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1 General

1.1 Manufacturer

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1.2 Proper application

RLV units (cleaning air/valve combination) are used in the food and beverages industry.

The RLV unit installed on a process tank or manhole cover fulfils tasks in CO₂/air distribution and the CIP cleaning of the tank interior.

The safety armatures on the RLV unit are used to provide overpressure and underpressure protection in closed process tanks.

RLV units may be used for the intended purpose only.

Always pay attention to country-specific guidelines, tank design, installation situation and specified process data, such as media, pressure and temperature.

During installation, operation and maintenance please pay attention to the generally accepted safety regulations as well as to the operating instructions.

1.3 Misuse

Unintended use applies if:

- operating conditions or uses other than those intended for the component/assembly/system apply,
- media other than those intended for the component/assembly/system are fed through them,
- unqualified personnel carries out the installation, operation and maintenance,
- unauthorized changes or modifications made on the component/assembly/system,
- Notes in the instructions are not observed.

Any improper use will void any warranties and statutory liability claims.

Cleaning-air-valve combination (2-hole)

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1.4 Duties of operator

The operator must ensure in particular that

- the component/assembly/plant is operated in accordance with its intended purpose and in correct functional condition.
- the legal requirements for operation and maintenance are observed.
- only sufficiently qualified authorised personnel performs maintenance on the component/assembly/plant.
- the personnel responsible for operation and maintenance is familiar with and observes the operating and assembly instructions and particularly the safety instructions contained in them.
- the attached safety and warning signs are not removed and remain legible.

2 Safety Information

Notice and Safety

The following safety advice is an addition to existing national regulations and laws for accident prevention. Existing regulations and laws for accident prevention always have to be adhered to. Pay attention to the specific regulations and laws in your country.

The safety advice does not take into account:

- Coincidences and events that may occur during assembly, operation and maintenance.
- Local safety regulations in responsibility of the operator.

Basic safety advice

Requirements for a proper function of the valve/component:

- Proper transportation and storage
- Installation and setting into operation by authorized staff
- Operation according to these operating instructions – proper application
- Proper and regular maintenance



WARNING

Warning – general dangers!

To avoid danger for health and life the following safety instructions strictly have to be obeyed.

- Assembly and setting into operation only by qualified staff.
- Instruction and supervision by the operator.
- Keeping of technical and electrical data as specified in the operating instructions.
- Guarantee the electric safety of external devices.
- Keep legal regulations.

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Non-observance may lead to the following dangers:

- Malfunction of the valve/component respectively of the plant.
- Danger for persons due to electrical, mechanical and chemical affects.
- Danger for the environment due to possible leakage of dangerous media.

2.1 Hazards and Safety Instructions

Endangerment to service personnel	
Explanations	Measures
<p>Squeezing danger for 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 valve. • Do not reach into the seat area of the valve disk with your hands.
<p>The RLV unit can weigh several kilograms.</p>	<ul style="list-style-type: none"> • Secure RLV unit against slipping and falling during assembly, disassembly and in maintenance work.
<p>Shock and impact danger Risk of injury due to the RLV unit falling or uncontrolled unit movements during transportation and lifting.</p>	<ul style="list-style-type: none"> • Never pass under suspended loads and avoid the swivel range.
<p>The RLV unit is partly located at high altitude on the process tank.</p>	<ul style="list-style-type: none"> • Safe access and safe working at height must be guaranteed.
<p>Danger of thermal burns, chemical burns and scalding If the RLV unit in a system is operated with hot media, the surface temperature of the safety valve can also reach this value.</p>	<ul style="list-style-type: none"> • Make sure that the piping system has cooled to a value below 50°C. • Attach warning signs (W026) for hot surfaces. • The piping area in question must be sealed off from the rest of the piping system.
<p>When discharging fluid from the safety relief valve, there is a risk of burns, scalding or chemical burns for the operating and service personnel.</p>	<ul style="list-style-type: none"> • Make sure that the fluids are discharged properly and safely (exhaust line). • Make sure that the valve is not opened in an uncontrolled manner during maintenance work.
<p>Performing work on the RLV unit or operating armatures manually when the pressure in the process tank has not been released, or the piping system has not been shut off, may result in burns, scalding or chemical burns.</p>	<ul style="list-style-type: none"> • Ensure that the piping system is shut off and the pressure inside the tank has been released
<p>Chemical burns If the RLV unit is operated in a system with acidic or alkaline media, your hands and fingers may suffer chemical burns when disassembling the unit</p>	<ul style="list-style-type: none"> • Ensure that the product area of the system is rinsed in advance. • Check the system pressure before removing the RLV unit.

