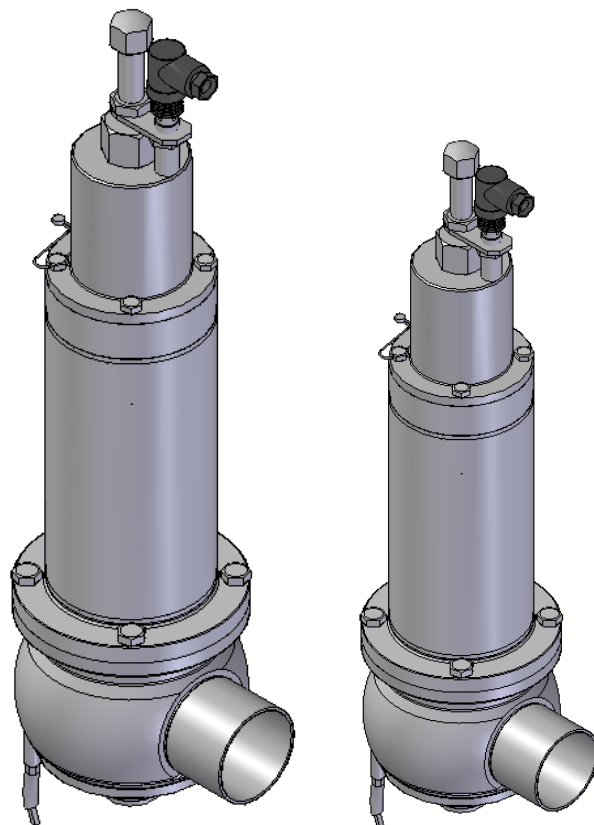


OPERATING MANUAL **ASME SAFETY RELIEF VALVES**
Code Section VIII - Division 1

Types 33551 / 33651



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Technical documentation of
Albert Handtmann Armaturenfabrik GmbH & Co. KG

Arthur-Handtmann-Straße 11

D-88400 Biberach an der Riss

Telephone +49- (0) 7351-342-0

Fax +49 (0) 7351-342 4480

sales.fittings@handtmann.de

www.handtmann.com

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Foreword

This operating manual is for the information of the service personnel and the user.

It is part of the valve delivery. If the operating manual or pages thereof are missing on site, they must be replaced immediately.

All the persons involved in the installation, commissioning, operation and maintenance of the safety relief valves must be familiar with the content of this operating manual. Your personal safety is at stake.

If required, in-house instructions taking into account the specialist qualifications of the respective persons must be given.

Also the codes of practice and national directives relevant for the safety relief valve shall be heeded.

To avoid operation errors and to ensure the correct performance of the required servicing and testing measures, this operating manual must be available to the operating personnel at all times.

Handtmann safety relief valves have been manufactured with great precision. To fulfil their purposes, the valves shall be treated carefully and checked at regular intervals. A functional failure may be hazardous to persons, the plant and the environment.

Even properly working safety relief valves may pose hazards in operation if information contained in the operating manual is not observed.

NOTICE

Handtmann Armaturenfabrik assumes no liability for damage, operating errors and follow-up costs resulting from the non-compliance with this operating manual!

This operating manual is applicable for the following valve types certified acc. to ASME (American Society of Mechanical Engineers) Section VIII - Division 1:

Type	Model
33551	Safety relief valve
33651	Safety relief valve with pneumatic actuator

1 Operational reliability

1.1 Proper application

Safety relief valves protect pressurized systems (tank, containers, piping, etc.) against impermissible excessive pressure. The valves are designed, constructed and tested in compliance with the specifications of ASME according to Section VIII - Division 1.

Safety relief valves may be used for the intended purpose only. In this case, special WARNING must be paid to the permissible pressure and temperature ranges, the type of fluids to be discharged, the environment on site and the installation situation.

On the basis of the technical documents provided, the user has to verify whether the appropriate safety relief valve has been selected for the intended use.

1.2 Improper Application

exists if:

- The operating conditions deviate from those specified in the operating manual.
- Fluids other than those specified in the operating manual are discharged.
- The safety relief valves are used although they are not functional.
- The safety information is disregarded during operation, assembly and maintenance, or the tasks are performed by unqualified personnel.
- Unauthorized modifications or changes are made to the safety relief valves that impair the functionality or safety.

1.3 Safety symbols and notices



WARNING

This symbol identifies extremely dangerous situations that may result in severe bodily injury or even death if the relevant safety instructions are disregarded.



CAUTION

This symbol identifies dangerous situations that may result in light to severe bodily injury if the relevant safety instructions are disregarded.

NOTICE

This symbol refers to issues requiring special WARNING which may cause functional impairment or even damage to property when being disregarded.

NOTICE

This symbol refers to special instructions for the functionality and operation of the component.



ENVIRONMENT

This symbol identifies an environmentally friendly procedure or disposal method.

1.4 Basic safety advice



CAUTION

This symbol identifies dangerous situations that may result in light to severe bodily injury if the relevant safety instructions are disregarded.

Endangerment to operating personnel	
Explanations	Measures
<p>Squeezing danger to fingers, hands and feet Unintentional opening and closing of the safety relief valve must be prevented during maintenance work.</p>	<ul style="list-style-type: none"> • Disconnect the pneumatic connection with the safety relief valve. • Do not reach into the seat area of the valve disk with your hands.
<p>The safety relief valve can weigh several kilograms.</p>	<ul style="list-style-type: none"> • Secure the valve against slipping and falling during assembly, disassembly and in maintenance work.
<p>Shock and impact danger Before taking out the upper valve part and loosening the screws, the safety relief valve must be lifted manually or pneumatically – relieve the spring force!</p>	<ul style="list-style-type: none"> • Turn the counter nut on the valve rod by 2-3 rotations against the valve housing or apply compressed air to the valve actuator.
<p>Hearing loss Upon response of the valve the fluid may flow out at high speed in producing loud noise.</p>	<ul style="list-style-type: none"> • Maintain sufficient distance and wear ear protection.
<p>Danger of burns, scalds and chemical burns If the pressure system is subjected to increased media temperatures, the surface temperature of the valve housing can also reach this value.</p>	<ul style="list-style-type: none"> • Attach warning signs. • Insulate all parts of the valve.
<p>When discharging fluid from the safety relief valve, there is a risk of burns, scalding or chemical burns for the operating and maintenance personnel.</p>	<ul style="list-style-type: none"> • Make sure that the fluids are discharged safely. • Make sure that the valve is not opened in an uncontrolled manner during maintenance work.
<p>Chemical burns Before carrying out maintenance work, the pressure side of the safety relief valve must be relieved or the exhaust side must be drained.</p>	<ul style="list-style-type: none"> • Before removing the safety relief valve, check which fluid the piping was conducting. If necessary, rinse the piping again beforehand with water. • Check the system pressure before removing the safety relief valve.

1.5 Basic information on the function

NOTICE

This symbol refers to issues requiring special WARNING which may cause functional impairment or even damage to property when being disregarded.

Malfunction due to incorrect handling	
Explanations	Measures
The valve must be switched off in the case of noticeable malfunctions.	<ul style="list-style-type: none"> • Faults must be eliminated immediately.
The switching function of the valve is faulty or takes place jerkily.	<ul style="list-style-type: none"> • Remove residues or loose small parts from the valve seat area. • Lift the valve periodically to prevent jamming of the seat gasket (clean seat). • Check the ambient temperature (icing in the seat area)
The valve may not work any longer or malfunction considerably if faulty or non-specified parts are installed on the valve or used as replacement parts.	<ul style="list-style-type: none"> • Only use parts approved by the manufacturer.
If the valve is not checked or serviced at regular intervals, it may not work properly any longer or malfunction considerably.	Check the valve within the scope of operational maintenance cycles (trained staff).
Malfunction due to incorrect installation	
<p>The safety relief valve does not work properly any longer if:</p> <ul style="list-style-type: none"> ➤ a shut-off device is installed in the supply or discharge piping. ➤ the diameter of the supply or outlet piping is smaller than that of the valve inlet and outlet. ➤ there isn't enough free space for the valve lift above the safety relief valve. ➤ complete draining of the product area cannot be ensured. ➤ the backpressure on the outlet side is too high. ➤ condensate can accumulate in the discharge piping. 	<ul style="list-style-type: none"> • Ensure that shut-off devices have not been installed. • Make sure that the cross-sections of the supply and discharge pipes at least meet the requirements. • Ensure sufficient free space above the lifting rod. • Install the valve in a vertical position. • The max. permissible backpressure is 10 %. • Install a condensate drain at the lowermost point.
Malfunction through improper use	
The range of application of the valve is intended for specific operating states (pressure, temperature, media).	<ul style="list-style-type: none"> • Ensure proper application

2 Delivery

The safety relief valves should remain in the delivered packaging systems until they are installed. After unpacking the goods and before installing them, the operating manual must be read.

