plug. Stringing together several chambers one behind the other allows the pressure to be brought to the required level in several stages.

Type AK

High pressure control valve with axial throttle body

Sectional drawing (angle type)

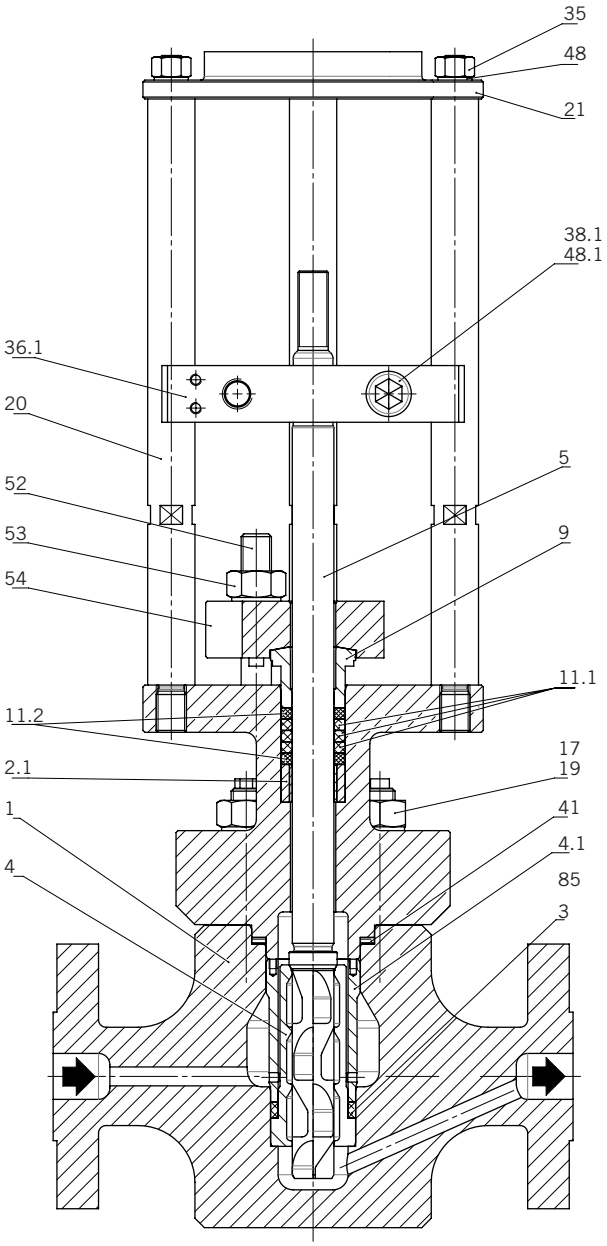


Dimensions: on request

Type AK

High pressure control valve with axial throttle body

Sectional drawing (globe type)



Dimensions: on request

Type AK

High pressure control valve with axial throttle body

Parts list (globe type)

Pos.	Item	Material
1	Housing	*
2	Cap	*
2.1	Bushing	1.4404
3	Profile ring	Grafit
4	Cascade bushing	1.4122
4.1	Shuck	1.4122
5	Valve spindle	1.4122
9	Packing follower	1.4122
11.1	Packing	PTFE
11.2	Packing	PTFE/Grafit
17	Hexagon nut	1.7218
19	Stud bolt	1.7709
20	Spacer bolt	1.1181
21	Flange	1.0460/A105
35	Hexagon nut	8
36.1	Bridge	1.4571
38.1	Socket head screw	8.8
41	Spiral gasket	1.4541/Grafit
48	Lock washer	1.1211
48.1	Lock washer	1.1211
52	Stud bolt	**
53	Gland plate	*
54	Hexagon nut	**

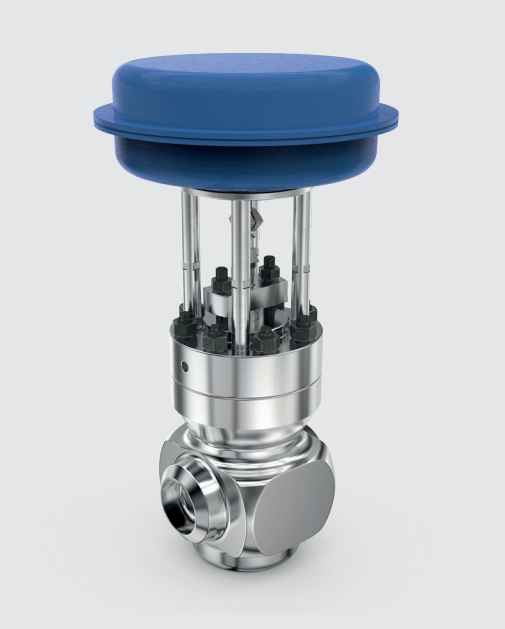
* See table “Technical data”

** Depending on customer requirements

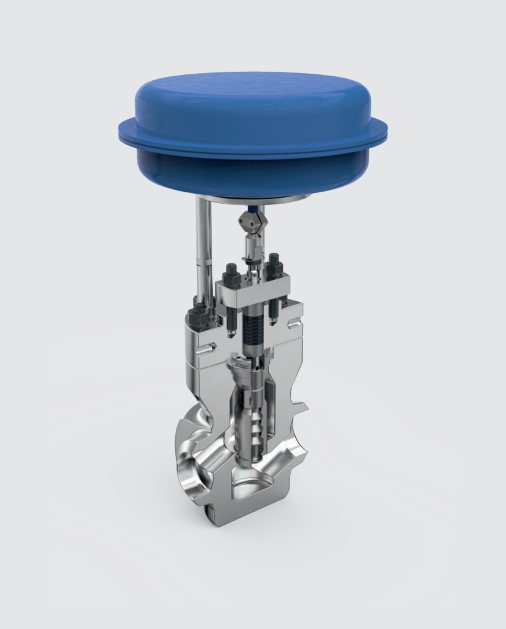
Parts list as an example of the standard configuation