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<p>Danger of electric shock If the RLV units are used outdoors, heating elements can be fitted</p>	<ul style="list-style-type: none"> • Ensure that they are switched off electrically during maintenance work
<p>Malfunction due to incorrect handling</p>	
<p>Explanations</p>	<p>Measures</p>
<p>If the valve is not checked or maintained at regular intervals, this can lead to malfunction or major functional disruption</p>	<ul style="list-style-type: none"> • Check the valve during operational maintenance cycles. • Inspection and maintenance work should only be carried out by qualified staff.
<p>Malfunction through improper use</p>	
<p>The range of application of the RLV unit is intended for specific operating states (pressure, temperature, media).</p>	<ul style="list-style-type: none"> • Ensure proper use.



DANGER

Danger – endangerment caused by product-specific and process-specific conditions!

While the compressed air supply is connected, hands may be crushed as a result of reaching into the interior of the valve housing.

- Make sure that the compressed air supply has been disconnected.
- Therefore, never place your hand inside the valve housing.



WARNING



Warning – general dangers!

If the pressure system is subjected to increased media temperatures, the surface temperature of the armature can also reach this value.

- Attach warning signs (W026) for hot surfaces.



CAUTION

Caution – damage to components!

Installation of faulty or non-specified parts or using the same as replacement parts may disable or disrupt functionality considerably.

- Only use parts approved by the manufacturer.

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3 Delivery, Completeness, Storage

- Check the data of the delivery note for factual correctness and the material for completeness. We regret that money cannot be refunded after purchase.
- Always check the material for transport damages. Possible damages have to be informed immediately.
- Store the material in a dry place and if possible in its original packaging.

4 Technical Description

The RLV unit (cleaning air/valve combination) with the integrated switching valve (2) takes on the functional separation between the CIP tank cleaning and the CO₂/air supply and outflow. Two central tank connections are required for the installation on the upper tank floor; therefore, the name "2-hole RLV".

The media supply (1) occurs via a combined standpipe on the process tank. A larger coupling (4) for the mounting pipe with spray head (3) to fit through and a laterally offset smaller coupling (5) for the CO₂/air supply and outflow are required.

Depending on the tank length, several spray head couplings and an end air coupling must be provided for horizontal tanks.

