

ZIMMERLI MESSTECHNIK AG

Low Pressure Reducing Valve, spring loaded

for steam, gases and liquids

Typ 75

Technical Documentation



DN 10 - DN 100

Contents

- **Technical Data**

- Datasheet
- Spring ranges
- Datasheet position

- **Assembly, care and maintenance**

- Mounting Instructions
- Storage, transport and commissioning
- Maintenance Instructions
- Troubleshooting operating problems

General Take-back conditions



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Attention!



ZIMMERLI reserves the right to decide on taking back its products on a process-related and situation-dependent basis.

Basically, only such products will be taken back, as remain unused and are not older than two years (date of delivery).

The costs of the assembly services rendered as well as expenses incurred in connection with the take-back will be deducted.

Custom-made products will basically, not be taken back.

In cases of custom-made products, order cancellations after the start of production shall not be free-of-charge. Production expenses that have already been incurred shall be invoiced on the basis of the status of production.

Spare parts and wearing parts shall be excluded from these conditions and will generally not be taken back irrespective of the condition they are in.

Pressure-Reducing-Valve, springloaded

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Standard version:

Material: Valve-body / media contact surfaces

Typ 75.2: BG 0 - II 1.4301, 1.4571 / 1.4571

BG III - IV 1.4571 / 1.4571

Connections:

Flange connections: DIN EN / ASME B16.5

Sealings:

FPM, EPDM

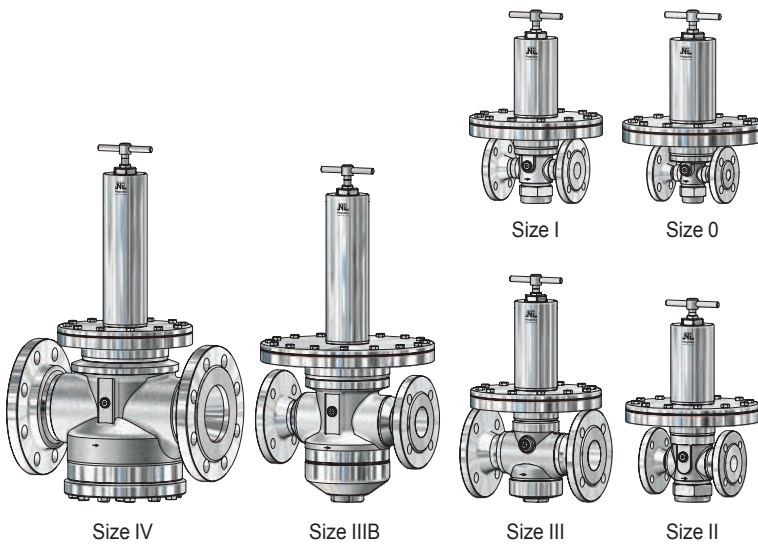
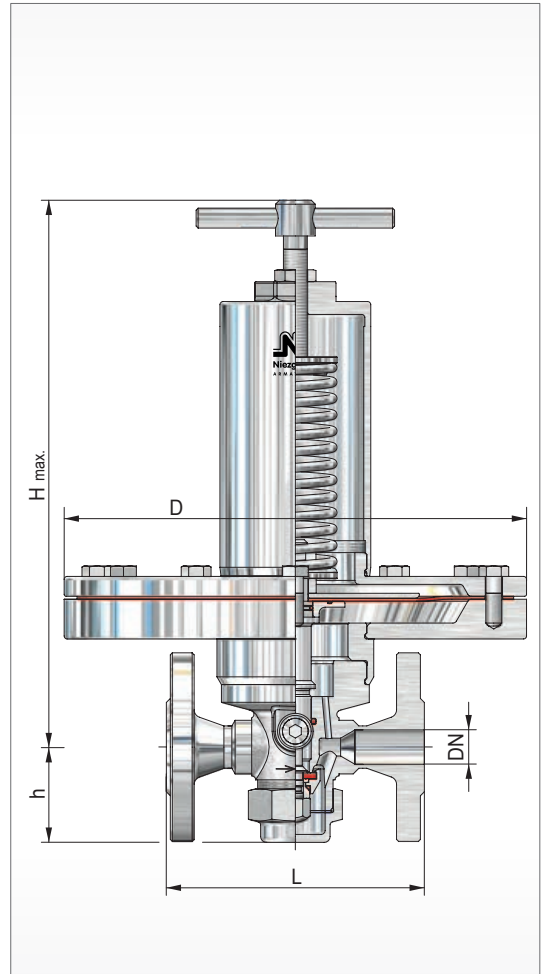
PTFE, EPDM (steam up to 150°C)

PTFE, FEPM, EPDM (steam up to 200°C)

Approvals:

Pressure Equipment Directive: 2014/68/EU

Declaration of Conformity



Size	Inlet			Outlet			Dimensions				Kvs value [m³/h]				
	DN	NPS	Inlet pressure range P1 [bar(g)] max.	DN	NPS	Reduced pressure range P2 min. [bar(g)] max.	Height 'H' max.		Diaphragm Ø = D						
							Toggle spindle [mm]	Cap [mm]	L [mm]	h [mm]		Design			
0	10	-	25	10	-	0,005 / 0,45	320	285	130	48	405	310	235	190	2,0
	15	1/2		15	1/2										2,2
I	15	1/2	25	15	1/2	0,005 / 0,40	310	290	130	58	405	310	235	190	3,0
	20	3/4		20	3/4										3,2
II	25	1	16	25	1	0,005 / 0,40	320	305	160	68	405	310	235	190	6,3
	32	1 1/4		32	1 1/4										6,5
III	40	1 1/2	16	40	1 1/2	0,005 / 0,40	350	335	200	85	405	310	235	190	12,5
	50	2		50	2										13,0
IIIB	50	2	16	50	2	0,005 / 0,30	535	465	300	145	405	310	235	190	27,5
	65	2 1/2		65	2 1/2										28,0
IV	80	3	16	80	3	0,005 / 0,30	545	470	290	157	405	310	235	190	28,5
	100	4		100	4										48,0
															53,0