Type AC

A particularly robust high-pressure control valve with multi-stage axial flow limitation



› Type AC, front view



› Type AC, sectional view

Product features

- Cavitation-free, multi-stage vortex plug with an axial flow direction under high pressure
- Linear characteristic curve or according to valve design
- Screwed-on housing cover
- Wear free
- Designed for extreme high pressure control and to avoid cavitation damage
- The multi-stage axial plug with vortex system operates in the axial flow direction, is extremely robust and special material combinations enable it to also be used with complex water mixtures and other media

Applications

- High-pressure control valve for the power plant and process industry as well as for offshore applications
- Also suitable as pump protection for minimum flow control
- Suitable for the control of the high pressure injection

Type AC

A particularly robust high-pressure control valve with multi-stage axial flow limitation

Technical data

Nominal diameter	DN 25–400 / NPS 1–16
Pressure class	PN 100–640/Class 600 –4500
Temperature (max.)	280 °C / 536 °F
Housing material	1.0460 / A105 1.5415 1.7335 / A182F12Cl.2 1.7383 / A182F22Cl.3 1.4903 / A182F91 1.6368 1.4404 / A182F316L
Housing type	Forged
Media	Water, water mixtures
Flanges	EN 1092-1, ASME B16.5, ISO 7005, JIS, JPI, welding ends on request
Designs	Angle type, globe type, z-type
Actuators	Electric, pneumatic, hydraulic
Number of stages (max.)	8
Number of controlled stages (max.)	8
Operating range (max.)	1:15

Type AC

A particularly robust high-pressure control valve with multi-stage axial flow limitation

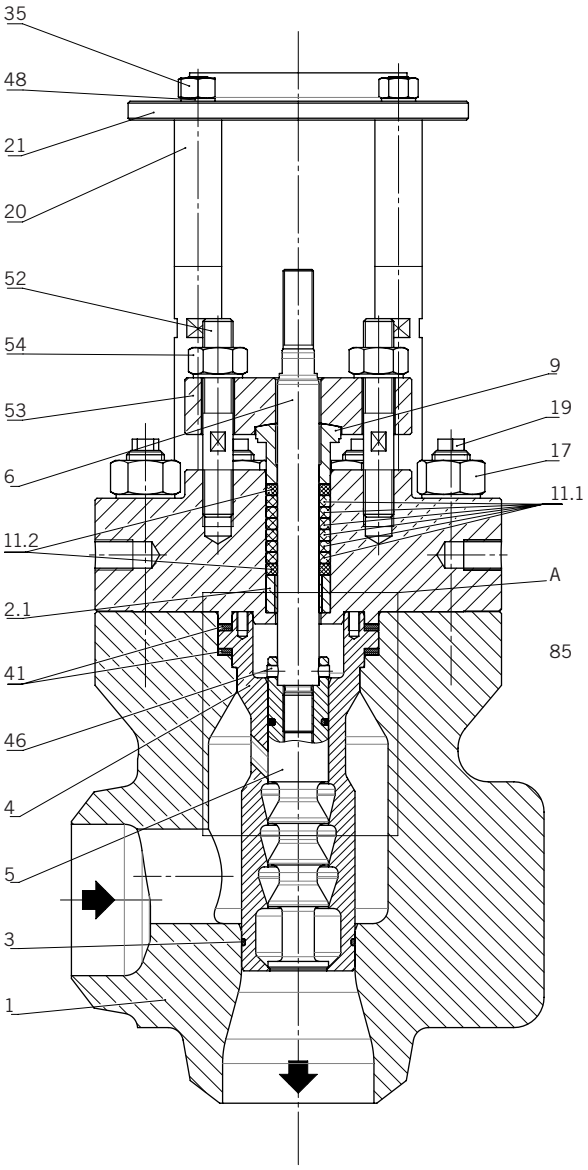
Function

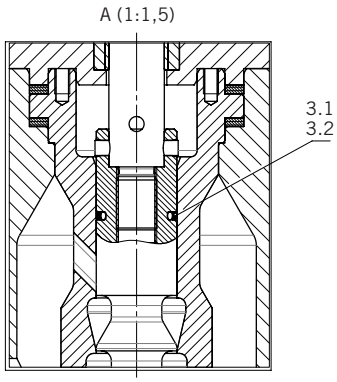
The AC valve reduces the pressure over multiple controlled stages with different cross-sectional constrictions. As a result, the pressure reduction takes place step by step without cavitation risk and independently of the stroke position. A control range below 5% is usually considered separately. Higher load ranges can also be achieved by combining other contol units (see also the combination valve type AVC).

Type AC

A particularly robust high-pressure control valve
with multi-stage axial flow limitation

Sectional drawing (angle type)