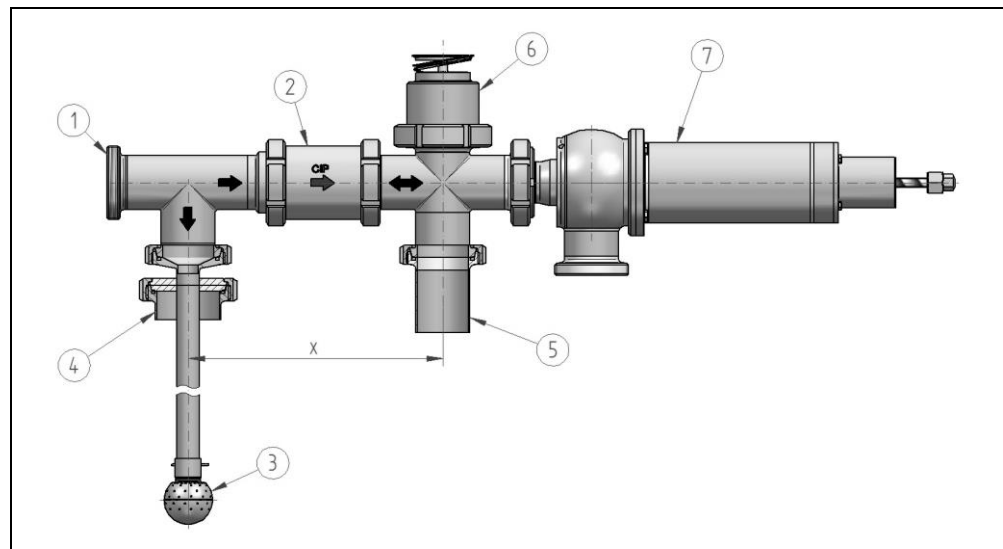




Fig. 1: cleaning air/valve combination

- | | |
|---|--------------------------------------|
| 1 | Connection CIP/CO ₂ /air |
| 2 | Switching valve |
| 3 | Mounting pipe with spray head |
| 4 | Tank connection CIP |
| 5 | Tank connection CO ₂ /air |
| 6 | Vacuum valve |
| 7 | Safety valve |
|  | CIP |
|  | CO ₂ /air |

Cleaning-air-valve combination (2-hole)

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4.1 Technical Data

Product range

Material	Stainless steel 1.4404, 1.4307
Seals	EPDM (FDA proof)
Surface inside	≤ 0.8 μm
Surface outside	Precision-turned, matte

Production / CIP

Operating pressure	PS min/max 0/10 bar-g
Temperature	TS min/max 0/95 °C
Fluids (nontoxic)	Fluids/gases/steam (Group II, PED 2014/68/EU) Readily commercially-available CIP cleaning media with 2-4 % lye/acid

5 Operation

5.1 Operating instructions

ATTENTION

Note

Correct and safe operation of the RLV unit is only guaranteed if the descriptions and instructions in the operating manuals for the safety armatures and spray head are also observed.

- Observe the mounting direction (directional arrow) of the switching valve
- Overpressure and underpressure protection of the process tank with safety armatures, especially safety and vacuum valve (observe the set pressures!).
- Internal cleaning of the process tank with a static or dynamic spray head. (Liquid pressure of 1.5 to 2 bar must be observed).
- Controlled, even supply of CO₂/air

Operation:

The spring-loaded switching valve (2) is normally opened.

- Supply of CO₂/air in the process tank (purging, pretensioning)
- Outflow of CO₂ for fermentation from the process tank.

During the supply of CIP liquid, the switching valve (2) is closed by the flow pressure.

- CIP liquid is guided into the process tank via the spray head.

Gas control:

BA_009900.06_EN

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During the supply or outflow of CO₂/air, the spring-loaded switching valve remains open and the media can flow in both directions.

- The flow velocity must be restricted for the supply to prevent the switching valve closing.

The following guidance values apply:

DN 25 - DN 50 max. 25 - 20 m/s

DN 65 - DN100 max. 15 - 10 m/s

CIP cleaning:

The product-side cleaning of the RLV unit and the installed safety armatures is performed during the tank cleaning.

- During cleaning, the switching valve closes automatically due to the liquid pressure and the flow of liquid is directed to the spray head.
- The area behind the switching valve is also sprayed during cleaning thanks to the nozzle holes in the valve disk.

Installation of the RLV unit must ensure that soiling caused by ambient conditions is either fully excluded or minimised. The outer surface of the manhole cover unit should be cleaned by hand at regular intervals.



CAUTION

Caution – damage to components!

Incorrect cleaning agents can damage the fittings.

- Only use cleaning agents which are appropriate for stainless steel and the seals. Please refer to the safety data sheets of the cleaning agents.