other design on request

Pressure-Reducing-Valve, springloaded

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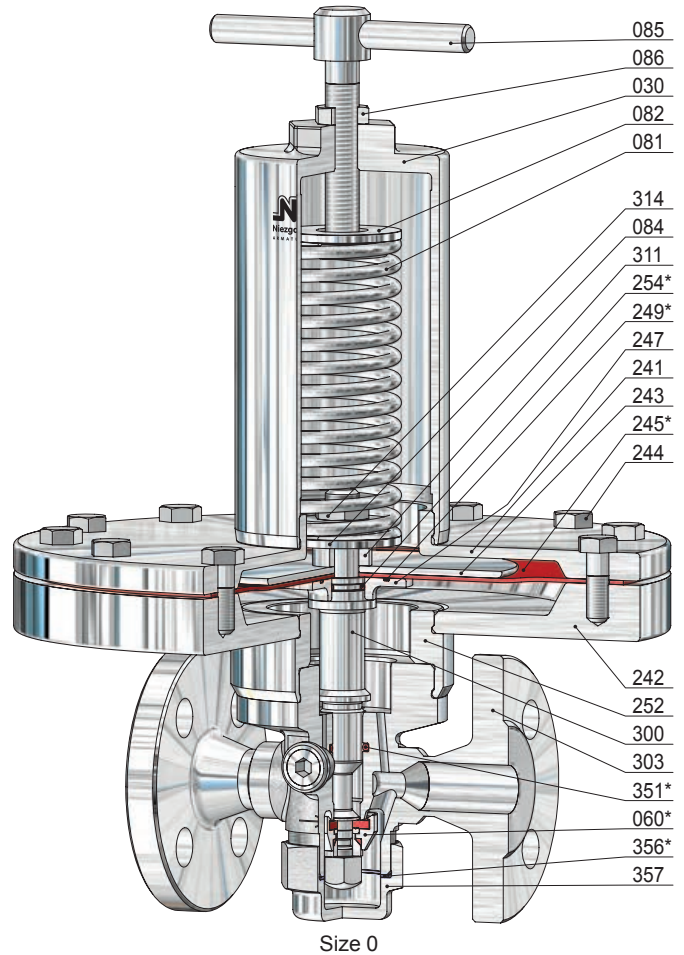
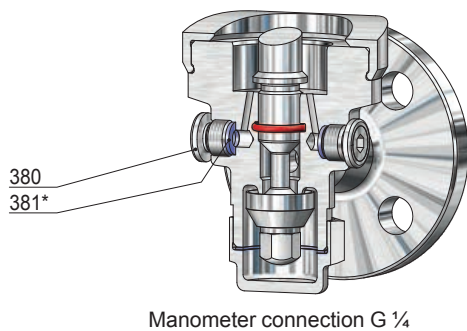
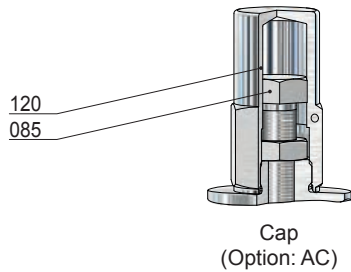
Typ 75

Diaphragm [mm]		Ø 405	Ø 310	Ø 235	Ø 190
Size	Spring no.	[bar(g)]			
0	301	0,005 - 0,008			
	302	0,009 - 0,015	0,026 - 0,030	0,051 - 0,070	0,11 - 0,15
	303	0,016 - 0,025	0,031 - 0,050	0,071 - 0,100	0,16 - 0,25
	304				0,26 - 0,45
I	301	0,005 - 0,008			
	302	0,009 - 0,015	0,026 - 0,030	0,051 - 0,070	0,11 - 0,14
	303	0,016 - 0,025	0,031 - 0,050	0,071 - 0,100	0,15 - 0,25
	304				0,26 - 0,40
II	301	0,005 - 0,008			
	302	0,009 - 0,014	0,026 - 0,030	0,051 - 0,065	0,11 - 0,14
	303	0,015 - 0,025	0,031 - 0,050	0,066 - 0,100	0,15 - 0,20
	304				0,21 - 0,40
III	301	0,005 - 0,007			
	302	0,008 - 0,010	0,026 - 0,028	0,051 - 0,060	0,11 - 0,13
	303	0,011 - 0,020	0,029 - 0,045	0,061 - 0,100	0,14 - 0,20
	304	0,021 - 0,025	0,046 - 0,050		0,21 - 0,40
IIIB	2 x 301	0,005 - 0,008			
	2 x 302	0,009 - 0,012	0,026 - 0,028	0,051 - 0,060	
	2 x 303	0,013 - 0,020	0,029 - 0,045	0,061 - 0,100	
	2 x 304	0,021 - 0,025	0,046 - 0,050	0,110 - 0,180	
	2 x 305			0,190 - 0,300	
IV	2 x 301	0,005 - 0,008			
	2 x 302	0,009 - 0,012	0,026 - 0,028	0,051 - 0,060	
	2 x 303	0,013 - 0,020	0,029 - 0,045	0,061 - 0,100	
	2 x 304	0,021 - 0,025	0,046 - 0,050	0,110 - 0,180	
	2 x 305			0,190 - 0,300	

