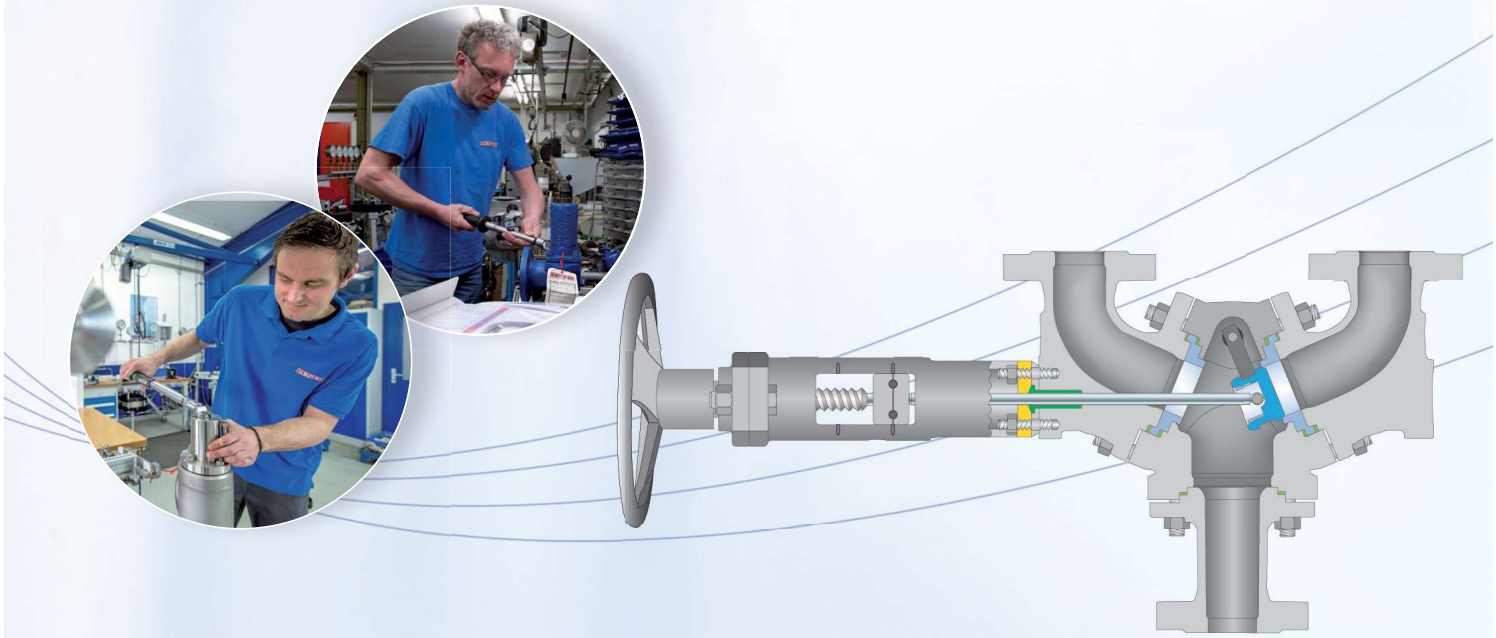
Instructions
Change-over Valve

Operating instructions
Betriebsanleitung
Instructions de service
Instrucciones de operación
Istruzioni per l‘uso
Руководство по эксплуатации
安装操作维护手册



LESER

The-Safety-Valve.com

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Contents

1 Introduction

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1.1 Manufacturer

LESER manufactures Change-over Valves for all industrial applications. A large selection of types, materials and options are available.

Change-over Valves from LESER fulfil all quality and environmental requirements.

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1.2 About this Document

This document describes Change-over Valves and attachments produced by LESER. It contains information regarding the design, function and installation of these valves and attachments. The document does not contain instructions regarding the actual use of these parts in the system.

Certain regulations and standards apply depending on the country of operation, the system and the fluid. These regulations and standards must be followed according to local regulations.

Always observe the instructions in the supplier documentation and adhere to the applicable occupational health and safety regulations. Also comply with all applicable environmental protection regulations.

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1.3 Illustration Conventions

Safety guidelines and warnings identify safety-relevant information. The safety instructions differentiate between the following risk levels:

Signal word	Consequences of non-compliance
⚠ DANGER	Non-compliance results in serious or fatal injury.
⚠ WARNING	Non-compliance might result in serious or fatal injury.
⚠ CAUTION	Non-compliance might result in minor injury.
CAUTION	Non-compliance might result in damage to property.