- Transport safety relief valves carefully.
- Impacts or knocks may damage the sealing surfaces.



WARNING

Any foil packaging used is airtight. Danger of suffocation in the event of misuse!
Therefore never pull packaging material over your head.



CAUTION

The safety relief valve weighs several kilograms. Secure the safety relief valve against slipping and falling during transportation.

Always wear safety shoes and protective gloves.

2.1 Instructions for Delivery and Performance

- Check the delivery NOTICE data for factual correctness.
- Check the delivery for completeness. Later complaints will not be accepted.
- Perform visual inspection of the packing system for external transport damage. These must be reported to the forwarder immediately. Claims due to transport damage not visible right away must be made within a week.

2.2 Storage Instructions

The goods must be stored in dry, closed rooms in the original packaging if possible. Exposure to UV radiation, sun exposure and high air moisture must be avoided.

NOTICE

Handtmann safety relief valves are made of stainless steel.

If the valves are exceptionally stored unpackaged, they have to be protected against ferritic dust to prevent corrosion.

2.3 Disposal of Packaging



ENVIRONMENT

Dispose of packaging in an environmentally sound way.

The packaging can consist of the following materials:

Wood / polyethylene film (PE foil) / paper or cardboard / plastic / strap iron.

3 Technical Description

3.1 Valve types

Safety relief valves for manual actuation or with a pneumatic actuator
(opens in response to excess pressure / closes by means of spring force)

Type	Model	Order code	
33551	Safety relief valve	33551 NPS xx 33551 DN xx	xx corresponding to orifice diameter: NPS 1, 1.5, 2, 2.5, 3 DN 25, 40, 50, 65, 80
33651	Safety relief valve with pneumatic actuator	33651 NPS xx 33651 DN xx	

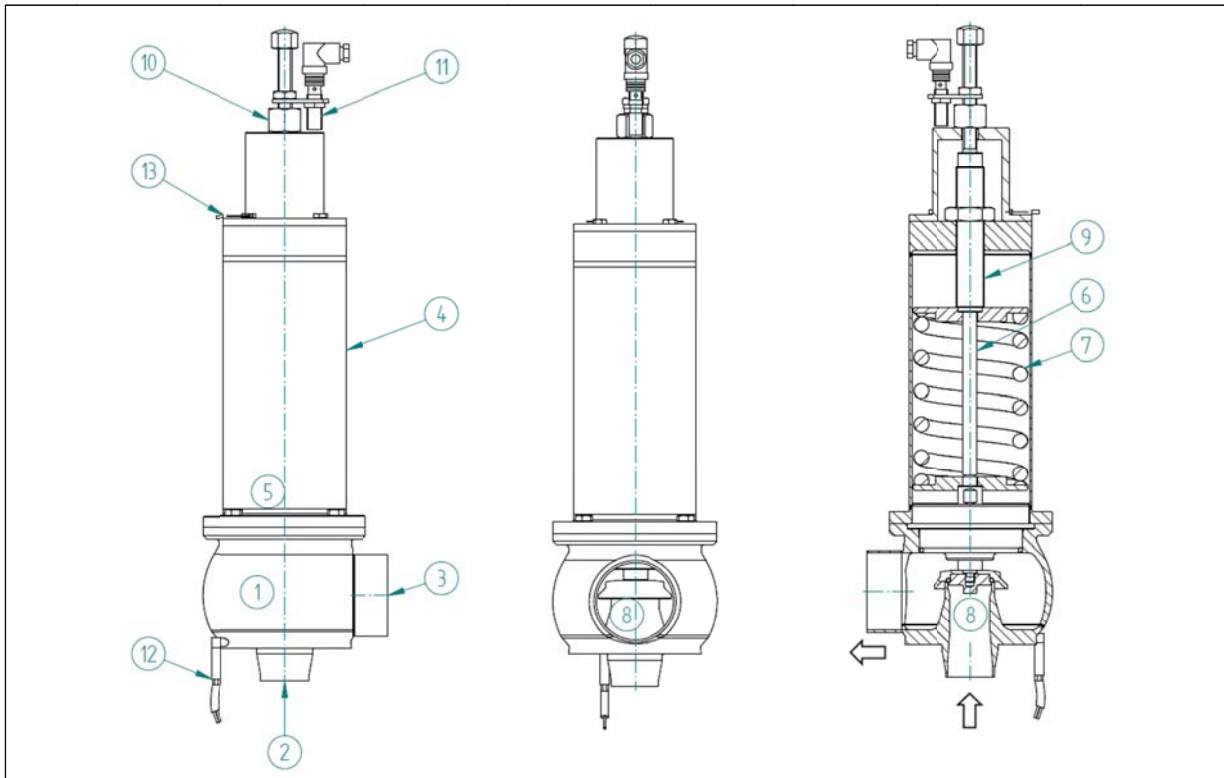
3.2 Technical data

Function	Spring tension	Spring-loaded safety relief valve
	Performance test	National Board NB
	Approval	ASME Section VIII - Division 1, UV Stamp
	Leak test	Seat tightness accord. to API 527 (elastomers)
Media	Production	Liquids/gases (non-toxic media)
	CIP	Commercially available cleaning agents in food processing areas (2-4 % caustic / acidic)
Operating data	Pressure min. / max.	15 - 145 psi / 1.03 - 10 bar
	Temperature min. / max.	-4 / 302 °F, -20 / 150 °C
	Compressed air min. / max.	70 / 100 psi, 5 / 7 bar
Materials	<i>Product range</i>	
	Materials	Stainless steel 316 L / 1.4404
	Seals (FDA)	EPDM, FKM, optional FFKM
	Surface	≤ 0.8 µm, optionally ≤ 0.4 µm
	<i>Other areas</i>	
	Materials	Stainless steel 304 L / 1.4307
	Pressure spring	Stainless steel 302 / 1.4310
	Seals	EPDM / FKM / HNBR
	Surface	Ground, matt
Connection	Input/output	Connecting adapter acc. to NPS or DN
Options	Proximity switch	Indicator for closed position (NO contact)
	Heating cartridge	Ambient temperature min. 0 °F / -20 °C

Valve data

Nominal pipe size		Nominal pipe size		Orifice diameter		Flow area		Discharge coefficient	
DN	Connection	NPS	Connection	[mm]	[in]	[mm ²]	[in ²]	kd Water	kd Air
DN25	25 / 50	1 NPS	1.5 / 2.5	21.00	0.827	346.36	0.537	0.436	0.640
DN40	40 / 65	1.5 NPS	2.0 / 3.0	33.50	1.319	881.42	1.366		
DN50	50 / 80	2 NPS	2.5 / 3.5	46.00	1.811	1661.91	2.576		
DN65	65 / 100	2.5 NPS	3.0 / 4.0	59.00	2.323	2733.98	4.238		
DN80	80 / 125	3 NPS	3.5 / 5.0	71.00	2.795	3959.20	6.137		

3.3 Valve design



1	Body	8	Valve seat
2	Valve inlet (supply piping)	9	Pressure adjusting screw
3	Valve outlet (discharge piping)	10	Lifting nut
4	Bonnet	11	Proximity switch
5	Pneumatic actuator	12	Heating cartridge
6	Valve spindle	13	Lead seal
7	Spring		

Connecting adapter	
DN	NPS
Pipe union, DIN 11851	
Hygienic-type union, DIN 11853	
Aseptic-type union, DIN 11864-1A	
Aseptic-type flange connection, DIN 11864-2A	
Aseptic-type clamping connection, DIN 11864-3A	Clamping connection, ASME BPE
Clamping connection DIN 32676	
HANDTMANN flange connection, NO. 113xx	
STANDARD flange connection, DIN 1092	ANSI flange connection, B 16.5 / Cl. 150
Other adaptations upon request	

3.4 Pressure setting and testing

All the safety relief valves are checked ex works and adjusted to the required set pressure. The setting is documented in a setting test log.

The pressure setting occurs at ambient pressure. If an external backpressure is applied to the discharge side, the response may be delayed. For this reason, the external backpressure must not exceed 5-10 % of the set pressure.

A change of the set pressure is prevented through positive locking inside the upper valve part. In addition, an lead seal will be installed as an external visible securing clip. The undamaged lead seal indicates that no modifications have been made to the valve interior.

NOTICE

Mechanical modifications to the safety relief valves that influence the set pressure or functionality are impermissible.

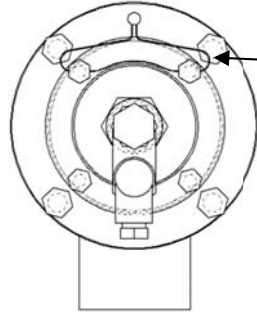
Exclusion of liability! Modifications by the manufacturer only!