Pressure-Reducing-Valve, springloaded

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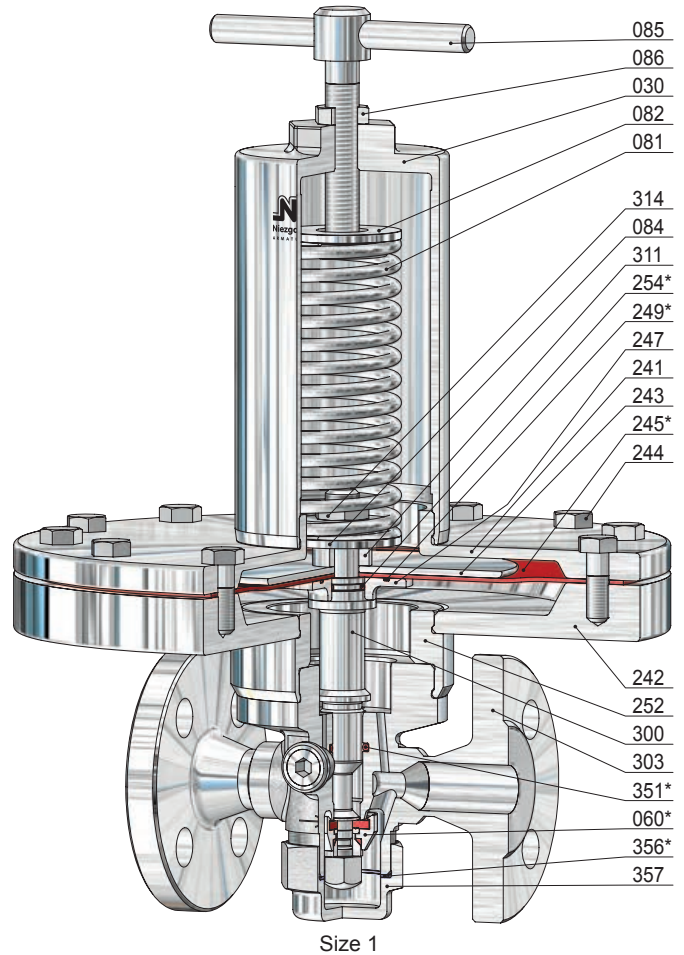
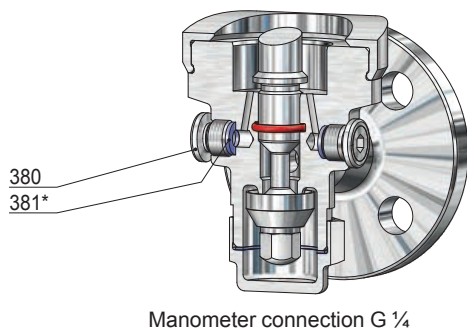
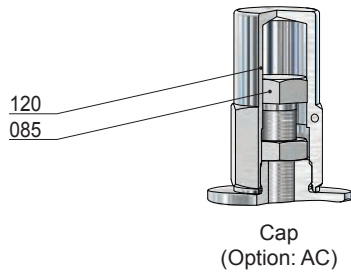
Item	Piece	Description	Item	Piece	Description
303	1	valve body	243	1	upper clamp plate
030	1	spring bonnet	244	12	screw (<i>variable</i>)
060 *	1	disc, complete	245 *	1	diaphragm
560	1	disc	247	1	lower clamp plate
061	1	pressure piece	249 *	1	o-ring
062	1	soft sealing	252	1	adapter
065	1	disc bolt	254 *	1	o-ring
071	1	o-ring	300	1	piston
072	1	locking ring	311	1	distance bush
073	1	o-ring (<i>only for thermoplastics soft sealing</i>)	314	1	lock nut
081	1	spring	351 *	1	o-ring
082	1	springplate, upper	356 *	1	sealing ring
084	1	springplate, lower	357	1	bottom plug
085	1	adjusting screw	380	2	screw plug
086	1	lock nut	381 *	2	sealing ring
120	1	cap			
241	1	upper housing			
242	1	lower housing			