2 Safety

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2.1 Proper use

Change-over Valves allow for the continuous operation of pressurised systems. For this purpose, two safety valves are connected through a Change-over Valve to a pressurised system. Such an arrangement allows for interruption-free operation of the system, as one safety valve is in operation and the other serves as a standby safety valve. The standby safety valve can be dissembled and serviced while the plant is in operation.

Each Change-over Valve type is designed for a specific pressure and temperature range and specific media classes (vapours, gases, fluids).

The maximum permissible operating limits are determined by the following factors:
- the material of the Change-over Valve,
- the operating temperature,
- the operating pressure,
- the medium,
- the flange rating classes.

To determine whether a specific Change-over Valve is approved for the intended purpose, check the approval documentation.

Depending on the system design, there might be temperature and pressure limits for specific media.

2.2 Improper use

Change-over Valves must not be used improperly.

Any modification to the Change-over Valve is deemed improper, as it might affect the function and the performance of the Change-over Valve.

Such modifications also include the application of a protective coating to moving and functional parts.

The operation of the Change-over Valve at pressures that are outside the allowable range is prohibited.

The Change-over Valve must not be blocked. Blocking the handwheel using the optional locking device is permitted. Before changing over, release the locking device.

Do not use the actuator assembly of the Change-over Valve as a hanger for other objects.

2.3 Standards and technical guidelines

The Change-over Valves conform to the latest technical standards applicable at the time of delivery.

The standards and technical guidelines that are fulfilled by a specific type of Change-over Valve can be found in the Declaration of Conformity.

2.4 Safety instructions

2.4.1 Safe handling of media

Malfunctions might occur during the operation of the Change-over Valve. In such cases, hazardous media might escape. Contact with residual media in the Change-over Valve can cause injury from poisoning, caustic and other burns.

When working with dangerous or harmful media, the respective regulations and standards must be followed. Dangerous media includes:
- toxic media,
- caustic media,
- irritating media,
- environmentally hazardous media,
- hot media,
- explosive media.

For certain media, it may be necessary to install Change-over Valves of a special design. For instance: for oxygen, you must install oil and grease-free valve types. It is the responsibility of the operator to check whether the materials from which the Change-over Valve is made is compatible with the media to be used in the plant.

When handling hazardous media, always use appropriate safety equipment and collection containers and wear suitable personal protective equipment.

Certain media, for instance corrosive or abrasive substances and media with a high particle content, can cause malfunctions, as particles might become trapped in the Change-over Valve. Regularly service the Change-over Valve and check it for free movement.

2.4.2 Modification of Change-over Valve

Unauthorised modifications to the Change-over Valve are prohibited. Modifications can lead to leakage or inadmissibly high pressures in the system. This, in turn, results in a higher risk of injury.

Do not insulate the actuator assembly of the Change-over Valve, as this could cause the valve to become blocked.

Moving and functionally-important parts must not be given a protective coating.

Regularly inspect the Change-over Valve for inadvertent changes, such as damage to the seatings or foreign objects in the valve.

2.4.3 Ambient and operating temperature

Materials tend to expand at high temperatures. Take this fact into account when choosing and installing the Change-over Valve.

At low ambient and/or operating temperatures, ice may form inside the Change-over Valve, vapours may freeze and the flow rate may drop. This can impair the function of the Change-over Valve. Observe the operating temperatures of the Change-over Valves and perform regular function tests.

Skin contact with hot or cold surfaces can cause injury from burns. Always wear suitable personal protective equipment.

2.4.4 Potential hazard zones on components

Sharp edges and burrs, and exposed spindle guides can cause injury. Always wear suitable protective gloves and install appropriate safety guards.

2.4.5 High noise emissions

Certain systems cause high noise emissions when in operation. Always wear suitable hearing protection.

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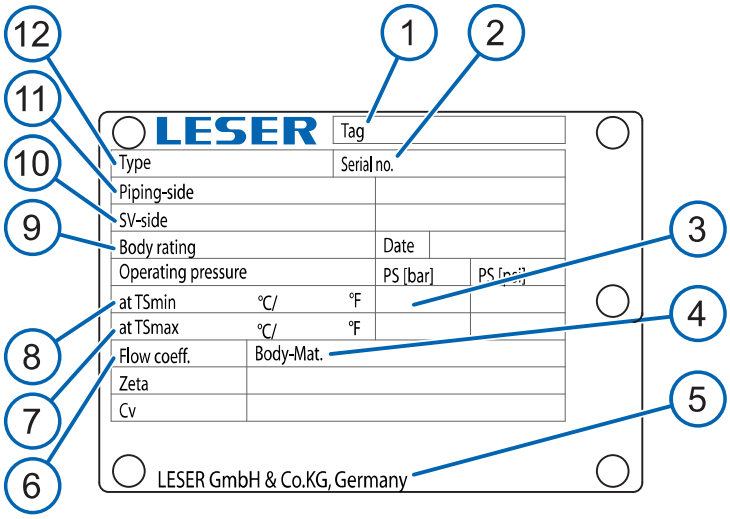
3 Marking

Each Change-over Valve is equipped with a type plate.
It may feature additional markings, e.g.:

- marking with a marking stamp,
- cast marking,
- hammered-in marking,
- detachable label.