5.2 Design Variants

Type	DN	Tank connection	Function and safety features		
09900	25 - 100	2	Switching valve	---	---
09901	25 - 80	2	Switching valve	Vacuum valve	---
09902	25 - 80	2	Switching valve	Vacuum valve	Safety relief valve
09903	25 - 80	2	Switching valve	---	Safety relief valve

Type series 09900 – 09903 Switching valve with plastic cone

Cleaning-air-valve combination (2-hole)

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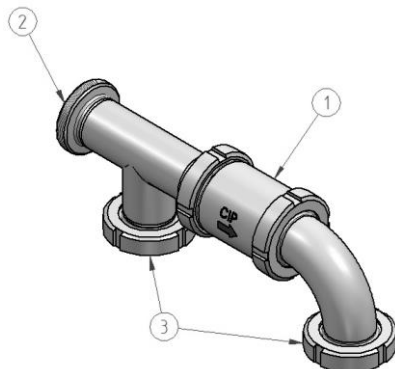
Type	DN	Tank connection	Function and safety features		
			Switching valve	Vacuum valve	Safety relief valve
09905	25 - 65	2	Switching valve	---	---
09906	25 - 80	2	Switching valve	Vacuum valve	---
09907	25 - 80	2	Switching valve	Vacuum valve	Safety relief valve
09908	25 - 80	2	Switching valve	---	Safety relief valve

Type series 09905 – 09908 Switching valve with stainless steel cone

Type Typ 09900/09905

consisting of switching valve for CIP/CO2 distribution:

- Predominantly used on a manhole cover
(larger safety armatures are installed separately from the RLV)
- Applications in larger tank volumes



- 1 Switching valve
- 2 CIP connection
- 3 Tank connection

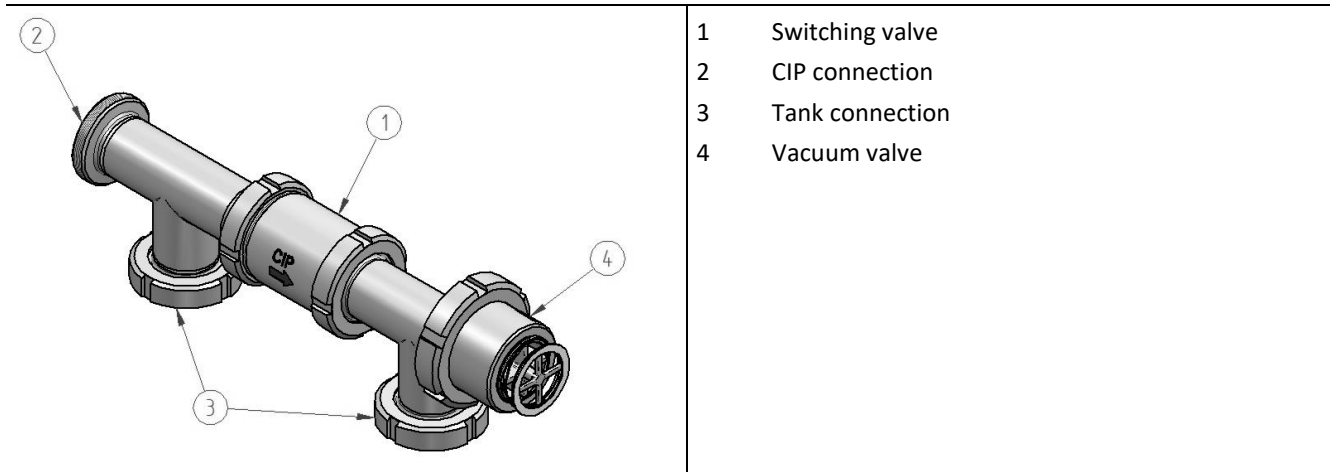
Cleaning-air-valve combination (2-hole)

09900 - 09903; 09905 - 09908

Type Typ 09901/09906

consisting of switching valve for CIP/CO₂ distribution with vacuum valve:

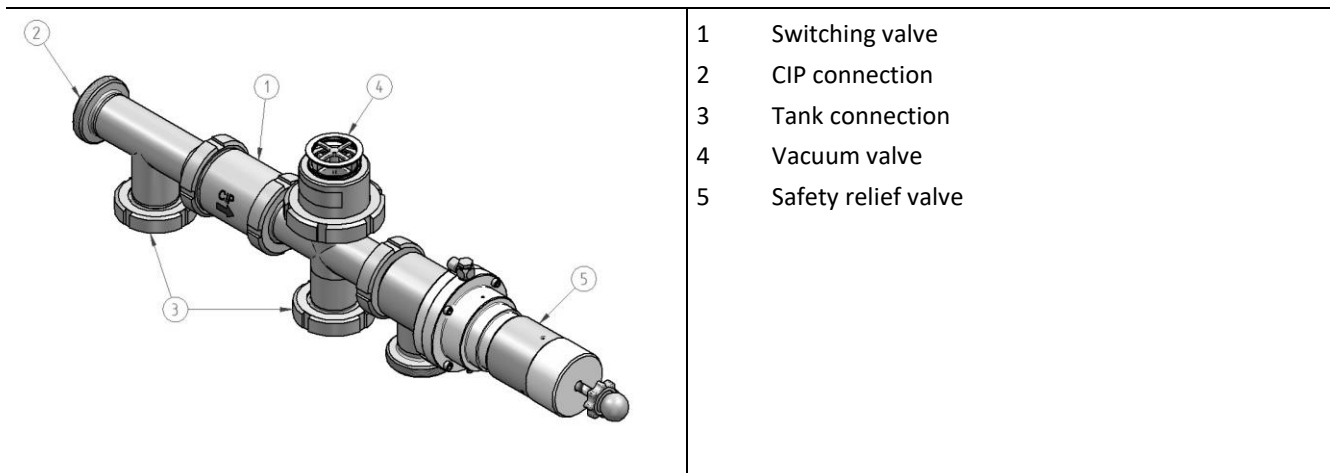
- Vacuum valve, spring-loaded or weight-loaded
 - Application for standard CIP processes
 - Applications in smaller and medium tank volumes



Type Typ 09902/09907

consisting of switching valve for CIP/CO₂ distribution with safety relief valve and vacuum valve:

- Safety relief valve, spring-loaded (acc. DGRL/PED or ASME UV)
- Vacuum valve, spring-loaded or weight-loaded
 - Standard RLV unit
 - Application for standard CIP processes
 - Applications in smaller and medium tank volumes



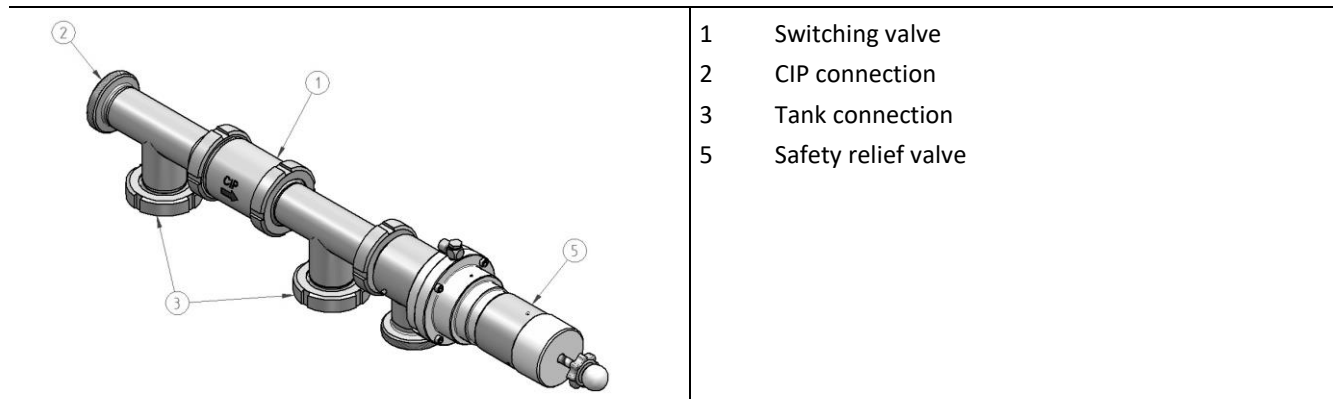
Cleaning-air-valve combination (2-hole)