* expendable parts

Pressure-Reducing-Valve, springloaded

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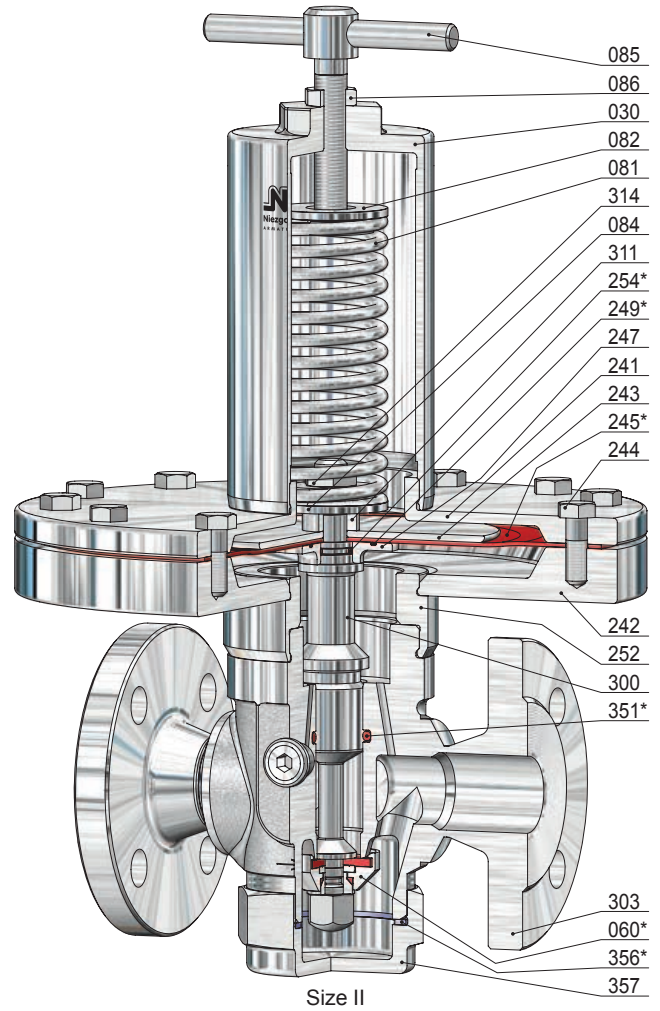
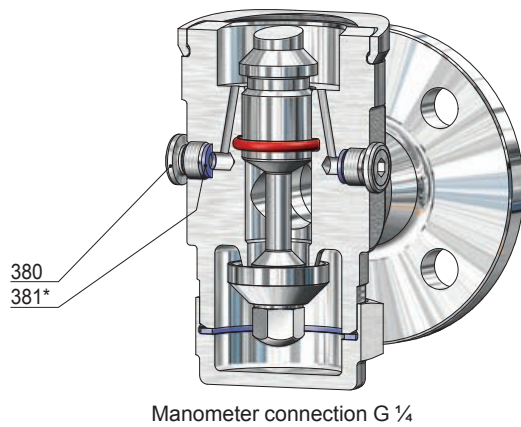
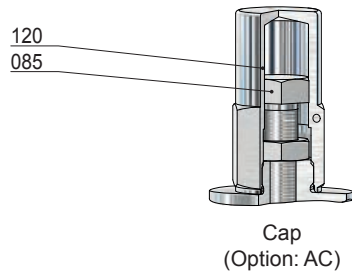
Item	Piece	Description	Item	Piece	Description
303	1	valve body	243	1	upper clamp plate
030	1	spring bonnet	244	12	screw (<i>variable</i>)
060 *	1	disc, complete	245 *	1	diaphragm
560	1	disc	247	1	lower clamp plate
061	1	pressure piece	249 *	1	o-ring
062	1	soft sealing	252	1	adapter
065	1	disc bolt	254 *	1	o-ring
071	1	o-ring	300	1	piston
072	1	locking ring	311	1	distance bush
073	1	o-ring (<i>only for thermoplastics soft sealing</i>)	314	1	lock nut
081	1	spring	351 *	1	o-ring
082	1	springplate, upper	356 *	1	sealing ring
084	1	springplate, lower	357	1	bottom plug
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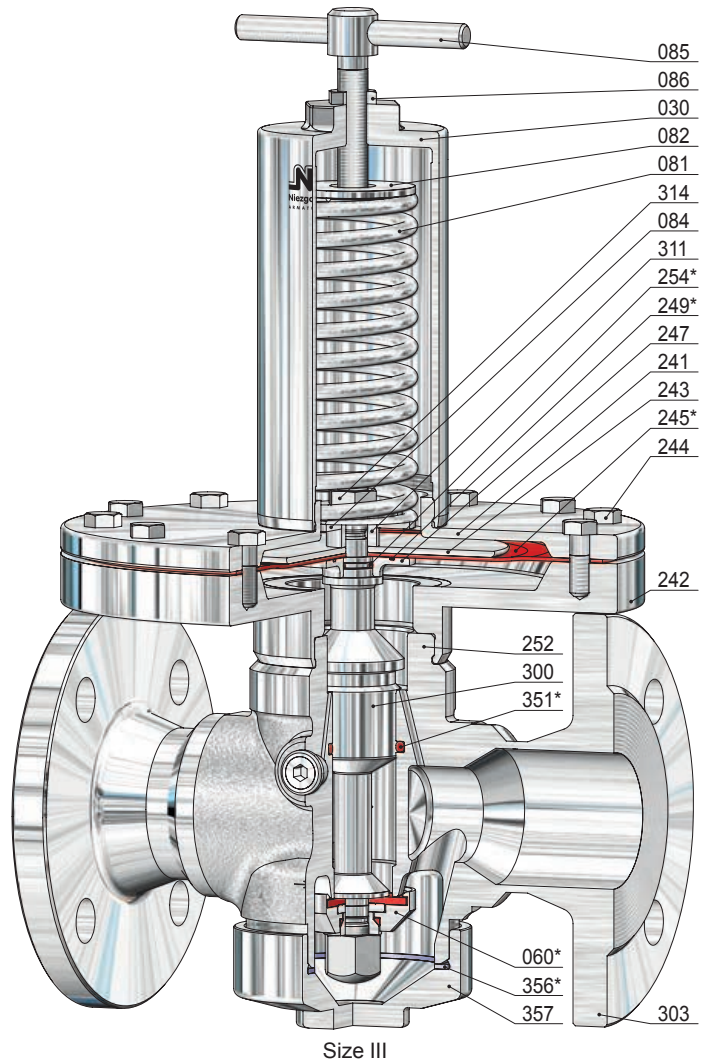
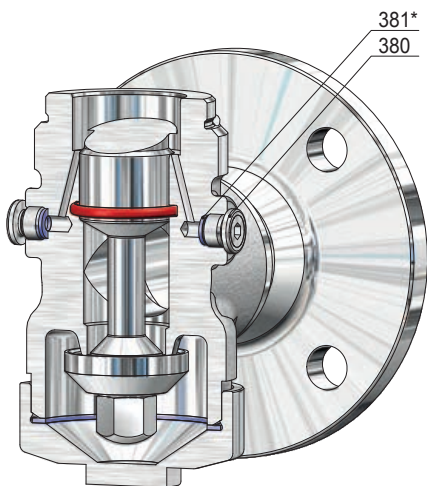
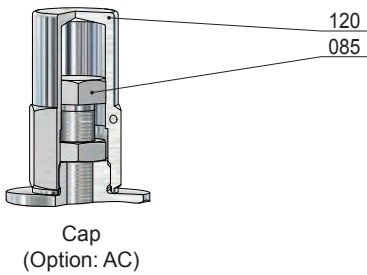
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030	1	spring bonnet	244	12	screw (<i>variable</i>)
060 *	1	disc, complete	245 *	1	diaphragm
560	1	disc	247	1	lower clamp plate
061	1	pressure piece	249 *	1	o-ring
062	1	soft sealing	252	1	adapter
065	1	disc bolt	254 *	1	o-ring
071	1	o-ring	300	1	piston
072	1	locking ring	311	1	distance bush
073	1	o-ring (<i>only for thermoplastics soft sealing</i>)	314	1	lock nut
081	1	spring	351 *	1	o-ring
082	1	springplate, upper	356 *	1	sealing ring
084	1	springplate, lower	357	1	bottom plug
085	1	adjusting screw	380	2	screw plug
086	1	lock nut	381 *	2	sealing ring
120	1	cap			
241	1	upper housing			
242	1	lower housing			