CAUTION

Mechanical modifications to the safety relief valves that influence the functional behavior are impermissible.

Such modifications may result in light to severe bodily injury if the relevant safety instructions are disregarded.

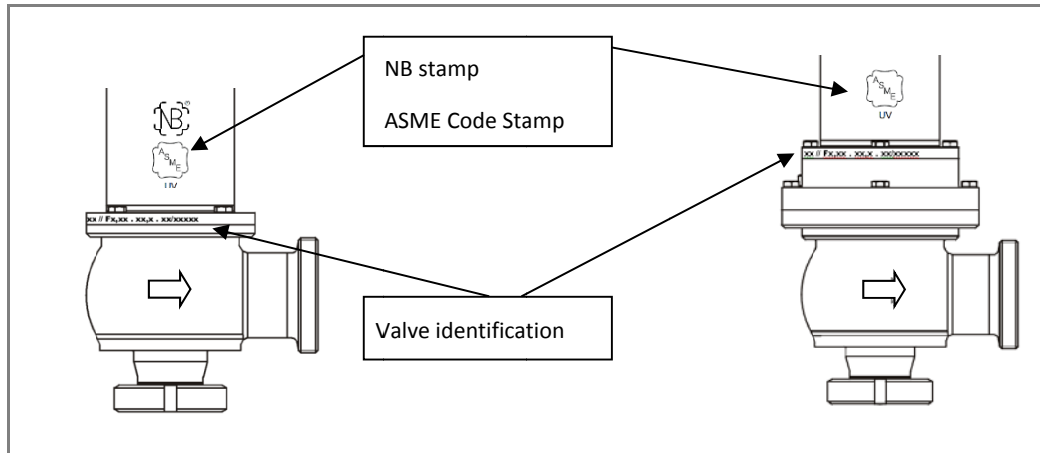
Sealing



A lead seal protects the pressure setting of the safety relief valves against inadvertent alteration of the adjustment.

After maintenance work this lead seal must be replaced by the user.

3.5 Identification



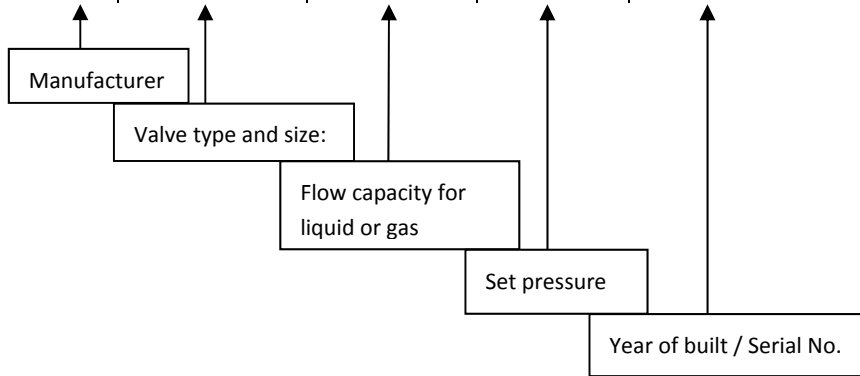
Valve identification

Fluid: Liquid

AHA	XXXXX NPSx.x -	xxxx GPM -	xxx PSI -	xx / xxxxx	US units
AHA	XXXXX DNxx -	xxx M ³ /H -	xx.x BAR -	xx / xxxxx	SI units

Fluid: Air / gas

AHA	XXXXX NPSx.x -	xxxx SCFM -	xxx PSI -	xx / xxxxx	US units
AHA	XXXXX DNxx -	xxx NM ³ /H -	xx.x BAR -	xx / xxxxx	SI units



Example:

Liquid	Air / gas
AHA 33551 NPS2.5 – 880 GPM – 145 PSI – 15/11111 H	AHA 33551 NPS2.5 – 3800 SCFM – 145 PSI – 15/11111 H
AHA 33551 DN65 – 200 M ³ /H – 10.0 BAR – 15/11111 H	AHA 33551 DN65 – 6500 NM ³ /H – 10.0 BAR – 15/11111 H

The abbreviation „H“ means hydrostatic test.

Stamp



ASME
Certification Mark



NB Symbol

UV

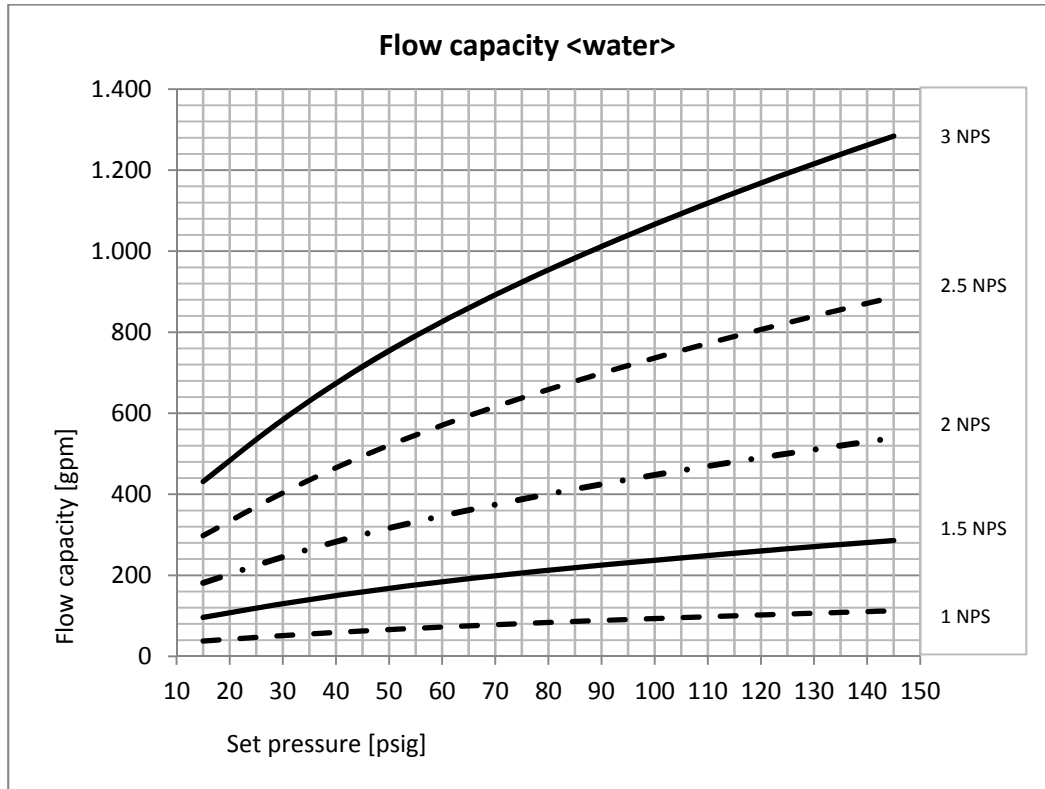
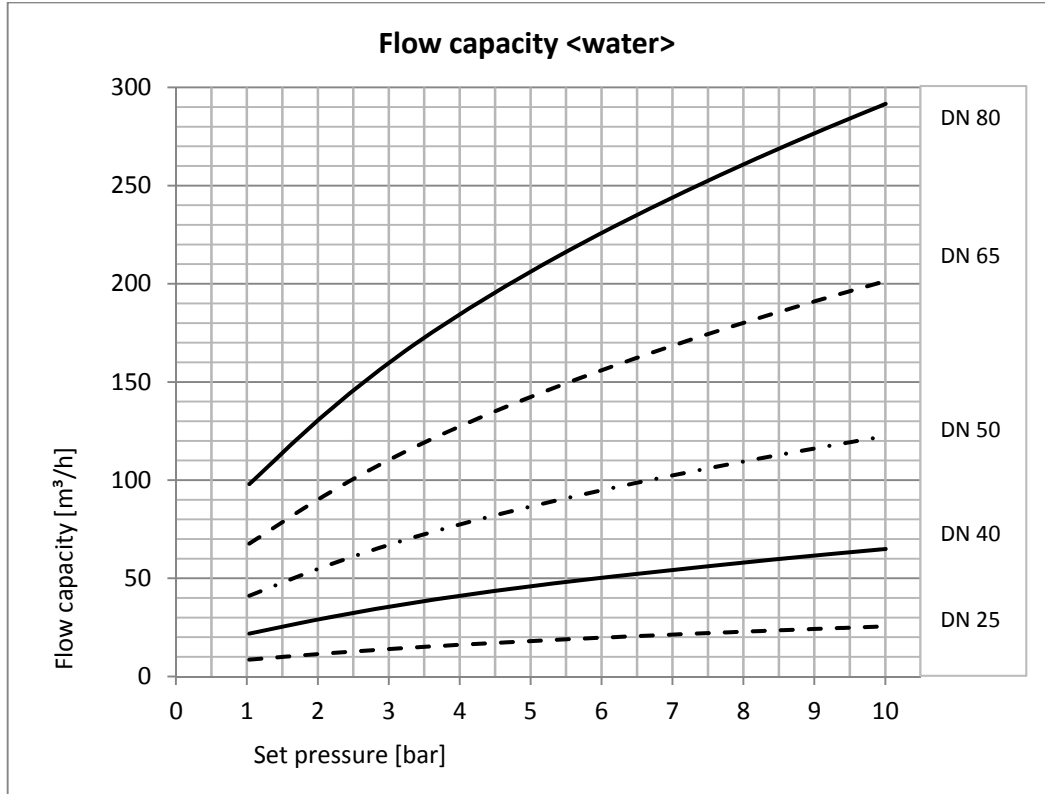
UV Designator
(Code Stamp)