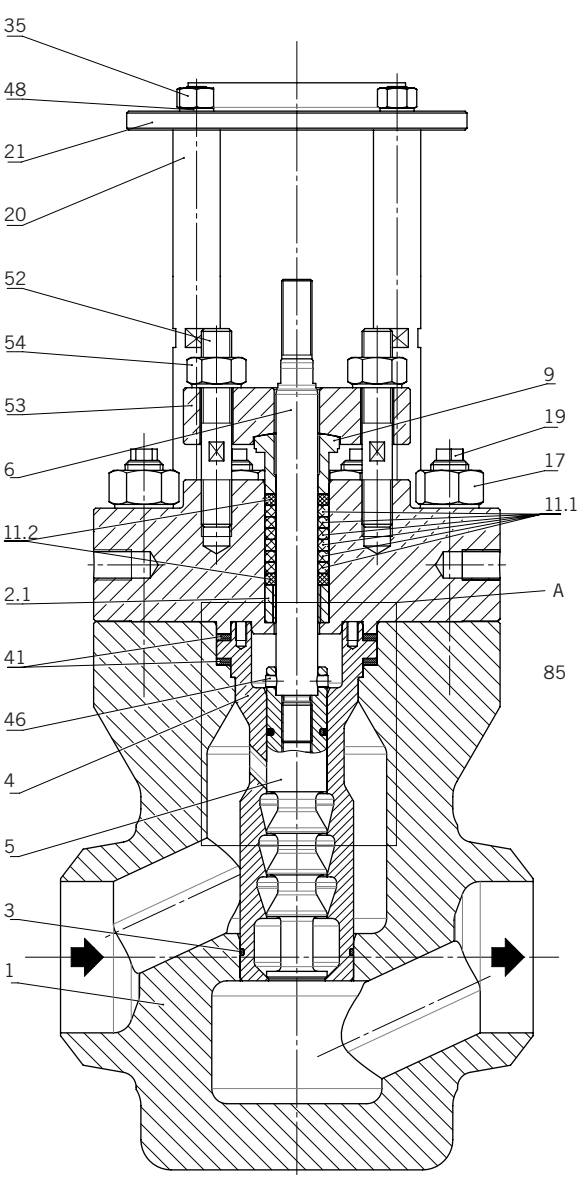


Dimensions: on request

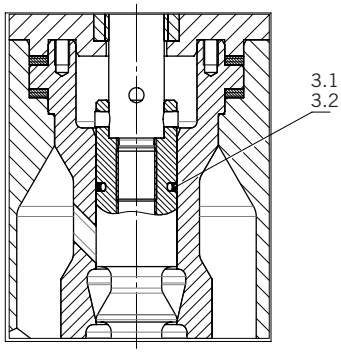
Type AC

A particularly robust high-pressure control valve
with multi-stage axial flow limitation

Sectional drawing (globe type)



A (1:1,5)

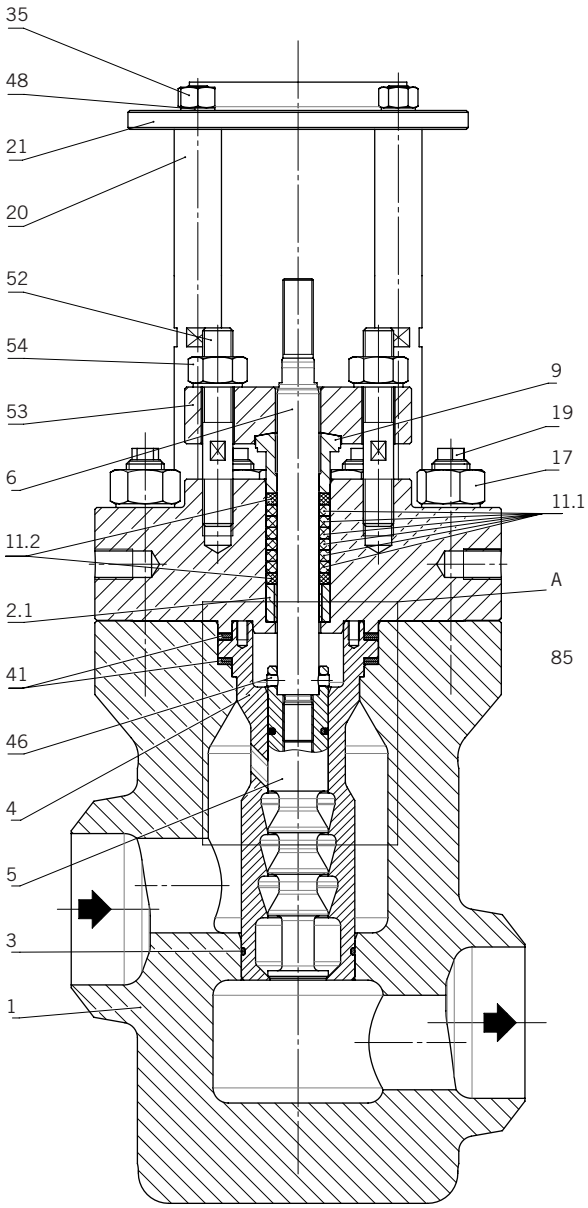


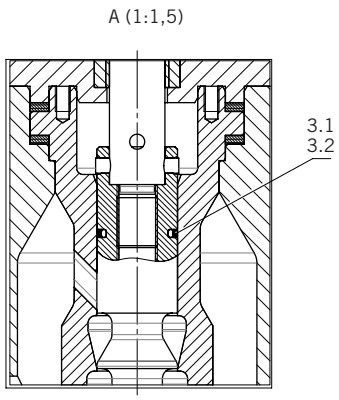
Dimensions: on request

Type AC

A particularly robust high-pressure control valve
with multi-stage axial flow limitation

Sectonal drawing (z-type)





Dimensions: on request

Type AC

A particularly robust high-pressure control valve with multi-stage axial flow limitation

Parts list (angle type, global type, z-type)

Pos.	Item	Material
1	Housing	*
2	Cap	*
2.1	Bushing	1.4404
3	O-Ring	**
3.1	O-Ring	**
3.1	Glyd ring	**
3.2	O-Ring	**
4	Vortex bushing	1.4122
4.1	Ring	1.4122
5	Valve body	1.4122
6	Valve spindle	1.4122
9	Packing follower	1.4122
11.1	Packing	PTFE
11.2	Packing	PTFE/Grafit
17	Hexagon nut	**
19	Stud bolt	**
20	Spacer bolt	1.1181
21	Flange	1.0460/A105
35	Hexagon nut	8
41	Spiral gasket	1.4541/Grafit
46	Pin	1.4301
48	Lock washer	1.8159
52	Stud bolt	**
53	Gland plate	*
54	Hexagon nut	**