Type plate

1 Tag number
2 Serial number
3 Operating pressure
4 Body material
5 Manufacturer and country
6 Discharge coefficient
7 Max. permissible operating temperature
8 Min. permissible operating temperature
9 Rated pressure according to DIN or ASME class
10 Nominal diameter and pressure rating at safety valve side
11 Nominal diameter and pressure rating at safety pipeline side
12 Product number

In the event of a modification to the Change-over Valve, which always requires the prior consent of the manufacturer, these specifications need to be amended accordingly.

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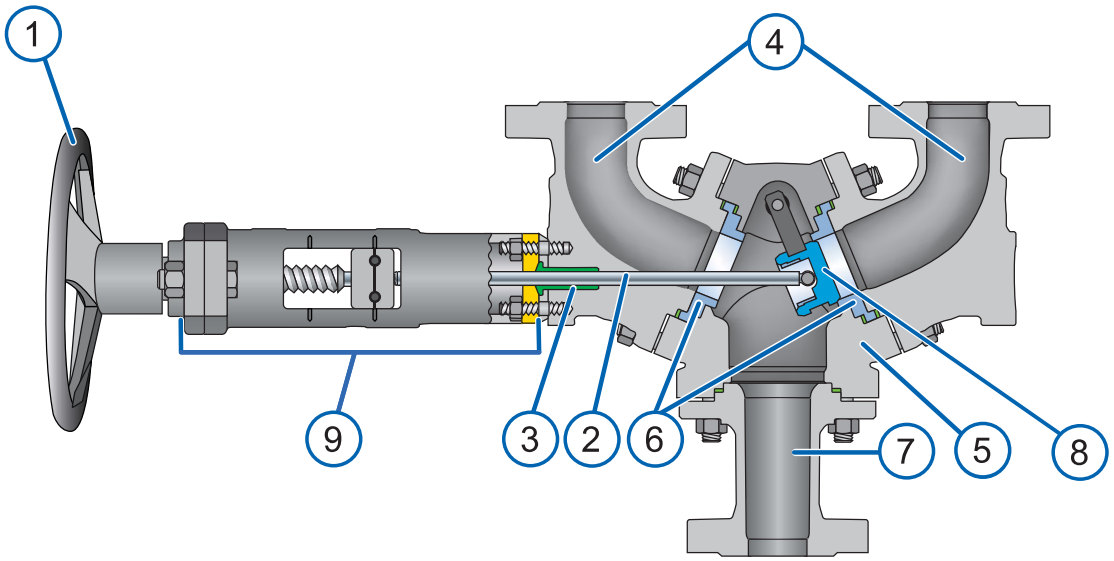
4 Design and function of Change-over Valves

4.1 Designs

Change-over Valves come in different designs.
– single valve,
– combination with safety valves at inlet side
– lockable combination with safety valves



Design of Change-over Valve

1 Handwheel
2 Spindle
3 Packing gland
4 Elbow
5 Base Unit
6 Seats
7 Inlet body
8 Disc
9 Operating unit

4.2 Gaskets and leaks

Change-over Valves are always designed as metal-to-metal seated valves. They are sealed against the atmosphere by means of an adjustable packing gland installed between the seat and the disc at the actuator side, and by flat gaskets installed between the body sections. If the seatings are damaged, the Change-over Valve may no longer be tight. Therefore, the seatings must be inspected regularly by the operator.