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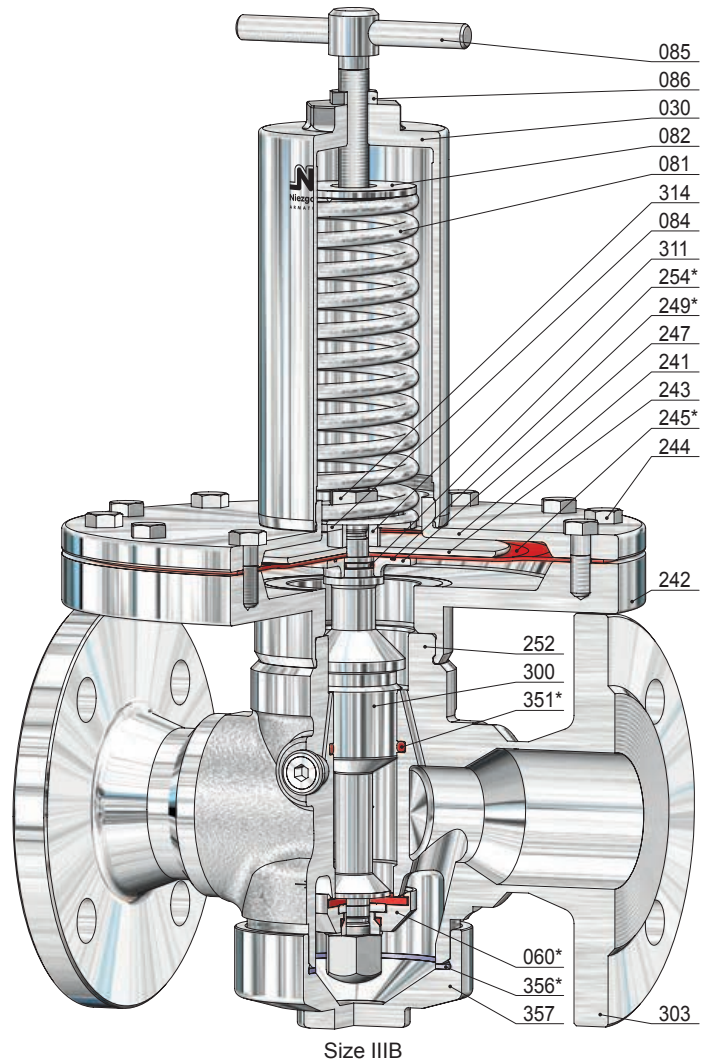
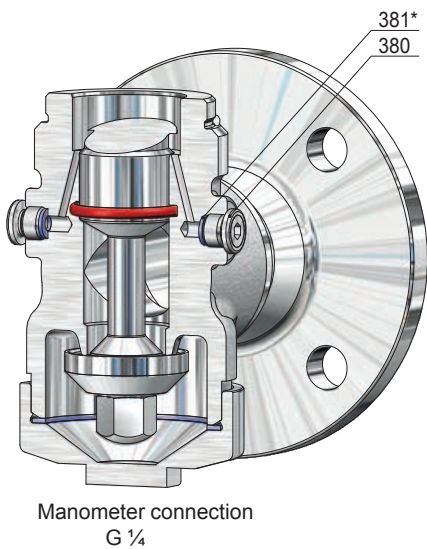
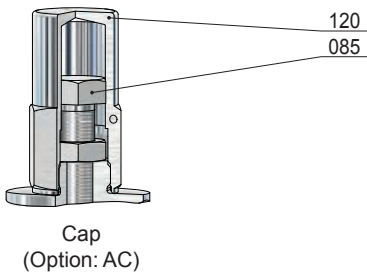
Item	Piece	Description	Item	Piece	Description
303	1	valve body	243	1	upper clamp plate
030	1	spring bonnet	244	12	screw (<i>variable</i>)
060 *	1	disc, complete	245 *	1	diaphragm
560	1	disc	247	1	lower clamp plate
061	1	pressure piece	249 *	1	o-ring
062	1	soft sealing	252	1	adapter
065	1	disc bolt	254 *	1	o-ring
071	1	o-ring	300	1	piston
072	1	locking ring	311	1	distance bush
073	1	o-ring (<i>only for thermoplastics soft sealing</i>)	314	1	lock nut
081	1	spring	351 *	1	o-ring
082	1	springplate, upper	356 *	1	sealing ring
084	1	springplate, lower	357	1	bottom plug
085	1	adjusting screw	380	2	screw plug
086	1	lock nut	381 *	2	sealing ring
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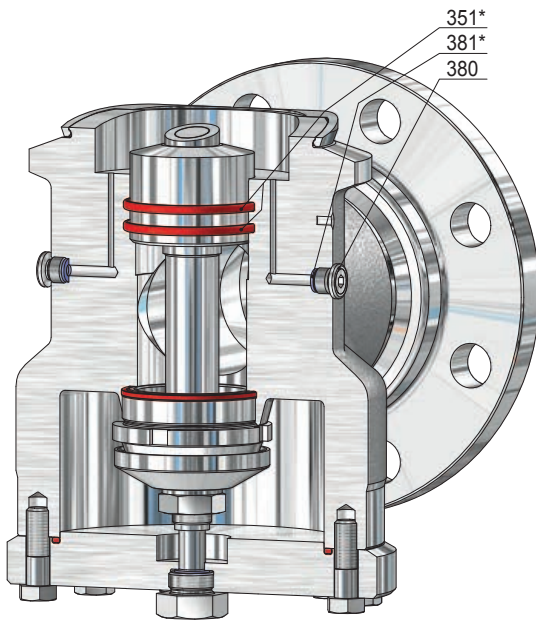
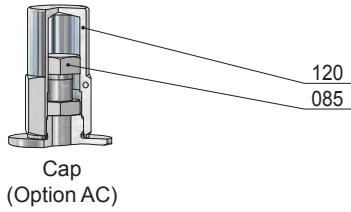
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303	1	valve body	243	1	upper clamp plate
030	1	spring bonnet	244	12	screw (<i>variable</i>)
060 *	1	disc, complete	245 *	1	diaphragm
560	1	disc	247	1	lower clamp plate
061	1	pressure piece	249 *	1	o-ring
062	1	soft sealing	252	1	adapter
065	1	disc bolt	254 *	1	o-ring
071	1	o-ring	300	1	piston
072	1	locking ring	311	1	distance bush
073	1	o-ring (<i>only for thermoplastics soft sealing</i>)	314	1	lock nut
081	1	spring	351 *	1	o-ring
082	1	springplate, upper	356 *	1	sealing ring
084	1	springplate, lower	357	1	bottom plug
085	1	adjusting screw	380	2	screw plug
086	1	lock nut	381 *	2	sealing ring
120	1	cap			
241	1	upper housing			
242	1	lower housing			