09900 - 09903; 09905 - 09908

Type 09903/09908

consisting of switching valve for CIP/CO₂ distribution with safety relief valve:

- Safety relief valve, spring-loaded (acc. DGRL/PED or ASME UV)
 - Application for standard CIP processes
 - Applications in smaller and medium tank volumes



Variants (depending on the version)

RLV [DN]	Process tank to Ø [m]	Connection nominal width [DN]				SK* [DN]	SV* [DN]	VV* [DN]
		CIP-RLV	Tank 1	Tank 2	Mounting pipe			
25	3,0	25	65	25	25/25	25	15 - 25	25
40	3,0	40	65	40	40/25	25	25 - 40	40
50	4,5	50	80	50	50/32	32	40 - 50	50
65	6,0	65	100	65	65/50	50	50 - 65	65
80	6,0	80	100	80	80/50	50	50 - 65	80
100**	10,0	100	100	100	-	-	-	-

*SK Spray ball

*SV Safety relief valve

*VV Vacuum valve

**applies to 09900

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09900 - 09903; 09905 - 09908

6 Assembly

6.1 Assembly instructions

Please pay attention to the following prior to installing and commissioning the RLV unit:

- Check the unit for visible external and internal damage.
- Check the current system status (pressure, temperature, medium).
- Pay attention to the safety instructions and the instructions regarding the assembly, operation and maintenance of the RLV unit and safety armatures in the respective operating manuals.

Installation instructions:

- The RLV unit should be installed free of tension – for larger units a suitable, safe hoisting device can be used.
- Clean the joining surfaces in advance and ensure the seal is positioned correctly.

ATTENTION



- Welding work should only be carried out by qualified welders (EN 287-1).
- Always remove weld residue.

Assembly instructions:

- Do not damage the valve insert, sliding surfaces or sealing surfaces. Only use suitable tools and tensioning devices.
- Only use suitable and approved spare parts from the manufacturer.
- Slightly grease seals and insert them evenly into the groove. (Only use grease approved for the field of food processing).
- Bolts, slightly grease threads. Tighten parts evenly.
- Following assembly work, you should always perform a function check.

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09900 - 09903; 09905 - 09908