To detect leaks between the seat and the disc, mount a check gauge in the elbows (see chapter „4.5 Spül- und Manometeranschluss“ auf Seite 12). To

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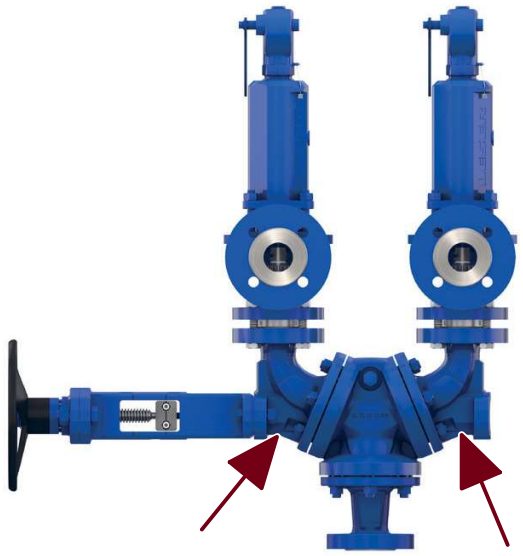
minimise emissions, choose the valve type that conforms to the Technical Instruction on Air Quality Control (TA-Luft).

Collect escaping media in suitable collection containers.

4.3 Drainage

Certain Change-over Valves are equipped with drainage openings in the two elbows. The drainage opening is used to release any residual medium at the blocked side before the safety valve is removed, preventing spillage.

During normal operation, the drainage openings must be closed. Ensure that the screw fittings/screws do not protrude into the flow area, as this would result in a pressure loss.



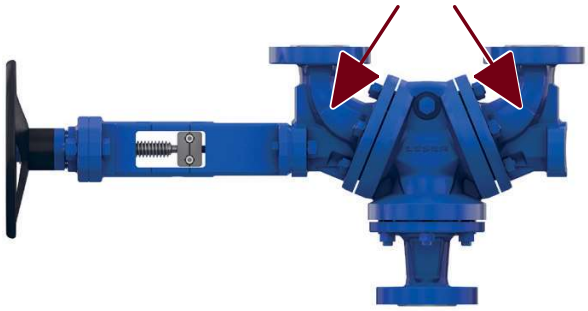
Drainage openings of Change-over Valve

Due to the position of the drainage openings, not all residual medium is drained out. To prevent injury, avoid contact with the residual medium.

4.4 Pressure relief

Certain Change-over Valves are equipped with pressure relief valves (flange shut-off valves or needle valves). The pressure relief valve is used to release the pressure at the blocked side before the safety valve is removed.

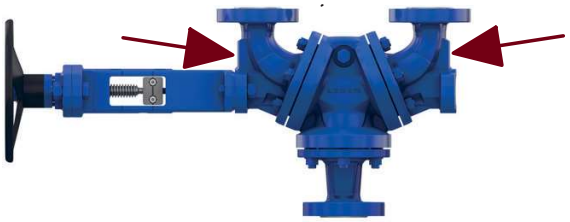
If the medium or the pressure poses a danger, choose a Change-over Valve with a pressure relief valve.



Pressure relief by means of needle or flange shut-off valves

4.5 Flushing and pressure gauge connection

Certain Change-over Valves are equipped with a flushing and pressure gauge connection. The flushing and pressure gauge connection is designed for the attachment of a check gauge. The check gauge is used to check whether there is any pressure left in the blocked elbow before the safety valve is removed. After removal of the safety valve, the depressurised elbow of the Change-over Valve can be flushed through the flushing and pressure gauge connection.



Flushing and pressure gauge connections

During normal operation, the flushing and pressure gauge connections must be closed.

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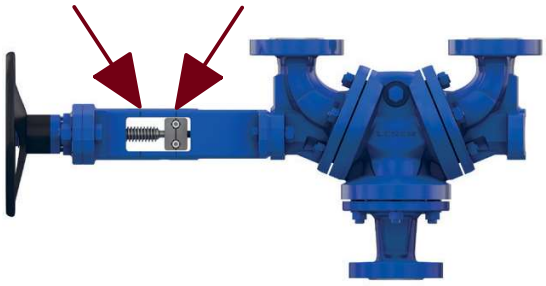
4.6 Lift indicator

Certain Change-over Valves feature lift indicators that monitor the switching position of the Change-over Valve. The lift indicator is installed in the traverse of the actuator assembly.

Ensure that the lift indicator is not screwed too far into the device, so that it does not block the spindle and/or the position indicator.



Lift indicators

4.7 Operating pressure and pressure loss

The Change-over Valve must have correct dimensions so as not to interfere with the function of the safety valves. For this purpose, the inlet pressure loss and the back pressure must be taken into account when designing and selecting the dimensions of the system.

4.8 Ambient conditions

The Change-over Valves and pipelines must be protected from atmospheric influences. Do not insulate the actuator assembly.

For extreme conditions, LESER recommends installing Change-over Valves made in stainless steel.

4.9 Protective coating

Change-over Valves are given a protective coating at the factory. This coating protects the Change-over Valve during storage and transport. If the ambient conditions are corrosive, additional corrosion protection is necessary.