* See table “Technical data”

** Depending on customer requirements

Parts list as an example of the standard configuation

Type AV

Particularly robust high-pressure control valve for water applications in single- or multi-stage design as perforated bushing

› Type AV, front view

› Type AV, sectional view

Product features

- Single-stage and multi-stage cavitation-free, low-noise throttle body design (perforated bushing)
- Robust valve reduction unit with single- or multi-stage perforated bushing system
- Unloaded and loaded throttle bodies
- Screwed-on housing cover
- Linearly modified characteristic curve

Applications

- High-quality high-pressure control valve for the power plant and process industry.
  Suitable for feed water control (100 %)

Type AV

Particularly robust high-pressure control valve for water applications in single- or multi-stage design as perforated bushing

Technical data

Nominal diameter	DN 50–600 / NPS 2–24
Pressure class	PN 16–640/Class 150 –4500
Temperature (max.)	280 °C / 536 °F
Housing material	1.0460 / A105 1.5415 1.7335 / A182F12Cl.2 1.7383 / A182F22Cl.3 1.4903 / A182F91 1.6368 1.4404 / A182F316L
Housing type	Forged
Media	Water, vapour, condensate
Flanges	EN 1092-1, ASME B16.5, ISO 7005, JIS, JPI, welding ends on request
Designs	Angle type, globe type
Actuators	Electric, pneumatic or hydraulic
Number of stages (max.)	7
Number of controlled stages (max.)	4
Operating range (max.)	1:50

Type AV

Particularly robust high-pressure control valve for water applications in single- or multi-stage design as perforated bushing

Function

The pressure reducing control valves of the AV series enable reliable control even under difficult operating conditions.

The series is characterized by the use of perforated throttle bodies as control units. Individual characteristic curves can be achieved by adapting the hole patterns to the particular requirements.

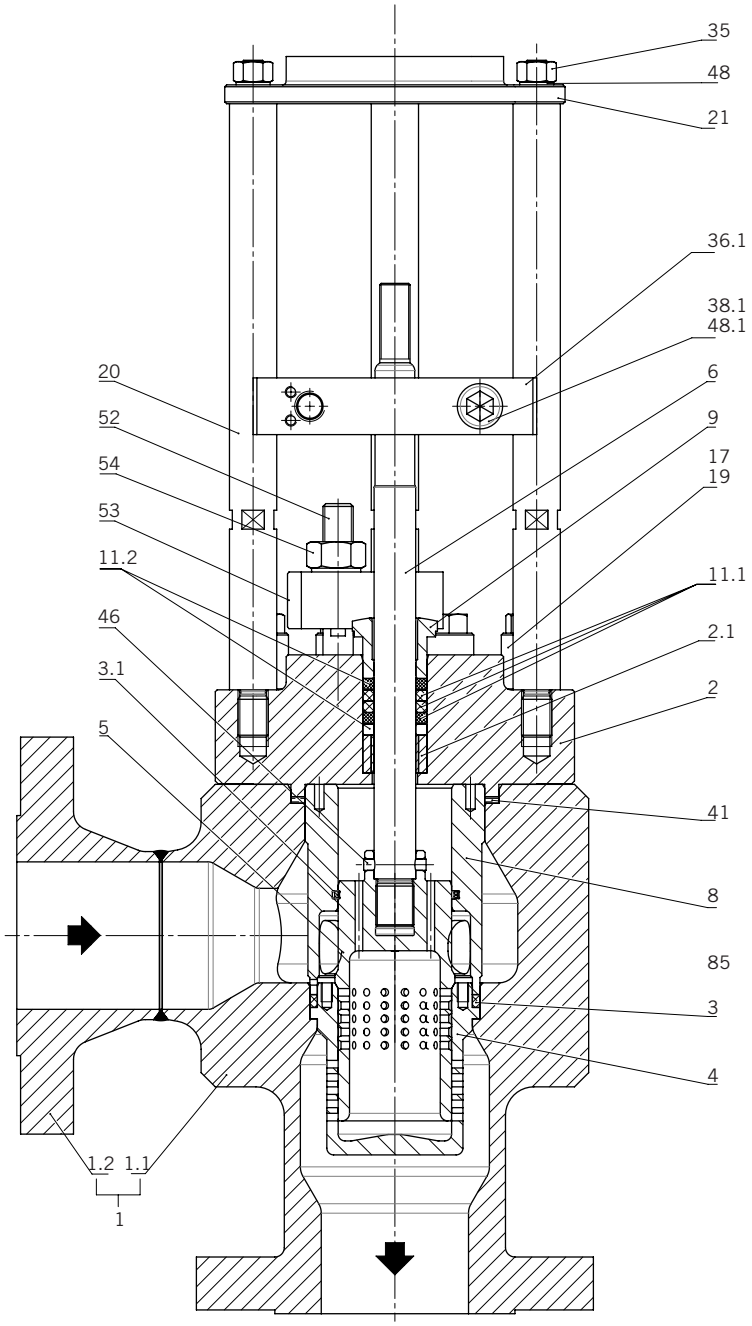
The optional pressure-balanced design also enables actuating forces to be reduced, which permits the use of smaller and more cost-effective actuators even at high pressures.

The parts of the throttle body are perfectly matched to each other so that best sealing properties are guaranteed even without the use of additional elastomers.