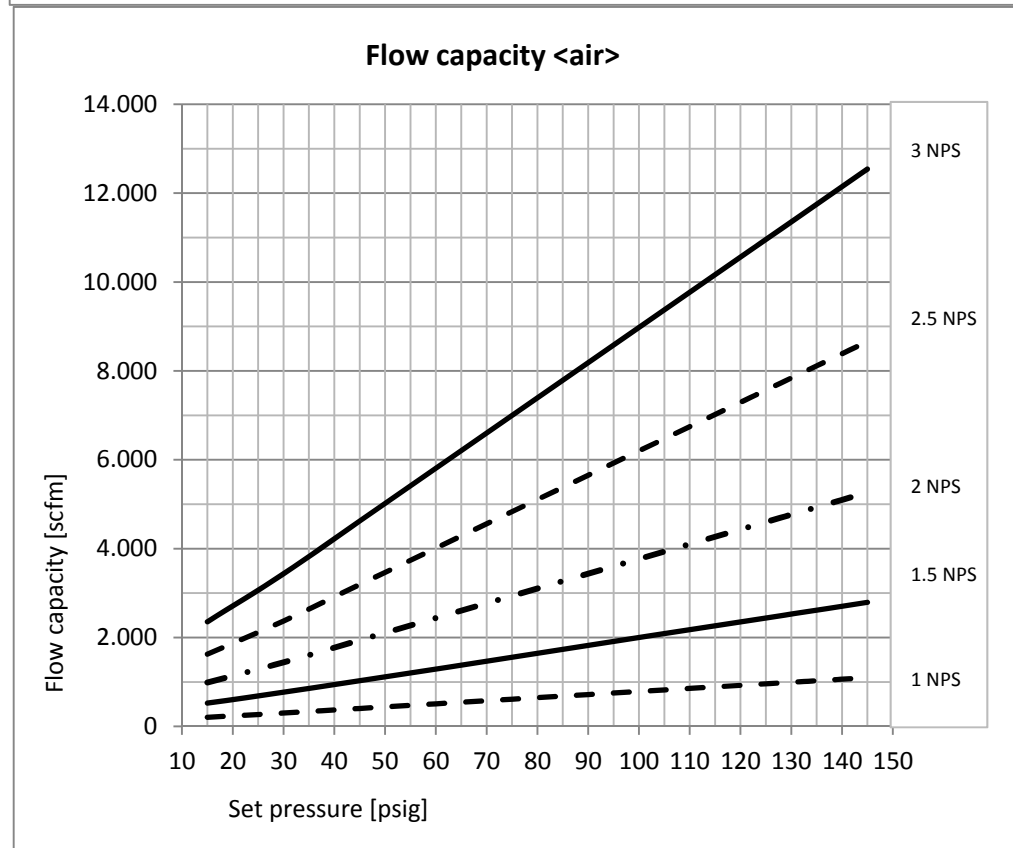
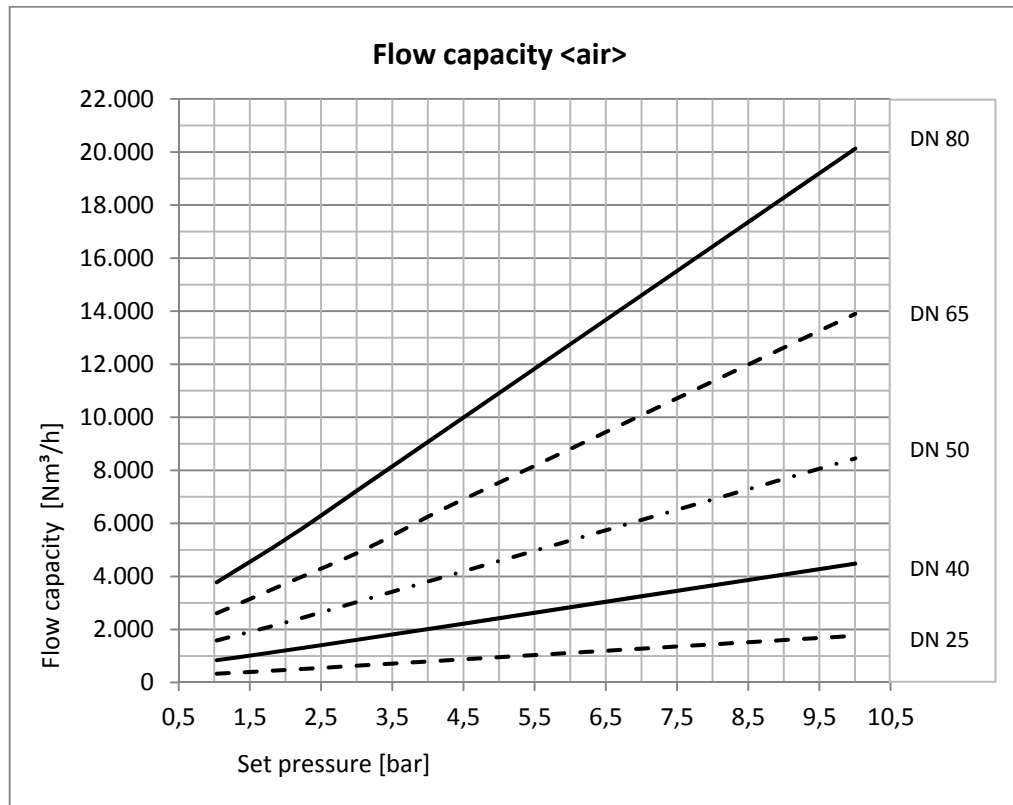
3.6 Dimensions

AH-SV-33551	Nominal size		a	b	c	Connection d, e		Weight
	DN	NPS	[mm]	[mm]	[mm]	DN	DN	[kg]
	25	1	466	65	88	25	50	8.0
	40	1.5	552	73	88	40	65	13.5
	50	2	574	88	110	50	80	15.5
	65	2.5	679	102	127	65	100	19.0
	80	3	771	118	143	80	125	32.5
	NPS	DN	[in]	[in]	[in]	NPS	NPS	[lbs]
	1	25	18.35	2.56	3.46	1.5	2.5	17
	1.5	40	21.73	2.87	3.46	2	3	28
	2	50	22.60	3.46	4.33	2.5	4.0	34
	2.5	65	26.73	4.02	5.00	3	4.0	42
	3	80	30.35	4.65	5.63	4.0	5	71
	Valve lift: max. 20 mm Different connecting adapters							

AH-SV-33651	Nominal size		a	b	c	Connection d, e		Weight
	DN	NPS	[mm]	[mm]	[mm]	DN	DN	[kg]
	25	1	522	65	88	25	50	13.5
	40	1.5	602	73	88	40	65	21.0
	50	2	623	88	110	50	80	22.5
	65	2.5	760	102	127	65	100	35.5
	80	3	853	118	143	80	125	52.5
	NPS	DN	[in]	[in]	[in]	NPS	NPS	[lbs]
	1	25	20.55	2.56	3.46	1.5	2.5	30
	1.5	40	23.70	2.87	3.46	2	3	46
	2	50	24.53	3.46	4.33	2.5	4.0	50
	2.5	65	29.92	4.02	5.00	3	4.0	78
	3	80	33.58	4.65	5.63	4.0	5	115
	Valve lift: max. 20 mm Different connecting adapters f: Compressed air connection \varnothing 6/4 mm							

3.7 Performance data





4 Operation

 **CAUTION**

The user shall have the safety relief valve operated and monitored by competent and trained staff such as to ensure that other persons in the environment of the valve are not endangered.

The safety relief valve must be used exclusively for its intended purpose and only in a functional condition.