Moving and functionally-important parts must not be given a protective coating.

4.10 Lubrication

For smooth switching, it may be necessary to lubricate the spindles. Use a lubricant that is suitable for the operating temperature.

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5 Packaging, transport and storage

5.1 Packaging

The Change-over Valves must be properly packaged to prevent damage during transport. All seatings and threads must be equipped with protectors.

5.2 Transport

⚠ CAUTION

Damage from toppling over

If a Change-over Valve topples over, the seatings might become damaged. In such a case, the Change-over Valve is no longer tight, so that medium might escape, causing injury.

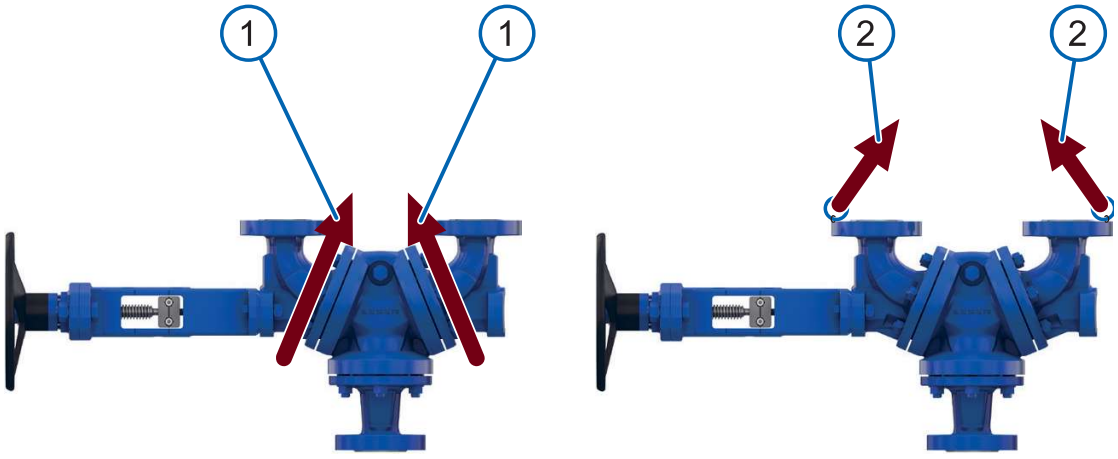
– Protect the Change-over Valve with suitable protectors.
– For transport, secure the Change-over Valve to prevent it from toppling over.

CAUTION

Damage caused by incorrect lifting

Lifting the Change-over Valve by the actuator assembly, the handwheel or other attachments might cause damage to the valve.

– Lift the Change-over Valve only with lifting straps or by its eye bolts.



Transport fixtures

1 Attachment of lifting straps
2 Eye bolts at valve flanges

Attach the lifting straps directly to the valve body or to the eye screws and nuts secured to the valve flange. Lift and transport the Change-over Valve with suitable lifting gear.

For transport, Change-over Valves must be protected against dirt.

5.3 Storage

Store the Change-over Valves in a clean and dry place.

Change-over Valves are equipped with flange protection caps at the factory. These flange protection caps must be in place during storage.

Temperature	Values
Safe storage temperature	41 °F / 5 °C to 104 °F / 40 °C
Maximum storage temperature	122 °F / 50 °C
Minimum storage temperature	14 °F / -10 °C

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6 Installation

6.1 Instructions for the installation of a Change-over Valve

Only trained personnel may install Change-over Valves.

Before installing the Change-over Valve, inspect it for leakage.

Observe the manufacturer's instructions for the fastening elements. Adhere to the specified tightening torques.

All designated fastening elements must be used so that no excessively high forces or mechanical stress may arise.

The Change-over Valves must be installed so that the spindle in the valve is in a horizontal position. The spindle is not designed for vertical installation.

When installing the Change-over Valves, ensure that the drainage openings are at the lowest point of the assembly.

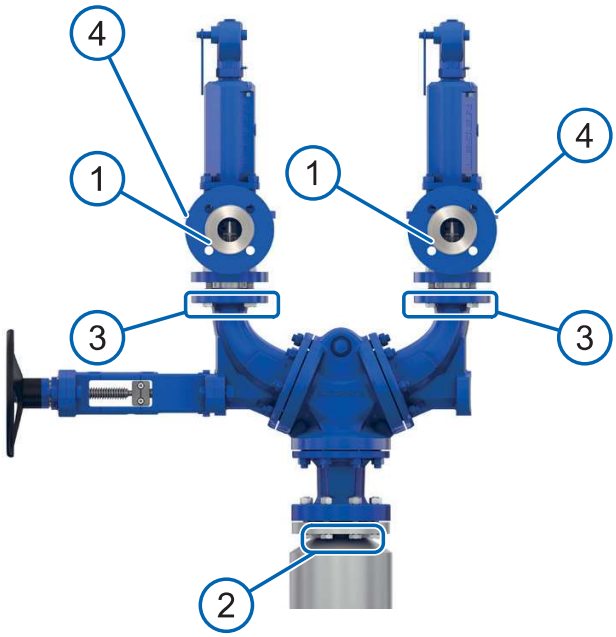
Establish the connections according to applicable regulations and standards.