Type AV

Particularly robust high-pressure control valve for water applications in single- or multi-stage design as perforated bushing

Sectional drawing (angle type)



Dimensions: on request

Type AV

Particularly robust high-pressure control valve for water applications in single- or multi-stage design as perforated bushing

Parts list (angle type)

Pos.	Item	Material
1	Housing cpl.	*
1.1	Housing	*
1.2	Flange	*
2	Cap	*
2.1	Bushing	1.4404
3	Profile ring	Grafit
4	Cascade bushing	1.4122
4.1	Shuck	1.4122
5	Calve Plug	1.4122
6	Valve spindle	1.4057
8	Bushing	1.4122
9	Packing follower	1.4122
11.1	Packing	PTFE
11.2	Packing	PTFE/Grafit
17	Hexagon nut	**
19	Stud bolt	**
20	Spacer bolt	1.1181
21	Flange	1.0460/A105
35	Hexagon nut	8
36.1	Bridge	1.4571
38.1	Socket head screw	8.8
41	Spiral gasket	1.4541/Grafit
48	Lock washer	1.1211
48.1	Lock washer	1.1211
52	Stud bolt	**
53	Gland plate	*
54	Hexagon nut	**

* See table “Technical data”

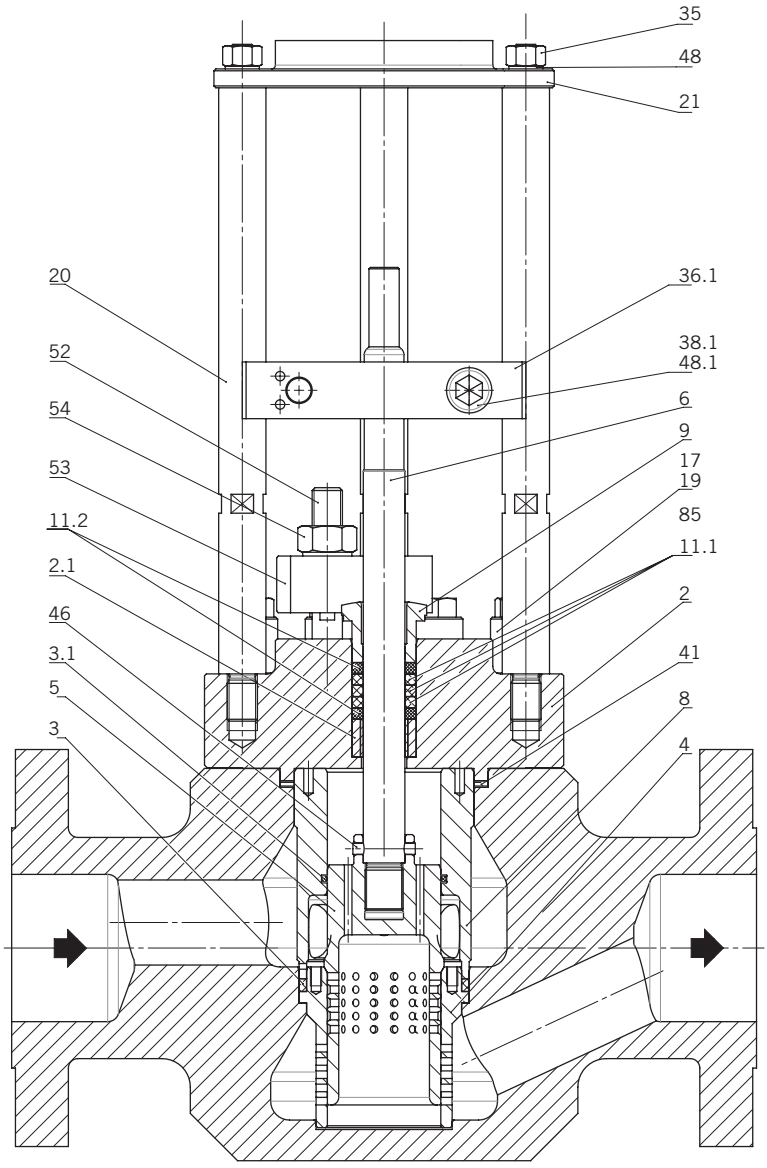
** Depending on customer requirements

Parts list as an example of the standard configuation

Type AV

Particularly robust high-pressure control valve for water applications in single- or multi-stage design as perforated bushing

Sectional drawing (globe type)



Dimensions: on request

Type AV

Particularly robust high-pressure control valve for water applications in single- or multi-stage design as perforated bushing

Parts list (globe type)

Pos.	Item	Material
1	Housing cpl.	*
2	Cap	*
2.1	Bushing	1.4404
3	Profile ring	Grafit
4	Cascade bushing	1.4122
4.1	Shuck	1.4122
5	Valve plug	1.4122
6	Valve spindle	1.4057
8	Bushing	1.4122
9	Packing follower	1.4122
11.1	Packing	PTFE
11.2	Packing	PTFE/Grafit
17	Hexagon nut	**
19	Stud bolt	**
20	Distance Bolt	1.1181
21	Flange	1.0460/A105
35	Hexagon nut	8
36.1	Bridge	1.4571
38.1	Socket head screw	8.8
41	Spiral gasket	1.4541/Grafit
48	Lock washer	1.1211
48.1	Lock washer	1.1211
52	Stud bolt	**
53	Gland plate	*
54	Hexagon nut	**

* See table “Technical data”

** Depending on customer requirements

Parts list as an example of the standard configuation

Type AVC

Customised high-pressure control valve with special dual valve combination of the throttle body

› Type AVC, front view

› Type AVC, sectional view

Product features

- Two valves in one: the start-up valve and the full load valve combined in a single valve
- Screwed-on housing cover
- The AVC valve uses two throttle bodies on one stem and opens up a much wider range of application of 1:500
- For the best handling of difficult operating conditions with extremely high demands on adjustability and high-quality pressure control

Applications

- Start-up control and main boiler feed control

Type AVC

Customised high-pressure control valve
with special dual valve combination of the throttle body