See chapter 1 - Operational reliability

4.1 Operational Function

Safety relief valves are used whenever a pressurized system must be protected against impermissibly excessive pressures. Liquids or gases are discharged to relieve the pressure.

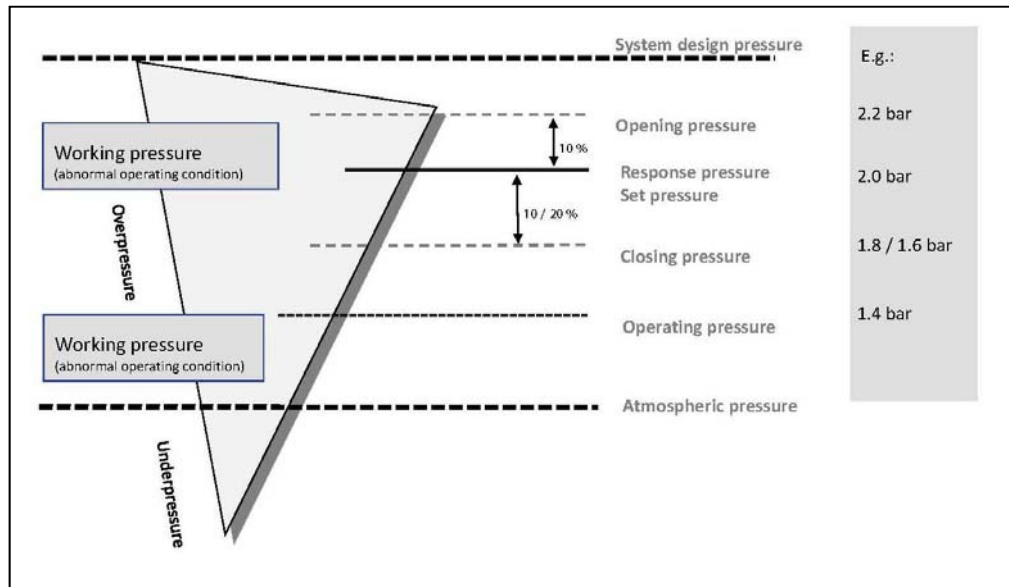
In standard operation it should be avoided if possible that the safety relief valve responds. Therefore the operating pressure must be below the set pressure (response pressure). If the set pressure is exceeded, the safety relief valves open completely within a pressure increase of 10 % relative to the set pressure.

It has to be observed that the safety relief valve will close only when the pressure is below the set pressure/response pressure again. Therefore the set pressure should be approx. 15 % above the operating pressure.

NOTICE

Set pressure:	Excess pressure at which the safety relief valve starts opening on the test stand
Response pressure:	Excess pressure at which the safety relief valve starts opening during operation
Opening pressure:	Corresponds to a pressure increase of 10 % over set pressure (continuous discharge)
Closing pressure:	Pressure at which the safety relief valve is closed again (reseated)
Operating pressure:	Working pressure under normal operating conditions
System design pressure:	Max. allowable working pressure (MAWP) in the system / tank

Pressures are indicated as excess pressures [psig and/or bar] above atmospheric pressure.



4.2 Operating Characteristics

The following data are applicable for opening and closing of safety relief valves:

NOTICE	
Opening within 10 % pressure increase or at an increase of 3 psi referred to the set pressure*. The higher pressure value will be considered. [ASME UG 131 (c) (1)].	

* water / liquid: First steady stream
 air / gas: initial audible discharge

NOTICE	
Closing within a pressure drop of 10 % for compressible and 20 % for non-compressible fluids below the response pressure or 6 psi, the higher pressure value will be considered. This applies for safety relief valves without adjuster ring [ASME UG 131 (c) (3) (b)].	

NOTICE	
The set pressure tolerance is ± 2 psi up to 70 psi set pressure or ± 3 % over 70 psi set pressure [ASME UG 134 (d) (1)].	

4.3 Valve cleaning / CIP

Safety relief valves (in hygienic areas) should be cleaned within a defined time period.

- Manual safety relief valves must be disassembled (refer to chapter 6.2).
The seat area and the seal are cleaned manually.
It is also possible to clean the manual valve within a CIP process if:
 - the valve is lifted manually by the lifting nut,
 - the valve is lifted by overpressure in a separate CIP process.
- Safety relief valves with pneumatic actuator are lifted via compressed air.
The seat area and the seal can be cleaned within an automated CIP process.
In this process, the safety relief valve should be alternately opened and closed.



CAUTION

This symbol identifies dangerous situations that may result in light to severe bodily injury if the relevant safety instructions are disregarded.

Refer to Chapter 1.4. - Basic safety advice

NOTICE

If the safety relief valve opens upon tank overfilling, especially with viscous, sugary media, the valve seat must always be cleaned afterwards.

Risk of sticking area for valve seat/valve disk!

Safety relief valves and sealing material in the product wetted area are designed for standard CIP operation.

- CIP fluids on the basis of commercially available caustic-acid-components (2 - 4 %)
- Material resistance towards EPDM / FPM / FFKM
- Cleaning temperature in the range of 30 - 90 °C / sterilization up to 140 °C

4.4 Seat tightness / leakage

Seat tightness or leakage is tested acc. to API 527.

If the valve seat area is not sealed properly, the valve will discharge in normal position (valve closed). This leakage also means, that a pressure built up is impossible in a pressurized system.

Trouble-shooting – see Chap. 7.4

4.5 Valve actuator

Safety relief valves with a pneumatic actuator can be lifted for open flow during a CIP process. For this purpose, compressed air at a pressure of 5 - 7 bar is required depending on the set pressure of the valve.

Pneumatic connection G 1/8" with plug connection for compressed air hose \varnothing 6/4 mm

4.6 Optional accessories

Heating cartridge

Design	High-performance cartridge HPL (No. 101192)
Diameter	6.5 mm
Length	40 mm
Voltage	24 V (No. 105373) / 42 V
Thermostat	Temperature control and monitoring using a thermostat (Technical data sheet TD_106838)

Proximity switch

Design	Normally open contact (NO) (No. 106220)
Nominal switching distance	5 mm flush (for steel) 2.8 mm flush (for stainless steel)
Supply voltage U	10 ...30 VDC
No-load current	max. 10 mA / max. 5 mA
Operating current	200 mA
Voltage drop U	max. 2.5 V
Switching frequency	200 Hz
Size	M 12x1

5 Installation and Commissioning

Before starting installation and commissioning:

- Check the current system status (pressure, temperature, medium).
- Check the valve by means of the identification marking.
- Check the valve for visible external and internal damage.
- Check the valve housing inside for residues.

WARNING

It must be ensured that safety relief valves are installed only if their functions and performance, pressure and temperature ranges, housing materials, type of connection and dimensions are suitable for the operating conditions.
Refer to Chapter 1.1 - Proper application

CAUTION

This symbol identifies dangerous situations that may result in light to severe bodily injury if the relevant safety instructions are disregarded.
Refer to Chapter 1.4. - Basic safety advice

5.1 Installation Instructions

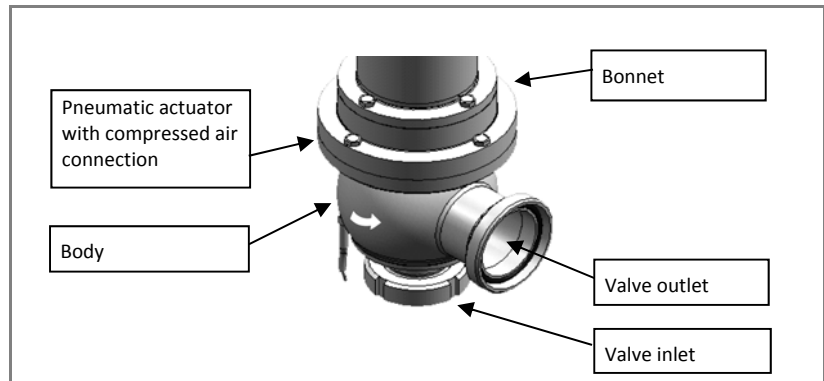
NOTICE

Observe the installation instructions in ASME Code Section VIII – Division 1 / Appendix M!

NOTICE
Safety relief valves are operated in a vertical mounting position – refer to the arrow direction. Horizontal mounting is also possible under consideration of good engineering practice. The direction of flow is always from bottom to top.

- Safety relief valves with detachable connection are integrated into the system being tension-free.
- Safety relief valves for welding in must be disassembled first. For this purpose, the upper part of the valve is removed from the housing. The housing is then welded into the piping system free of stress.
- The welding work (TIG, welding gas) must only be carried out by qualified welders (ASME Code Section IX).
- The pipe cross sections of the supply and discharge pipes to the valves must at least correspond to those of the valve inlet and outlet.
- Discharge pipes for liquids must be routed downward and must empty into a receptacle without constituting a hazard (provide for complete draining).
- Discharge pipes for vapors and gases must be routed upward and must empty into a receptacle without constituting a hazard.
- Extended supply pipes to the valve must be of self-draining design.
- Shut-off devices not be installed on the upstream and downstream sides of the safety relief valve.
- There must be sufficient free space around the installed valve for service tasks later on.