Observe the direction of flow indicated on the inlet body and elbows.

Change-over Valves must be installed in such a way that dynamic vibrations in the system cannot be transmitted to the safety valves. In systems where vibration cannot be eliminated, install anti-vibration devices.

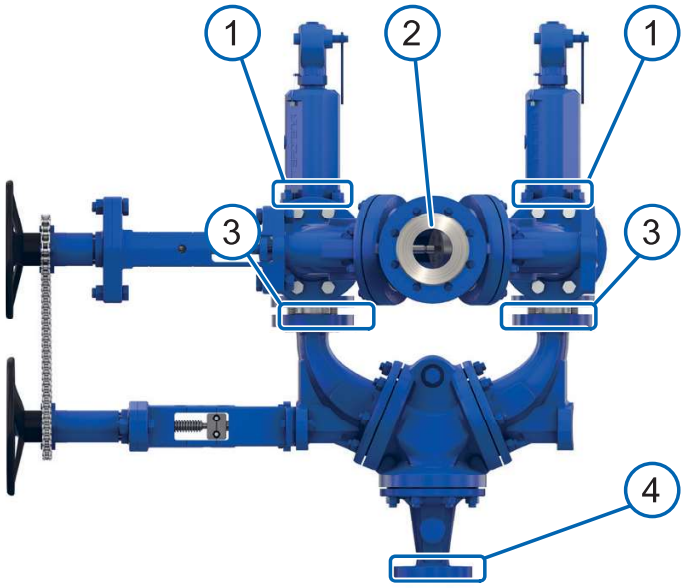
For correct installation, reaction forces and temperature expansion during operation must be taken into consideration. Take stress-relief measures such as:

- support of outlet pipeline,
- support of inlet pipeline,
- support of Change-over Valves around flange circumference at safety valve side,
- support of safety valves through bores in cast support brackets.



Support options with lockable combination

1 Support of outlet pipeline
2 Support of inlet pipeline
3 Support of Change-over Valves around flange circumference at safety valve side
4 Support of safety valves through bores in cast support brackets



Support options with inlet and outlet side combination

1 Support of safety valves through bores in cast support brackets
2 Support of outlet pipeline
3 Support of Change-over Valves around flange circumference at safety valve side
4 Support of inlet pipeline

Ensure that the inlets and outlets of the Change-over Valve are sufficiently large, suitable for the site and operating conditions and positioned to maximise flow (see operating instructions for LESER safety valves).

Make sure that the medium can flow freely through the valve, so that the function of the safety valves is not impaired in any way.

The specified maximum pressures and inlet pressure losses for the built-in safety valves, and the maximum operating temperature must not be exceeded.

6.2 Example of Change-over Valve installation in a system

CAUTION

Damage caused during installation

During installation, the Change-over Valve might be damaged if it is dropped or exposed to other impacts.

– Therefore secure the Change-over Valve during installation to prevent it from falling.
– During installation, protect the Change-over Valve against mechanical impact.

Prerequisites

– The Change-over Valve has been identified as being the correct one (type plate).
– A visual inspection of the system has been performed.
– Flat gaskets that do not obstruct the flow area are available at the installation site.
– The connections have been checked for leakage.
– The system has been flushed.
– All necessary tools are ready at the installation site.
– Suitable studs and nuts are ready at the installation site. For the installation of the Change-over Valve, it may be necessary to use longer studs (see product catalogue).
– Lifting gear and lashing equipment with the necessary load capacity (e.g. crane or forklift truck) are available at the installation site.
– The pipeline system into which the Change-over Valve is to be installed is free of force and torque stress.
– The dimensions of the connections have been checked and are correct.

⚠ CAUTION

Risk of injury from falling parts

Falling parts can cause injury.

– Secure all parts against falling.

Procedure

1. Set the Change-over Valve to the centre position.
2. Attach the lifting straps to the valve body or the eye bolts screwed to the elbows.
3. Lift the Change-over Valve with suitable lifting gear, transport it to the site of installation and position it correctly.