Technical data

Nominal diameter	DN 50–500 / NPS 2–20
Pressure class	PN 100–640/Class 150 –4500
Temperature (max.)	280 °C / 536 °F
Housing material	1.0460 / A105 1.5415 1.7335 / A182F12Cl.2 1.7383 / A182F22Cl.3 1.4903 / A182F91 1.6368 1.4404 / A182F316L
Housing type	Forged
Medium	Water
Flanges	EN 1092-1, ASME B16.5, ISO 7005, JIS, JPI, welding ends on request
Actuators	Electric, pneumatic, hydraulic
Designs	Angle type, globe type
Number of stages (max.)	7 + 1
Number of controlled stages (max.)	7 + 1
Operating range (max.)	1:500

Type AVC

Customised high-pressure control valve with special dual valve combination of the throttle body

Function

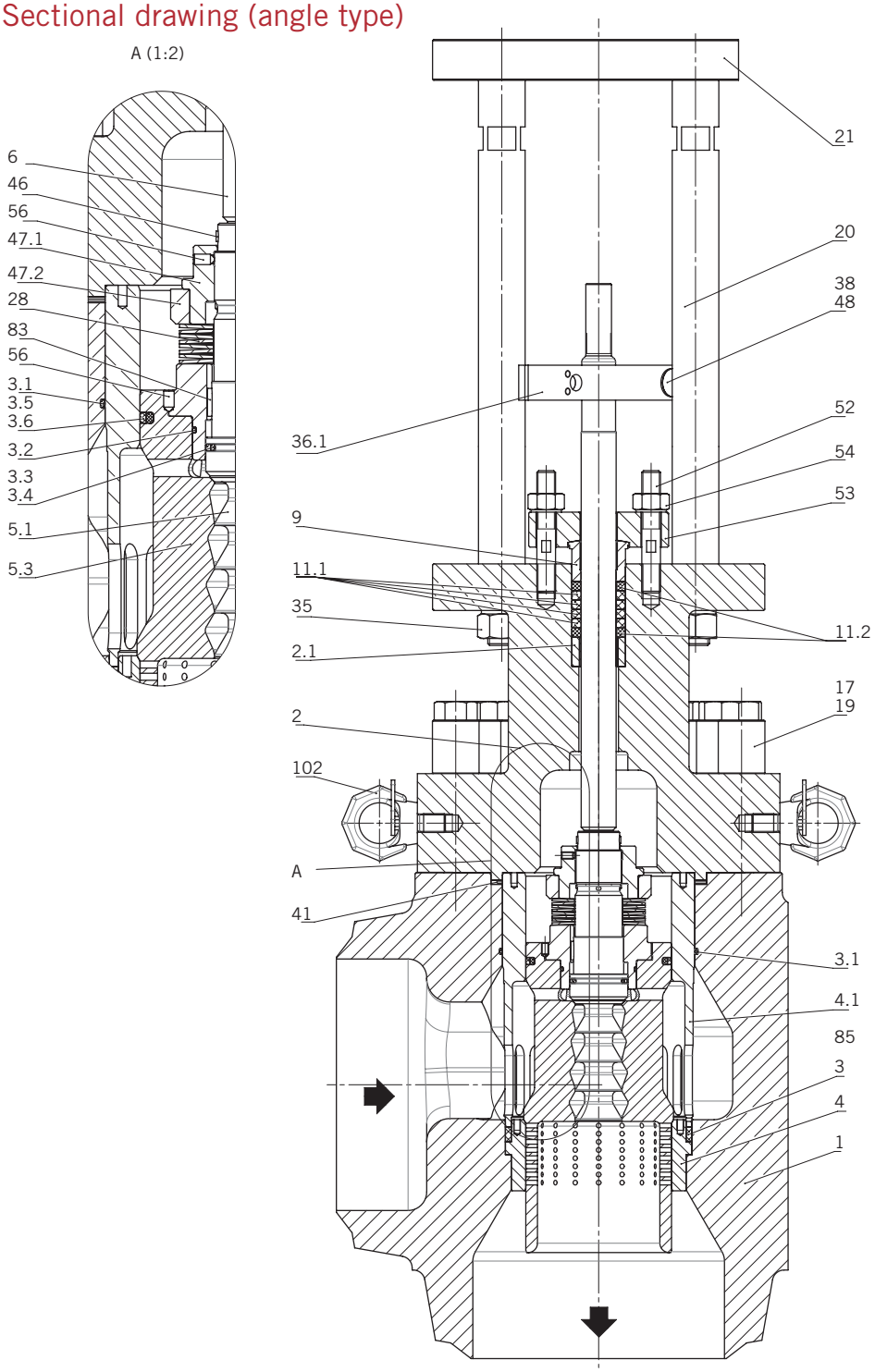
AVC combination valves with internal fittings consisting of axial throttling stages and perforated basket fittings.

Combination valve consisting of a multi-stage high-pressure reducing unit for start-up or low load and a single-stage or multi-stage main control unit. Combining these two valve units in one valve achieves an extremely wide rangeability that was previously only possible with two separate valves. This special solution also replaces the previously customary boiler control operation using two separate valves with a main valve and a start-up valve.

Type AVC

Customised high-pressure control valve
with special dual valve combination of the throttle body

Sectional drawing (angle type)