* expendable parts

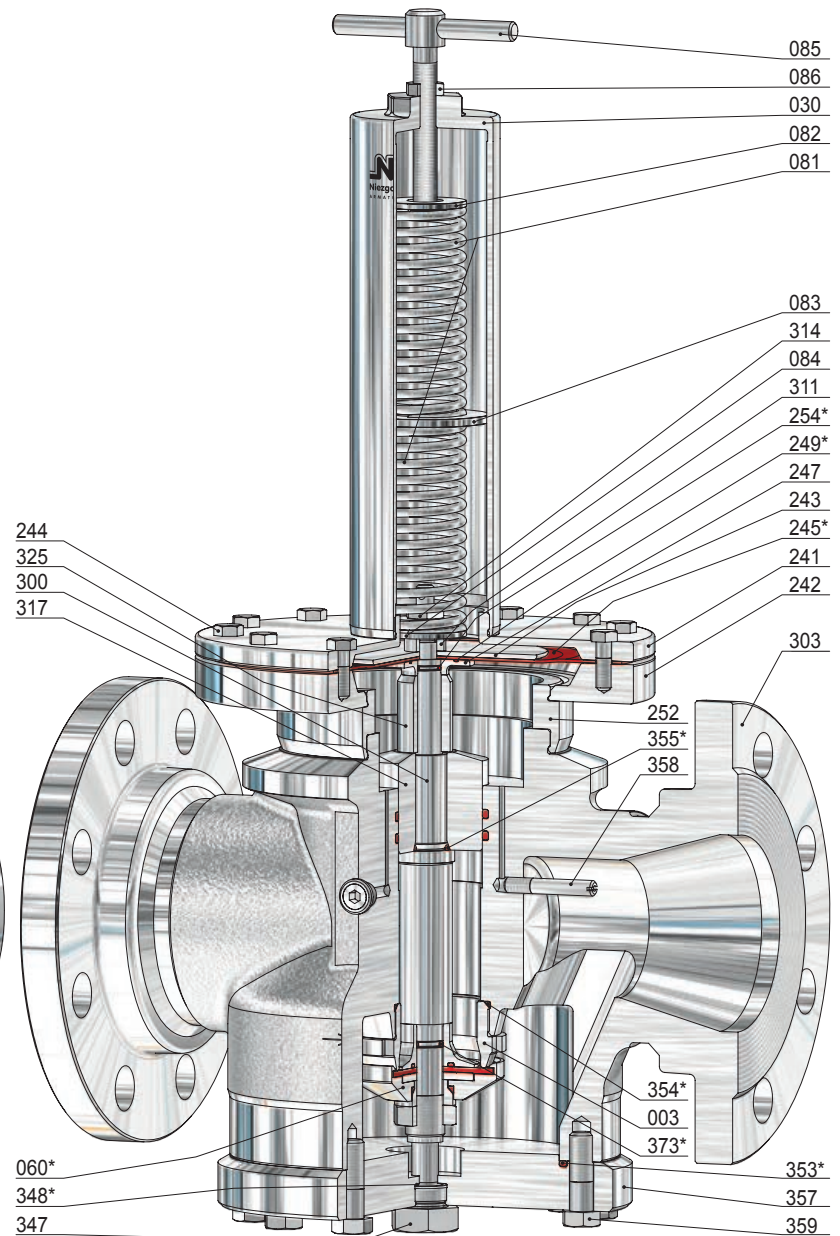
Pressure-Reducing-Valve, springloaded

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Manometer connection G 1/4



Size IV

Item	Piece	Description	Item	Piece	Description	Item	Piece	Description
303	1	valve body	085	1	adjusting screw	325	1	distance bushing
003	1	seat	086	1	lock nut	347	1	screw
030	1	spring bonnet	120	1	cap	348 *	1	sealing ring
060 *	1	disc, complete	241	1	upper housing	351 *	2	o-ring
560	1	disc	242	1	lower housing	353 *	1	o-ring
061	1	pressure piece	243	1	upper clamp plate	354 *	1	o-ring
062	1	soft sealing	244	12	screw (variable)	355 *	1	o-ring
065	1	disc bolt	245 *	1	diaphragm	357	1	bottom plug
071	1	o-ring	247	1	lower clamp plate	358	1	suction tube
072	1	locking ring	249 *	1	o-ring	359	12	screw
073	1	o-ring	252	1	adapter	373 *	1	o-ring
074	1	disc plate	254 *	1	o-ring	380	2	screw plug
081	2	spring	300	1	piston	381 *	2	sealing ring
082	1	springplate, upper	311	1	distance bush			
083	1	springplate, middle	314	1	lock nut			
084	1	springplate, lower	317	1	piston guide			

* expendable parts



1. Installation

The preferred location of pressure reducing valves in pipework systems is where operating conditions are stable, that is not immediately upstream or downstream from bends, branches, pressure devices, stop valve fittings or similar restricting elements, and not adjacent to consumer points. They should be fitted to horizontal sections of the pipe. Where not specified to the contrary, the unit can be fitted with the spring cap up or down. With steam the spring cap must point downwards.

Figures 1 - 4 show the most common position for installing a pressure reducing valve into a pipe. On operationally sensitive installations, i.e. where a fault in the pressure reducing valve could result in an unacceptable breakdown of downstream consumer units, a by-pass with a shut-off device (fig. 5 - 6) must be provided.

In the event of a fault, emergency operation can then be maintained via the by-pass. The by-pass must be kept closed during normal operation. Before installing a pressure reducing valve, the pipework must be carefully cleaned and flushed out. If fouling during operation is unavoidable, a strainer (4) must be fitted. After removing it from its packaging and taking off the plastic caps, the pressure reducing valve is to be fitted to the pipe, taking care to observe the direction of flow (arrow).

Pressure reducing valves are regulating devices, not shut-off elements providing leak-proof seating. According to VDI/DE Guidelines 2174, a leakage rate of 0.05% of the Kvs-value is permitted. We therefore recommend that a shut-off valve (1) be fitted upstream of the pressure reducing valve.

2. Safety Devices

The Accident Prevention Regulations VBG 17, which stipulates the provision of a safety device, e.g. a safety valve (7), to prevent the maximum permissible pressure from being exceeded in the downstream section of the pipe, must be complied with. The safety valve must be adequately rated.

If a shut-off valve (3) is interposed between the pressure reducing valve (5) and the safety valve (7), for example when a by-pass is fitted as in (fig. 5 - 6), it may become necessary to fit a further safety valve (6) to protect the pressure reducing valve. This is the case when the input pressure is greater than the maximum permitted pressure in the output section of the pressure reducing valve. The minimum response pressure of this safety valve should be at least 10% greater than the minimum response pressure of the system safety valve (7). It must not, however, be greater than the nominal pressure on the output side of the pressure reducing valve.

In addition, it is incumbent upon the system operator to ensure that any medium escaping from the spring cap, as a result of the control piston seal or the diaphragm becoming defective, cause no damage. If necessary, a drainage tube must be fitted to the spring cap to conduct any leakage away.

3. Operation

Before leaving the factory, the pressure reducing valve has been checked for leaks. With steam, it will be necessary to tighten the screws and the bottom plug (357) the pressure reducing valve has thoroughly heated up.

Before putting the valve into operation, the spring (081) should be released (by turning the adjusting screw (085) anticlockwise).

The upstream shut-off element (1) must be opened slowly until the input pressure [pressure gauge (8)] reaches its limit. The output pressure should then be set to required pressure (preset level) whereby there must be some medium consumption on the outlet side. To achieve this, the adjusting screw (085) is turned clockwise, observing the output side pressure gauge (9), until the reduced pressure is reached. Once the adjustment is complete, the adjusting screw (085) should be secured with the locknut (086).