6.2 Disassembly instructions

RLV-units 0990x

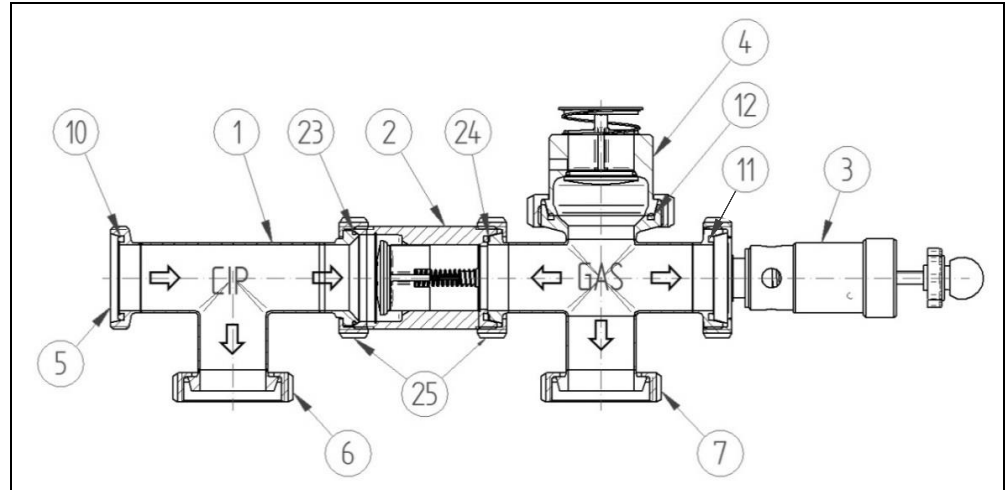


Fig. 2: Example RLV

Switching valve 09801

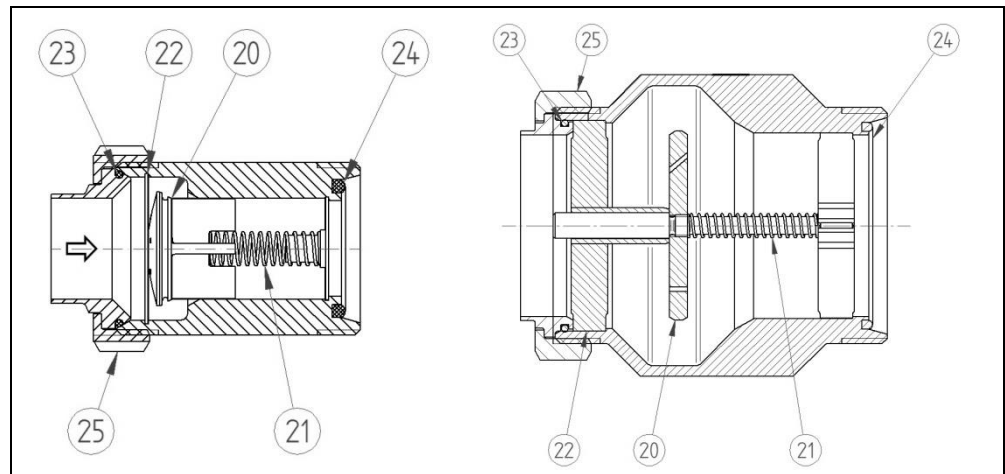


Fig. 3: DN 25 – 65

DN 80 - 100

1	RLV housing	11	Sealing ring (SV)
2	Switching valve	12	Sealing ring (VV)
3	Safety reliefvalve (SV)	20	Valve cone (DN 25-65) /
4	Vacuum valve (VV)	20	Valve disk (DN 80-100)
5	CIP connection	21	Pressure spring
6	Tank connection CIP	22	Stopper (DN 25-65) /
7	Tank connection Luft/CO2	22	Guide star (DN 80-100)
		23	O-ring

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		24	Sealing ring
10	Sealing ring	25	Coupling

Replacing parts:

The switching valve is wear-free and can be dismantled easily if necessary:

- Disassembling the RLV unit
 - > Loosen the CIP coupling (5) at the standpipe, loosen both tank couplings (6, 7)
 - > Remove the RLV unit from the top (mounting pipe with spray head remains in the tank)
 - >> The seal (10) can be replaced.

 - Disassembling the switching valve
 - > Loosen both couplings (25) at the installed switching valve, (loosen the rear coupling first)
 - > loosen the front coupling and disassemble the valve insert
 - >> both seals (23, 24) can now be replaced

 - Dismantle the switching valve
(valid for type series 09900 – 09903 and type series 09905 – 09908 with stainless steel cone DN80 and DN100)
- Info: Switching valves with stainless steel cone DN 25 - 65 must not be disassembled. If necessary, the complete valve must be replaced.
- > Bend the stopper (22) and remove it from the groove (observe the spring tension!) or disassemble the guide star (22)
 - > Disassemble the valve cone/valve disk and the pressure spring
 - >> The pressure spring (21) can be replaced.

ATTENTION



Note

- Make sure the stopper/guide star is inserted and positioned correctly during subsequent assembly!