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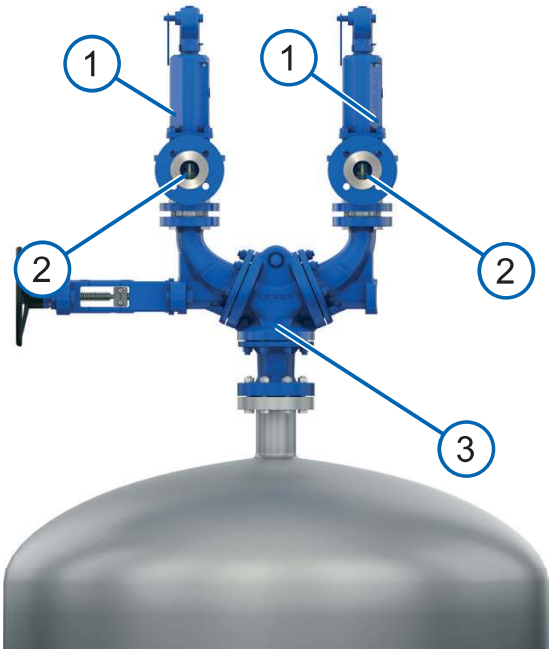
4. Align the connections of the Change-over Valve to the system connections.
5. Remove the protectors and the flange protection caps.
6. Insert the flat gaskets between the flanges.
7. Insert the flange screws and secure them with the nuts.
8. Tighten the nuts crosswise.
9. Connect the safety valves to the Change-over Valve.
10. Turn the spindles to position the disc of the Change-over Valve to the very left or the very right.
11. Seal the optional openings (e.g. drainage openings) at the Change-over Valve.
12. Connect the optional lift indicators to the process control unit.
13. If connecting Change-over Valves to pilot-operated safety valves (POSV) in order to provide a separate pressure take-off point, ensure that the opening of stagnation pressure pipe in the inlet of the Change-over Valves is facing against the flow.
    » The Change-over Valve is installed.



Inlet side combination

1 Safety valves
2 Pipeline to blow-out system
3 Change-over Valve

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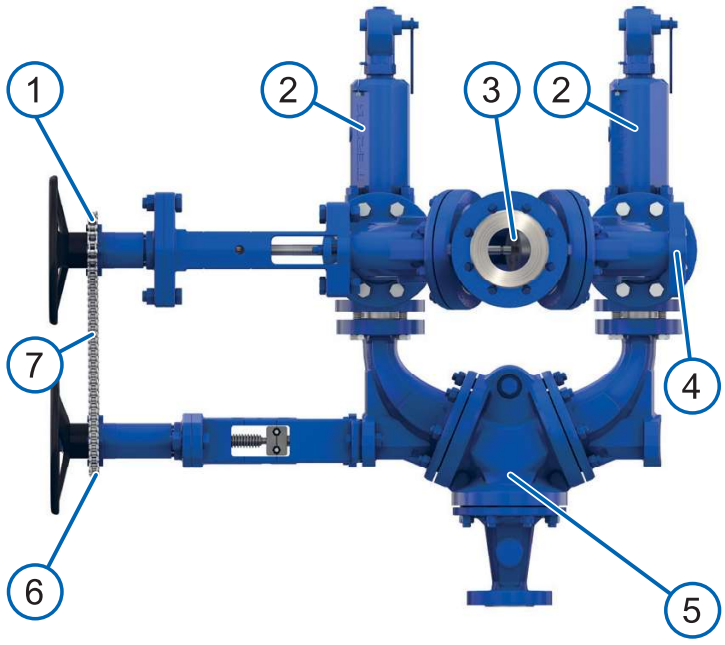
6.14 Example of connection of Change-over Valve combinations

When installing a Change-over Valve combination, the chain wheels of the two Change-over Valves are linked to each other with a chain. This allows for synchronised switching of the Change-over Valves.

Procedure

1. Position the discs of the Change-over Valves to be connected to the very left or the very right.
2. Turn the handwheel of the Change-over Valve at the outlet side back by approx. 160°.
3. Place the chain on the two chain wheels, shorten it to fit the distance between the Change-over Valves and close the chain lock.
   » The Change-over Valves are now connected.



Change-over Valve combination

1 Chain wheel of second Change-over Valve
2 Safety valves
3 Pipeline to blow-out system
4 Second Inlet Change-over Valve
5 First Inlet Change-over Valve
6 Chain wheel of first Change-over Valve
7 Chain

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7 Start-up

The start-up procedure varies depending on the system. The instructions below provide a rough guideline only.