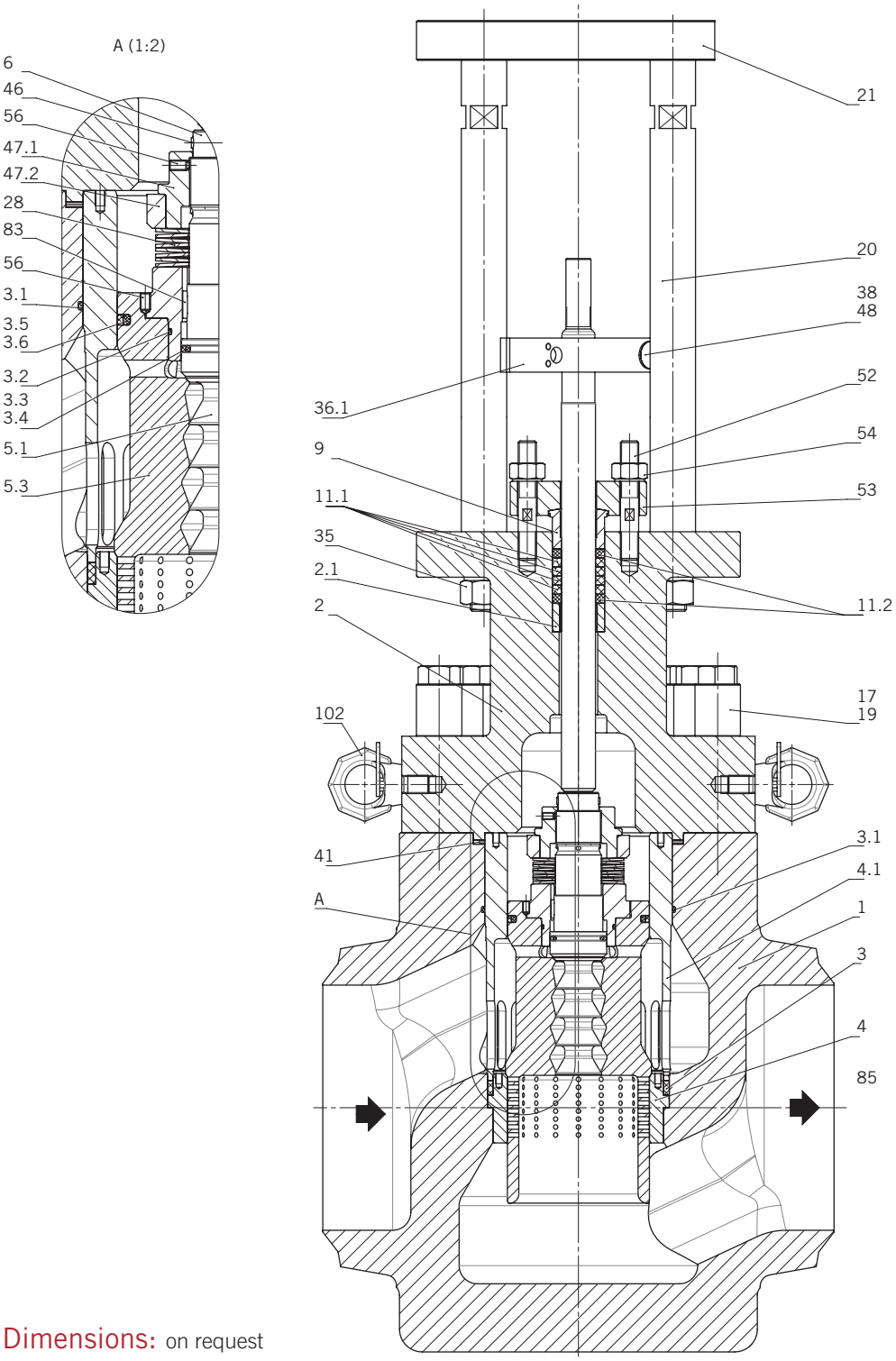


Dimensions: on request

Type AVC

Customised high-pressure control valve
with special dual valve combination of the throttle body

Sectional drawing (globe type)



Dimensions: on request

Type AVC

Customised high-pressure control valve with special dual valve combination of the throttle body

Parts list (angle type, globe type)

Pos.	Item	Material
1	Housing cpl.	*
1.1	Housing	*
1.2	Pipe	*
2	Cap	*
2.1	Bushing	1.4404
3	Profile ring	Grafit
3.1	O-Ring	**
3.2	O-Ring	**
3.3	O-Ring	**
3.4	Glyd ring	**
3.5	O-Ring	**
3.6	Glyd ring	**
4	Seat bushing	1.4122
4.1	Bushing	1.4122
5.1	Pilot plug	1.4122
5.3	Valve plug	1.4122
5.4	Threaded ring	1.4122
6	Valve spindle	1.4057
9	Packing follower	1.4122
11.1	Packing	PTFE
11.2	Packing	PTFE/Grafit
17	Capped nut	**
19	Stud bolt	**
20	Spacer bolt	1.7709
21	Flange	1.0460/A105
28	Washer	1.4404
35	Hexagon nut	1.7218
36.1	Bridge	1.4571
38	Socket head screw	8.8
41	Spiral gasket	1.4541/Grafit
46	Pin	1.4301
47.1	Threaded ring	1.4122
47.2	Pressure disc	1.4122
48	Lock washer	1.8159
52	Stud bolt	**
53	Gland plate	*
54	Hexagon nut	**
56	Threaded pin	A4
83	Parallel key	1.0540
102	Ring bolt	1.6541

* See table “Technical data”

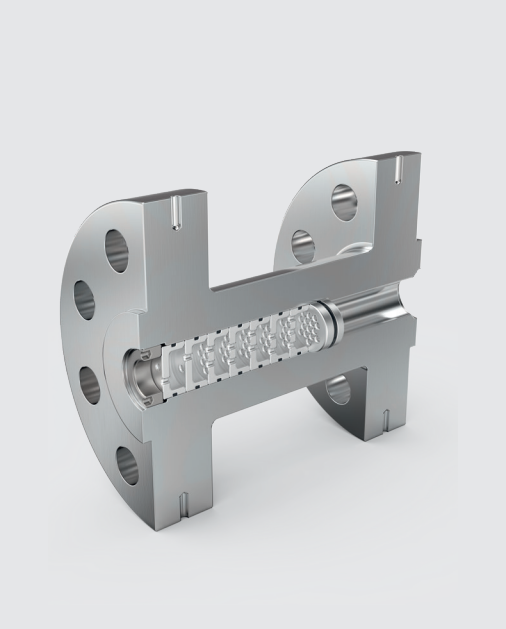
** Depending on customer requirements

Parts list as an example of the standard configuation

Type GD

Particularly robust single- or multi-stage throttle with axially arranged perforated orifice