5.2 Valve installation



(Steps 1-7)

Step no.	Type of activity
1	Connect or screw the valve inlet with the supply pipe and the valve outlet with the discharge pipe if any. Connecting adapter – see Chap. 3.3
2	For welding-on the top part of the valve has to be removed from the body before. Welding instructions – see Chap. 5.1
3	If the safety relief valve has a pneumatic actuator, the compressed air supply has to be connected with the plug connection of the valve with a hose. Actuator – see Chap. 4.5
4	If heating cartridges are installed, they are connected to the available electrical system. Optional accessories – see Chap. 4.6
5	If a proximity switch is installed, it is connected to the available electrical system. Optional accessories – see Chap. 4.6
6	The installation of the safety relief valve has been completed.
7	Perform a function check of the safety relief valve. Functional check – see Chap. 7.2

5.3 Commissioning

NOTICE
<p>The safety relief valve may be commissioned after proper installation only and exclusively with the valve in operational condition.</p> <p>Check installation and function before.</p>

6 Disassembly and Assembly



CAUTION

This symbol identifies dangerous situations that may result in light to severe bodily injury if the relevant safety instructions are disregarded.

Refer to Chapter 1.4. - Basic safety advice

NOTICE

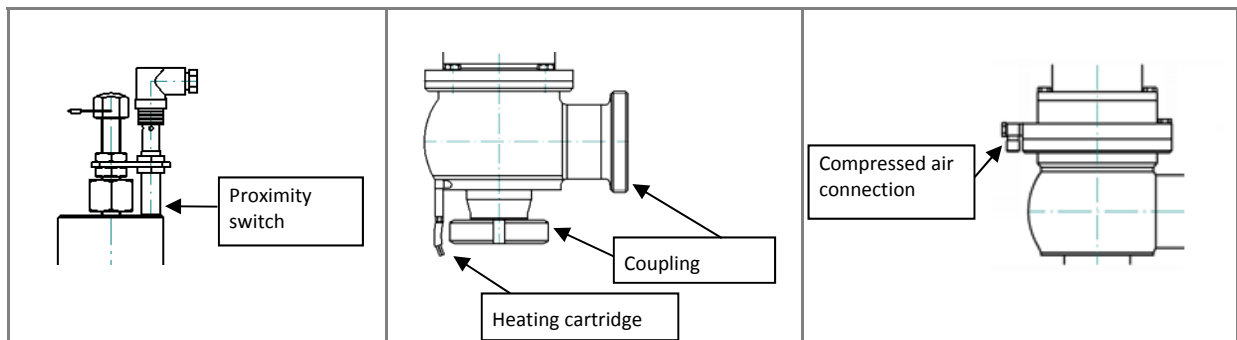
If protection devices were attached for maintenance or supply and discharge pipes to the safety relief valve blocked, the protection devices/line blockings must be disassembled.

Ensure that a function check is always performed on the safety relief valve following maintenance work.

NOTICE

If the safety lead seal is removed for maintenance work, it has to be replaced by the user upon completion of the functional check.

6.1 Valve removal

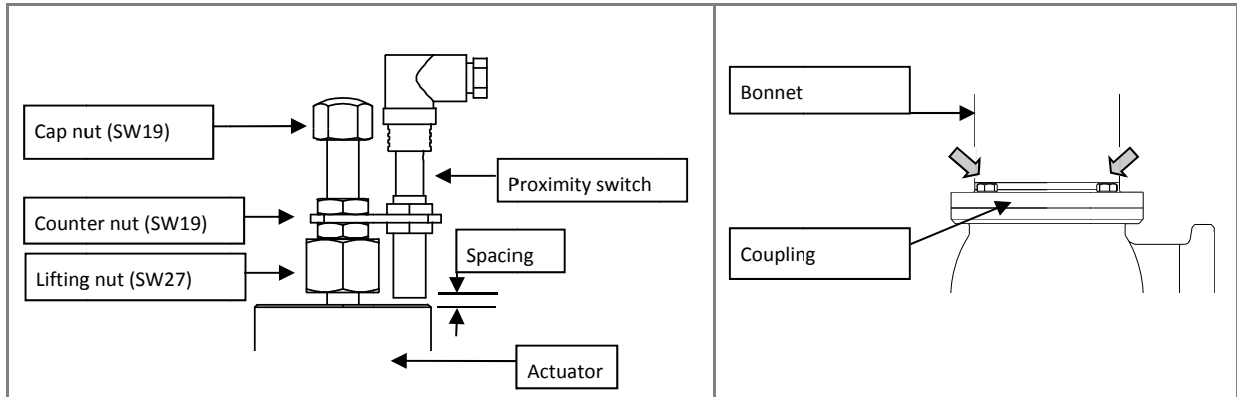


(Steps 1-3)

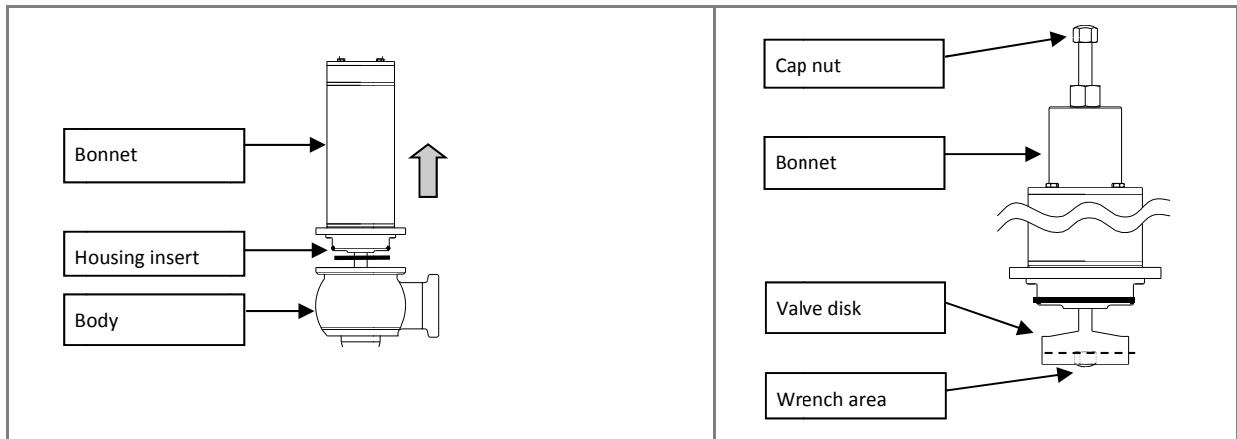
Proceed as follows to remove the safety relief valve:

Step no.	Type of activity
1	If installed, proximity switches and heating cartridges are removed and the compressed air hose is pulled off the plug connector.
2	If the body is fixed to the pressure system by a detachable connection, these connections of the supply and discharge pipe must be loosened. Remove the entire safety relief valve.
3	If the body is welded into a pressure system, the screws must be loosened on the flange of the body - see Chap. 6.2. Remove the bonnet from the body.

6.2 Disassembling manual safety relief valves



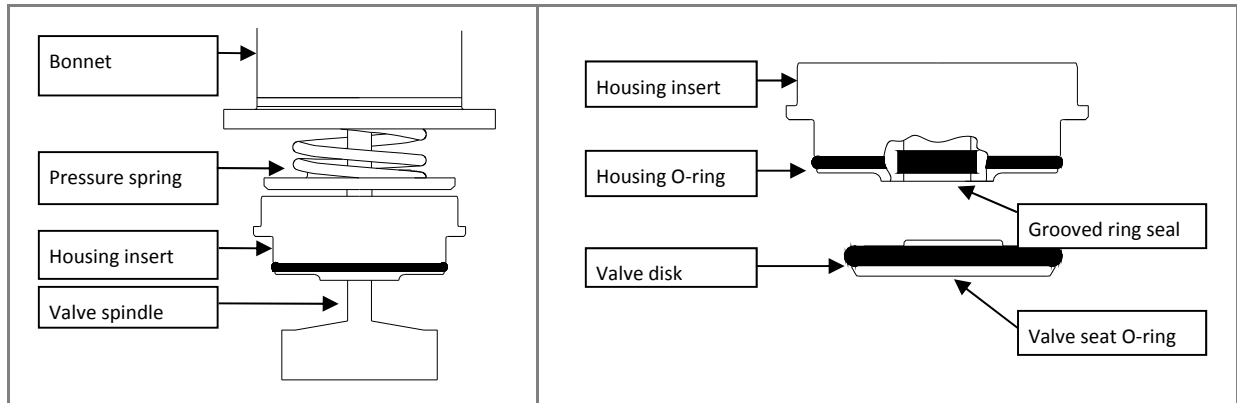
(Steps 1-4)