Prerequisites

- The Change-over Valve is installed.
- The packing glands are tight.
- The spindle rotates when the handwheel is turned.
- The disc of the Change-over Valve is positioned to the very left or the very right.
- For Change-over Valve combinations: the chain is mounted and the tolerance compensation has been checked.

Procedure

1. Slowly increase the pressure, but keep it below the set pressure of the safety valve at all times.
2. Check the Change-over Valves and the connections in both switch positions for leakage.
   » The system is now in operation.

8 Operation

CAUTION

Incorrectly closed Change-over Valve

If a Change-over Valve is not closed correctly, the performance of the safety valves is impaired.

– During operation, do not move the disc of the Change-over Valve to the centre position.

8.1 Instructions for operation

If a safety valve is to be dismantled, switch over the Change-over Valve. As a result, the system side that contains the safety valve is isolated. To switch the Change-over Valve, you might need to lower the operating pressure, until manual switching is possible.

Alternatively, install a pressure equalisation device that connects the elbows and facilitates manual switching. The pressure must be equalised slowly to prevent sudden pressure changes. When using a pressure equalisation device in systems with high operating pressure, ensure that the device is properly installed (to avoid redundancy). It may be necessary to repeatedly switch the shut-off fitting at the pressure equalisation devices.

When disassembling the safety valve, always check the drain, flashing and pressure gauge connections, the shut-off valves and other components of the Change-over Valve for damage.

To test the Change-over Valve function when removing one of the safety valves, switch the Change-over Valve (see chapter „8.2 Wechselventil umschalten“ auf Seite 25).

8.2 Switching Change-over Valve

⚠ WARNING

Use of inadmissible tools and implements

The use of inadmissible tools and implements such as lever extensions when switching the Change-over Valve can cause damage to the valve. There is also a risk that the medium escapes. This can result in poisoning and caustic and other burns.

– Turn the handwheel with both hands. Do not use any tools or implements.
– Wear safety goggles, protective gloves and protective clothing.

⚠ WARNING

Risk of injury from escaping medium

There is a risk of serious injury when the medium escapes with a loud noise under high pressure and at a high temperature.

– Wear safety goggles, protective gloves and protective clothing.

⚠ WARNING

Risk of injury from escaping residual medium

Due to the design of the valve, it is not possible to fully drain all residual medium. Escaping residual medium can cause serious injury.

– Wear safety goggles, protective gloves and protective clothing.

As no two systems are the same, the Change-over Valves must be tested according to plant-specific regulations and best practice.

The instructions below provide a rough guideline only.

Prerequisites

– The system pressure is low enough for manual switching by means of the handwheel. Alternatively, install an optional pressure equalisation device between the two elbows to facilitate switching at high pressures (see product catalogue).
– The safety valves are installed so that no medium can escape during the switching procedure.
– All openings on the Change-over Valve are sealed.
– If the valve is equipped with an optional locking device, this device must be fully opened.

Procedure for single or inlet side combination

1. Clean the actuator assembly.
2. Fully open the optional locking device of the actuator assembly.
3. Turn the handwheel to move the disc to the opposite side. Stop turning the handwheel when there is resistance.
4. Adjust the handwheel by hand to seal the Change-over Valve.
5. Release the pressure/medium from the blocked elbow.

» The Change-over Valve is switched.

For two-side combinations:

1. As above.
2. Turn first handwheel (e.g. at inlet side Change-over Valve) to move both discs to the opposite sealing position. Stop turning the handwheel when there is some resistance.
3. Adjust first handwheel by hand (at inlet side).
4. Adjust second handwheel (outlet side Change-over Valve) by hand to seal the Change-over Valve.
5. See item 5. above

The disc can now be returned to its initial position.

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9 Maintenance

9.1 General information about maintenance

LESER Change-over Valves are maintenance-free. LESER recommends however performing regular visual inspections. The inspection intervals must be shortened if:

- corrosive, aggressive or abrasive media are used,
- the Change-over Valve is switched frequently.

Only trained personnel may disassemble Change-over Valves.

9.2 Checking Change-over Valve

Regularly check the following:

- Gaskets and sealing points:
  In the event of leakage, readjust the packing gland at the actuation side. To do this, first depressurise the Change-over Valve. In the event of leakage, replace all gaskets.
- Perform function tests of the drainage, flushing and pressure gauge connections, the shut-off valves and other built-in components.

After disassembly of the Change-over Valve, replace all gaskets.

10 Technical data

For technical data, see supplier documentation and type plate.