A sharply fluctuating flow or shock pressure loading are to be avoided.

Installation and operating instructions

Pressure-Reducing-Valve



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Piston design

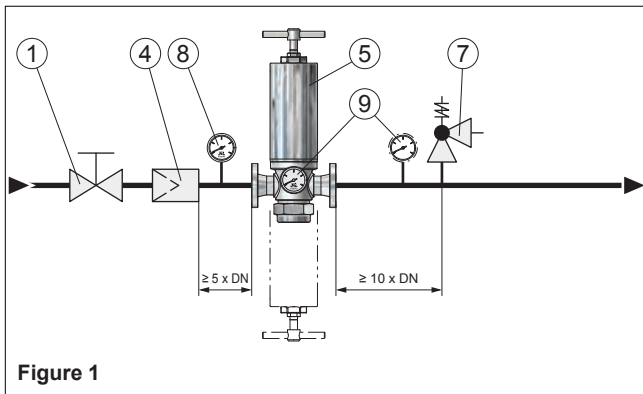


Figure 1

Diahragm design

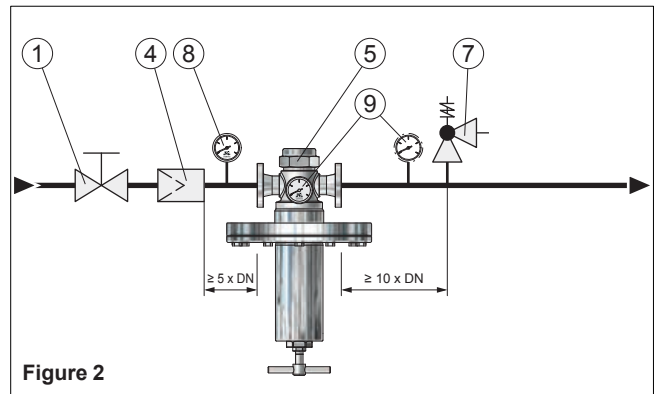


Figure 2

Pressure reducing valve without bypass pipeline

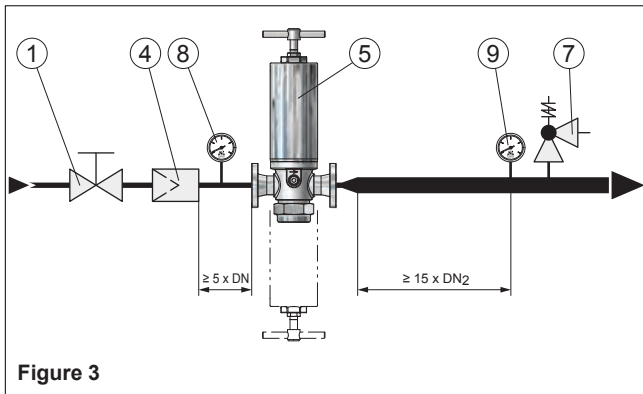


Figure 3

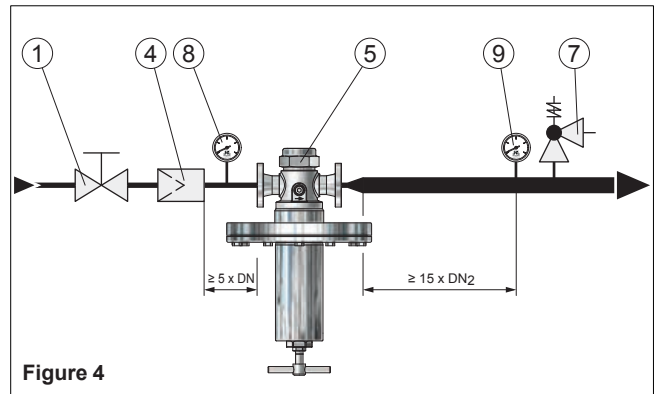


Figure 4

Pressure reducing valve without bypass pipeline with pipe downstream enlargement at the outlet

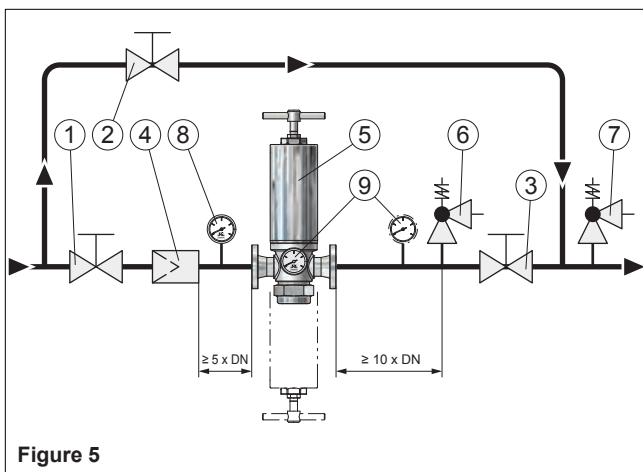


Figure 5

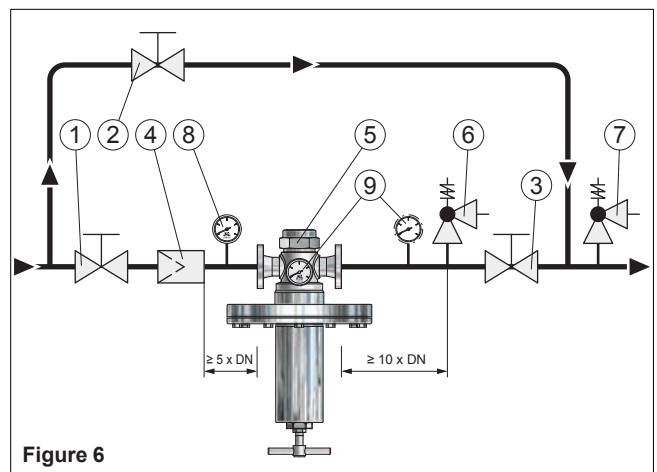


Figure 6

Pressure reducing valve with bypass pipeline

Unless specified differently the spring cap can face either upwards or downwards.
When the pressure reducer is used for steam, it has to be fitted with the spring cap facing downwards.