(Steps 5-6)

Proceed as follows to install the safety relief valve:

Step no.	Type of activity
1	If installed, remove the proximity switch. Spacing between the proximity switch and the upper edge of the actuator approx. 2-3 mm.
2	Detach the lifting nut (w.a.f. 27) from the counter nut (w.a.f. 19).
3	First, turn the lifting nut clockwise against the actuator and then turn another 1-2 turns. This will lift the valve disk (spring tension no longer extant).
4	Remove the four screws on the base of the bonnet.
5	Remove the bonnet with the housing insert from the body.
6	The valve disk is split and consists of the upper and lower disk. Both disk halves were installed using liquid screw adhesive. To detach the connection, hold the cap nut at the upper end of the valve spindle with a wrench and screw the lower disk out of the upper disk on the wrench area. (flat: w.a.f. 8 for DN25, w.a.f. 10 for DN40/50/65, w.a.f. 16 for DN80)



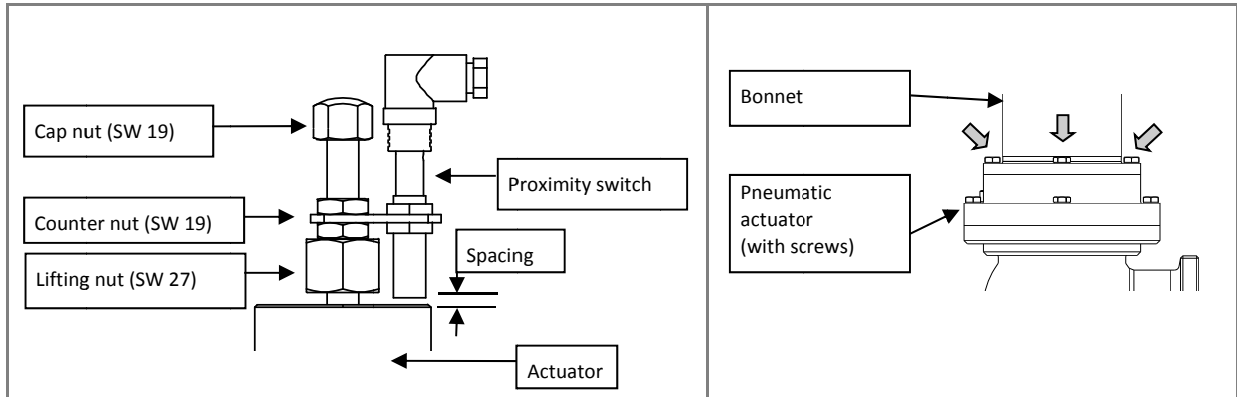
(Steps 7-13)

7	Remove the lower valve disk half to expose the O-ring seal of the valve seat.
8	Remove the cap nut at the upper end of the valve spindle. The cap nut was mounted with a screw locking fluid. (If necessary preheat the cap nut to facilitate loosening).
9	Remove the lifting nut.
10	Pull the valve spindle with the housing insert, the spring pressure disk and the pressure spring out of the bonnet to the bottom.
11	Pull the upper spring pressure disk and the pressure spring as well as the lower spring pressure disk off the valve spindle.
12	Pull the housing insert off the valve spindle to the top. The housing O-ring seal and the grooved ring seal will be exposed.
13	The safety relief valve has been dismantled. The seals can be replaced.

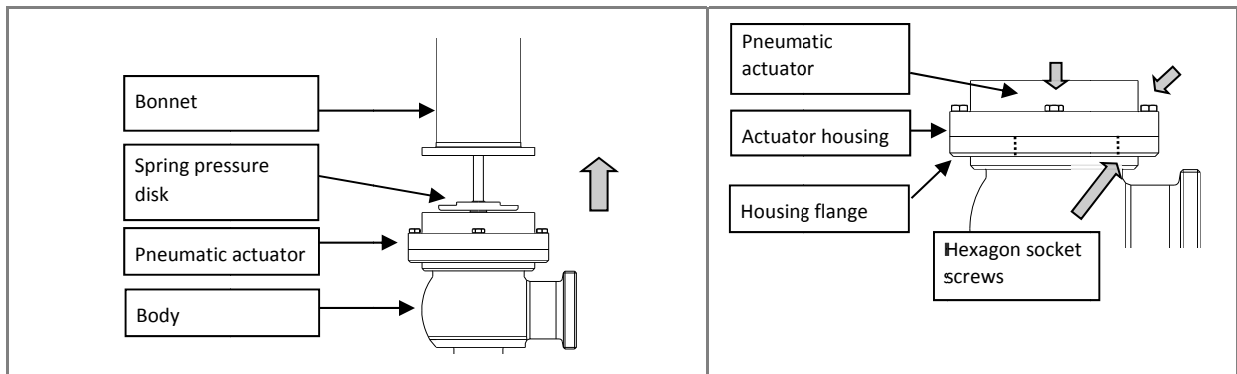
Proceed as follows to install the safety relief valve:

Serial No.	Type of activity
1	Prior to installation, clean all the dismantled individual parts of the safety relief valve.
2	Remove the rests of the screw locking fluid from the threads of the valve spindle.
3	Mount the safety relief valve analogously in reverse order to the removal procedure.
4	Use a liquid screw locking fluid when screwing the cap nut on the end of the valve spindle or screwing the valve disk halves (Weicorlock AN301-43).

6.3 Disassembling the Pneumatic Safety relief valves



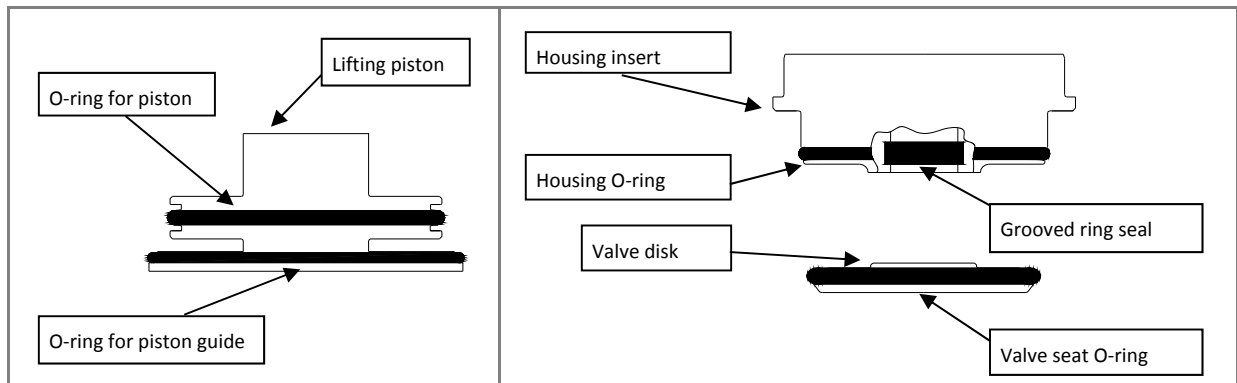
(Steps 1-4)



(Steps 5-8)

Proceed as follows to remove the safety relief valve:

Step no.	Type of activity
1	If installed, remove the proximity switch. Spacing between the proximity switch and the upper edge of the actuator approx. 2-3 mm.
2	Detach the lifting nut (w.a.f. 27) from the counter nut (w.a.f. 19).
3	First, turn the lifting nut clockwise against the actuator and then turn another 1-2 turns. This will lift the valve disk (spring tension no longer extant).
4	Remove the four screws on the base of the bonnet.
5	Remove the lifting nut and pull the bonnet off the body (without housing insert).
6	Take the upper spring pressure disks and the spring off the valve spindle.
7	Remove the retaining ring above the lower spring pressure disk and remove the lower spring pressure disk.
8	Remove the four screws in the flange of the actuator housing.



(Steps 9-15)

9	Withdraw the actuator housing via the valve spindle and remove the lifting piston. The O-rings of the lifting piston are exposed.
10	Remove the hexagon socket head screws in the upper side of the body flange.
11	Remove the housing insert with the valve spindle from the valve body.
12	Pull the valve spindle out of the housing insert to the bottom. The housing O-ring seal and the grooved ring seal will be exposed.
13	The valve disk is split and consists of the upper and lower disk. Both disk halves were installed using liquid screw adhesive. To detach the connection, hold the valve rod with a wrench and screw the lower disk out of the upper disk on the wrench area. (Wrench area w.a.f. 8 for DN25, w.a.f. 10 for DN40/50/65, w.a.f. 16 for DN80)
14	Remove the lower valve disk half to expose the O-ring seal of the valve seat.
15	The safety relief valve has been dismantled. The seals can be replaced.