Cleaning-air-valve combination (2-hole)

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7 Maintenance

7.1 Maintenance

Inspection and maintenance intervals:

- Visual inspection of the RLV unit must be carried out every 4 weeks.
>> Check for leaks, perform a manual function test.
- To ensure that the RLV unit and installed armatures are ready for operation and functionally reliable, they should be checked annually within the scope of the general internal maintenance procedure. .
>> Maintenance intervals must be set by the user.
- After maintenance, always remove protective devices and reconnect the feed and drain lines to the RLV unit.
- Ensure that a function check is always performed following maintenance work, including for the safety armatures.

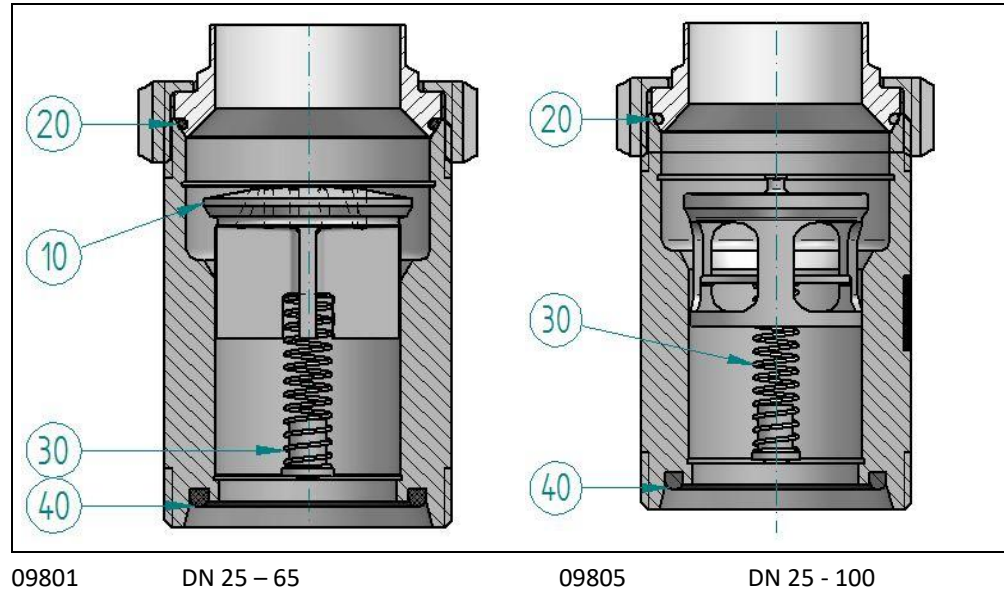
7.2 Trouble-Shooting

Faults	Possible causes	Measures
RLV unit leakage	<ul style="list-style-type: none"> • Seal between the flange and the housing damage • Flange bolts have become loose • Screw connections at the installed components have become loose 	<ul style="list-style-type: none"> • Replace seal • Test tightening torque Retighten screw connections
Noise development	<ul style="list-style-type: none"> • Uneven flow 	<ul style="list-style-type: none"> • Check process conditions
Throughput fluctuation	<ul style="list-style-type: none"> • Poor CIP cleaning • Poor gas supply and outflow 	<ul style="list-style-type: none"> • Check CIP supply • Check spray head • Check switching valve • Check piping system • Check switching valve • Check gas throughput and gas pressure
Malfunctioning safety armatures	<ul style="list-style-type: none"> • See operating manual for respective armature 	<ul style="list-style-type: none"> • Faults must be eliminated immediately

Cleaning-air-valve combination (2-hole)

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7.3 Spare parts



DN	09801*	09805**
25	009801.00025LE	009805.00025LER1
32	009801.00032LE	009805.00032LER1
40	009801.00040LE	009805.00040LER1
50	009801.00050LE	009805.00050LER1
65	009801.00065LE	009805.00065LER1
80	---	009805.00080LE
100	---	009805.00100LE

LE – EPDM

09801* - with plastic cone; 09805** - with stainless steel cone