› Type GD, front view



› Type GD, sectional view

Product features

- Cavitation free single- or multi-stage-layer perforated orifice for reducing pressure
- Interchangeable internal parts
- Wear-free
- Designed for extreme high pressure applications and to prevent cavitation damages
- The orifice plate throttels are extremely robust and thus enable the use of complete water mixtures and other media

Applications

- Power and process industry
- Offshore applications
- Also suitable as pump protection for pressure reduction of the minimum flow

Type GD

Particularly robust single- or multi-stage throttle with axially arranged perforated orifice

Technical data

Nominal diameter	DN 25 – 200 / NPS 1 – 8
Pressure class	PN 100 – 640 / Class 150 – 4500
Temperature (max.)	Up to 230 °C / 446 °F (or on request)
Housing material	1.0460 / A105 1.5415 1.7335 / A182F12Cl.2 1.7383 / A182F22Cl.3 1.4903 / A182F91 1.6368 1.4404 / A182F316L
Housing type	Forged
Medium	Water, water mixtures
Flanges	EN 1092-1, ASME B16.5, ISO 7005, JIS, JPL, welding ends on request
Designs	Globe type
Number of stages (max.)	12
Number of controlled stages (max.)	0
Operating range (max.)	1:1

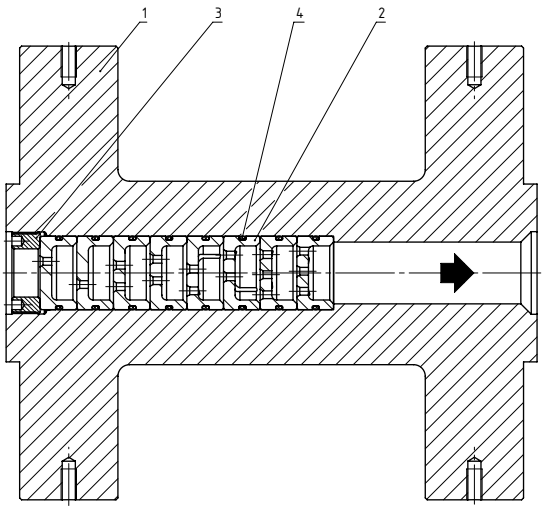
Function

The GD throttle reduces the pressure over axially arranged perforated orifice with different cross-sectional contrictions. As a result, the pressure reduction without cavitation risk take place step by step.

Type GD

Particularly robust single- or multi-stage throttle
with axially arranged perforated orifice

Sectional drawing (multi-stage)



Parts list (multi-stage)

Pos.	Item	Material
1	Housing	*
2	Orifice	1.4122
3	Ring	1.4122
4	O-Ring	**

* See table “Technical data”

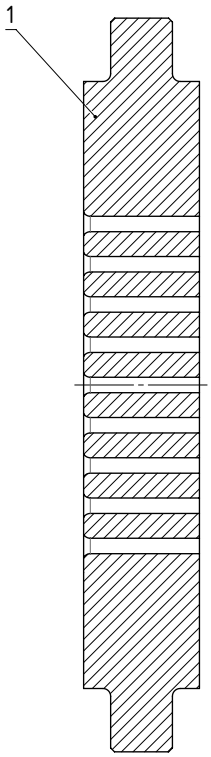
** Depending on customer requirements

Parts list as an example of the standard configuation

Type GD

Particularly robust single- or multi-stage throttle with axially arranged perforated orifice

Sectional drawing (single-stage)



Parts list (multi-stage)

Pos.	Item	Material
1	Orifice	1.4404

Parts list as an example of the standard configuation

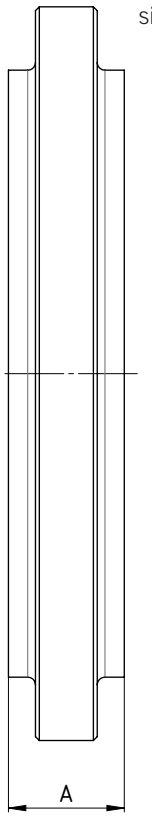
Type GD

Particularly robust single- or multi-stage throttle
with axially arranged perforated orifice

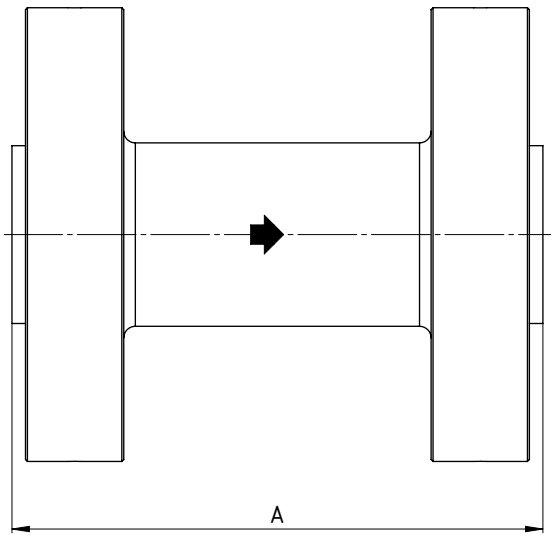
Dimensions (throttle)

Nominal diameter		Measures A (mm)		
DN	NPS	single-stage	multi-stages up to 8	multi-stages up to 12
25	1	20	200	200
32	1,25		200	200
40	1,5		250	350
50	2		250	350
65	2,5		250	350
80	3		350	500
100	4		350	500
125	5		350	500
150	6		500	700
200	8		500	700

single-stage



multi-stage



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