Proceed as follows to install the safety relief valve:

Serial No.	Type of activity
1	Prior to installation, clean all the dismantled individual parts of the safety relief valve.
2	Remove the rests of the screw locking fluid from the threads of the valve spindle.
3	Mount the safety relief valve analogously in reverse order to the removal procedure.
4	Mount the cap nuts on the ends of the valve rod using the screw locking fluid.

7 Maintenance



CAUTION

This symbol identifies dangerous situations that may result in light to severe bodily injury if the relevant safety instructions are disregarded.

Refer to Chapter 1.4. - Basic safety advice

NOTICE

If protection devices were attached for maintenance or supply and discharge pipe to the safety relief valve blocked, the protection devices/line blockings must be disassembled.

Ensure that a function check is always performed on the safety relief valve following maintenance work.

NOTICE

Safety relief valves must be lifted manually or pneumatically at periodical intervals.

Functional check – see Chap. 7.2

NOTICE

Inspection, maintenance and troubleshooting are to be documented by the user!

7.1 Inspection and Maintenance Intervals

Visual inspections must be carried out continuously every 2-3 months.

- Check electrical and pneumatic supplies.
- Check for leaks, perform a function test of the valves.

NOTICE

To ensure that the safety relief valve is ready for operation and functionally reliable, it should at least be checked annually within the scope of the general internal maintenance procedure. If there are national stipulations of the country of installation as to inspection and maintenance, these have to be complied with.

The service intervals depend on the operating conditions and must be determined by the user.

7.2 Function Checks

Serial No.	Type of activity - pneumatic lifting
1	Apply compressed air to the pneumatic actuator to lift the safety relief valve. The safety relief valve must open and blow off. (lifting motion / measure lift)
2	Relieve the pneumatic actuator of pressure. The test has been completed.

Serial No.	Type of activity - pressurizing
1	Pressurize the system to be protected with a gas pressure slightly above the set excess pressure of the safety relief valve. The safety relief valve must open (lifting motion) and blow off.
2	Reduce the gas pressure of the piping system / tank to the normal or operating pressure. The test has been completed.

Serial No.	Type of activity – manual lifting
1	First, turn the lifting nut (w.a.f.27) clockwise against the actuator and then turn another 1-2 turns. This will lift the valve disk and the valve will blow off.
2	To close the valve, turn the lifting nut anticlockwise up to the cap nut (or to the proximity switch). The test has been completed.

7.3 Spare part kits

Spare part kits (seals) for safety relief valves type 33551 and type 33651

EPDM (E)	DN 25	DN 40	DN 50	DN 65	DN 80
	NPS 1	NPS 1.5	NPS 2	NPS 2.5	NPS 3
33551	033551.00025LE	033551.00040LE	033551.00050LE	033551.00065LE	033551.00080LE
33651	033651.00025LE	033651.00040LE	033651.00050LE	033651.00065LE	033651.00080LE

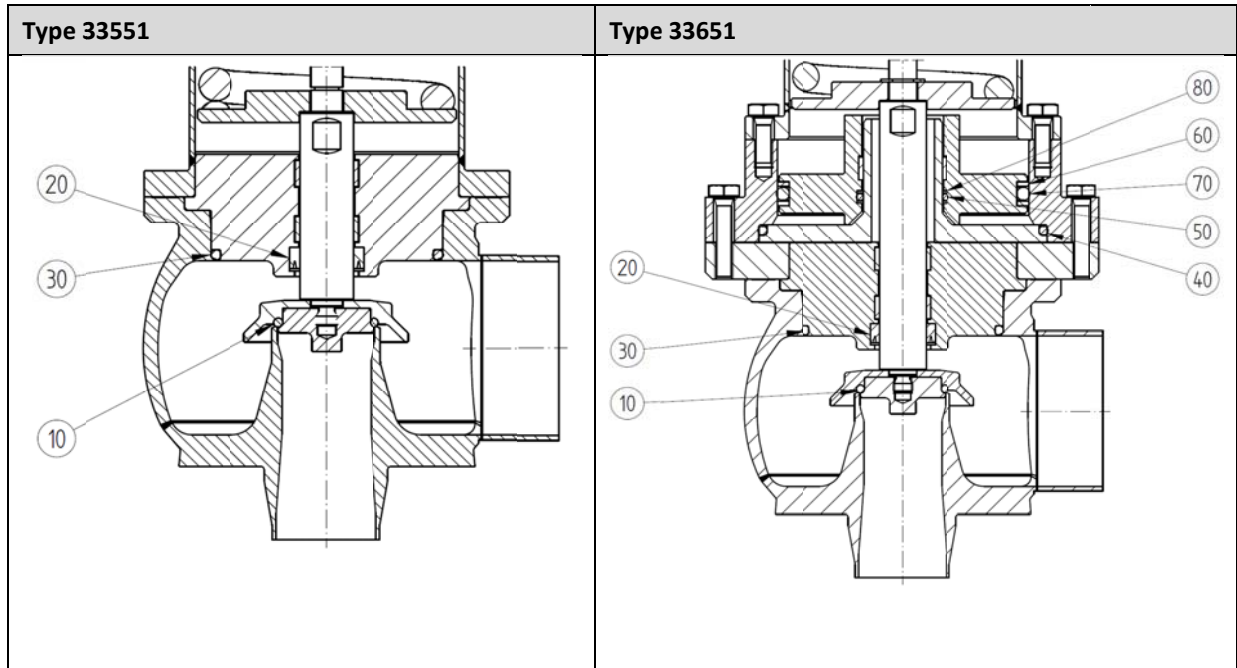
FKM (V)	DN 25	DN 40	DN 50	DN 65	DN 80
	NPS 1	NPS 1.5	NPS 2	NPS 2.5	NPS 3
33551	033551.00025LV	033551.00040LV	033551.00050LV	033551.00065LV	033551.00080LV
33651	033651.00025LV	033651.00040LV	033651.00050LV	033651.00065LV	033651.00080LV

FFKM * (F)	DN 25	DN 40	DN 50	DN 65	DN 80
	NPS 1	NPS 1.5	NPS 2	NPS 2.5	NPS 3
33551	033551.00025LF	033551.00040LF	033551.00050LF	033551.00065LF	033551.00080LF
33651	033651.00025LF	033651.00040LF	033651.00050LF	033651.00065LF	033651.00080LF

* NOTICE: Only the valve seat seal of material FFKM, other seals in the product area of EPDM

NOTICE	
The following points must be taken into account before changing the seal: <ul style="list-style-type: none"> • Clean the sealing grooves before installing the new seals. • Slightly grease the seals using grease approved for the field of food processing. 	

Seal positions in the product wetted area and/or pneumatic actuator



- 10 Valve seat O-ring seal
- 20 Grooved ring seal
- 30 Housing seal O-ring seal
- 40 Piston guide O-ring seal
- 50 Internal piston O-ring seal
- 60 External piston seal support rings (2x)
- 70 External piston O-ring seal
- 80 Internal piston seal support rings (2x)

7.4 Troubleshooting

NOTICE

All faults must be checked and repaired immediately.

The necessary work should only be carried out by qualified personnel keeping strictly to the safety instructions.

Disturbance	Possible causes	Measures
Safety relief valve does not open (pneumatic)	<ul style="list-style-type: none"> Valve seat stuck Pressure insufficient for opening Lifting / opening process is blocked Compressed air supply insufficient Solenoid valve or electrical actuation has been disturbed 	<ul style="list-style-type: none"> Lift the valve manually and clean the valve seat Check the pressure setting Check free movement of the valve spindle (lift the valve manually) Compressed air with a pressure of at least 5 bar should be available Check the compressed air hose Check the solenoid valve
Safety relief valve opens prematurely	<ul style="list-style-type: none"> Possible vibrations Temperature increase in the medium 	<ul style="list-style-type: none"> Eliminate vibrations
Safety relief valve opens and closes alternately (chatter)	<ul style="list-style-type: none"> The pressure difference between operating pressure and response pressure is too small Blow-off volume too small 	<ul style="list-style-type: none"> Lower operating pressure Use smaller valve
Safety relief valve does not close (leak) (pneumatic)	<ul style="list-style-type: none"> Lifting nut is screwed against the housing Seal defective Foreign object jammed in the valve seat The actuator spring is blocked or broken Pressure venting defective 	<ul style="list-style-type: none"> Screw the lifting nut upwards Replace seal Clean the valve body and seat The actuator must only be repaired by the manufacturer or a company certified for the purpose (VR stamp) Check the solenoid valve