Item	Description	Item	Description	Item	Description
1	Shut-off valve	4	Strainer	7	Safety valve
2	Shut-off valve	5	Pressure reducing valve	8	Pressure gauge
3	Shut-off valve	6	Safety valve	9	Pressure gauge



General: **NI-Valves** are high quality products which must be treated with care. The sealing faces on the seating (001 / 003) and disc (060) are hardened, annealed, ground and lapped. Improper handling can cause them to be damaged, resulting in leakage and inoperability. They must therefore be protected against shocks (throwing, impacting, hitting etc.). On valves equipped with a venting lever etc., the lever must not be misused as a carrying handle. All valves are to be properly secured to prevent them falling over or falling down in the course of transportation, fitting and maintenance.

Observe the following storage instructions:

Environment: Places of storage must be clean and dry.

Temperatures: **NI-Valves** should be stored at temperatures between 5°C to 35°C, the best being 10°C to 20°C. The instructions for disc sealing must be complied with in the case of soft sealing valves.

Transportation: Only use suitable packing materials for transportation. Inlet and outlet apertures are to be protected for transportation purposes by caps or plugs which are only to be removed shortly prior to assembly.

Commissioning:

Delayed initial opening caused by so-called sticking (adhesion) effect of the seating (001 / 003) and disc (060) is quite normal after transportation and longer storage of valves with a preset response pressure. This applies both to metal/elastomers sealing faces and highly polished metal/metal faces.

When the valve has been fitted the sealing faces are separated by pressurisation higher than the actual response pressure and by operating the venting lever.

The valve, together with the preset pressure response, is now fully functional, taking the permissible pressure increase/closing pressure into consideration.

Attention!



- The regional safety regulations are to be observed.
- The material, pressure, temperature and flow direction specifications must be checked prior to commissioning.
- The valve data are to be checked for position (arrangement) in the system.
- Residues in pipelines and valves (welding beads, grinding dust, dirt etc.) lead to leakage or damage.
- Touching the valve can give rise to the risk of injury when it is operated at high medium temperatures of (>50°C) or low temperatures of (>0°C).
- Remove the blocking screw (149), which may have been used, from the cap (120).
- Remove protective caps and lever fixtures prior to commissioning.
- Sticking, freezing or blockage of the valve is to be avoided without fail.
- When a blow-out pipe is not used, the medium can suddenly escape from the valve outlet aperture. **Hazard!**
- Large amounts of flow noise can be heard when blowing out.

Care is to be taken to ensure prior to putting a new system into operation or restarting a system that has been subject to repair or conversion that:

- All work is completed in an orderly manner!
- The valve is in the correct function position.
- Safety devices are in place.

Instructions for maintenance

for pressure-reducing-valve



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Maintenance:

NI pressure reduction valves shall be provided in design and manufacture in such a way that optimal quality and service-friendliness is attained. Minimum care and maintenance is the result when using our fittings.

We recommend to have the pressure reduction valves / spare parts replaced only in an authorized technical workshop. In the absence of adequate means of repair, it is advisable to send the complete valve to ZIMMERLI MESSTECHNIK AG. All spare parts supplied by us are suitable for installation in our valves without exception. Since the valves supplied are however adapted to the respective case of application, it is necessary to also state our **valve number** and the delivery slip / invoice number or order number of processing while placing order for spare parts.

Test intervals:

Depending on the properties of the medium and the operational circumstances in the facility, maintenance shall be performed or function of valve verified once each year or also at shorter intervals.

Leakages:

Faults are often caused by soiling, which result in damages or softening of seals:

Leakages on the piston plate sealing (o-ring 350) are indicated by medium escaping through the spring hood opening. To repair, the respective o-ring (350) shall be renewed. A strong increase in back pressure at low removal rate is an indication of a defective soft sealing (062).

Caution!



In case of oxygen, keep all parts free of oil and grease. For operation in oxygen-charged atmosphere (-25°C/+250°C), only approved lubricants, e.g. „ **gleitmo 594** “ shall be used for the lubrication of the o-rings, media-contacting guide areas and thread connections.

Caution!



Care must be taken to ensure that the system is depressurised prior to assembly, dismantling or opening of the pressure reducing valve. The remaining dimensions and seal properties, preloading forces, tightening torques etc. are to be determined by the user themselves in accordance with the operating instructions. In doing so special attention must be paid to the following:

Medium residues in the pressure reducing valve or in the spring cap represent a serious chemical burning, burns and poisoning hazard. It must, therefore, be established prior to removing a valve from the plant which medium could be present in the pressure reducing valve. Appropriate safety measures must be taken.



For further information, see our website

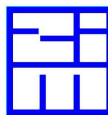
Troubleshooting operating problems

for Pressure-Reducing-Valve



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Fault	Possible cause	Remedy
increasing low pressure at less removal or zero removal	defective soft sealing (062) and/or defective piston o-ring (351)	Replace soft sealing (062) and/or replace piston o-ring (351), better still replace all sealing materials!
escaping medium at spring bonnet (030)	defective piston plate O-ring (350) or defective diaphragms (245)	Replace o-ring (350) or diaphragms (245), better, replace all sealing materials!
escaping medium at bottom plug (357)	setting of packing ring (356) or slackening of bottom plug (357)	Tighten the bottom plug (357) using the screw-wrench, eventually, replace packing ring (356)
no medium passage through the pressure reduction valve	pressure reduction valve installed against the direction of flow	Install pressure reduction valve in the direction of flow indicated (arrow)
pressure gauge on pressure reduction valve indicates no pressure even though there is pressure	pressure gauge boring blocked by residues of PTFE sealing or pressure gauge faulty	Remove sealing residues from the pressure gauge boring of the pressure reducer housing, install new pressure gauge sealing and replace pressure gauge if out of order
low pressure P2 plunges strongly upon removal and cannot be increased even through the adjustment of the set-point value (turning of setting screw clockwise)	dimensioning of pressure reduction valve too small	Insert pressure reduction valve with higher Kvs value
pressure reduction valve works in a jerky manner, regular deviations are higher than usual, pressure reducer does not shut at zero removal	sluggish movement of pressure reduction valve through medium soiling and subsequently damaged surfaces in guide areas, dynamically stressed o-rings (350, 351) without sufficient lubricant	Perform maintenance work for pressure reduction valves in accordance with the Servicing and Repair Manual (Technical Documentation); clean parts, smoothen damaged surfaces, replace defective parts and renew sealing materials, oil the guide areas of moved parts and sealing range of the dynamically stressed o-rings (350, 351) with the special lubricant Gleitmo 591



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